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PRELIMINARY

National Science and Technology Seminar (SENASTEK) is an annually agenda of Research and Community Service Institute of Udayana University and for 2019 is the sixth SENASTEK agenda. This seminar is aimed to disseminate the results of the researcher and community services and it was a means of communication for the researcher and community services from wide university, education institutes, research institutes, and industry to accelerate the enhancement of science and technology.

Generally, in the senastek, it would be disseminated the research and community service results. The community service in senastek is an academic activity that aimed to implemented and civilized science and technology for improving society prosperity and educate the nations life, in which those results could be perceived by the society and as well as it become a benchmark as to what extent those research results could be implemented to welfare the society.

The 6th SENASTEK or 2nd of International Conference on Science, Technology and Humanities (ICoSTH). This conference by then become the means of communications between the researcher and the community of university, research institute, education institute, to accelerate the development of science and technology in Indonesia and internationally as well. The topic in this conference is included Humanity, Food Security, Health and Medicines, New and Renewable Energy, Transportation and Manufacture, Information and Communication Technology, Defense and Security, Orderliness and Disaster, Biodiversity and Natural Resources.

ICoSTH is being held in accordance with the 57th anniversary of Udayana University which invite international keynote and invited speaker from Indonesian Ministry of Research, Technology and Higher Education, as well as other well-known scientific international researcher. This international seminar is conducted to encourage the exchange of information, knowledge and experience in the applications of science, technology and humanity to solve the problem in community. In additions, other seminar objectives is to improve the quality and quantity of research publication and at the same time, networking or collaboration can be performed or widened among the participants and researchers.

In the future, there would be a sustain improvement for the SENASTEK and ICoSTH that could be provided a wider communications and knowledge exchange that could improve the community life and prosperity. Herewith we would like to deliver many thank for all the participant that has already attended this conference. Hope many experiences in this conference would be useful in improving our collaboration, communication and knowledge exchange.

Bukit Jimbaran,   November 2019

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LEMBAGA PENELITIAN DAN PENGABDIAN KEPADA MASYARAKAT UNIVERSITAS UDAYANA
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The Mediating Role Of E-Satisfaction On The Effect Of E-Service Quality And E-Wom Toward Repurchase Intention

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Abstract— This research is motivated by the ease of shopping online that makes online shopping consumers vulnerable to switching. This study aims to determine the role of e-satisfaction in mediating the relationship between e-service quality and e-wom towards repurchase intention in online marketplace site users in Denpasar City. The sampling method in this study is non probability sampling with purposive sampling technique. Data was collected from 120 respondents who met the criteria of having made an online shopping transaction on an online marketplace site at least twice and domiciled in Denpasar. The analytical method used is path analysis estimated using the SPSS program. The results showed that e-service quality has a positive and significant effect on e-satisfaction; e-wom has a positive and significant effect on e-satisfaction; e-service quality has a positive and significant effect on repurchase intention; e-wom has a positive and significant effect on repurchase intention; e-satisfaction has a positive and significant effect on repurchase intention; and e-satisfaction significantly able to mediate the effect of e-service quality on repurchase intention and also e-satisfaction significantly able to mediate the effect of e-wom on repurchase intention.

Keywords—e-satisfaction, e-service quality, e-wom, repurchase intention.

I. INTRODUCTION

The development of increasingly sophisticated internet technology has benefited many parties, including business people in Indonesia. Online business is growing rapidly in the homeland which is characterized by the increasing number of business people using the internet as a marketing medium, such as to promote, interact, and connect with customers (Juniwati, 2015). Through the internet network, companies can present product information, prices, terms of purchase, how to order and payment systems and delivery of goods to customers.

The rapid development of online business in Indonesia has caused the number of consumers shopping online in Indonesia to increase. Online shopping is increasing due to the rapid development of e-commerce in supporting business activities. E-commerce is the activity of conducting business transactions online through internet media and devices that are integrated with the internet (Laudon, 2012). E-commerce is the result of the development of trends in society as an effort to meet human needs in a more effective and efficient way. E-commerce that is growing rapidly as a medium for buying and selling online is a marketplace. Online marketplace is an online marketplace for buying and selling online.

Repeated purchases at an online shopping place have become an important issue due to the ease of consumers switching from one online store to another store and the ease with which consumers make comparisons of the purchase of the same product / service between different online stores (Lu et al., 2013). In other words, online consumers can freely choose different online stores and make purchases without having to be tied to a particular online store. The result is a shift or movement of consumers between other online stores often found in online shopping, which makes it difficult for companies / online businesses to realize long-term and sustainable profitability (Yen, 2010).

Several studies have shown that repurchase intention in online shopping is influenced by consumers' assessment of e-service quality as in the study of Chen et al. (2013). In online shopping, consumers cannot make an assessment of the physical elements of the company caused by the absence of direct interaction (face-to-face) between consumers and companies so that consumers can only assess the quality of services provided by the company online or referred to as e -service quality. E-service quality shows how an e-commerce site serves and facilitates online shopping, ordering, and shipping a product or service effectively and efficiently (Zeithaml et al., 2000).

According to Li et al (2009), the dimension of e-service quality is seen from two perspectives, namely the company perspective and the customer perspective. When viewed from a company perspective, the dimensions of e-service quality that must be considered are ease of use (ease for customers to use a website), website design (website must be well designed and visually appealing), reliability (consistency of performance and web reliability) , system availability (correct technical functions of the website), privacy (security and protection of customer information), responsiveness (effective problem handling and returns via the internet), and empathy (individual care and attention given to customers via electronic channels). Meanwhile, if viewed from the customer's perspective, the dimensions of e-service quality that must be considered are experience (the impression of the company through previous customers) and trust (customer trust by providing fast and information-rich services).

Research Ario et al. (2016) shows that increasing e-service quality will increase customer satisfaction and increase repurchase intention. Customer satisfaction is a measure between customer expectations and company products or services as long as customers use the company's products or services (Yong et al., In Andreas 2012). Service quality and customer satisfaction are the success factors of a company to achieve competitive advantage (Sawitri et al., 2013). Ristina's research (2013) shows that e-service quality has a positive and significant effect on customer satisfaction, but e-service quality does not directly influence e-repurchase intention. While the results of research Felicia (2016) states that e-service quality has a positive and significant effect on customer satisfaction and e-service quality directly affects repurchase intention.

Based on the background of the problem and the results of previous studies, a study was conducted to analyse the effect of e-service quality and e-wom on repurchase intention with e-satisfaction as a mediating variable in online marketplace users in Denpasar.

II.   METHODS AND PROCEDURES

The analysis conducted in this study is the effect of e-service quality and e-wom on repurchase intention with e-satisfaction as a mediating variable. Thus, the research conceptual framework that links between variables is as shown in Figure 1.
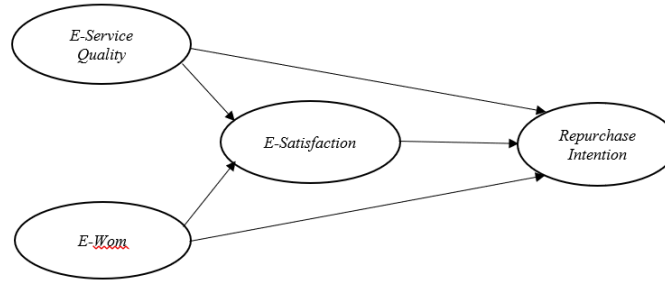
Fig. 1 Research Conceptual Framework

Based on previous empirical studies, the following hypothesis can be arranged: H1: e-service quality has a positive and significant effect on e-satisfaction. H2: e-service quality has a positive and significant effect on repurchase intention. H3: e-wom has a positive and significant effect on e-satisfaction. H4: e-wom has a positive and significant effect on repurchase intention. H5: e-satisfaction has a positive and significant effect on repurchase intention. H6: e-satisfaction significantly mediates the effect of e-service quality on repurchase intention. H7: e-satisfaction significantly mediates the effect of e-wom on repurchase intention.

Data analysis method

This study uses a path analysis technique. Path analysis is an extension of multiple linear regression analysis that is useful for estimating causality relationships between variables (Pracher & Hayes, 2004). Path analysis techniques will be used in testing the amount of contribution expressed by the path coefficient on each path diagram of the causal relationship or causal relationship that occurs between the independent variable with the dependent variable.

III. RESULTS

Respondent characteristics in this study were seen from gender, age, education, online marketplace sites used, and tools used to access online marketplace sites. As shown in Table 1, the largest percentage of respondents were women (62%), aged between 26 to 35 years (44%), and undergraduate education (57%). The most widely used online marketplace site is Tokopedia (53%), while the tools used to access online marketplace sites are dominated by smartphones (91%).

TABLE 1
CHARACTERISTIC OF RESPONDENTS

No	Characteristic	Information
1	Age of respondents	
	17-25 years	18 %
	26-35 years	44 %
	36-45 years	34 %
	46-55 years	3 %
	56 years and above	1 %
2	Gender	
	Men	38 %
	Women	62 %
3	Education	
	SMA/SMK	39 %
	Bachelor	57 %
	Others	4 %
4	Online marketplace sites used	
	Tokopedia	53 %
	Bukalapak	30 %
	Lazada	14 %
	Blibli.com	1 %
	OLX	1 %
	Lainnya	1 %
5	Tools for accesing online marketplace sites	
	Smartphone	91 %
	Laptop	6 %
	Tablet	2 %

PC	1%

Sumber: Data processed, 2019

Discussion of hypotheses: (i) Discussion of the results of hypothesis 1 test shows that the significance level of the two-sided t-test for the e-service quality variable is 0.00 less than 0.05 with a positive regression coefficient of 0.746. This shows that H_1 is accepted, which means that e-service quality has a positive and significant effect on e-satisfaction. (ii) Discussion of the results of hypothesis 2 test shows that the significance level of the two-sided t-test for the e-service quality variable is 0.00 smaller than 0.05 with a positive regression coefficient of 0.464. This shows that H_1 is accepted, which means that e-service quality has a positive and significant effect on repurchase intention. (iii) Discussion of the results of hypothesis 3 test shows that the significance level of the two-sided t-test for the e-wom variable is 0.00 less than 0.05 with a positive regression coefficient of 0.746. This shows that H_1 is accepted, which means that e-wom has a positive and significant effect on e-satisfaction. (iv) Discussion of the results of hypothesis 4 test obtained the level of significance of two-sided t test for e-wom variables of 0.00 smaller than 0.05 with a positive regression coefficient of 0.464. This shows that H_1 is accepted, which means that e-wom has a positive and significant effect on repurchase intention. (v) Discussion of the results of hypothesis 5 test obtained the level of significance of the two-sided t test for e-satisfaction variables of 0.00 smaller than 0.05 with a positive regression coefficient of 0.413. This shows that H_1 is accepted, which means that e-satisfaction has a positive and significant effect on repurchase intention. (vi) Discussion of the results of the hypothesis test 6. To test the significance of e-satisfaction as a mediator variable in the relationship between e-satisfaction and repurchase intention variables, a sobel test is used to calculate the Zhitung value as follows: $Z = \frac{ab}{\sqrt{b^2 s_a^2 + a^2 s_b^2}} = 4,355$. Because the Zhitung of 4.355 is greater than 1.96, it indicates that H_1 is accepted, which means e-satisfaction is a variable that mediates the effect of e-service quality on repurchase intention. (vii) Discussion of the results of the 7 hypothesis. To test the significance of e-satisfaction as a mediator variable on the effect of e-wom on repurchase intention, a sobel test is used to calculate the Zhitung value as follows: $Z = \frac{ab}{\sqrt{b^2 s_a^2 + a^2 s_b^2}} = 6,374$. Because the Zhitung of 6.374 is greater than 1.96, it shows that H_1 is accepted, which means that e-satisfaction is a variable that mediates the effect of e-wom on repurchase intention.

IV. CONCLUSION

The conclusion of this study is based on the results of data analysis and the discussion that has been done can be stated as follows: (i) E-service quality has a positive and significant effect on e-satisfaction. Increasing the quality of online services increases the online consumer satisfaction. (ii) E-service quality has a positive and significant effect on repurchase intention. Increasing the quality of online services will increase online consumer loyalty. (iii) E-wom has a positive and significant effect on e-satisfaction. Increasing e-wom increases customer satisfaction online. (iv) E-wom has a positive and significant effect on repurchase intention. Increasing e-wom increases online consumer loyalty. (v) E-satisfaction has a positive and significant effect on repurchase intention. Increasing online consumer satisfaction increases customer loyalty online. (vi) E-satisfaction significantly mediates the effect of e-service quality on repurchase intention. These results indicate that the important role of e-satisfaction in e-service quality will have an impact on repurchase intention of online marketplace users in Denpasar. (vii) Finally, this study concludes that E-satisfaction significantly mediates the effect of e-wom on repurchase intention. These results indicate that the important role of e-satisfaction in e-wom will have an impact on repurchase intention of online marketplace users in Denpasar.

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Antibiotic Resistance of *Streptococcus suis* Isolated from Pigs

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Abstract -This study aims to determine the sensitivity of Streptococcus suis to antibiotics in pigs. In this study, thirty samples of pig organs which were suspected of infected from Streptococcosis were collected from pig farms in Tabanan, Bangli and Karangasem districts. Samples were cultured in Blood Agar Plate, and Gram Stains. Additionally, amplification of the gene was performed using polymerase chain reaction using the SSRecN-F/SSRecN-R primers. Antimicrobial susceptibility testing on all isolates using the Kirby–Bauer disk diffusion method. The data obtained were matched to the next standard sensitivity of the bacteria classified as sensitive, intermediate, and resistant. The results showed that Streptococcus suis from pigs are sensitive to kanamycin, streptomycine, sulfamethoxazole, Chloramphenicole whereas the doxcycicline are resistant.

Keywords : Antibiotics, pigs, streptococcus suis

I. INTRODUCTION

Streptococcosis is still considered a cause of various health problems in pigs. The disease caused by *Streptococcus suis*, lives normally in the lower tract of digestion. In the event of streptococcosis, bacteria will be found in the tissues or respiratory tract and action as the cause of this major disease. However, other infections often serve as secondary infections. These bacteria can function as primary or secondary so difficult to overcome.

Streptococcosis is most common in pigsbetween the ages of 1-2 weeks [1]. The mortality rate reaches 10% and will increase if with other infectious diseases such as: Newcatstle disease, *M. gallisepticum* or Infectious bronchitis. A poor sanitary enclosure will cause an increase in the incidence of the disease. *Streptococcus suis* will contaminate equipment in the cage, air, drinking water and cutlery [2].

Clinical symptoms due to *Streptococcus suis* infections cause growth disorders, decreased production, increased number of rejects, quality of carcass and eggs decreased, egg hatchability decreased and quality of chickens decreased

[3]. The decrease in quality of hatch followed by infection of complex diseases of the respiratory tract [4], digestion or reproduction will complicate the proliferation of this disease. Another disadvantage is to increase the cost of sanitary cages, treatment, cleaning cages, and chicken products hard to sell [5].

Handling Streptococcosis is to improve the sanitation of the cage and drug delivery [5]. Low awareness and knowledge of farmers on antibacterial use will adversely affect the development of bacterial resistance. Bacteria that are initially sensitive to antibacterial will change properties become resistant. This is a phenomenon that generally occurs not only in Indonesia but also in other developing countries. *Streptococcus suis* causes Streptococcosis have been resistant to ampicillin, trimethoprim, sulfamethoprim, tetracycline, amikacin, cholcystine, norflosacin, florfenicol, enroflosaxine, cefaleksin, neomycin, chloramphenicol, and gentamicin [6]. The incidence of *Streptococcus suis* resistance to some antibacterials is likewise found in pigs. *Streptococcus suis* isolates from pig farms in Thailand's Khon Kaen province have been resistant to penicillin, tetracycline, ampicillin and sulphamethoxazole [7].

The presence of antibacterial resistance is a major problem in treating Streptococcosis. In the United States, 4668 *Streptococcus suis* isolates taken from different farms have resistance to kanamycin, chloramphenicol, streptomycin, ampicillin, tetracycline, and trimetropin. The occurrence of resistance to antibiotics, because bacteria are often exposed by antibiotics so that bacteria have the ability to prevent the influence of antibiotics by forming cell membranes that will inhibit the entry of antibiotics into cells. Changes in this nature will increase in line with uncontrolled antibacterial usage such as inappropriate dosage, duration of drug administration, and incorrect drug selection. The presence of resistant bacteria causes a failure in treatment. Thus, the antibacterial susceptibility test should be carried out periodically and continuously.

Data on the occurrence of *Streptococcus suis* resistance in Bali have not been reported, so there is no known effective drug in handling streptococcosis. Thus, *Streptococcus suis* sensitivity test against antibacterial is needed in order to determine the proper drug in handling streptococcosis.

II. RESEARCH METHOD

A. Sampling

Thirty samples of pig organs which were suspected of infected from Streptococcosis were collected from pig farms in Tabanan, Bangli and Karangasem districts. Samples were put into a tube containing Stuart's media. Furthermore, the samples were taken to the laboratory for laboratory test.

B. Isolation and Identification of Streptococcus suis

Each sample was cultured on sheep blood agar and Eosin Methylene Blue Agar. Small colonies were suspected as Streptococcus suis bacteria and were tested by PCR using F / SSRecN-R primers [8] . Test results that indicate Streptococcus suis then followed by a sensitivity test[7].

C. Antimicrobial Susceptibility Test

Antimicrobial Susceptibility Test was performed by diffusion agar with a method of Kirby-Bauer. A total of 3 - 5 *Streptococcus suis* colonies were cultured on broth Mouller Hinton and incubated for 2 hours at 37^0 C until the point when turbidity was equal to Mc Farland 0.5 [9]. Further 0.5 ml of culture was grown on Mouller hinton agar (MHA) and distributed evenly and afterward incubated for about 30 min. Attach the antibiotic disc to the culture medium. The antibiotic disks used were doxycyclin hydroxide (30 mcg), bacitracin (10 mcg), cholramphenicole (30 mcg), Kanamycin (30 mcg), sulfamethoxazole (30 μg), and streptomycin (10 μg). As controls used *Streptococcus suis* ATCC 25922. Further measured inhibition diameter on each antibiotic disk.

D. Data analysis

All samples showing positive reactions to *Streptococcus suis* were tested for susceptibility and analyzed descriptively by calculating the percentage of bacteria sensitive, intermediate, and resistant to each antibacterial.

III. RESULTS AND ANALYSIS

A total of 30 pigs suspected of suffering streptococcosis were collected from 4 districts in Bali. The samples were from Karangasem Regency with 3 samples, Tabanan Regency with 13 samples, Badung with 3 samples, Gianyar with 8 samples, and Denpasar with 3 samples. The selected samples were showing clinical symptoms of fever, weakness, lazy to move and if walking looks lame. The samples must be still alive and have not got any medication.

The results of isolation and identification of bacteria were planted on blood agar media and Mac Conkey Agar media, then followed by Gram staining, and catalase test. Bacteria that grow on blood agar media and show positive

Gram and coccus shape in a row pattern are suspected to be Streptococcus. These bacteria will not grow on Mac Conkey Agar media. Furthermore, the germ was stored in Mueller Hinton Broth liquid media for the Polymerase Chain Reaction (PCR) test

Bacteria that grow on the blood agar media then followed by PCR show results as bellow:

Fig 1. Electrophoresis results of SSRecN-F [8] & SSRecN-R primer (M :Marker, 1-16 : samples, K(-): negtiver control)

Based on the PCR test it was found that of the 30 samples examined, only 8 samples were positive of *Streptococcus suis*. The results of antimicrobial susceptibility test on Muller Hinton's media was presented in figure 2.
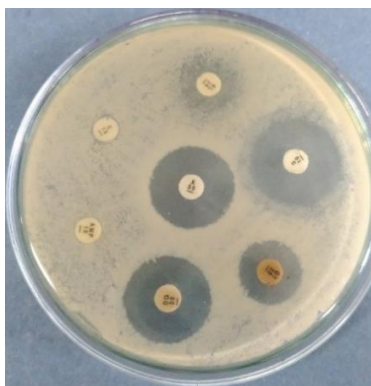
Fig 2. Antimicrobial susceptibility test *Streptococcus suis* on Muller Hinton Agar

Antibiotic sensitivity test results showed that Streptococcus suis was still sensitive to kanamycin, streptomycin, sulfamethoxazole, and chloramphenicol. However, the bacteria were resistant to doxycycline and bacitracin. These results indicate that these germs are still sensitive to the antibiotic. As a result, the treatment of Streptococcus suis infection is relatively easy. The existence of germ resistance to antibiotics is related to the use of antibiotics as both treatment and prevention of disease. Poorly controlled use of antibiotics such as incorrect dosage, time of administration is not considered and mixing antibiotics in drinks to prevent and spur growth will result in the occurrence of resistance. Bacteria that are already resistant will be able to transfer these resistant characteristics to others that are still sensitive with the mediation of plasmid [10].

The incidence of *Streptococcus suis* resistance has occurred in Iran in 2012. A total of 154 isolates of *Streptococcus suis* tested were 91.6% and 62.3% resistant to chloramphenicol and florfenicol, resistant to erytromsin and tiamulin 96.1% and 87.0% [11]. In 2012 in India it has also been reported that there is resistance of *Streptococcus suis [11]*. As many as 35 isolates were tested, 20 isolates showed multiple drug resistance of 52.63%, cephalexin resistance of 73.68%, and to chloramphenicol still 100% sensitive. The incidence of *Streptococcus suis* resistance in Egypt also shows a high figure [12]. The results showed that *Streptococcus suis* was resistant to enroflokssin (72.2%), neomysin (75%), trimethoprim-sulfamethoxasol (82.2%), ampicillin (84.5%) and amoxicillin (87.8%), nalidic acid (96.7%) and deoxycycline (98.3%) [13]. *Streptococcus suis* isolated from swine in France and from humans in

different countries between 1996 and 2000 were susceptible to penicillin G, amoxicillin, ceftiofur, florfenicol, gentamicin and bacitracin [14].

IV. CONCLUSION

The results showed that Streptococcus suis isolated from pigs was sensitive to kanamycin, streptomycin, sulfamethoxazole, chloramphenicol and resistant to doxycycline and bacitracin.

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Application of Pulse Shaping in Improving The Performance of Orthogonal Frequency Division Multiplexing

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Abstract—Orthogonal Frequency Division Multiplexing (OFDM) has been implemented on fourth generation (4G) networks. One of the weaknesses of the OFDM system is that it is very sensitive to carrier frequency offset (CFO) caused by jitter on the carrier wave and the Doppler effect caused by movement by both the sending and receiving stations. The existence of CFO can damage orthogonality between sub-carriers, causing intercarrier interference (ICI). The existence of CFO can reduce OFDM system performance. In this paper, the performance of the system was improved by using the pulse shaping method which were Rectangular Pulse and Improved Sinc Power Pulse. The application of the pulse shaping method on the OFDM system over an AWGN (Additive White Gaussian Noise) and flat fading channel was simulated using Matlab. System performance was analysed using the parameters Bit Error Rate and Energy Bit per Noise Power (BER vs Eb/No). From the results, it can be seen that the performance of OFDM with Improved Sinc-Power Pulse (ISP) pulse shaping is better than Rectangular pulse shaping indicated by BER ISP pulse shaping is lower than BER rectangular pulse shaping.

Keywords— AWGN, bit error rate, fading channel, pulse shaping, ISP.

I. INTRODUCTION

Long Term Evolution (LTE) technology uses Orthogonal Frequency Division Multiplexing (OFDM) for downlink and SC-FDMA (Single-Carrier Frequency Division Multiple Access) for uplink. In OFDM, the input signal will be divided into subchannel, then by using IDFT/IFFT, the OFDM output signal will be orthogonal to each other. If there is a distortion in the communication path that causes ISI (inter symbol interference) and ICI (inter carrier interference), then at the receiving station, each subchannel can still be separated by using DFT/FFT [1]. OFDM is a transmission or modulation technique using multiple frequencies (multi-carrier) that are mutually orthogonal or perpendicular. With the orthogonal nature of OFDM, this affects the efficiency of the bandwidth used. Bandwidth will be more efficient because the signals coincide with one another and make the space of the bandwidth not much use. The main principle of OFDM is to divide a series of high-speed information data into a series of low-speed information data arranged in parallel, as well as adding a cyclic prefix that is able to reduce the effect of ISI from multipath fading or interference due to noise [2].

However, the OFDM technique has some disadvantages, which are high in Peak Average Power Ratio (PAPR) and sensitive to frequency offset that will cause Intercarrier Interference (ICI). The existence of ICI will reduce the performance of the OFDM system. So that the ICI reduction accurately and efficiency is needed to demodulate the data received. Several methods have been proposed in reducing this ICI including the pulse shaping method [3, 4]. In this paper, the evaluation of using the pulse shaping method for assess the performance OFDM system was carried out. Improved Sinc Power (ISP) and Rectangular pulse shaping pulses with the QPSK mapper was used to assess the OFDM performance over AWGN and flat fading channels. The OFDM system with pulse shaping will then be compared to OFDM without pulse shaping to find out how much influence the performance improvements produced by pulse shaping.

The rest of the paper is organized as follows. Section II presents the method and procedure of the implementation of pulse shaping in OFDM system over AWGN and flat fading channels. Section III discusses the simulation results. The simulation results are described. Section IV concludes the paper.

II.   METHOD AND PROCEDURES

The block diagram of OFDM system simulation using pulse shaping for ICI reduction can be shown in Figure 1.
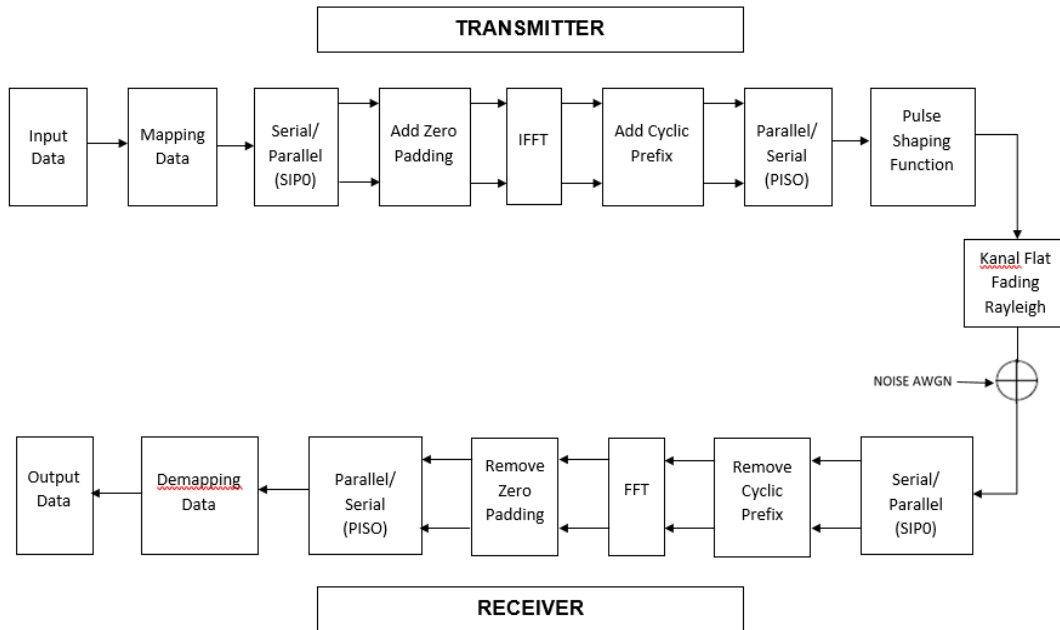
Fig. 1 OFDM System Block Diagram

From Figure 1, it can be seen that that OFDM system simulation divided in three parts which were transmitter, communication channels and receiver. The pulse shaping function was applied in transmitter.

The ICI effects on the received symbol is expressed by the variable Δf called the carrier frequency offset where then the value of the carrier frequency offset will be normalized to the value of the subcarrier spacing which is then called the normalized frequency offset of ΔfT or ε which will indicate how much the subcarrier shifts are detected by the receiver oscillator where the value of | ΔfT | ≤1.

In the simulation used a variation of the normalized frequency offset (ε) that was 0.2, 0.4 and 0.5 as a sample for subcarrier shifts that have a large value and a small value. In accordance with the fixed WIMAX standard, the magnitude of the subcarrier spacing (Δfc) was 9765 Hz, so that frequency offset was as follows:
   a. Normalized frequency offset (ε) = 0,2

$$\Delta f = \epsilon \, x \, \Delta f_c = 0,2 \, x \, 9765 = 2000 \, Hz = 2 \, kHz$$

b. Normalized frequency offset (ε) = 0,4

$$\Delta f = \epsilon \, x \, \Delta f_c = 0,4 \, x \, 9765 = 4000 \, Hz = 4 \, kHz$$

c. Normalized frequency offset (ε) = 0,5

$$\Delta f = \epsilon \, x \, \Delta f_c = 0,5 \, x \, 9765 = 6000 \, Hz = 5 \, kHz$$

Pulse shaping function block was to form pulses of existing symbols. Each symbol that is transmitted will be multiplied by the pulse function. In this simulation, rectangular and Improved Sinc-power (ISP) pulse shaping ere used. The purpose of using the pulse shaping method was to eliminate side lobes that can potentially cause ICI power. The pulse function equation in the frequency domain used in this thesis is in accordance with Equations (1) and (2) as follows:

- Rectangular pulse

$$P_{rec}(\Delta f) = sinc(\Delta f T) \tag{1}$$

- Improved Sinc-power Pulse (ISP)

$$P_{ISP}(\Delta f) = e^{-a(\Delta f T)^2} sinc^n(\Delta f T) \tag{2}$$

III. RESULTS AND DISCUSSION

The parameters used in this simulation can be seen in Table 1. The performance of OFDM system with and without frequency offset over Rayleigh flat fading channels can be seen in Figure 2.

TABLE I
SIMULATION PARAMETERS

Parameter	Value
Input Bit	Random 100.000 bit
Tipe Modulasi	QPSK
FFT size	64,128,256
Jumlah Subcarrier	64,128,256
Number of used subcarriers (nDSC)	52,80,192
Panjang Cyclic Prefix	16,32,64
Jenis Kanal	Flat fading Rayleigh
Normalized Frequency Offset	0,2, 0,4 dan 0,5
Frequency Offset	2 kHz, 4 kHz dan 5 kHz
Subcarrier spacing	9.765 kHz
Nilai Eb/No	0:2:20
Pulse Shaping type	ISP pulse & REC pulse
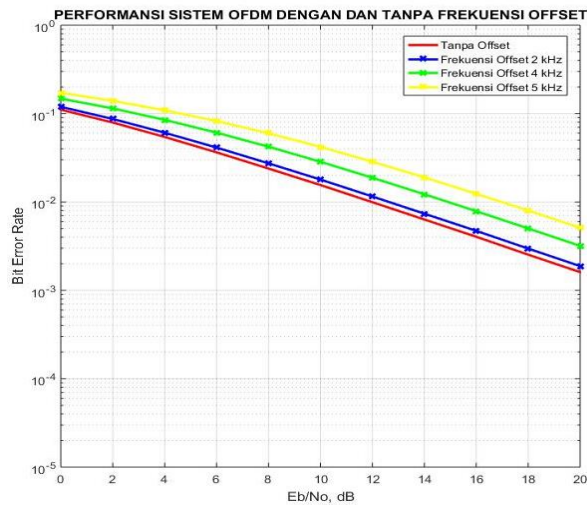
Fig. 2 The performance of OFDM system with and without frequency offset over Rayleigh flat fading channels

BER vs. Eb/No of OFDM system performance without and with Rectangular and Improved Sinc-power Pulse (ISP) pulse shaping in reducing Inter Carrier Interference (ICI) can be seen in Figure 3.
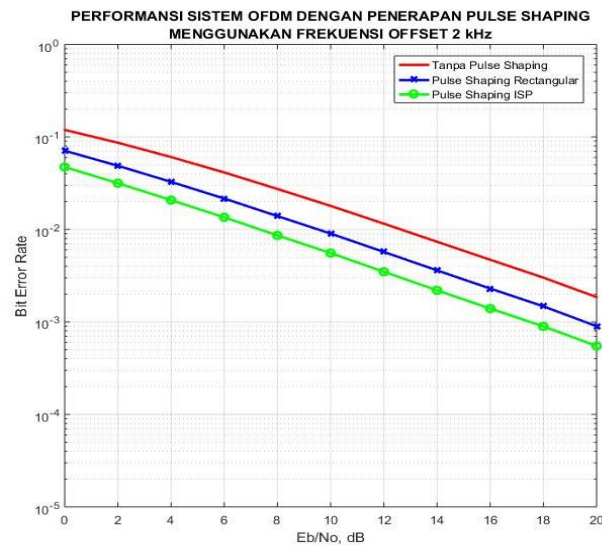
Fig. 3 The OFDM system performance without and with applied Rec and ISP pulse shaping

IV. CONCLUSION

The performance of OFDM system over AWGN and flat fading channels has been simulated and analyzed. Rectangular and ISP pulse shaping methods have bee applied to the system. From the results, it can be concluded that OFDM system performance with applying Rectangular pulse shaping is better than OFDM system without pulse shaping because pulse shaping is able to reduce the side-lobe power of a subcarrier that has the potential to cause ICI so that the side-lobe will not interfere with other subcarriers. OFDM system performance with Improved Sinc-power Pulse (ISP) is better than Rectangular Pulse because ISP pulse shaping is able to minimize ICI power better than Rectangular Pulse where the greater the normalized frequency offset used then OFDM system performance will decreasing due to the higher frequency offset in OFDM systems so that the ICI power generated will also be even greater.

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Architecture Design in Controlling And Monitoring Class Media Using Smart Devices Electronic attendance for Smart Classroom

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Abstract— The development of information technology has indirectly shifted the model of organizing education. The model of conventional education based on teacher centered learning becomes student centered learning. The concept of this education requires the actual activity of students in the classroom. The attendance of students in the classroom is the key to this educational model. The level of student participation in the classroom is still considered a serious problem in classroom management until today. The lack of control over students' attendance which is done manually needs to be improved. The solution offered for this problem is by digitizing student absences by using NFC-based electronic attendance devices to support the implementation of Smart Classroom. A student ID card is the only student identity that is used for data matching process between student attendance and personal data effectively. The authentication mechanism with fingerprint biometrics is applied to increase the actual attendance of students in the classroom. This study proposes an architecture concept mechanism of internet of things effectively which is applied to electronic attendance. This mechanism is able to present student attendance data digitally and on time to encourage productivity and effectiveness of classroom management.

Keywords— electronic attendance, fingerprint autentication, IoT, smart classrom, student ID card NFC,

I. INTRODUCTION

The industrial revolution 4.0 has indirectly influenced the development of national education. The development of information technology has moved the learning model towards online learning systems. The purpose of national education as in Act of The Republic of Indonesia Number 20 Year 2003 on National Education System, Article 3 stated that developing learners' potentials so that they become persons imbued with human values who are faithful and pious to one and only God; who possess morals and noble character; who are healthy, knowledgeable, competent, creative, independent; and as citizens, are democratic and responsible. [1]. It means that the educational model is not just the absorption of knowledge, but it is more than that. Active participations such as physically present in the education process is still important.

Student attendance is still considered as a serious problem in classroom management. It is an indicator that reflects the level of interest and motivation of students' in following the teaching and learning process [2]. Frequency information of student attendance can be used in making class policy. Some educational institutions up till today still use the minimum standard of student attendance in classroom policies. A good management in recording student attendance lists is one of the methods that can be applied to improve effectiveness in classroom management.

II. RELATED WORKS

A. Smartcard introduction

Near Field Communication (NFC) is now commonly used in short distance data exchange media. Various electronic transaction applications have been developed using this technology. Some examples of NFC technology implementation are identity cards and e-toll cards. Low production costs and implementation of extensive technology development makes NFC technology can develop rapidly.

Smartcards with NFC technology that are growing widely for education generally use the ISO / IEC 14443 protocol standard. Data storage memory available on this type consists of 1Kbyte data and 4Kbyte data. Student ID Card designs require 4Kbyte of storage memory. Stored data are NIM as a student unique number, Name, Date of birth, Department and other student's personal data. Student photos are stored on smart card memory with limited storage capacity.

The memory structure of a 4Kbyte type smart card can be seen as follows: The smallest data unit is stored in the data block. Each data block has a 16-byte storage capacity that is devided to two sectors: sector 0 to 31 consists of 4 blocks and sector 32 to 39 consists of 16 blocks.
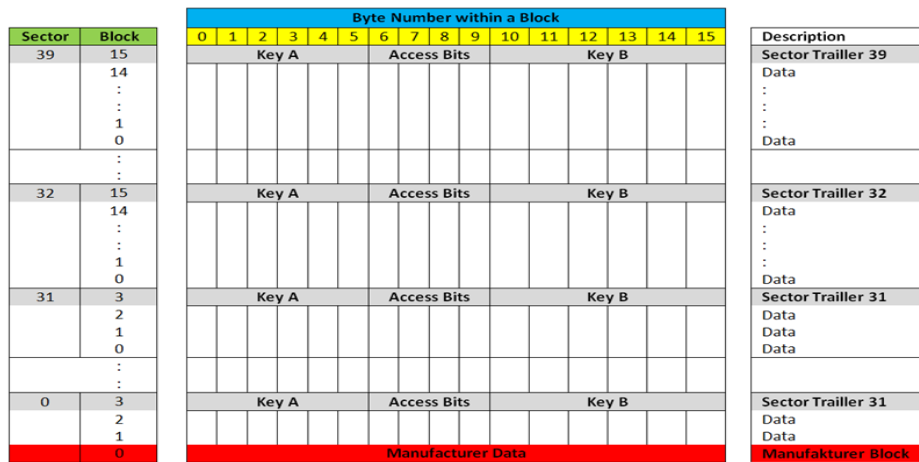
Fig 1. Memory Structure of Smart Card ISO/IEC 14443 4K Byte

The manufacturing block is read only, written in block 0 sector 0 with a length of 16 bytes of data. Data blocks are read and write outside the manufacturing block and trailler block. The trailler block occupies one block at the last position for each sector. It contains Key A, Access Bit and Key B. Private key A is mandatory, meanwhile private key B is optional. Private key A occupies the LSB position (bytes 0 to 5 bytes), private key B on MSB bits (bytes 10 to 15 bytes) and Access Bits are bytes 6 to 9 bytes. As key B is optional, then the block MSB bytes for the trailler block can be used as Block Data if needed.
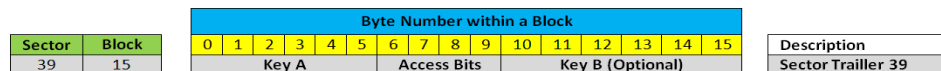
Fig 2. Trailler Block of Smart Card ISO/IEC 14443 4K Byte

B. Fingerprint biometric sensor

The importance of someone's physical occurs in a system makes the authentication process must be done by using physical parts that can be digitally recognized. A variety of physical authentication processes have been developed and used digitally, such as: facial recognition, fingerprints and bio-retinal eye metrics (the process of collecting data on *e-KTP*).

The fingerprint is a reproduction result from the track of finger that were intentionally taken, stamped with ink, or marks left on an object due to the touch of the palm or foot skin. Fingerprint patterns always stay in every hand and permanent which means it has been there since infancy to adulthood and the pattern will not change same goes to a hand line.

Each finger also has a different fingerprint pattern. There are four basic Dermatoglyphic patterns about fingerprints that need to be known, namely Whorl or Swirl, Arch, Loop, and Triradius. Apart from that, the other variations are only the combination of these four patterns.

The development of digital technology and electronic sensor devices makes fingerprint biometric sensor technology increasingly inexpensive. Various sensor products with its methods for different authentication purposes are widely used in the market, one of the examples is FPM10A sensor. This type of sensor is very sensitive to dust or oil that sticks to the sensor glass surface. An error in reading often occur when there are stains that affect the sensor readings.

C. Smart classroom

The learning model paradigm has experienced a shift. The conventional learning model of teacher based learning begins to shift to student based learning. Technology support and the development of information technology have caused the distortion of the educational model. Today's class has shifted a lot towards digital learning. Supporting facilities for student learning is increasing for the convenience of access to information and classrooms[3]. Classroom supporting devices such as LCD projectors, Smart TVs, Personal Computers, Internet Access, Lighting, Air conditioners, and other electronic devices add convenience in delivering the information.

The support of Internet of Things technology can be implemented to increase hardware access flexibility and optimize resources [4]. A variety of studies have been conducted related to the concept of smart classroom. For example, R. Huang in *The concept and characters of smart classroom* defines smart class as a physical classroom that is effective, comfortable in interacting to access resources and easy to manage or combined with contextual awareness [5]. MacLeod et al. in his research try to develop instruments in order to understand the students' preferences towards smart classes [6].

III. METHODS

A. Case Study

The case of this study shows how to design an electronic presence architecture model to effectively record student attendance in class. In addition, the general objective is to digitize the student attendance model for efficient data management and reports. Internet of Things technology optimizes services, therefore, the data generated can be collected at the right time. The data can be presented informatively based on web application services.

NFC-based smartcard technology is used as a Student ID card when taking student attendance. The fingerprint authentication model is used as a method of proving the physical evidence of students present in class when the presence is done.

B. System design metodology

The methodology applies to this study is a research and development model in producing a product. In this study, the object is electronic attendance devices as part of the smart class design. In addition, the goal is to determine the level of success of the designed product.

The research scenario is divided into three stages, such as:

1. Evaluating scenarios, describing attendance models performed, collecting data in the field, designing business processes in accordance with roll models in the field

2. Planning the design and architecture of the system, determining the technical specifications of the system hardware. Choosing of communication models, transmission and sensor services. Determining the technical specifications of system software, database and application service models.

3. Testing and verifying. The feasibility test of the product is carried out by using the reliability test approach.

IV. SMART CLASSROOM CONCEPT FOR ELECTRONIC ATTENDANCE

Smart classroom is equipped with a number of electronic devices to support classrooms with the aim of increasing the effectiveness of teaching and student learning experiences. In addition, smart devices which capable of optimizing the resources of classroom support devices that can operate automatically and in a modern way.

The concept of smart classroom with smart devices is divided into three, namely: 1) Automation of classroom support system devices, 2) connectivity and 3) security. The automation emphasizes aspects of function optimization. Reducing direct user contact with the device therefore it can optimize resources. Furthermore, maintenance and system repair costs. The connectivity emphasizes the concept of sharing data and information resources. Internet of Things technology is able to provide convenience in the data services connection of classroom

support devices. It can be accessed anytime, for any service, anywhere, through the network, by each member in the smart classroom. The security covers each layer of data access in a smart classroom system.

The electronic attendance design concept for smart classroom tries to provide a solution to the mechanism of filling student attendance lists, such as reducing fraud, being on time in class, and increasing the level of student attendance in class. The mechanism of electronic attendance in smart classrooms will explain below.

First, the registration mechanism. A student ID card is the only student identity card which includes their photos and fingerprint templates. The students need to register themselves to the campus administration in order to obtain their ID cards. The campus administration takes their data and registers their fingerprints. The collected data is written on the student ID card.

The second mechanism is setting the lecture schedule. The campus administration maps classes, time, rooms, lecturers and students who register for each lecture. The lecture settings are done online on a web-based attendance application. The master attendance data is stored on the database server and accessed in every beginning of the lecture.

The third mechanism is the implementation of lectures. The lecturer is able to reload attendance data from the application into the electronic device. The validation of lecture that have been successfully reloaded is done by using the lecturer ID card. Each student fills their attendance by using an electronic attendance device that has been set up for lectures that have been activated consecutively. Student ID Card Tags by using NFC technology are brought close to the student attendance device. Data stored on student ID cards is reloaded and temporarily stored on an electronic attendance device. Matching mechanism is carried out between the personal data on the student ID card with the student data on the relevant lecture. Only students who are members of that lecture are declared active to attend attendance. In order to prove that the student ID card belongs to the correct student registered in that lecture and is physically present in the class, fingerprint data matching is used.

The fourth mechanism is data synchronization. After the class is finished, the lecturer validates student attendance. The attendance data contained in the electronic attendance device are transmitted to the attendance application on the web service. This process is performed for each beginning of lecture.

V. CONCLUSION

Electronic attendance devices are designed to support in building smart classroom. NFC technology on student ID cards is used as a mechanism for effective matching between student attendance data with their self-data and in each lecture. The authentication mechanism with fingerprint biometrics is performed to increase the actual attendance of students in the classroom. The statistics of student attendance can be displayed in real-time on the web-based attendance application. The offered system design is able to improve student discipline in terms of punctuality and frequency of student attendance in class.

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Changes in the Brightness Temperature Distribution of Lake Batur during the 2019 Dry Season Based on Landsat-8 Satellite Data

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Abstract— Lake Batur is one of the largest lakes on the island of Bali. Various community activities, such as aquaculture and tourism activities utilize the waters of Lake Batur. To find out the ability of Lake Batur in sustaining these activities, it is necessary to study the condition of the waters of Lake Batur. The main purpose of this study is to monitor the change in brightness temperature of Lake Batur during the 2019 dry season based on Landsat-8 satellite data. The method used in this research is to compare the distribution pattern of brightness temperature on channel 10 of Landsat-8 satellite imagery. The spatial and temporal comparisons were made from April to June 2019. The results of the comparison show an increase in the value of the brightness temperature starting from April to early May. However, in mid-May to the end of June there was a significant decrease in brightness temperature with a maximum decrease of 1.4 degrees Celsius. It certainly showed a trend inverse to the brightness temperature rise in general during the dry season.

Keywords— Brightness Temperature, Batur Lake, Dry Season, Landsat-8, Remote Sensing.

I. INTRODUCTION

The distribution of Brightness Temperature (BT) that scales spatially and temporally in the whole of lake water is one of the important parameter and an indicator of the aquatic ecosystem. The measurement of BT distribution is done by utilizing the satellite remote sensing technology [4] [5] [6] [7]. One of the latest satellites that capable to measure the BT distribution was built by the collaboration between NASA and the U.S. Geological Survey (USGS). The satellite has been operating a thermal infrared sensor since 2013, which is nicknamed "Landsat 8" [2]. It is equipped with sensors that can detect the heat emitted by the earth's surface [3]. Based on the sensor, it will provide dual channel of a high resolution of BT data sets. The high spatial resolution of BT data sets capturing fundamental properties such as the minimum and maximum values, and rates of change in BT values would provide important baseline information for understanding lake processes.

In this research, the change in BT values of Lake Batur, one of the largest lakes on the island of Bali [1], during the 2019 dry season were analyzed based on Landsat-8 satellite data. The channel 10 of Landsat-8 satellite imagery was used to generate the distribution pattern of BT. Finally, the distribution patterns become critical information to find out the ability of Lake Batur in sustaining the various community activities surrounding the lake.

II. Methods and Procedures

A. Research Area

This study was conducted at Batur Lake, Bali-Indonesia. The Batur Lake is located in the northern part of Bali Island (Fig. 1). The satellite data was obtained from agencies (https://earthexplorer.usgs.gov) that provide Landsat-8 satellite remote sensing dataset. Landsat 8 provides metadata of the bands such as thermal constant, acquisition date, path/row, etc. shown at Table I.
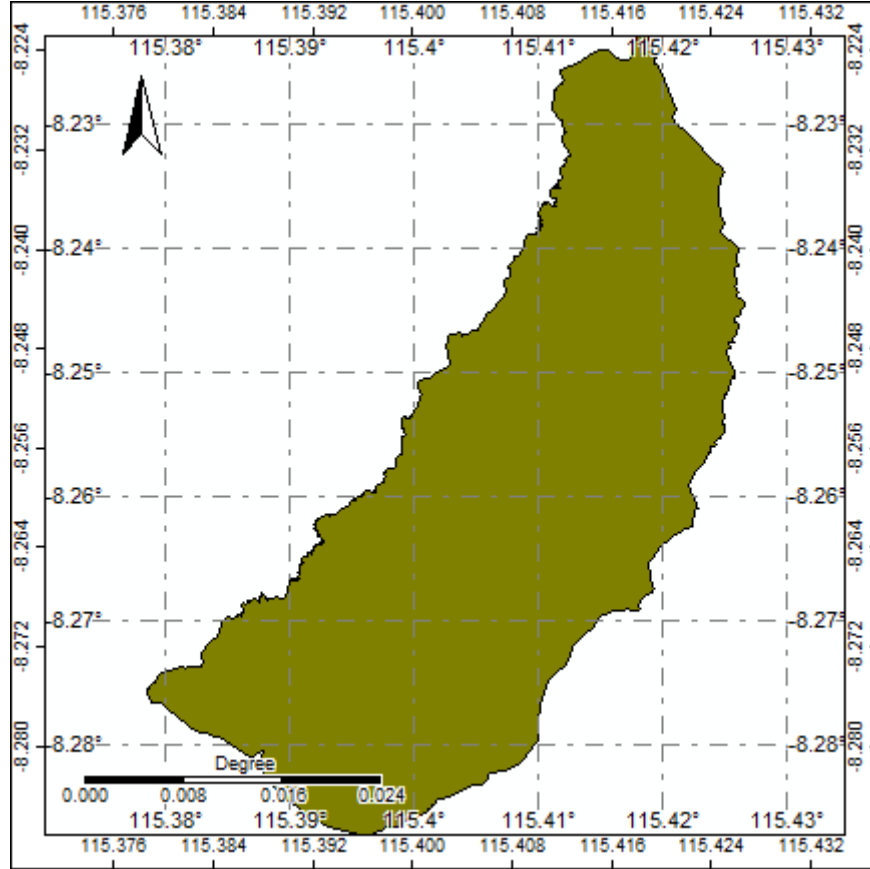
Fig. 1 Batur Lake

TABLE I
METADATA OF LANDSAT 8 SATELLITE IMAGE

Sensor	Acquisition date	Path/Row	Rescaling Factor		Thermal Constant	
			M_λ	A_λ	K1	K2
TIRS	April 10, 2019	166/66	3.3420E-04	0.10000	774.8853	1321.0789
TIRS	April 26, 2019	166/66	3.3420E-04	0.10000	774.8853	1321.0789
TIRS	May 12, 2019	166/66	3.3420E-04	0.10000	774.8853	1321.0789
TIRS	May 28, 2019	166/66	3.3420E-04	0.10000	774.8853	1321.0789
TIRS	June 29, 2019	166/66	3.3420E-04	0.10000	774.8853	1321.0789

B. Research Method

The digital number of Band 10 was converted to the BT values by using the metadata as shown at Tabel I. First, it had to be converted to radiance by using (1).

$$L_\lambda = M_\lambda * Q_{cal} + A_\lambda \tag{1}$$

L_λ is top of atmosphere spectral radiance. M_λ is band-specific multiplicative rescaling factor. Q_{cal} is digital number.

And A_λ is band-specific additive scaling factor [2]. Then, the second step is to calculate the BT value by using (2).

$$T = \frac{K2}{ln\left(\frac{K1}{L_\lambda}+1\right)}$$

(2)

T is the calculated BT value. $K1$ and $K2$ are band-specific thermal conversion constant [2].

III. RESULTS

Fig. 2-4 shows the distribution pattern of brightness temperature on channel 10 of Landsat-8 satellite imagery. The spatial and temporal comparisons were made from April to June 2019. In general, the results of the comparison show that the rising value of the brightness temperature starting from April to early May. However, in mid-May to the end of June, there was a significant decrease in brightness temperature with a maximum decrease of 1.4 degrees Celsius.
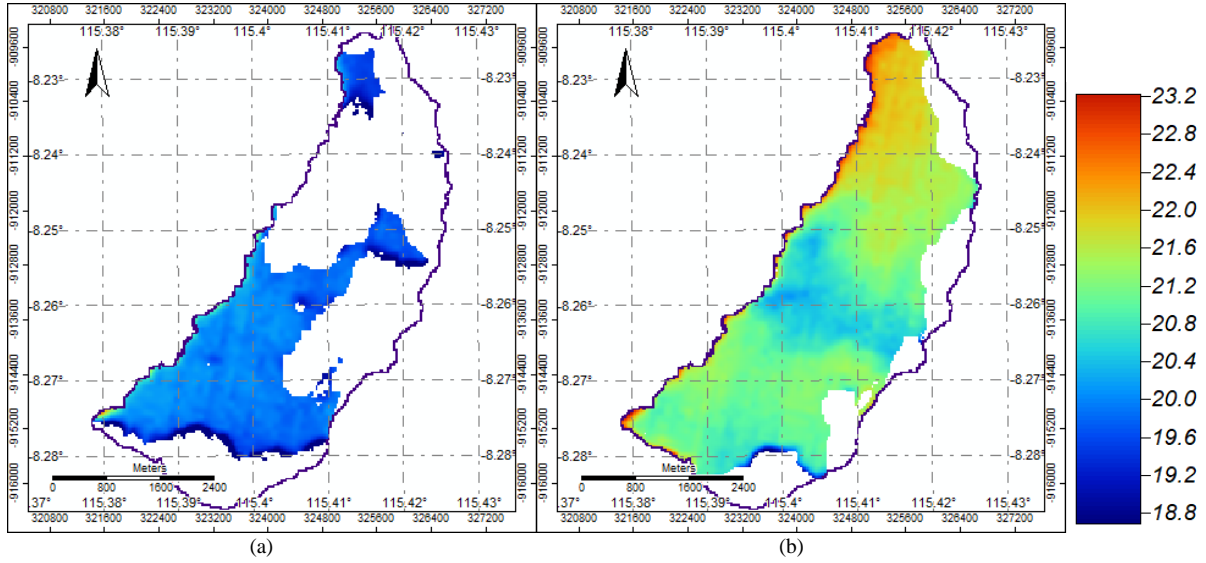
Fig. 2 BT Distribution of Band 10 on April 10, 2019 (a) and April 26, 2019 (b)
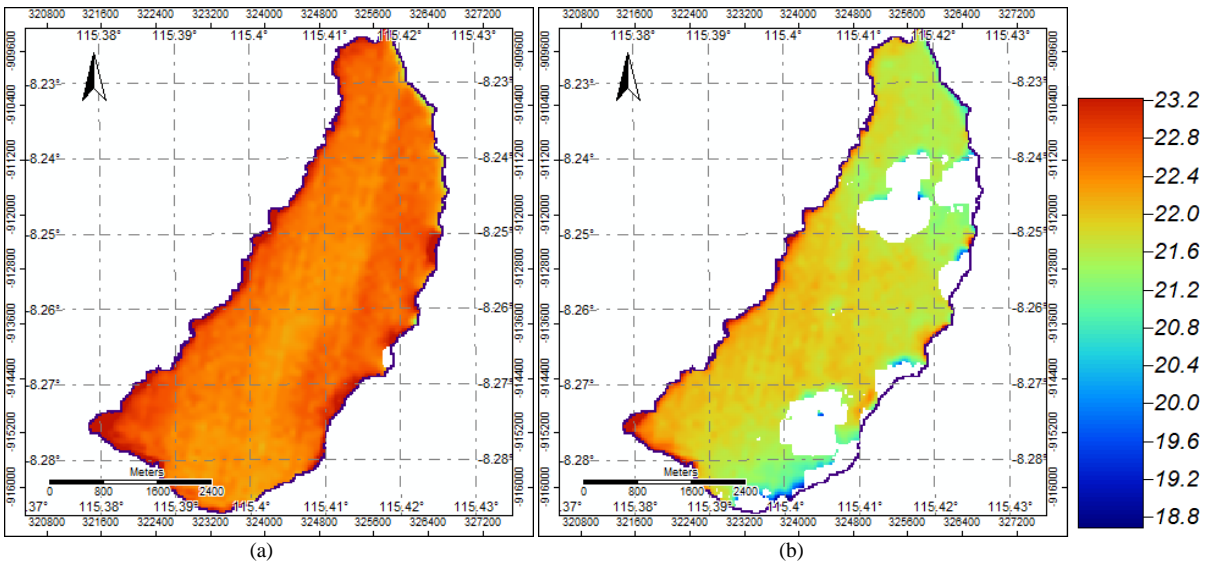
Fig. 3 BT Distribution of Band 10 on May 12, 2019 (a) and May 28, 2019 (b)
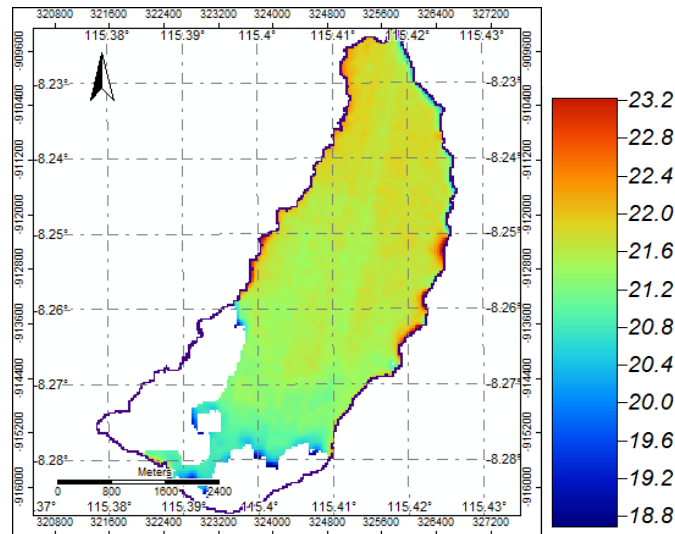
Fig. 4 BT Distribution of Band 10 on June 29, 2019

IV. CONCLUSION

Based on BT distribution maps from the thermal infrared bands on Landsat-8 satellite, it is clearly shown that the highest BT values was occured on may 2019. It is also important to noted that the BT values decrease significantly, reach until 1.4 °C different, starting from the end of may 2019. In general during the dry season, the rising of BT values should be continue, but the distribution map shows an anomaly of trend due to the inverse change of BT values.

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Concentration Of Several Types Of Heavy Metals On Part of Potato Plant and Potato Tuber

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Abstract—Seedling cultivation with LEISA system uses 10-30 tons/ha of compost fertilizer and 250 kg/ha of NPK fertilizer. Analysis of the impact of the LEISA system on the content of several heavy metals in potato plants is the aim of this study. Metal concentrations of Fe, Pb, Cd and Cr in the parts of potato plants became the research parameters. The metal content of Fe, Pb, Cd and Cr in the soil for the cultivation of potatoes group G2, G1 and G0 respectively: 160.0 - 2,014.4 ppm, 8.96 - 71.64 ppm, 0.42 - 5.42 ppm and 0.40 - 12.07 ppm. The metal content of each potato tuber for the initial planting period are: 0.26 - 0.61 ppm, 0.02 - 0.08 ppm, 0.0001 - 0.001 ppm and 0.02 - 0.13 ppm, while metal content in all parts of the plant when potatoes are harvested are: 11.23 - 19.97 ppm, 0.09 - 0.28 ppm, 0.11 = - 0.18 ppm and 0.38 - 1.17 ppm. The content of Fe in potato tubers at the beginning of planting for G0, G1 and G2 generation seedlings are respectively: 0.19 - 0.26 ppm, 0.21 - 0.32 ppm and 0.42 - 0.61 ppm. The content for Pb and Cr metals for each group of potato seeds G0, G1 and G2 is very close to the values varying from: 0.02 - 0.03 ppm, 0.04 - 0.06 and 0.07 - 0 , 08 ppm.

Keywords— content, metal, potato, soil

I. INTRODUCTION

Agricultural activities using compost, fungicides, and insecticides lead to the accumulation of metals in the soil, especially in the 0-15 cm depth or rooting zone [1]. The heavy metals are in the ground in both soluble and combination forms. Increased levels of environmental pollution by heavy metals from compost, fungicides, insecticides have an impact on the health of plants, animals and humans [2]; [3]; [4]; and [5].

The metabolic activity of plants, planting using compost, and spraying plants using insecticides and fungicides were impacted on the toxic metal content of soil. Metals in dissolved form are more easily absorbed by plants and washed by irrigation water or rainwater [6]. The concentration of hazardous metals in the vegetable parts is related to: (1) metal concentrations in the plant root zone, (2) planting species, (3) plant age, (4) soil types, (4) soil conditions, and (5) microclimate and the environment [7].

II. METHOD AND PROCEDURE

Research was used factorial models, these factors are the group of cultivated seed potatoes, and fertilizer dosage. The group of seed potatoes cultivation are G0, G1 and G2 group. The dosage of chicken manure compost used is 0,

10, 20 and 30 tons/ha. Seed potato cultivation is carried out with additional NPK fertilizer of 250 kg/ha, and cultivated potato plants are sprayed with pesticides every 2 weeks starting at 1 month old plants [7].

Each treatment occupies an area of 10 x 10 m^2 and is repeated 5 times. Cultivation in mounds dimension 1 m wide and 20 cm high with drainage channels between the mounds. On each mounds there are 4 planting grooves with a spacing of 25 cm and a spacing of 25 cm in each groove. Each mounds is covered with black plastic mulch [7]. Fe, Cd, Pb and Cd Heavy Metal concentration at soil, part of potato plant and potato tuber were observed by atomic absorption spectrofotometry / AAS.

III. RESULT AND DISCUSSION

A. Content of Heavy Steel on Root Zone Potatoes Cultivation

The metal content of Fe, Pb, Cd and Cr in the soil during the cultivation of potatoes were respectively: 160.0 - 2.014.4 ppm, 8.96 - 71.64 ppm, 0.42 - 5.42 ppm and 0.40 - 12.07 ppm. Concentration of Cd and Pb logaberat research results in potato cultivation is lower than the results of research by Cui [8], Jung [9] and Premanatha [10]. Chicken manure compost used contained Fe, Pb, Cd and Cr metal at 600.5 ± 11.2 ppm, 7.3 ± 0.3 ppm, 2.4 ± 0.2 ppm and $4.7 \pm 0,2$ ppm, this also happened in the study by Bulent Topcuoğlu [11].

Fe and Pb are present in Dithane M45 pesticides with concentrations of 247.3 ppm and 7.4 ppm. The Atracol pesticide is content Cd = 4.15 ppm and it is to protect fungal attack disease, the Acrobat is content Cr, Acrobat is content Cr = 4.96 ppm. Average of increasing pesticide residues in potato cultivation is 0.03 - 0.06 ppm/spraying [8].
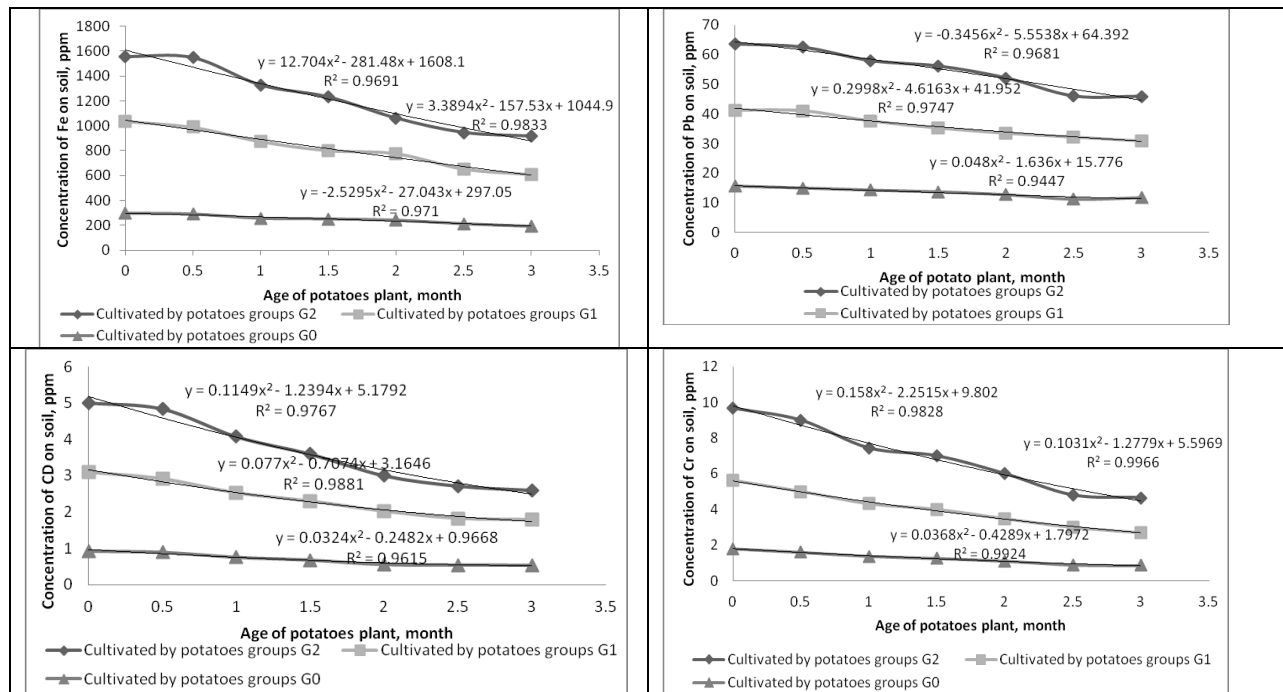
Fig. 1 Concentration of Fe, Pb, Cd and CR on soil at potato root zone

Decreasing the amount of metals in the soil as a result of: (1) decomposition of metals by bioremediation processes, (2) absorption by plant roots, and (3) leaching by irrigation or rainwater [12]; [13]. The speed of metals reductions on G2 potato cultivation in the soil is the fastest. The increase of Fe, Pb, Cd and Cr from G0 group potato cultivation to G1 group was 407.57 ± 13.4 ppm, 18.93 ± 3.39 ppm 1.33 ± 0.46 ppm and 2.92 ± 0.90 ppm, the increase in the metal content of Fe, Pb, Cd and Cr from the cultivation of potatoes in the G1 group to the G2 group were 571.37 ± 12.9 ppm, 22.52 ± 2.52 ppm 1.65 ± 0.35 ppm and 2.74 ± 0.70 ppm.

B. Concentration of Heavy Steel Absorbs by Potatoes and Accumulation on Roots, Steam, and Leaves

The total metal content in potato plants when harvested is Fe = 25.17 - 179.29 ppm, Pb = 0, 16 - 1.73 ppm, Cd = 0.16 - 1.40 ppm and Cr = 0.68 - 7.20 ppm. The metal content of Cd, Pb, and Zn by Janette [14] was 0.058 ppm Cd, 0.020-0.630 ppm Pb, 1,836-3457 ppm Zn [15]. The results of the study of Jonathan [16], the content of heavy metals in the leaves more than in the stem and tubers, with the lowest heavy metal content in the tubers. The Pb metal content in the tuber portion varies 0.08 ± 0.02 ppm - 0.63 ± 0.24 ppm.

While the results of research on the cultivation of seed potatoes in fields with Fe, Pb, Cd and Cr content are 160 - 2014.4 ppm, 8.96 - 71.64 ppm, 0.02 - 5.42 ppm and 0.4 respectively. - 12.7 ppm produces potato tubers with the metal content of 2.3-4.22 ppm, 0.02 - 0.092 ppm, 0.052 - 0.095 ppm and 0.023 - 0.096 ppm, respectively. Pb, and Cd metal concentrations in potato tubers are lower than the results of research by Hang Zhou [17]; and Jonathan [16]. Potato plants group G2, G1 and G2 have the ability to absorb Fe, Pb, Cd and Cr metals from the soil by 8.42 - 10.13%, 1.28 - 1.64%, 15.35 - 16.08% and 22 , 79 - 24.23%.

Fertilizing doses with compost, groups of seeds used and the combination of the results of variance have a very significant effect on increasing the metal content of Fe, Pb, Cd and Cr in potato plants. The increase in metal content in potato plants each time the fertilizer dosage was bonded with chicken manure compost 1 ton/ ha was respectively: 1.10 ± 0.1 ppm, 0.01 ± 0.002 ppm, 0.01 ± 0.002 ppm and 0.06 ± 0.002 ppm, the increase in metal content is in accordance with the results of research by Zeliha [18] which states that an increase in metal content in the soil increases the metal content in parts of the potato plant. Concentrations of Fe, Pb, Cd and Cr metals from the soil absorbed by the G2, G1 and G0 potato plants until harvested are 2.18 - 5.86%, 0.63 - 0.76%, 6, respectively. 96 - 19.76% and 25.18 - 44.99%. The amount of metal absorbed by the G0 potato group was the most compared to the other two groups.

The metal content of Cd, Pb, and Zn results of research by Janette [14] is 0.058 ppm Cd, 0.020-0.630 ppm Pb, 1,836-3457 ppm Zn. The results of the study of Jonathan [16], the content of heavy metals in the leaves more than in the stem and tubers, with the lowest heavy metal content in the tubers. The Pb metal content in the tuber portion varies 0.08 ± 0.02 ppm - 0.63 ± 0.24 ppm.

The concentration of Pb, Cd, Cu, Zn, and As metals results of Hang Zhou [19] was 0.004-2.361 ppm, 0.002-2.918 ppm, 0.155-3.125 ppm, 1,151-54.65 ppm, and 0.014-1.780 ppm, with an average concentration of 0.383, 0.161, 0.810, 10.16, and 0.207 ppm. Vegetables are cultivated on land containing Pb, Cd, Cu, Zn and As, respectively 1090 ppm, 7.52 ppm, 128.7 ppm, 820 ppm and 903.5 ppm. While the results of research on the cultivation of seed potatoes in fields with Fe, Pb, Cd and Cr content are 160 - 2014.4 ppm, 8.96 - 71.64 ppm, 0.02 - 5.42 ppm and 0.4 respectively. - 12.7 ppm produces potato tubers with the metal content of 2.3-4.22 ppm, 0.02 - 0.092 ppm, 0.052 - 0.095 ppm and 0.023 - 0.096 ppm, respectively. Pb, and Cd metal concentrations in potato tubers are lower than the results of Hang Zhou [17] and Jonathan [16].

Fertilizing doses with compost, groups of seeds used and the combination of the results of variance have a very significant effect on increasing the metal content of Fe, Pb, Cd and Cr in potato plants. The increase in Fe, Pb, Cd and Cr metal content in potato plants each time the attachment of fertilizer doses with compost of chicken manure 1 ton / ha was respectively: 1.10 ± 0.1 ppm, 0.01 ± 0.002 ppm, 0.01 ± 0.002 ppm and 0.06 ± 0.002 ppm, the increase in the metal content is in accordance with the results of the study Zeliha [18] and Bulent Topcuoğlu [11] which states that an increase in the metal content in the soil increases the metal content in parts of potato plants.

C. Concentration of Heavy Steel on Potatoes Tuber

In the cultivation process the concentration of metal Fe, Pb, Cd and Cr has increased as a result of increasing the fertilizer dosage using chicken manure compost. The results of variance showed the fertilizer dose factor, the factor of the seed group used and the combination factor had a very significant effect on the metal content of Fe, Pb, Cd and Cr in potato tubers at the tubers were harvested [11] . Fertilizer dosage with compost of more than 20 tons/ha is not good enough for the cultivation of potatoes group G1, G2 or G3, because the concentration of Fe, Pb, Cd and Cr metals at harvest time in the potato tuber is as big as: 1.8 - 4 , 21 ppm, 0.002 - 0.92 ppm, 0.0148 - 0.093 ppm and 0.0159 - 0.0957 ppm, this value is below the threshold value of food safety standards set by SNI, namely 6 ppm, 0.2 ppm, 0 , 1 ppm and 0.1 ppm for metals Fe, Pb, Cd and Cr.

TABLE 1. CONTENT OF FE AND PB ON PLANT AND POTATOES TUBER BEFORE PLANTEING AND AFTER HARVESTING

Concentration of metal, ppm	Dose Compost fertilizer	Group of potato tuber			Group of potato tuber		
		G2	G1	G0	G2	G1	G0

	Dose						
On potato plant	0	120,03± 1,2	72,02 ± 0,9	25,17 ± 2,7	0,86 ±0,4	0,76 ±0,3	0,16± 0,2
	10	144,46 ±2,3	82,30 ± 1,2	29,49 ± 1,5	1,10±0,17	0,90±0,12	0,21 ±0,1
	20	159,00 ±1,7	92,00 ± 1,8	40,03 ± 1,1	1,52±0,18	0,92±0,11	0,37±0,21
	30	179,96 ±2,1	118,05 ±2,2	58,87 ± 2,7	1,73±0,18	1,13 ±0,14	0,43±0,08
After Harvesting	0	2,603±0,03	2,433±0,04	2,303±0,05	0.068±0,005	0,036±0,006	0.02±0,002
	10	3,409±0,153	3,187±0,054	3,016±0,052	0.085±0,003	0,045±0,008	0.13±0,003
	20	4,035±0,03	3,772±0,065	3,569±0,056	0,091±0,008	0,048±0,005	0.28±0,004
	30	4,216±0,072	3,042±0,069	3,73±0,552	0,092±0,007	0,061±0,005	0.23±0,005

TABLE 2. CONTENT OF CD AND CR ON PLANT AND POTATOES TUBER BEFORE PLANTEING AND AFTER HARVESTING

Concentration of metal, ppm	Dose Compost fertilizer, tons/ha	Group of potato tuber			Group of potato tuber		
		G2	G1	G0	G2	G1	G0
On potato plant	0	0,8±0,11	0,53 ±0,12	0.16 ±0,13	3,68 ± 0,18	1,50 ±0,09	0,68 ±0,07
	10	0,98±0,12	0,72 ±0,17	0,26 ±0,05	4,20 ±0,11	2,80±0,09	1,09±0,045
	20	1,25 ±0,16	0,87 ±0,16	0,30 ±0,08	6,64 ±0,08	3,85±0,17	1,23 ±0,12
	30	1,40 ±0,12	0.99 ±0,08	0,48 ±0,05	7,20 ±0,12	5,78 ±0,15	1,85 ±0,11
On potato tuber	0	0.056±0,005	0.0403±0,005	0.054±0,002	0.0607±0,001	0.0424±0,006	0.0234±0,005
	10	0.0706±0,005	0.0508±0,005	0.052±0,001	0.0765±0,009	0.0534±0,002	0.0295±0,001
	20	0.0756±0,005	0.0545±0,005	0.065±0,002	0.0820±0,005	0.0572±0,005	0.0316±0,005
	30	0.0953±0,01	0.0686±0,006	0.069±0,004	0.0957±0,003	0.0721±0,005	0.0398±0,007

Janette Musilova [14] results of the metal content of Cd = 0.039 - 0.106 ppm, Pb = 0.03 - 0.318 ppm in potato tubers. The contents of heavy metals in the potato cultivars were found in the ranges: 48.87-72.64 ppm for iron, 3.07-5.43 ppm for copper, 13.80-18.89 ppm for zinc, 6.93-13.06 ppm for manganese, 0.51-0.77 ppm for leads, 2.02-3.55 ppm for nickel and 0.08-0.32 ppm for cadmium [19]. The content of Pb in the tuber in plants Zn 3.7 ppm, Cu 2.7 ppm and Cd 0.04 ppm [20]. The concentration of Mg is 420–438 ppm, Cr is 176–254 ppm, Fe is 27.3–90.4 ppm and Pb is 2.00-17.4 ppm [21].

IV. CONCLUSION

The metal content of Fe, Pb, Cd and Cr in the root zone also underwent a bioremediation process of 42.3 ± 3.4 ppm/month, 0.09 ± 0.007 ppm/month, 0.0063 ± 0.0005 ppm/month, and 0,0038 ± 0,00041 ppm/month. The contents of heavy metals in the potato cultivars were found in the ranges: 48.87-72.64 mg/kg for iron, 3.07-5.43 ppm for copper, 13.80-18.89 ppm for zinc, 6.93-13.06 ppm for manganese, 0.51-0.77 ppm for leads, 2.02-3.55 ppm for nickel and 0.08-0.32 ppm. The content of Pb in the tuber in plants without amendments reached to Zn 3.7 ppm, Cu 2.7 ppm and Cd 0.04 ppm. LEISA system with fertilizer technique using compost is needed by farmers, because the productivity and quality of the resulting potatoes increases. In addition, the quality of land for cultivation can also be improved, this has been shown by improving the physical properties of soil and soil fertility in the root zone.

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Contamination of Lead in the Blood of Bali Cattle Associated with the Geographical Location and Age of Cattles

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Abstract—This study aims to determine the level of lead in the blood of bali cattle related to geographical location and age of cattle. A total of 300 cattle were drawn for use as a research sample, consisting of 150 cattles from the lowlands and 150 cattles from the highlands location. Each location consisting of 50 young cattles (<2 years old), 50 ccattles at puberty (2-3 years old), and 50 old cattles (> 3 years old). Blood is took and collected in tubes containing ethylene diamine tetraacetic acid (EDTA) anticoagulants. Measurement of lead content was carried out using the atomic absorption spectrophotometer (AAS) method. The results of measurements of lead levels obtained data for the lowlands namely young age = 0.430 ± 0.411 ppm, puberty = 0.792 ± 0.356 ppm, and old = 1.234 ± 0.533 ppm, while the highlands ie young age = 0.047 ± 0.074 ppm, puberty = 0.057 ± 0.061 ppm, and old = 0.089 ± 0.169 ppm. Analysis of variance result showed that lead levels in cattles blood in the lowlands were significantly higher than in the highlands. Lead levels in cattles blood in the lowlands showed a significant increase in lead levels with age of the cattles, but not for the cattle in highlands location. The conclusion is the cattle raised in the lowlands are exposed to higher lead than in the highlands. Increased blood lead levels in line with increased age of cattle occur in cattle in the lowlands location but does not in the highlands location.

Keywords —age, bali cattle, geographic, lead

I. INTRODUCTION

Cattles are one of the animals that are sensitive to exposure to lead. The results of research on several livestock products obtained data contained contaminants of lead [1]. Cattle raised in urban landfills were detected in the blood, lead contamination is also detected in the tissues of internal organs [2]. Feed factor is a major cause of contamination of cattles by lead, as evidenced by the presence of cattle exposed to lead in conventional farming [3]. Research on geographic clusters of lead contamination in humans is reported that contamination is higher in urban areas than in the surrounding area [4,5].

The relationship of age factors to the bioconcentration level of lead in animals has been studied including among Oyster (*Saccostrea cucullata*) monkeys [6] and in fish [7]. Level of lead contamination to age factors in humans reported that young age is more sensitive to contamination than adults [8]. The relation between age of cattle and the level of lead contamination is important to know in the effort to select cattle for seedlings and to be slaughtered, so that a healthy and free lead contamination can be obtained.

II. METHOD AND PROCEDURE

A. Research Sample

This research useed 300 cattle bloods, each 150 cattle from lowlands and highlands location. From the two locations were selected cattles with young age (<2 years old), puberty age (2-3 years) and adult age (> 3 years), respectively. Determination of age of cattles is done based on the number of teeth and the number of rings on the horn [9, 10].

B. Measurement of Lead Level

The blood samples were processed for the measurement level of lead by using atomic absorption spectrophotometry (AAS) method [11].

III. RESULT AND DISCUSSION

A. Result

Levels of lead metal contamination are higher in cattle in the lowlands (0.819 ±, 547 ppm) significantly than in the highlands (0.064 ± 0.113 ppm). Based on the age of cattle shows that the older the cattle higher the lead level in their blood, both in lowland and highland area (Table 1).

TABLE I

THE AVERAGE OF LEAD LEVEL IN THE CATTLE BLOOD BASED ON GEOGRAPHIC LOCATION AND AGE.

	The level of lead in the cattle blood (ppm)					
	Lowland location			Highland location		
	Young	*Puberty*	*adult*	*Young*	*Puberty*	*adult*
Mean	0,430±0,411	0,792±0,356	1,234±0,533	0,047±0,074	0,057±0,061	0,089±0,169
Mean	0,819±,547 ppm			0,064**±0**,113 ppm		

In general the level of lead was significantly different (p <0.05) between age category, that is the lowest at young age, followed by puberty and the highest at adult age. The results of the analysis of variant data based on geographic of cattle, the level of lead in lowland cattle showed a significant difference (p <0.05) between young, puberty and adult cattle, whereas in highland of cattle it was not significantly different (p> 0.05).

B. Discussion

Level of lead is higher in cattle in the lowlands than in the highlands location, indicated sources of pollutants in the lowlands (Denpasar and Badung) more than highland location (Bangli Regency). Analogous with this study is about the level of lead in the blood of pregnant women at Duke Obstetrics and Durham Regional Hospital Obstetrics, showing higher levels of lead in mothers in urban areas compared to surrounding areas [12].

In addition there is a possibility due to the acquisition of a cattles to her calf during the embryonal period through transplacenta. In humans it is reported that transplacental lead contamination can occur [13]. Bali cattle naturally have the same characteristics between cattle in the lowlands and in the highlands [14], but the level of environmental pollutants will cause different developmental characteristics.

The results of research showed that the duration of exposure greatly affected the level of lead contamination, because old cattle meant that they had been in the environment for a long time. Studies on fish have reported that the older the age and the bigger the body size, the higher the heavy metal contamination [15, 16]. In addition, many factors influence the level of heavy metal contamination, including geographic and fish species [7], physiological fish [16], tissue types [17, 18, 19], feed habit [25] and certain infection [20]. Physiological factors are closely related to the hormonal system, where during puberty the release of the hormone gonadotropin releasing hormone (GnRH) can affect the resistance to heavy metal contamination [14,26]. In contrast to the results of experiments using rats it was reported that young rats was exposed to lead higher than older rats [8], and caused persistent immunotoxicity [21]. The same thing happened to ducks due to exposure to lead heavy metals in Argentina [22]. Similarly, studies on rock oysters (*Saccostrea cucullata*) found that young age were more exposed to lead [23]. This may be due to animal species factors, as reported that the exposure response between fish species by heavy metals varies greatly [7]. In addition, breeds in one animal species are also very influential on the level of contamination by lead, which occur in buffaloes [24].

IV. CONCLUSION

Bali cattle raised in the lowlands are contaminated with lead heavy metals which are higher than cattle raised in the highlands. Cattle in the lowlands are contaminated by heavy metals are higher in young cattle compared to puberty and adult cattle. While cattle in the highlands there is no significant difference between young cattles, puberty and adult cattle.

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Regional Coverments Autority In Determining Policy On The Master Plan Tourism Development

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Abstract-This study intends to examine the authority of local governments establishing policies in the formation of legislation, especially regional legal products that are focused on policies on tourism development master plans . The policy formation on the tourism development master plan is based on authority by promoting philosophical, sociological aspects and juridical aspects with normative juridical methods.

Based on these objectives, research questions are proposed as a guide in examining the above issues, namely: First, What is the basic of authority of consideration or philosophical, sociological, and   juridical   the formation of policies regarding tourism development plans. Second,what are the target, the scope and direction of regulation, and the content of the policy in the form of Regional Regulations tourism development plans.

This research is to get the results of the study related to the authority of the regional government in establishing policies regarding regional tourism development by basing policies on the principles of establishing legislation and prioritizing aspects of the tourism industry, marketing destinations and cultural of Bali Tourism

Keywords: *Policy and Tourism*

I. INTRODUCTION

The policy on the tourism master plan in the regions provides guidelines related to the development of a strategic tourism area within the geographical area of one or more administrative regions in areas where there is potential for tourist attraction, high accessibility, availability of public facilities and tourism facilities as well as social and cultural activities of the community who support each other in the realization of tourism.

The Importance of Formulating the Authority of Regional Governments in Establishing Policies on the Tourism Development Master Plan aims to provide planning related to tourism development. Regional tourism development includes: development of regional tourism destinations; development of regional tourism marketing; regional tourism industry development; and the development of regional tourism institutions. The development of regional tourism aims to realize quality and sustainable cultural tourism and has competitiveness based on Tri Hita Karana that is able to encourage regional development and people's welfare.

Considering the very important role of the tourism development master plan, it is very necessary to conduct an assessment in the form of other dissemination published in the form of journals and research in accordance with RIP Unud. The importance of research related to: 1) Basic authority related to policy in the form of a tourism development master plan; and 2) the target to be realized, the scope and direction of regulation, and the scope of material for the master plan for tourism development. The importance of this research to answer the above problems.

II. RESEARCH METODS

This study uses a statutory approach. Terry Hutchinson who studies the conditions of legal norms. This study also

uses a philosophical approach (theoretical approach), a theoretical approach (theoritical approach) to study and understand the direction of regulatory arrangements by regional governments relating to regulatory policies related to the tourism development master plan. The legal concept approach (conceptual approach) is carried out by examining views on the delegation of the tourism development master plan. The analysis technique of legal materials used in this study is the technique of description, interpretation, systematization, argumentation and evaluation. At this description stage an explanation is made as well as determining the meaning of the legal rules studied thus at this stage. only describe what it is about a situation. Legal hermeneutics is essentially a method of interpretation of legal texts or a method of understanding deeply about a normative text [1]. The rule of law has two aspects, namely express in the form of sound legal texts and what is implied is an idea behind the rule of law.

III. RESULTS

The results of research on Regional Coverments Autority In Determining Policy On The Master Plan Tourism Development
Bali is a tourist destination that is visited by many tourists, both domestic and foreign tourists. The number of tourists visiting Bali from year to year is relatively increasing. The number and level of growth of tourists visiting Bali can be seen in
Table 1.1 Number and Growth of Tourists to Bali in 2006-2016

Year	Number Of Tourist				Total Travelers (Person)	Growth (%)
	Nusantara (Orang)	Growth (%)	Manca-negara (Orang)	Growth (%)		
2015	7.147.100	11,77	4.001.835	6,24	11.148.935	8,86
2016	8.643.680	17,31	4.927.937	18,79	13.571.617	17,85

Sumber: Dinas Pariwisata Pemerintah Provinsi Bali, 2018.

A. Concept of Authority

In relation to the authority to form laws and principles, the formation of laws and regulations is very important to be considered in order to understand the scope and purpose of the formation of the law. Ron Jue stated that the principles of law are the values underlying the rule of law (B Arief Sidharta, 1996).

From the understanding of attribution, delegation and mandate according to Philip M Hadjon, A Hamid S Attamimi, Bagir Manan, Ic Van Der Vlies, in the Dictionary of Legal Terms Fockema Andreae Dutch-Indonesian and Black's Law Dictionary can be concluded that in attribution is created an authority, in the delegation handed over an authority while in the mandate there is no creation or surrender of authority.

B. Concept of Policy

The formulation of public policy is a complicated process. Several methods for studying it have been developed by scientists who are interested in public policy. First learn how problems arise and enter the government's agenda, how people formulate these problems to take action, what attitudes are taken by legislative bodies or other institutions, how leaders implement policies, and finally, how policies these are evaluated [2]. Policy determination, according to A. Hoogerwerf [3] includes making decisions regarding the contents of a policy.

This includes the selection and elaboration of objectives, tools, timelines and activities. Part processes in policy making, as is the systematic description of A.F. Leemansa [4] is: 1) Problem formulation, 2) Determination of objectives, 3) Determination of alternatives, 3) Determination of means, 5) Determination of definitive policy and determination of policy.

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C.Formulation of Public Policy Issues

Problem formulation can be seen as a process with four interdependent phases, namely: problem recognition / problem sensing, problem search / problem definition, problem definition, and problem specification [5]

Trained analysts usually face a large chaotic network of formulations of competing problems that are dynamic, shaped by social situations, and distributed throughout the policy making process. As a result, analysts are faced with a meta of problems - the problems above are complex problems because the area of problem representation that is owned by policy makers appears to be unorganized.

D. Tourism Development Master Plan

The definition of tourism according to the Law of the Republic of Indonesia Number 10 Year 2009 Concerning Tourism is a variety of tourism activities and is supported by various facilities and services provided by the community, entrepreneurs, the Government, and the Regional Government. While tourism is a travel activity carried out by a person or group of people by visiting a certain place for recreational purposes, personal development, or learning the uniqueness of the tourist attraction that is visited in a temporary period. Regional Tourism Destinations, hereinafter referred to as Tourism Destinations, are geographical areas within one or more administrative regions in which there are tourist attractions, public facilities, tourism facilities, accessibility, and communities which are interrelated and complement the realization of tourism. Travel Attractions (DTW) are all things that have a uniqueness, beauty, and value in the form of diversity of natural wealth, culture, and man-made products that are the target or destination of tourist visits.

Bali Tourism Destinations are a united tourism destination consisting of a number of tourism areas, special tourist attraction areas and other areas that have tourist attractions in accordance with the Bali Provincial Spatial Plan. According to the Provincial Regulation of the Province of Bali Number 10 Year 2015 Concerning the Regional Tourism Development Master Plan of the Province of Bali in 2015-2029.

Legislation that forms the legal basis for the formation of Regional Regulation on the Tourism Development Master Plan: Law Number 10 of 2009 concerning Tourism and Law Number 23 of 2014 concerning Regional Government ［5］.

The description of the policy is set forth in the content material as in the table below:

Table 2: Determination of policies regarding the tourism development master plan as outlined in the Regional Regulation

Load Material	PERATURAN DAERAH PROVINSI BALI NOMOR 10 TAHUN 2015 TENTANG RENCANA INDUK KEPARIWISATAAN TAHUN 2015-2019	PERATURAN DAERAH KABUPATEN BADUNG NOMOR 17 TAHUN 2017 TENTANG RENCANA INDUK PEMBANGUNAN KEPARIWISATAAN KABUPATEN BADUNG TAHUN 2017 – 2025	PERATURAN DAERAH KABUPATEN JEMBRANA NOMOR 1 TAHUN 2018 TENTANG RENCANA INDUK PEMBANGUNAN KEPARIWISATAAN DAERAH TAHUN 2018-2032	Analysis
Article 9 paragraph (3) of Law Number 10 Year 2009 concerning Tourism, it is necessary to stipulate a Regional Regulation concerning the Tourism Development Master Plan	1. General Provisions 2. Regional Tourism Development. 3. Development of Regional Tourism Destinations 4. Development of Regional Tourism Marketing 5. Regional Tourism Industry Development. 6. Institutional Development of Regional Tourism 7. Indications for the Regional	1. General Provisions 2. Position, Scope and Period of Implementation 3. Principles, Vision and Mission of Tourism Development 4. Objectives and Targets 5. Tourism Development Policies and Strategies 6. Tourism Region Development Plan 7. Tourism Development Program 8. Supervision and Control	1. General Provisions 2. Regional Tourism Development 3. Development of Regional Tourism Destinations 4. Development of Regional Tourism Marketing 5. Regional Tourism Industry Development 6. Institutional Development of Regional Tourism 7. Indications for the Regional Tourism Development Program 8. Supervision and Control 9. Closing Provisions	1.Development of Regional Tourism Destinations. 2.Regional Tourism Marketing Development 3.Regional Tourism Industry Development 4.Institutional Development of Regional Tourism

	Tourism Development Program 8. Supervision and Control 9. Closing Provisions			

IV. CONCLUSIONS

Based on the above study, it can be concluded as follows:

First, the problems faced are related to the Tourism Development Master Plan. The basis of the authority for the delegation of formation arrangements is regulated in the Tourism Act, the Regional Government Law on the National Tourism Development Master Plan. This problem was overcome by making a Regional Regulation on the Tourism Development Master Plan. The description in the material content is about:

1. General Provisions
2. Position, Scope and Period of Implementation
3. Principles, Vision and Mission of Tourism Development
4. Objectives and Targets
5. Tourism Development Policies and Strategies
6. Tourism Region Development Plan
7. Tourism development program
8. Supervision and Control

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Declining Age at Menarche: Study from One of Junior High School in Denpasar

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Abstract—Age at menarche tends to decrease in many countries. Results from Riskesdas, 2010 indicated that most Indonesian girls experience menarche between the ages of 12 to 14 years old (64,9%). Among them 6.4% have experience early menarche at age 11 or younger and 28.8% of those have late menarche at age 15 or older. Most studies in Indonesia showed that the age at menarche has declined, however there is still no data about declining age at menarche in Bali. Objective: To determine the age at menarche in Bali using sample from one of junior high school in Denpasar Methods: This cross-sectional study was conducted in one of junior high school in Denpasar in 2016 . Results: Of 297 eligible subjects, the mean age of menarche was 11,7 years with range between the ages of 10 to 14 years old. The percentage of teenager who had menarche at the ages between 12 to 14 years old was 63,7%, while for those who had early menarche at the age of 11 years or below was 36,3%. None of the students has late menarche at the age of 15 years or older. There is increasing percentage of early menarche in our study (36.3%) compared with data from Riskesdas, 2010 (6,4%).Conclusion: Early menarche in one of junior high school at Denpasar in year 2016 was increasing compare from result of Riskesdas 2010.

Keywords— age, denpasar, early menarche, menarche.

I. INTRODUCTION

Menarche, defined as the first menstrual period in a woman's life, is a marker of female puberty and the onset of ovarian and other endocrine functions related to reproductive capacity. Age of menarche has declined over the last several decades through improvement of socioeconomic conditions or exposure to environmental chemicals and it received a great deal of attention as having important health implications. [1-3]

Age at menarche (AAM) can be a risk factor for disease, and there were several studies on the interaction between AAM and genetic factors especially for breast cancer susceptibility.[3, 4] Early exposure to estrogens, as expressed by early menarche, and induction of thyroid autoimmunity may be associated with Subclinical hypothyroidism (SH) risk. SH has been linked to cardiovascular disease (CVD), metabolic syndrome, atherosclerosis, dyslipidemia, diabetes mellitus (DM) type 2 and hypertension, particularly when TSH levels are above 10 mIU/L.[5] Multiple studies have shown that early age at menarche or early pubertal timing is associated with an increased risk of depression in adolescent girls.[6] Base on those reports , it becomes important to asses the age of menarche in population base research especially to predict the possibility of any diseases related with early menarche.

Early menarche is often defined as menarche before the age of 12 years (≤11 years old), but some have definition as menarche at ≤12 years. Late manarche is defined as menarche after age of 14 years. [3, 7, 8]

Data from other part of Indonesia show dispate from body mass indexs (BMI) but the age of menarch seem to declain.[7, 9-12] Results from Riskesdas, 2010 indicated that most Indonesian girls experience menarche between the ages of 12 to 14 years old (64,9%). Among them 6.4% have experience early menarche at age 11 or younger and 28.8% of those have late menarche at age 15 or older.[13] There is still no continue data about declining age at menarche in Bali.

II. METHOD AND PROCEDURE

The objective of this research is to determine the age at menarche in Bali by using sample from one of junior high school in Denpasar.

This cross-sectional study was conducted in one of junior high school in Denpasar on 2016 . We included healthy female students with parents approval and they experienced at least three menstrual cycles before the study. We excluded females taking hormonal drugs, any routine medications, or had chronic diseases. Data of age at menarche were derived from self-reported questionnaire to the nearest of month. We define early manarche as menarche before the age of 12 years. Late menarche is defined as menarche after age of 14 years.

III. RESULTS AND DISCUSSION

Of 297 eligible subjects, the mean age of menarche was 11,7 years with range between the ages of 10 to 14 years old. The percentage of teenager who had menarche at the ages between 12 to 14 years old was 63,7%, while for those who had early menarche at the age of 11 years or below was 36,3%. None of the students has late menarche at the age of 15 years or older.

TABLE I
AGE AT MENARCHE IN 297 SUBJECT

Age at menarche	Number	Percentage (%)
10	9	3
11	99	33,3
12	150	50,5
13	38	12,8
14	1	0,3
Total	297	100,0

There is an increasing percentage of early menarche in our study (36.3%) compared with data from Riskesdas, 2010 (6,4%). Compared with other reports in Indonesia, it becomes more prominent that the number of early menarche are getting higher each year. Juliyatmi dan Handayani reported that in the percentage of early menarche among 58 subjects at Junior High School in Bantul Yogyakarta in 2015 is 14,8 % .[14] Another study from Kadir at al showed that the percentage of early menarche among 388 subjects at Junior High School in Palembang in 20016 is 49,5%.[7] Taufiqurrahman at al reported that the percentage of early menarche among 153 subjects at Junior School in Kecamatan Martapura Kabupaten Banjar in 2017 is about 53,3%. This number is much higher compared with the subject's mother that experienced early menarche is only 26,1%.[15] Kadri reported that there is an increasing number of early menarche which up to 60% among 25 students with low social economic at Junior high school in Jambi in 2018. .[9]

Our results have similarities with results from other countries using their own methods and sample groups to examine about menarche; that there is an increasing number of early menarche globally [16-20]

IV. CONCLUSION

Early menarche in one of junior high school at Denpasar in year 2016 was increasing compared with results from Riskesdas 2010.

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Design Small Scale Portable Biogas Digester for Electric Generation for Rural Area in Developing Country

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Abstract— Fixed dome and floating drum are found having drawback in application in developing country. It was difficult in maintenance and operation. It was also difficult to relocate to the new site of waste processing. The portable anaerobic digester is prepared in this work as a solution. The capacity is about 500 liter so that suitable for home scale organic waste treatment. The material that is used for the digester was 304 stainless steel. The digester is completed wit agitator to optimize the biogas production. A slurry of cow dung (50% cow dung+ 50% water) is use to feed the digester. There are 2 variations of slurry loading rate that were investigated in this work, namely 5 liter slurry/day and 10 liter slurry/day. The biogas production rate is found about 51.7 liter biogas/day if loading with 5 liter slurry/ day. The biogas production rate is found increase significantly to become 82 liter biogas/day if loading with 10 liter slurry/day.

Keywords— biogas, design, digester, portable, small scale

I. INTRODUCTION

Generally designs of biogas digester that is used in developing countries for digestion of livestock waste are classified as low-rate digesters, and lacking stirring capability [1]. In many countries biogas technology spread has foundered and/or up to 50% of plants are non-functional. This is linked to inadequate emphasis on maintenance and repair of existing facilities. Many new design of anaerobic digester are introduced with many feature to increase the performance. Attention to establish anaerobic digester in the developing country is increase rapidly [1].

The disadvantages of low-rate digesters biogas technology such as fixed dome and floating drum are: requires reliable feed source, high construction costs relative to income of users, laborious operation and maintenance, limited lifespan, requires reliable feed source, construction costly [2]. Certain researcher develop small size anaerobic digester but nor for the purpose of portable design [3].

A static scum-breaking device in the form of nylon net has been incorporated in a fixed-dome biogas plant to control scum formation and to provide a limited amount of stirring. Many of concrete fixed dome type of digester is found difficult to be repair. [4]. A portable bio-digester should be fabricated with consideration of economic and ergonomic factors with maximum efficiency in production of methane gas [5].

For the case in Vietnam, there no best choice house hold biogas plant model for all the farmers. The existing models have their weaknesses and strengths. More studies are required to find optimal biogas models to the real situation. Such future biogas plant models should take 3 requirements: simple in construction, operation, and maintenance [6].

Many improvements already addressed for the fixed dome and floating drum [7] but portable design was not take in to account in the improvement. Little sized biogas plants solves the problem of the organic waste, reducing its transportation costs and producing green energy [3]. Effort to find best suit biogas digester is still on going, different technologies have been analyzed in order to identify the most suitable for small sized biogas plants [8].

In this work a small size (500 liter) anaerobic digester is introduced and can be operated as continuous system. The design is completed with manual agitator to optimize the result. Stainless steel is used as a material of anaerobic digester for corrosion resistance purpose. The effect of loading rate to the biogas production rate as well as biogas composition will be investigated

II. METHODS AND PROCEDURES

The 500 liter portable anaerobic digester was set up at In Bali Island, Indonesia. The operation temperature was recorded   vary between 20-33ºC, the climate is tropical so that no external heating energy is needed to operate the anaerobic digester. Humidity level is around 85%..

The anaerobic digester is made from stainless steel plate (thickness 1.22 mm) to ensure that the digester having high corrosion resistant. The biogas contain hydrogen sulfide (H_2S) [9, 10, 11] that is very corrosive to carbon steel or metals in general.

The anaerobic digester cylinder with diameter 76 cm and length 122 cm was obtained by rolling the stainless steel plate. The anaerobic digester cylinder was mounted horizontally for ergonomic design and easy loading [5]. The manufacture of the stainless steel anaerobic digester utilizes tungsten inert gas (TIG) welding technique.
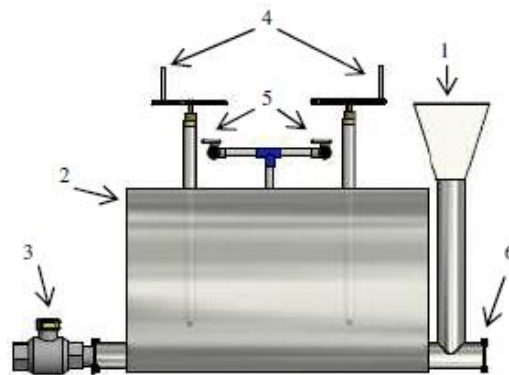
Fig. 1 The design of anaerobic digester. 1. Inlet slurry, 2. Anaerobic tank, 3. Slurry outlet, 4. Manual agitator handle, 5. Outflow biogas, and 6. Manhole

The drawing of anaerobic digester is presented in Fig. 1. The main parts of the digester are inlet slurry, anaerobic tank, manual agitator handle, outflow biogas, slurry outlet, agitator blade. The manhole is also provided for easy cleaning during maintenance. The total weight of empty digester is about 60 Kg.

At the beginning the anaerobic digester is operated as batch system by filling the tank fully with slurry of cow dung (50% cow dung+50% water). The stirring with agitator was conducted for about 10 minutes for 3 times a day (morning, noon, and evening). The anaerobic digestion then is let to produce biogas by batch system until no longer produce biogas again. In this stage the anaerobic digestion process finished byusing batch system.

The research then was continued with the investigation of the performance for continuous system. The first

variable was conducted by releasing for about 5 liter slurry from the outlet and about the same amount (5 liter) of new slurry (50% cow dung+50% water) was added from the inlet. The stirring with agitator was conducted for about 10 minute for 3 times a day (morning, noon, and evening). The biogas produced in 30 day then was measured. The same process also was conducted for second variable that was by releasing for about 10 liter slurry from the outlet and about 10 liter new slurry (50% cow dung+50% water) was added from the inlet.

III. RESULTS

Base on the result from the experiment in this research, it is found that by loading rate 10 liter slurry/day the biogas production rate is higher (around 82.0 L/day) comparing with the one with loading rate 5 liter slurry/day (around 51.7 L/day) as can be seen in Fig. 2 as well as Table 1. The biogas production rate from both loading rate are found linear in the range of 30 days (1 month) of biogas production. From this point it is clear that loading rate influent the biogas production rate in the continuous system of 500 liter anaerobic digestion. It is explained in previous publication that indeed loading rate influent the biogas production rate [12].
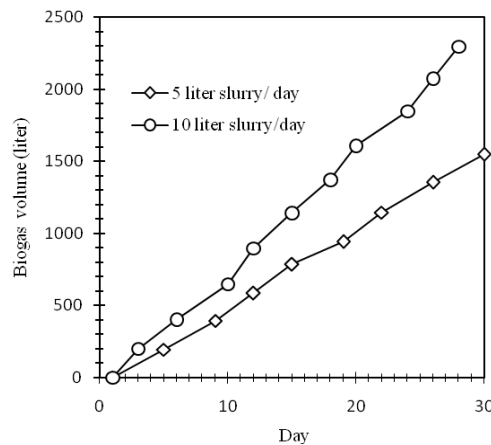
Fig. 2 The effect of loading rate of slurry to biogas production in the 500 liter of continuous anaerobic digestion

TABLE I
THE EFFECT OF LOADING RATE TO BIOGAS PRODUCTION RATE 30 DAYS (1 MONTH) WITH CONTINUOUS SYSTEM OPERATION.

Loading rate of slurry (liter of slurry/day)	Biogas production rate (liter of biogas/day)
5	51.7
10	82.0

The effect of loading rate to biogas composition can be seen in the Table 1. The result reveal that related with utilization of biogas as a fuel, loading rate 5 liter slurry/day resulting better quality of biogas with CH_4 around 58.75 % vol comparing loading rate 10 liter slurry/day that reach 56.40 % vol. which is a lower value. There are four stage of biological and chemical of anaerobic digestion namely: hydrolysis, acidogenesis, acetogenesis, and methanogenesis as a final stage [12, 13].

Biomass is made up of organic polymers. To access the energy potential of the material , in anaerobic digesters, the bacteria must first broken down these chain in to smaller constituent part such as amino acids, simple sugar, and fatty acids. To break the chain and dissolving the smaller molecules in to the solution is called hydrolysis. Hydrogen and acetate are produced in the hydrolysis and can be used by methanogens directly. volatile fatty acids (VFAs) with a chain length greater than that of acetate must first be catabolised into compounds that can be used by methanogens. The process of acidogenesis results in further breakdown of the remaining components by acidogenic (fermentative) bacteria. Here, VFAs are created, along with carbon dioxide, ammonia, and hydrogen sulfide, as well as other byproducts. Acetogenesis is the third stage of anaerobic digestion. Simple molecules through the acidogenesis phase are further digested by acetogens to produce largely acetic acid, as well as hydrogen

and carbon dioxide. The biological process of methanogenesis is the terminal stage of anaerobic digestion. Methanogens use the intermediate products of the preceding stages and convert them into water, carbon dioxide and methane that make up the majority of the biogas [12, 13]. CO_2 is produced during stage acidogenesis, acetogenesis, as well as methanogenesis. H_2S is produced during stage of acidogenesis. Methane is produce during stage of methanogenesis [12]. Hydrogen sulfide is produced during stage of acidogenic [12]. Biogas with low content of H_2S in very good as a fuel of the engine [14] because will reduce the corrosion in the metal component of the engine.

III. CONCLUSION

For the 500 liter anaerobic digester made by stainless steel operated in continuous system, the biogas production rate will be around 51.7 L/day if the loading rate of slurry is 5 L/day. The biogas production rate increase to reach 82.0 L/day if the loading rates of the slurry IS increased to 10 L/day. The slurry is made from cow dung (50% cow dung + 50% water).

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Development of E-Learning Media to Increase Mathematics Learning Motivation for College Student of Industrial Engineering Departement Mahendradatta University

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Abstract--The purpose of this research was developed learning media to increase student motivation in Mathematics lecture. This research was a development research conducted at Mahendradatta University with the research subjects was college student in the academic year 2018/2019, Engineering Faculty, Industrial Engineering Departement. For development of e-learning, this research used ADDIE development model that consisted: (1) Analyst (Analysis), (2) Design, (3) Development, (4) Implementation or execution (Implementation), and (5) Evaluation / feedback (Evaluation). Data analyzed were motivational scores obtained from the completion of the motivation questionnaire. Data analysis technique used to determine the effect of e-learning media on mathematics learning motivation was paired t-test. Based on the results of data analysis using paired t-test, showed there was an effect of e-learning media on student motivation in mathematics lecture. In desctriptive analyzed motivation of college students in learning using e-learning was increased. This was indicated by the increase in the average score for filling out the motivation questionnaire before and after using e-learning, from 57,92 to 69,97. Learning with e-learning media certainly gives a positive impression to college student. The purpose of developing this learning was to provide a different learning atmosphere for college student in the Industrial Engineering Departmenet. With the interest in learning media, it will indirectly affect the increase in student motivation.

Keyword -- *e-learning, learning, mathematics, motivation*

I.   INTRODUCTION

Learning in this era has begun to enter the digital age. Learning in Unmar Industrial Engineering college students were mostly still conventional in nature but they involve technology such as learning media. Learning generally only focuses on face-to-face activities in the classroom. As for some of the findings that occur in the field related to the implementation of learning in class were :

1.   Limited learning time which was carried out every week.
2.   Submission of material when face to face can not be delivered optimally, so that not all college students were able to understand the material presented properly.
3.   Diverse ability of college students, so the ability to understand the material between college students was different from one another.
4.   Opportunities for college students to explore problem-solving skills in the classroom were very limited.
5.   The density of lecture material but face-to-face meetings in class were very limited.

Based on these problems, it must choose the right method or learning media that can fix these problems. One alternative that can be used to fix these problems was by implementing e-leraning. This learning is intended to provide unlimited space and time for college students to learn lecture material both currently in the classroom and prior learning. Of course, to facilitate this, learning must be designed so that it can be accessed by all college

students wherever and whenever. E-learning was teaching and learning that uses electronic circuits (LAN, WAN, or internet) to convey learning content, interactions, or guidance [1]. Motivation was a series of efforts to provide certain conditions, so that someone wants and wants to do something, and if he was not like it, then he will try to eliminate or avoid the feeling of dislike [3]. In learning activities, motivation is a driving force within students that causes learning activities and ensures the continuity of learning activities, so that the desired goals of learning subjects can be achieved [4].

II.   METHOD AND PROCEDURE

This research was a research development. The subjects in this study were students of the Industrial Engineering study program Mahendradatta University in the academic year 2018/2019. The development research model used in the development of e-learning was the ADDIE model. The ADDIE model consists of five stages: (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation / feedback (Evaluation) [5].

The results of this development research tested the level of validity and effectiveness. The level of validity of learning media was known through the results of data analysis from: a) validation by technology and information experts b) trials conducted include individual tests, small group tests, and field trials [2]. The expert validation test used is the Gregory Validation test, while the Gregory Validation test criterion was an instrument said to be valid if the r_{xy} value was at least 0.7 [6]. While the level of effectiveness was known through the results of the questionnaire before using e-learning and after using e-learning. Research design to determine the effectiveness of e-learning using one group pretest and posttest design [7]. This design was used in accordance with the objectives to be achieved, namely to know the effectiveness of e-learning in increasing learning motivation. To find out the level of effectiveness of e-learning to increase learning motivation, data were analyzed using Paired T-Test. In this case the proposed hypothesis were:
1. H_0 : There was no difference in students' motivation to learn mathematics before and after using e-learning.
2. H_1: There were differences in students' motivation to learn mathematics before and after using e-learning.

III.   RESULTS AND DISCUSSION

In the implementation stage, this stage consists of several tests, namely individual test, small group test and field test. When using e-learning, the e-learning login process is very important because it aims to determine user authorization [9]. Thus the system can distinguish, whether the user was an admin, teacher, or student. The user enters the username and password in the login box, then the system will authenticate to determine the validity of the username and password. If the login is correct, a web page will be displayed according to the user's type. The validation used was Gregory validation. Based on the calculation results in the Gregory Tabulation table, the value of $r_{xy} = 0.8$ was obtained. Based on Gregory's validation table, the value was in the high category. Therefore it can be interpreted that e-learning was valid and feasible to be implemented. The following are the results of the field test in implementing e-learning showed in Table 1.

TABLE I
THE RESULT OF MOTIVATION SCORE IN FIELD TEST

Motivation	Indiviudal Test	Small Group Test	Field Test
Motivation Before	61,0 (sufficient)	60,3 (sufficient)	57,92 (sufficient)
Motivation After	65,5 (sufficient)	65,7 (sufficient)	69,97 (high)

From the normality test, it can be seen that the significance value of motivation before and after motivation was more than 0.05. Therefore it can be concluded that the data was normally distributed. The next prerequisite test was sample homogeneity test. Homogeneity test used was the Levene's Test for Equality of Variances. From the Levene's Test for Equality of Variances for the motivational value obtained an F value of 1.169 with a numerator dk of 19 and dk of the denominator of 19 with a significance (sig.) of 0.369. Because the significant value was greater than 0.05, the data comes from a homogeneous population. From the results of the test for the normality of the distribution of data and the homogeneity of the variance data of motivation to learn mathematics above, it can be concluded that the data comed from populations that are normally distributed and homogeneous, therefore the requirements for hypothesis testing with Paired T-Test can be fulfilled.

Based on the correlation table, it can be seen that the correlation value is 0.882. This shows that there was a strong and positive relationship between the value of student's mathematics learning motivation before and

after using e-learning. Furthermore, the paired samples test table shows that the significant value was 0,000. This value is less than 0.05, therefore it can cause H_0 to be rejected and H_1 to be accepted. From these results it can be concluded that there were differences in the value of mathematics learning motivation of students before and after using e-learning in classroom learning activities. In addition to using the Paired T-Test, to determine the effectiveness of the use of e-learning in learning is to use a quantitative descriptive test to see the average value of motivation before and after using e-learning. Based on the result of motivation quisioner, it can be seen that the average value of student's mathematics learning motivation after using e-learning increased, from 57.92 to 69.97, which was included in the high category.

Learning by implementing e-learning raised the concept of independent learning. In an era that was completely online demands the world of education to continue to grow, so that learners do not feel bored with conventional learning. With the right direction and guidance of course the implementation of e-learning in the classroom can be used as an alternative solution to increase motivation to learn mathematics. Motivation was essentially a stimulation factor that occurs both internally and externally coming from outside, which in turn will cause humans to experience stimulation or encouragement and then behave and behave [10]. Motivation can foster passion, feelings of pleasure and enthusiasm for learning. Students who have strong motivation, will have a lot of energy to conduct learning activities. This was mean, motivation will determine the intensity of college student learning efforts [4]. Mathematics, known as an abstract and frightening lesson, learned using e-learning makes a different impression among college students. With e-learning it will be develop the interest, based on that, there was an impact on increasing student motivation for learning.

IV. CONCLUSION

Learning by using e-learning is very useful to be applied. Based on the results of the study there are differences between motivation before and after the implementation of e-learning. The average filling of motivation questionnaire before was 57.92 which was included in the sufficient category while the average motivation value after the implementation of e-learning is 69.97 which was included in the high category. The high category in this case means that the response of students to e-learning and its implementation was positive. If seen from the average value of motivation an increase between the values before and after, this showed that the implementation of e-learning in learning is very effective. The e-learning implementation was responded positively by college students. With a positive response of course this will have an impact on student's interest and motivation to learn. With increased motivation for learning, it will indirectly have an impact on increasing mathematics learning outcomes.

ACKNOWLEDGEMENTS

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Development Of Natural And Hybrid Porous Wick For Heat Pipe

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Abstract— This study is aimed to develop natural and hybrid material used as wick heat pipe. The raw material are zeolite and copper powder, grain size 80-100 microns and 177-200 microns respectively. The raw material was fabricated with sintering method at 950ºC for 3 hour. The sintering process for sintered wick is important for its quality. Tests were carried out to determine the microstructure and porosity of the sample. The test results show that the size and type of powder will affect the microstructure, porosity and roughness of the sample, thus affecting the wettability and capillary pumping amount of sample. The natural and hybrid porous wick presented hydrophilic performance, which could achieve the higher capillary performance and rising velocity of working fluid for the wick.

Keywords— zeolite; sintering; microstructure; porosity.

I.   INTRODUCTION

Wick is an important part of heat pipes, especially conventional heat pipes and loop heat pipes. Wick serves to circulate the working fluid continuously in the heat pipe [1]. In order to circulate the working fluid wick must have capillary pumping capability. Capillary pumping will be achieved on a wick with a pore structure [2, 3]. Pore structure that has a small channel will be able to generate capillary pressure so that the working fluid is able to circulate in the wick.

The wick material that is often used is copper [4], aluminum [5], stainless steel [6] or copper alloys with other metals such as Cu-Ni [7], Al-Ti-Mg [8].

Research on the use of wick from biomaterials [9] has been carried out, which is an alternative metal substitute that tends to oxidize during the manufacturing process and when the wick operates.

Various wick structures have been developed to improve the performance of heat pipes, such as grooves [10], meshes [11] and sintered [12] metal powders. Research conducted by Kumaresan [13] comparing the ability between wick sintering and mesh found that wick sintering has the advantage of being able to reduce thermal resistance and increase heat transfer capacity in heat pipes compared to mesh. In this study the sintered wick structure was chosen because zeolite is a natural rock which must be changed to powder first.

In the process of making a heat pipe wick is by sintering the wick material is usually in the form of powder with a certain grain size. The sintering temperature used is the temperature below the melting point of the material to be highlighted. Zeolite is a type of natural rock, of course, has a very high melting temperature, above 1000oC. For this reason, the sintering temperature for zeolite and zeolite-copper hybrid 950oC was determined. Sintering time is the time required by the zeolite to reach its melting point. Sintering time is determined 60 minutes and 120 minutes.

This research aims to design and make wick from zeolite and zeolite-copper hybrids which are sintered for conventional heat pipes. The sintering process between zeolites and copper metals is done with non-uniform grain

sizes. Furthermore, wick zeolite and zeolite-copper hybrid samples will be characterized after preparation. Characterization was carried out to determine the shrinkage and porosity of wick samples.

II.   RESEARCH METHODOLOGY

A.   Sample Preparation

The materials used as wick samples in this study were zeolite and copper. Making a wick heat pipe sample begins with making zeolite powder, by destroying zeolite gravel. The size of zeolite sand is 0.5-1 cm. The zeolite powder is then filtered to obtain grain sizes of 100 µm and 200 µm. The size of copper grains used in hybrid zeolites are 100 µm and 200 µm, the image of zeolite and copper powder is shown in Figure 1. The zeolite powder has an irregular grain shape, while the copper grains are round. The characteristics of the ingredients are shown in Table 1.

The zeolite and copper powder are then processed into slurry. Slurry is a mixture of zeolite powder, copper and binder. Binder is prepared from tapioca flour. The composition of zeolite and binder is 60wt% zeolite and 40wt% binder. Slurry is poured into a copper pipe mold with an inner diameter of 8.58 mm and a length of 65 mm. The slurry must be dried and vacuum before the sintering process. Then the sample is ready for the sintering process.

B.   Sintering Process

The sintering process is carried out based on the powder sintering theory, carried out through three stages of the process namely heating, containment and cooling. During the sintering process the furnace pressure is kept vacuum.

In the heating process the sintering temperature is gradually increased, until a temperature of 950°C is reached. The first stage of sintering is carried out for 40 minutes to reach a temperature of 400°C and held for 20 minutes. The second stage of sintering was carried out for 20 minutes to reach a temperature of 700°C and held for 25 minutes. The third step is the last step to raise the temperature for 25 minutes to 950°C. This temperature holding process is carried out for 60 minutes. And the last process is the cooling process. The cooling process is carried out in the furnace until the furnace initial temperature is reached.

Fig. 1 Zeolite and copper powder

C.   Micro Morphological Analysis

Micro morphology is needed to see the structure and pore distribution of wick samples. Micro morphological testing was performed by Scanning Electron Microscope (SEM). Micro morphological testing was carried out on zeolites and wick samples. Figure 2 shows the zeolite micro morphology which has an irregular grain shape, has many pores and chemical properties. SEM testing on wick samples is carried out on cross sections wick sample.

(a)   (b)
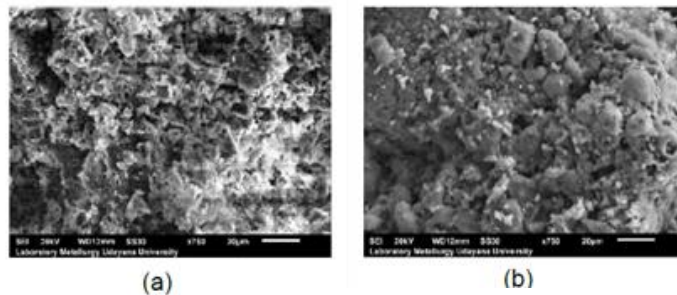
Fig.2 Micro morphology of zeolite and hybrid zeolite-copper
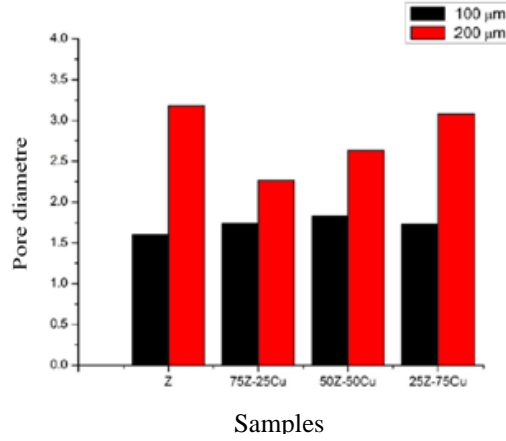
Fig. 3 Distribution of size and shape samples

D. Porosity

Porosity is one of the important conditions that must be owned by the capillary axis. Capillary axis porosity will affect the performance of the heat pipe. Porosity will produce capillary ducts in order to circulate the working fluid from the condenser to the evaporator on the heat pipe [14, 15].

Porosity can be determined based on the Archimedes principle . The measurement method can be done based on the measurement of specific gravity [16]. Where porosity is the ratio between initial wick weight and wick weight saturated by working fluid, as described in the following formula [17]:

$$Porosity(\varepsilon) = \frac{V_{pw}}{V_w} \tag{1}$$

III. RESULT AND DISCUSSION

A. Effect of Temperature and Sintering Time

Samples with a 60 minute sintering time show a denser form, while samples with a sintering time of 120 minutes show a reduced density.

Fabrication of wick samples with a sintering time of 60 minutes produces a solid sample, while sintering with a time of 120 minutes produces a wick sample that is less dense. Longer sintering time causes longer heating and vacuum, so the binder burns and evaporates more so that the structure of the wick sample loses its density.

B. Effects of Micro Morphology

Based on micro morphology, it can be seen the structure and pore distribution of wick samples. Pore structure produced in wick zeolite samples is irregular in shape, this is due to the irregular shape of zeolite grains. The round shape of Cu and the irregular shape of zeolite will affect the pore structure that is formed. Pore structure that is formed will be more dominant to be irregular. This can be seen in Figure 2.

Based on micro morphology, porosity from wick samples can be determined, as shown in Figure 4. Porosity in wick samples with a grain size of 100 µm has a greater porosity than a wick sample with a grain size of 200 µm. The average diameter of a smaller pore, which is owned by a 100 µm sample with a large amount of pore volume, causes a 100 µm sample to have high porosity. Whereas a sample of 200 µm in average pore diameter is larger with smaller pore volume, causing lower porosity.

Based on the porosity measurement results, wick samples with grain size of 100 can be recommended as wick heat pipes.
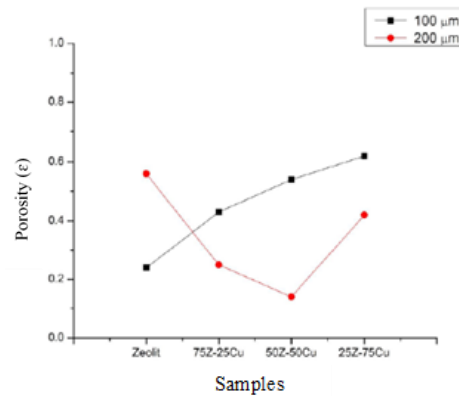
Fig. 4 Porosity of wick samples

IV. CONCLUSION

This research studies the effect of powder shape and powder size of the material used, the process of making wick samples, and the process of sintering on the micro morphology of wick samples. Analysis is carried out to optimize wick material and design. The conclusions that can be drawn are as follows:

1. The shape and size of the powder greatly influences the distribution and size of the pores that make up the wick sample.
2. The time of the sintering process affects the density of the wick sample. The right time makes the wick sample denser and reduces shrinkage.
3. Distribution and pore size of wick samples with 100 µm powder size have better porosity than wick samples with 200 µm powder size. This porosity is a requirement that must be fulfilled wick heat pipe. Porosity will affect the performance of the heat pipe.

ACKNOWLEDGMENTS

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The Influence of Product Innovation, Market Orientation, and E-Commerce Adoption on Competitive Advantage and Marketing Performance

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Abstract—A market-oriented company that innovates on a product is believed to be able to improve marketing performance. This study aims to determine the effect of product innovation, market orientation, and e-commerce adoption on competitive advantage and marketing performance in Balinese souvenir producers in Denpasar. The sampling method in this study is non probability sampling with purposive sampling technique. Data was collected from 100 respondents who met the criteria of a typical Balinese souvenir producer in Denpasar who had used e-commerce. The analytical method used is path analysis estimated using statistical application software. The results showed that product innovation has a positive and significant effect on competitive advantage; market orientation has a positive and significant effect on competitive advantage; e-commerce adoption has a positive and significant effect on competitive advantage; product innovation has a positive and significant effect on marketing performance; market orientation has a positive and significant effect on marketing performance; e-commerce adoption has a positive and significant effect on marketing performance; and competitive advantage has a positive and significant effect on marketing performance.

Keywords: competitive advantage, e-commerce adoption, market orientation, marketing performance, product innovation.

I. INTRODUCTION

Tourism is one of the development sectors developed by the government because it has an important role in Indonesia's development, especially as a foreign exchange earner in addition to the oil and gas sector. Bali is one of the most well-known international tourist destinations in the world. The tourism sector has been a driving force for the economy and development in Bali since the 1970s. Therefore tourism is a very close and inseparable part of community life and development in Bali.

The development of Bali tourism makes the need for tourists for Balinese souvenirs is increasing. This increasing need has an effect on increasing the production of Balinese souvenirs every year. This is a measure of the marketing performance of the typical Balinese food souvenir manufacturer. Marketing performance is a measure of the success of a company that is measured every time period that has been determined (Basuki and Widyanti, 2014). Marketing performance is something that is used to measure the success of strategies used by companies in marketing their products in the market (Mulyani, 2015). This result can be said as the value of each activity that has been compiled and implemented to be able to identify whether the strategies made and their implementation are appropriate or even vice versa. In conducting marketing performance, it cannot run without regard to market orientation to get good performance results. Conducting market orientation is important for companies in line with increasing global competition and changes in customer needs where companies realize that they must always be close to their markets (Bakti and Harun, 2011).

According to Pertiwi and Siswoyo (2016), market orientation is a condition where a company makes a decision based on real conditions in the market and approaches the market by researching and understanding applicable values. Market-oriented companies are companies that make customers as the center for running their business, meaning companies that always try to understand what their customers need and want (Utaminingsih, 2016). According to Guspul (2016), companies that have made market orientation an organizational culture will be based on external basic needs, market wants and demands as the basis for developing strategies for each business unit in the organization and determining marketing performance.

In addition to market orientation, innovation is also one of the strategies in improving marketing performance (Guspul, 2016). Product innovation is needed to meet market demand so that product innovation can be used as a competitive advantage of a company (Asashi and Sukaatmadja, 2017). According to Haryanti and Nursusila (2016), product innovation is a product creation process that starts from the market stage that relies on evaluating customer needs, creating ideas, developing processes or introducing new products.

The rapid development of information technology has also affected the company's marketing activities which have shifted from conventional to digital methods. Adoption of e-commerce is an action that can be taken by companies to anticipate the progress of information technology in business activities. Some research results show that e-commerce adoption increases the company's marketing performance.

This research was conducted because the findings from previous studies about the effect of product innovation, market orientation on marketing performance with different results. In the research of Narastika and Yasa (2017), it states that product innovation and competitive advantage play a mediating relationship between market orientation and marketing performance. The results of Julina and Kusuma's research (2017) state that market orientation has a positive and significant effect on marketing performance. However, the results of the study of Setyawati and Harini (2013) state that market orientation does not positively influence marketing performance.

Based on the background of the problem, a study was carried out to determine the effect of product innovation, market orientation, and e-commerce adoption on competitive advantage and marketing performance at Bali Typical Food Producers in Denpasar City.

II. METHODS AND PROCEDURES

The analysis conducted in this study is the effect of product innovation, market orientation, and e-commerce adoption on competitive advantage and marketing performance. Thus, the research conceptual framework that links between variables is as shown in Figure 1.
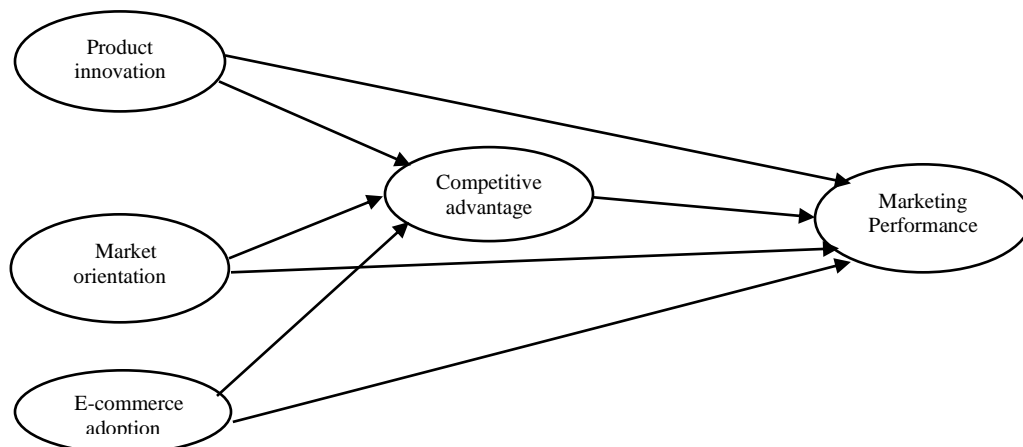
Fig.1 Research Conceptual Framework

Several literature reviews show that product innovation, market orientation, e-commerce adoption, and competitive advantage have a positive and significant effect on company performance. Yulimar (2006) research examines the relationship between e-commerce adoption and company performance where empirical evidence is obtained that the relationship between the two variables is proven so that it can be concluded that the higher the adoption of e-commerce, the company's performance will increase. The results of this study are in accordance with the research of Venkat (2000) and Kraemer et al. (2002). Whereas Ibrahim et al. (2016) states that e-commerce adoption has a positive and significant effect on competitive advantage in Small and Medium Enterprises in the United States and Egypt, the higher the rate of e-commerce adoption, the more competitive advantage increases.

Based on previous empirical studies, the following hypotheses can be compiled: H1: Product innovation has a positive and significant effect on competitive advantage. H2: market orientation has a positive and significant effect on competitive advantage. H3: adoption of e-commerce has a positive and significant effect on competitive advantage. H4: Product innovation has a positive and significant effect on marketing performance. H5: market orientation has a positive and significant effect on marketing performance. H6: e-commerce adoption has a positive and significant effect on marketing performance. H7: competitive advantage has a positive and significant effect on marketing performance.

This study uses a path analysis technique. Path analysis is an extension of multiple linear regression analysis that is useful for estimating causality relationships between variables (Pracher & Hayes, 2004). Path analysis techniques will be used in testing the amount of contribution expressed by the path coefficient on each path diagram of the causal relationship or causal relationship that occurs between the independent variable with the dependent variable.

To test the role of mediating variables in influencing the relationship between the independent variable and the dependent variable, the Sobel test was used. Testing the mediation hypothesis with the Sobel test is done by a procedure developed by Sobel (Suyana Utama, 2016).

III. RESULTS

Characteristics of respondents seen from gender, age, last education, position of the respondent, type of SME business, legal entity SMEs, place of business, number of employees, and length of using e-commerce as shown by Table 1.

TABLE I.
Characteristics of respondents

No	Characteristics	Information
1	UKM legal entity	
	• PT	9.4%
	• CV	18.8%
	• Cooperative	3.5%
	• UD	27.1%
	• Others	41.2%
2	Place of business	
	• At home	47.1%
	• At your own business place	52.9%
3	Number of employees	
	• 1-10	81.2%
	• 11-50	14.1%
	• 51-100	3.5%
	• 101-200	0%
	• More than 200	1.2%
4	Long time using *e-commerce*	
	• In the past year	35.3%
	• Between 1-3 years ago	44.7%
	• More than 3 years	20%
5	Gender	
	• Men	61.2%
	• Woman	38.8%
6	Education	
	• SMA / SMK	57.6%
	• Diploma	10.6%
	• S1	28.2%
	• S2	3.5%
7	Position of respondent	
	• Owner	58.8%
	• Manager	7.1%
	• Owners and managers	23.5%
	• Others	10.6%

Source: Data processed, 2019

Discussion of Hypotheses: (i) Hypothesis 1 testing obtained the level of significance of the two-sided t test for product innovation variable of 0.00 less than 0.05 with a positive regression coefficient of 0.746. This shows that H_1 is accepted, which means that product innovation has a positive and significant effect on competitive advantage. This positive influence means that the more innovative the product, the more competitive advantage of Balinese

souvenir producers in Denpasar. (ii) Hypothesis 2 testing obtained the significance level of t two-tailed test for market orientation variable of 0.00 smaller than 0.05 with a positive regression coefficient of 0.568. This shows that H_1 is accepted, which means that market orientation has a positive and significant effect on competitive advantage. This positive influence means that the better the market orientation, the more competitive advantage of Balinese souvenir producers in Denpasar. (iii) Hypothesis 3 testing obtained the level of significance of two-tailed t test for e-commerce adoption variable of 0.00 smaller than 0.05 with a positive regression coefficient of 0.792. This shows that H_1 is accepted, which means that e-commerce adoption has a positive and significant effect on competitive advantage. This positive influence means that the more the adoption of e-commerce, the more competitive advantage of Balinese souvenir producer in Denpasar. (iv) Hypothesis 4 testing obtained the significance level of t two-tailed test for the product innovation variable of 0.00 smaller than 0.05 with a positive regression coefficient of 0.464. This shows that H_1 is accepted, which means that product innovation has a positive and significant effect on marketing performance. This positive influence means that the more innovative the product, the more the marketing performance of Balinese souvenir producers in Denpasar. (v) Hypothesis 5 testing obtained the level of significance of t two-tailed test for market orientation variable is 0.00 smaller than 0.05 with a positive regression coefficient of 0.413. This shows that H_1 is accepted, which means that market orientation has a positive and significant effect on marketing performance. This positive influence means that the more market orientation increases the marketing performance of Balinese souvenir producers in Denpasar. (vi) Hypothesis 6 testing obtained the significance level of t two-tailed test for e-commerce adoption variable is 0.00 smaller than 0.05 with a positive regression coefficient of 0.564. This shows that H_1 is accepted, which means that e-commerce adoption has a positive and significant effect on marketing performance. This positive influence means that the more the adoption of e-commerce, the increasing marketing performance of Balinese souvenir producers in Denpasar. (vii) Hypothesis 7 testing obtained the significance level of t two-tailed test for market orientation variables is 0.00 smaller than 0.05 with a positive regression coefficient of 0.613. This shows that H_1 is accepted, which means that competitive advantage has a positive and significant effect on marketing performance. This positive influence means that the more competitive advantage increases the marketing performance of Balinese souvenir producers in Denpasar.

IV. CONCLUSION

The conclusion of this research is stated as follows: (i) Product innovation has a positive and significant effect on competitive advantage. Increasing product innovation increases competitive advantage of Balinese souvenirs producers in Denpasar. (ii) Market orientation has a positive and significant effect on competitive advantage. Increasing the quality of market orientation increases the competitive advantage of Balinese souvenirs producers in Denpasar. (iii) E-commerce adoption has a positive and significant effect on competitive advantage. Increasing adoption of e-commerce will increase the competitive advantage of Balinese souvenirs producers in Denpasar. (iv) Product innovation has a positive and significant effect on marketing performance. (v) Market orientation has a positive and significant effect on marketing performance. (vi) E-commerce adoption has a positive and significant effect on marketing performance. (vii) Finally, this study concludes that the role of competitive advantage significantly mediates the influence of product innovation toward marketing performance, market orientation toward marketing performance, and e-commerce adoption toward marketing performance of Balinese souvenir producers in Denpasar.

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The Effectiveness Of Traditional Market Revitalization (Case Study In Pasar Badung, Denpasar)

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Abstract—Traditional market revitalization policies are important to be implemented as there is unhealthy competition between traditional markets and modern markets. Revitalization of traditional markets is one of government's efforts in overcoming the weaknesses of traditional markets by reforming traditional markets as a whole, starting from improving the physical environment to market management. The purpose of this study was to determine the effectiveness of revitalization in traditional markets (case study in Badung market, Denpasar). The results of the study showed that revitalized Badung Market had a positive impact on the increase in the number of consumers shopping at PasarBadung. Thus, Badung Market revitalization was very effective in increasing the number of consumers shopping in Traditional Markets.

Keywords—Effectiveness, Traditional Market, Badung Market

I. INTRODUCTION

Economic growth is an important problem for every country in the world regardless of the country's economic structure (Alp Ozel et al., 2013). Trade center is one of indicators of economic activity in the community. According to its physical form, trade center is divided into two, namely traditional trade center and modern shopping center (Ayuningsasi, 2010). As time goes on and advanced technologies are provided, the market is not only a place for buying-selling transactions for society around the market, what lies beyond is that the market has become a means of driving the economy on a large scale (Nidya in Mirah, 2013).

The existence of modern markets such as retail industry is one of the strategic service industries that are very important in improving the economy. This field was able to absorb workforce up to tens of millions of people, however politician from Sampang noted that the retail presence could be managed well and did not threaten traditional markets. This is the reason that triggered Government to revitalize traditional markets. According to the type, market is divided into traditional markets and modern markets.

The fact that is happening now is the occurrence of unhealthy competition between the two. This will have an impact on the existence of traditional markets if it is not considered, because the number of modern markets is expected to continue to grow every year. The rapid development of the modern market is felt by many parties. It has

an impact on the decline in the number of sales of traditional traders so that they will potentially lose the profession as traditional traders. The research conducted by Nielsen (2005) shows that since the emergence of the modern market in 2001, the contribution of modern market turnover which only began 24.8% increased to 34.4% in June 2006 and vice versa on the traditional market the turnover decreased from 75.2 % in 2001 to 65.6% in June 2006.

The existence of a modern trade center has disturbed the existence of traditional markets. The similarity of functions owned by modern shopping centers and traditional markets has led to competition between the two. The rapid growth of modern shopping centers is feared to turn off the existence of traditional markets which are a reflection of popular economy. The biggest weakness of traditional markets is identical to its conditions that are dirty and smelly, resulting in inconvenience in shopping (DwiPerwira, 2017). The development of modern markets has resulted in increasingly marginalized traditional markets, which leads to a condition where small capital traders who will certainly be unable to compete with large investors (Rinda, 2014).

Market revitalization also needs to be done in order to re-attract traditional shopping consumers due to behavioral changes. Because today's modern society is reluctant to shop in traditional markets that seem slum, and prefer shopping in a comfortable place. As traditional markets start to attract consumers, the opportunities for micro, small, and medium enterprises (MSMEs) rises. This is because traditional market manager often does a partnership with MSMEs.

With revitalization, the existence of traditional market will remain strong and its competitiveness towards modern markets can increase so that it can advance people's economy. The existence of traditional markets must be maintained and preserved because there are values that are not found in modern shopping centers. One way that the government does to reduce the impact of the rapid development of modern markets is revitalizing traditional markets. Traditional market revitalization is carried out by reforming traditional markets as a whole, starting from revamping the physical environment, arranging market management, to improving the quality of human resources (Ayuningsasi, 2013). Revitalization of traditional markets was conceived with the intention of solving all the problems inherent in traditional markets which caused traditional markets to be managed without significant innovation, so that the market situation became uncomfortable and competitive (Kasali, 2007).

The research objective to be achieved in this study is to find out the Effectiveness of Traditional Market Revitalization (Case Study of Badung Market, Denpasar).

II.   LITERATURE REVIEW

A.   Concept of Market

Indonesia as a developing country, the industrial sector is a top priority in economic development. As a place where many industries meet, it is very important to maintain and develop the existence of traditional markets to improve the country's economic development. Community economic activities both in terms of production, distribution, and consumption are closely related to market activities. Market is a meeting place for sellers and buyers. The market is used as a place or location for people who have the need to be satisfied, have money to spend, and the willingness to spend money. It is a very important role in economic development in various aspects

including: 1) Essentially, market is a physical place where buyers and sellers gather to exchange a number of certain goods and services 2) For economist, the market means all buyers and sellers who sell and make transactions on certain goods and services. In this case, the economists are more interested in the structure of the market, behavior, and performance of each market 3) For marketer, the market is a set of all real buyers and potential buyers of a particular product (Kotler & Keller, 2006).

B. Concept of Revitalization

Market revitalization is a process that must be passed by traditional markets in the competitive era of globalization. Revitalization is an effort made to revitalize an area or part of a city that used to live, but was degraded by the times (Danisworo&Martokusumo, 2000). It is expected to increase traditional market competitivenessresulting the ability to compete with modern market. Common problems faced by traditional markets include large number of traders who are not accommodated, traditional markets have slum impression, ready-to-eat goods have a less hygienic impression, modern and growing shopping centers are serious competitors for traditional markets, low awareness of traders to develop its business and occupy a predetermined location, the number of markets that are not operating optimally, the low awareness of paying retribution, and there are still markets whose activities are only on market days (Kuncoro, 2013). Revitalization of traditional markets carried out by the government not only takes into account market conditions, trading volume in the market, availability of land used for market repairs, and design of market improvement plans, but it is also necessary to limit the growth of the modern market. Revitalization of traditional markets without limiting the growth of modern markets will not have a significant effect if the government revitalization program is only in the form of physical improvements without improving regulation. The ultimate goal to be achieved by revitalization is prosperity for the entire community. Society must realize that shopping in traditional markets is no longer considered outdated.

III. RESULTS AND DISCUSSION

Calculation of the effectiveness of the implementation of the traditional market revitalization program in Badung Market used effectiveness analysis. Based on the cumulative calculation of the effectiveness of traditional market revitalization programs on the income of traders, market management, and the number of visitors at the Nyanggelan Market in Panjer Village, it can be said that this program runs very effectively or at 83.83%. This is because the market was officially opened to the public on March 22nd 2019 which was inaugurated directly by President Joko Widodo, so that the market revitalization program has been running for approximately 3 months (at the time the research was being conducted). It was during these 3 months that market managers and traders adapted to the atmosphere of a newer and more comfortable market. The main problem in the running of the revitalization program is to change the mindset and trading behavior. Some traders still have limited knowledge regarding capital management, how to sell, how to satisfy customers, and also traders often pay less attention to the cleanliness of their trading environment.

After being revitalized, merchants' booths are reorganized to make it look neater. Traders are grouped based on the type of goods sold, traders who obtain a booth in the front line are more accessible to consumers resulting increased income. Limited space for peddling goods makes traders find it difficult to expand their business,

as well as the small amount of capital owned by traders. This is in line with the research conducted by Ayuningsasi (2010) regarding income analysis before and after the traditional market revitalization program at SudhaMerthaSidakaryaMarket, which resulted that this program was less significant related to the increase in merchant income due to limited capital and selling position changes. This research was also supported by DewiWijayanti (2008) regarding the impact of market revitalization on social interactions and income in the LegiBlitar Market. The decrease in income is felt by traders who obtain less strategic booth, while traders who obtain strategic locations experience an increase in income.

In the success of this revitalization program, there are still some weaknesses in market management. The weakness that often arises in a market management system is the lack of coordination between each member of the market manager who often works arbitrarily.To overcome this kind of problems, training is needed for market managers, as well as Standard Operational Procedure (SOP) to measure performance of market manager.

IV. CONCLUSIONS AND RECOMMENDATIONS

In carrying out socialization activities regarding traditional market revitalization programs, it needs to be done clearly and in detailed, and pre-published to traders. In terms of the process, traders are dissatisfied with the response of officers who are still slow in dealing with problems faced by officers due to the lack of market officers, to overcome this, more competent market officers must be hired to respond quickly to complaints from traders. For the implementation of monitoring activities, it needs cooperation from more independent and scheduled external parties so that traders can find out that there are monitoring activities. In terms of output, market management needs to be evaluated to achieve better performance.The physical condition of the market also needs to be maintained on an ongoing basis to create a sense of comfort and so that more visitors are interested in shopping at PasarBadung, Denpasar.

In terms of increasing the number of visitors, this program has been said to be successful in attracting visitors to go back to shopping in traditional markets that are packaged more modernly. This must be maintained to increase competitiveness with the modern market. The interest in shopping for consumers in traditional market should be maintained by doing promotions, lottery prizes from visitor parking tickets, and so on.

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Ergonomic Study on Cooling Process in Steamed Sponge Cake Industry in Denpasar

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Abstract— Steam cake industry has economic potential in Bali. High market demand requires the industry to produce maximum steamed cake and ignore the health aspects of its workers. The working process complained by the workers is caused by using unergonomic tools resulting in repetitive movement. Objective: The purpose of this study is to find ergonomic problems on cooling process in steamed sponge cake industry. Technology or Method: This cross-sectional study observed 7 workers on cooling process in steamed sponge cake industry in Denpasar. The study was conducted in June 2019. Measurement of workload was using pulse, musculoskeletal complaint using Nordic Body Map questionnaire, and fatigue using reaction time. Results: The result of this research founded that work pulse rate was 100.72 ± 2.14 times per minute, Nordic Body Map's score was 31 ± 0.58, reaction time after working was 294.86 ± 44.38 milli seconds, and production time for 12 baking sheets was 9.31 ± 0.25 minutes. Working pulse indicates moderate workload. Worker. The biggest in musculoskeletal complaint scores is in the right lower arm and right shoulder. Conclusions: It can be concluded that there were still ergonomic problems on cooling process in steamed sponge cake industry in Denpasar. Clinical Impact: It needed ergonomic improvement to eliminate the repetitive movement.

Keywords— Cooling Process, Denpasar, Ergonomic Study

I. INTRODUCTION

Urban communities are getting busy these days. In addition to having to work, they also must be active in customary activities, especially people in Bali. Most people in Bali, especially people in the Denpasar City anticipate this situation by utilizing the supply industry of offerings such as *canang, banten*, and cakes for offerings. Cakes that commonly used for offerings are *jaje uli, jaje begina, dodol*, steamed sponge cake, and so forth.

Increasing the need of steamed sponge cake occurs especially during holy days of Hinduism in Bali such as *Purnama, Tilem, Galungan, Kuningan,* and *Pagerwesi*. The high demand for steamed sponge cake in Denpasar has made this industry a potential industry. The steamed sponge cake industry in Denpasar is a home scale industry where the number of workers is less than four. This industry has not considered ergonomic studies such as aspects of the task, organization, environment, so the potential for work accidents and health problems is still large [1]. Activities that using non-ergonomic equipment may cause injury or pain in the muscles and joints of the worker [2].

The work process of steamed sponge cake industry has found many ergonomic problems such as bending posture when lifting tools and dough, repetitive movements during pouring dough and cake wrapping process, heat exposure from stove during steaming process, lack of job safety information, and so forth. Steamed sponge cake industry is still managed in a simple way and not yet have good regulation so that potential health problems that can arise greater [1].

Workers complain about the process on cooling process. Non-physiological work process such as repetitive movements and static work postures are the cause. Repetitive movements can cause musculoskeletal complaints. The pain that arises from repetitive motion can also cause slower movement as well as errors in performing certain movements. The purpose of this study is to find ergonomic problems on cooling process in steamed sponge cake industry.

II. METHOD

The research was conducted at one of steamed cake industry in Denpasar. This cross-sectional study observed 7 workers on cooling process in steamed sponge cake industry. The study was conducted in June 2019. Measurement of workload was using pulse, musculoskeletal complaint using Nordic Body Map questionnaire, and fatigue using reaction time.

III. RESULT AND DISCUSSION

This research founded that work pulse rate was 100.72 ± 2.14 times per minute. The working pulse is classified as medium workload. Repetitive movements need more energy and increase the workload. Several results found that ergonomic approach can decrease the working pulse rate. Decrease in the work pulse rate due to the ergonomic approach is caused by efficiency of energy use so that it can reduce the workload as measured through the work pulse rate. Research found a decrease in workload of 21.43% on the modification of ergonomics-based conditions *Tri Hita Karana* to rice milling workers [3], decrease in workload on hybrid solar drying research considering the ergonomic aspects of the dodol industry in Bali by 15.3% [4], total ergonomic applications can reduce the workload of workers by 21.69% in earthenware workers in Bantul [5], modification of ergonomic-based cattle feed tools can reduce the workload of workers by 13.7% in broiler farm workers [6].

Nordic Body Map's score was 31 ± 0.58 points. The biggest in musculoskeletal complaint scores is in the right lower arm and right shoulder. Repetitive movements can cause these complaints. To solve the problem, we need ergonomic approach. Several results found that ergonomic approach can decrease musculoskeletal complaints. Improved working posture make the muscles contract naturally so that the muscle pain can be reduced [7]. A decrease in musculoskeletal complaints of 5.53% was reported in a study of improved working conditions with a total ergonomic approach to metal craftsmen in Kediri [8], decreased musculoskeletal complaints on traditional coconut oil makers in Nusa Penida Village [9], total ergonomic applications can reduce workers' musculoskeletal complaints by 87.8% in earthenware industry workers in Bantul [5], intervention with ergonomic approach (stretching and sweet tea) can reduce musculoskeletal complaints of tailor by 24.98% [10], ergonomic approach intervention (giving Pilates exercise and modification of working conditions) can decrease musculoskeletal complaints by 31.6% in batik workers [11].

Reaction time after working was 294.86 ± 44.38 milli seconds. Repetitive movement cause higher workload that can lead to worker fatigue. Ergonomic-based tools are needed so workers could work more efficiently so that energy use by the body is lower and eventually fatigue can be reduced. Several results found that ergonomic approach can reduce fatigue. There was a 6.79% fatigue decrease in the improvement of working conditions with a total ergonomic approach to metal craftsmen in Kediri [8], ergonomic participatory interventions were able to reduce fatigue by 12.9% through Ladle-Kowi redesign in metalwork industry workers [12], decreased musculoskeletal complaints on traditional coconut oil makers in Nusa Penida Village [9], total ergonomic applications can reduce worker fatigue by 77.5% in earthenware industry workers in Bantul [5], intervention with ergonomic approach (stretching and sweet tea) can decrease worker fatigue by 27.06% in tailors [10].

After the steaming process, the steamed sponge cake should be cooled before they are wrapped. The worker will take the steamed sponge cake one by one, then putting the steamed sponge cake on the cooling tray. This activity is quite time consuming. Production time for 12 baking sheets was 9.31 ± 0.25 minutes. The shorter time required to complete the job the better productivity that can be. Several results found that ergonomic approach can increase productivity. Increased productivity gained due to improved physiological response, faster processing time, as well as an increase in the amount of production. Increased productivity gained by 6.79% on improving working conditions with a total ergonomic approach to metal craftsmen in Kediri [8], a 54.95% increase in productivity on the use of a solar dryer with a Techno-Ergonomic approach to dodol making in Singaraja [13], total ergonomic

applications can increase worker productivity by 59.49% in earthenware industry workers in Bantul [5], ergonomic intervention (stretching and sweet tea) was also reported to increase worker productivity by 66.67% in tailors [10]. Modification of ergonomic-based cattle feed tools can increase the productivity of workers by 58.6% in broiler farm workers [6].

IV. CONCLUSION

It can be concluded that there were still ergonomic problems on cooling process in steamed sponge cake industry in Denpasar. For clinical impact, it needed ergonomic improvement to eliminate the repetitive movement.

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Experimental Study on Mechanical Properties of Various Materials of Masonry

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Abstract—Research carried out on reinforced concrete structure with infill walls (RDP) has indicated that the mechanical properties of infill wall material (masonry) such as compressive strength and modulus of elasticity are very influential on overall structural behaviour. In this study, testing was carried out in the laboratory using local materials to obtain mechanical properties from a variety of masonry materials made of clay bricks, lightweight bricks, and concrete blocks. Thus mechanical properties are not yet available in the reference books or Indonesian national standards for designing RDP buildings so that later the results of this study can be used as a reference in designing. The test was carried out according to SNI 15-4164: 1996. The test results were compared with the predicted compressive strength and modulus of elasticity calculated based on BS EN 1996-3: 2006. Testing was also carried out on the quality of mortar used. Mortar with a ratio of 1:3 gives a greater compressive strength compared to 1:4. Among the three types of test specimens, the material made of clay bricks has the highest compressive strength. The compressive strength of 1:3 brick masonry is similar to lightweight brick masonry. The value of the compressive strength of the masonry test results is smaller than the predicted value. The modulus of elasticity of concrete block masonry is the highest, followed by lightweight brick and clay brick.

Keywords— Clay brick, compressive strength, concrete block, lightweight brick, modulus of elasticity.

I. INTRODUCTION

Walls in buildings generally function as a divider between rooms and are not counted as structural elements. The results of the study by [1] showed that the structure of the infill wall frame structures (RDP) was able to increase its strength in resisting the base shear forces caused by the earthquake and also reduce the amount of displacements caused by lateral loads. The behavior of the RDP structure is influenced by the infill wall material (masonry) both in size and properties. The existence of this DP is able to increase the strength and stiffness of the structure when compared to an open structure (open frame). DP material is very diverse types. Most walls in low rise building (2-5 stories) is made of clay bricks. From a number of studies, it can be seen that the DP material varies greatly in size and properties, namely the compressive strength and modulus of elasticity of the local red brick [2], [3].

In designing the RDP, compressive strength and modulus of elasticity of the masonry are mechanical properties required. In Indonesia, there is no standard value of the property of masonry and their forming material. In general, the manufacture of clay brick units is produced manually with a simple process so that the material characteristics are not uniform. Due to technological developments and innovations, currently many new units are produced as wall-forming materials such as lightweight bricks and concrete blocks. Research by [4] with samples taken from a local brick-making site in Cikarang, Jakarta showed that the average modulus of rupture of bricks was 3.0 MPa. The study was also carried out on brick masonry by using 2 (two) different types of mortar with cement and sand ratios

of 1:3 and 1:4. From thus studies it was concluded that mortar with greater compressive strength results in stronger compressive strength of brick masonry. Research related to the testing of brick masonry from producers in Bali was conducted by [3] the compressive strength values obtained from brick masonry using 1: 4 mortar with clay brick units from Gianyar, Tabanan, and Negara respectively were 1.22, 1.32, and 1.42 N/mm^2. Other tests also conducted by [5] on testing compressive strength of masonry made of local clay brick from Tulikup Gianyar. The compressive strength values of masonry with 1:3 and 1:4 mortars are 1.6 N/mm^2 and 1.28 N/mm^2, respectively

This paper presents an experimental study on the property of the wall material made of masonry. The unit to form masonry is made of clay brick, lightweight brick, and concrete block and mortar with a mixture of 1:3 and 1:4. The aim of this research is to evaluate and add information on the compressive strength of the unit (clay brick, lightweight brick, and concrete block), mortar, and masonry. The behavior studied included the compressive strength of the masonry, modulus of elasticity, and crack patterns.

II. METHOD

A. Units

The compressive test of bricks according to SNI 15-0686-1989 [6] was performed on 30 whole bricks and the pressed surfaces were cast with a 6 mm mortar mix. For lightweight bricks and concrete blocks, the compressive stress was conducted using 5 specimens in accordance with SNI 03-0348-1989 [7].

The top and bottom surfaces of the concrete bricks are also cast with mortar as in the clay brick test. After the material has hardened the sample was soaked in clean water (room temperature) for 24 hours. On testing day, the test material was lifted from the water and dried with a damp cloth to remove excess water. Compressive strength of the sample is derived from the maximum load and unit surface area.

B. Mortar

Mortar compressive strength testing is carried out on cube-shaped specimens with a size of 50 x 50 x 50 mm in accordance with SNI 03-6825-2002 [8] with a mixture of Portland cement, sand, and water. Two types of mortar were made where six samples were prepared for each mortar type. The ratio of cement and sand was 1:3 and 1:4. Maximum load test were recorded and the value is divided by loading surface area in order to determine the compressive strength of mortar.

C. Masonry

Masonry compressive strength testing is carried out in accordance with BS EN 1052 - 1: 1999. The dimensions of the wall test material are determined using the brick unit length (lu) and unit height (hu) while the thickness of the wall test material is made as thick as the unit without plaster. The test material on both loading surfaces was applied/flattened using a mortar mix with a 1: 3 mixture or higher compressive strength material. The specimens were covered with a damp cloth to keep it dry and ready for testing on 28-day of age.

During the compressive test, the strains were also measured using dial gauge. The relation between stress and the corresponding strain were later used to calculate the modulus of elasticity of masonry. Three specimens were prepared for each type of masonry.

III. RESULTS AND DISCUSSION

Tests carried out on 1: 3 and 1: 4 mortars resulted in compressive strengths of 24.4 N/mm^2 and 13.37 N/mm^2, respectively. The size of the Tulikup caly brick is length (P) 225 mm. width (b) 110 mm and thickness (t) 51 mm Tests carried out on clay brick, lightweight bricks, and concrete blocks resulted in compressive strengths of 5.15 N/mm^2, 1.16 N/mm^2, and 1.55 N/mm^2, respectively.

Compressive strength of the masonry is defined as the maximum load divided by the loaded surface area which causes the masonry to collapse. The load that causes the specimen to no longer be able to withstand the applied load is recorded during the test. Table 1 shows the test results i.e. the weight of the masonry (W), the failure load (F$_i$, max), the compressive strength of each specimen (f$_i$), the average compressive strength (f$_i$ average) and the characteristics compressive strength of masonry (f$_k$).

TABLE I

COMPRESSIVE STRENGTH AND MODULUS ELASTICITY OF MASONRY

Specimens	W (kg)	Weight Volume (kg/m³)	F_i,max (N)	f_i (N/mm²)	f_i, average (N/mm²)	f_k (N/mm²)	Modulus Elasticity (N/mm²)	Modulus Elasticity, average (N/mm²)
BM13 A	32.1	2499	82.5	2.01	1.92	1.60	113.02	
BM13 B	30.7	2166	83.0	1.83			253.34	155.94
BM13 C	30.8	2419	79.0	1.93			101.46	
BM14 A	30.2	2144	77.5	1.71	1.54	1.28	305.23	
BM14 B	31.2	2228	65.0	1.44			65.28	186.71
BM14 C	30.4	2369	60.0	1.46			189.59	
BT13 A	73.3	1628	96.0	1.37	1.43	1.19	615.62	
BT13 B	73.7	1639	113.0	1.61			478.06	489.66
BT13 C	72.8	1604	93.0	1.32			375.30	
BT14 A	73.5	1598	95.0	1.32	1.23	1.02	345.08	
BT14 B	73.3	1602	75.0	1.05			251.40	565.65
BT14 C	73.6	1623	92.5	1.31			1100.46	
BR 1	36.9	671	-	-	1.44	1.20	-	
BR 2	36.5	661	135.0	1.50			297.87	279.14
BR 3	36.7	667	125.0	1.39			260.41	

From Table 1 it can be seen that the characteristic compressive strength of the clay brick masonry BM13 (1.60 N/mm²) is lower than BM14 (1.28 N/mm²). The characteristic compressive strength of BT13 and BT 14 are 1.19 N/mm²and 1.02 N/mm², respectively. The characteristic compressive strength of the lightweight BR masonry is 1.20 N/mm².

In BS 5628-1-1992 [9], the characteristics compressive strength of clay brick masonry is given graphically and also in a table. The value can be determined using data of mortar designation and compressive strength of units. By using data of test results and plotted them into a graphic in BS 5628-1-1992 [9], the compressive strength of the clay brick masonry is of 2.5 N/mm². However, when it is compared with the test results, the value is higher. It shows that the local clay brick strength is much lower than those in The UK, although the mortar strength is in comparable.

In BS 5628-1-1992, it can be estimated also the characteristic compressive strength value of concrete block masonry using graphs. The estimated value of the compressive strength of concrete block masonry is of 0.65 N/mm² and lightweight brick masonry is of 0.84 N/mm². When compared with the characteristic compressive strength values by direct testing, these values have smaller compressive strength values.

The stress strain diagram obtained from the experiment is shown in Figure 1. The five types of masonry are plotted in one figure. It can be seen that the highest modulus value is generated by BT14. However, from Table 1 it can be seen that the modulus values of the three BT14 specimens have considerable differences. This means that the masonry material is not homogeneous. The modulus value of BT14 is also greater than BT13. Masonry made of clay bricks gives the smallest modulus value.
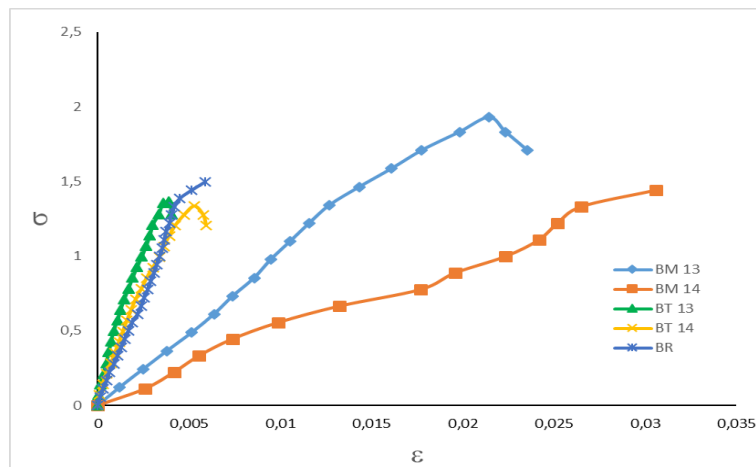
Fig. 1 The stress-strain diagrams of five different masonry.

IV. CONCLUSION

Tulikup clay brick has a compressive strength of 5.15 N/mm^2 with 34% water absorption. According to SNI 15-2094-2000 it is a brick of class 50 and according to BS EN 5628-1-1992 it is a class 2 clay bricks. The size of the concrete brick manufacturer of Tegal Arta Graha - Mengwi has length (P) of 388 mm. width (b) 150 mm and thickness (t) 94 mm. The compressive strength value of concrete block is 1.16 N/mm^2 and water absorption is 11.71%. The size of the lightweight brick Citicon-Surabaya has length (P) 200 mm. width (b) 200 mm and thickness (t) 100 mm. Lightweight brick has compressive strength value of 1.55 N/mm^2 and water absorption of 51.18%. The average compressive strength of mortar 1:3 is 24.4 N/mm^2, classified as class (i) according to BS EN 5628-1-1992, while according to ASTM C 270 is as type M mortar. The average compressive strength of 1:4 mortar is 13.37 N/mm^2, a class mortar (ii) or as type S mortar. The compressive strength values of the BM13. BM14. BT13. BT14, and BR is 1.60 N/mm^2. 1.28 N/mm^2. 1.19 N/mm^2. 1.02 N/mm^2. 1.20 N/mm^2, respectively. Modulus of elasticity of BM13, BM14. BT13. BT14, and BR masonry are of 155.94 N/mm^2, 186.71 N/mm^2, 489.66 N/mm^2, 565.65 N/mm^2, and 279.14 N/mm^2, respectively.

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Formulation Biocatalyst Of Lignocellulolytic Bacteria As Lignocellulosic Degrader

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Abstract— Development of competitive and sustainable bali cattle livestock are purpose of a study. Production of waste decomposer biocatalysts through the formulation of lignocellulolytic bacteria from bali cattle rumen fluid and termites from the results of the Mudita Dissertation study (2019) is a strategy developed in overcoming various problems in livestock business. a study was carried out through production and evaluation of quality and effectiveness of 5 biocatalyst formulas (B0, B1234, B1235, B1245, and B12345) which were formulated from superior lignocellulolytic bacteria Bali cattle rumen and termites namely 1) *Bacillus subtilis strain BR4LG, 2) Bacillus subtilis strain BR2CL,3)Aneurinibacillus sp strain BT4LS, 4) Bacillus sp strain BT3CL,* and *5) Bacillus sp. strain BT8XY* as starter fermentation feed (rice straw silage). The results showed that the use of superior lignooselulolytic bacteria was able to produce higher quality of solid biocatalysts with high bacteria populations and lignocellulase enzyme activity and utilization as starter fermentation rice straw capable of producing high quality of rice straw silage with high quality of nutrient content and higher digestibility of dry matter and organic matter than without biocatalyst lignocellulolytic bacteria. It was concluded that the utilization of probiotic lignocellulolytic bacteria was able to produce high quality of biocatalysts.

Keywords— *Biocatalyst, Probiotic Lignocellulolytic Bacteria, Waste Decomposer*

I. INTRODUCTION

Waste utilization and treatment is the main strategy developed in agricultural development in realizing national food security. The catalyst is a vital element in processing waste into useful products and economic value. Various chemical or biological catalysts are developed to accelerate the utilization and treatment of waste. Bacteria is one of the microbes that is widely used as a biological catalyst (biocatalyst), especially in the development of integrated animal husbandry business, such as the pattern of symmetry developed in Bali.

Various starter fermentation biocatalysts have been developed, but livestock productivity and product quality of waste origin are still very diverse and have not been able to produce productivity such as forage feeding. This is mainly due to feed ingredients from agricultural waste and livestock waste rich in lignocellulose, which is difficult to break down into its constituent components. Only certain microbes that can degrade lignocellulose, one of which is lignocellulolytic bacteria. Mudita (2019) has succeeded in isolating and selecting superior lignocellulolytic bacteria from the bali cattle rumen fluid and termites that have the ability to overhaul lignocellulosic compounds and produce high lignocellulase enzyme activity, namely *Pseudomonas aeruginosa* BR9LS, *Bacillus subtilis* BR4LG, *Bacillus subtilis* BR2CL, *Paenibacillus sp*. BT4LS, *Aneurinibacillus sp*. BT5LG, *Bacillus sp*. BT3CL, and *Bacillus sp*. BT8XY, and 5 of them were allegedly able to play a role as probiotic agents, namely [1]*Bacillus subtilis strain BR4LG,* [2]*Bacillus subtilis strain BR2CL,* [3]*Aneurinibacillus sp strain BT4LS,* [4]*Bacillus sp strain BT3CL,* and [5]*Bacillus sp. strain BT8XY*. Utilization of superior lignocellulolytic bacteria as biocatalyst of agricultural waste feed can produce silage rations of high quality agricultural waste that can increase the productivity of Bali cattle and reduce emissions of faecal and urine pollutants. Liquid biocatalyst formulated by *Bacillus subtilis* BR4LG, *Bacillus subtilis* BR2CL, *Aneurinibacillus sp*. BT4LS, and *Bacillus sp*. BT8XY produces the best livestock productivity. The results also showed differences in lignocellulolytic bacterial

formulas resulting in different biocatalyst qualities. The level of microorganism synergism determines the quality produced.

II. MATERIALS AND METHODS

A. Location, Biocatalist Lignocellulolytic Bacteria, Experimental Design

A research has been carried out at Sesetan Public Laboratory and feed and nutrition Laboratory of Animal Science Faculty, Udayana University. Biocatalist lignocellulolytic bacteria produce by probiotic lignocelulolytic bacteria isolated from Bali cattle rumen and termites were results Mudita Dissertation study (2013-2019), namely [1)]*Bacillus subtilis strain BR4LG,* [2)]*Bacillus subtilis strain BR2CL,* [3)]*Aneurinibacillus sp strain BT4LS,* [4)]*Bacillus sp strain BT3CL,* and [5)]*Bacillus sp. BT8XY.*

This experiment used a Completely Randomized Designed with five treatments and six replicates. The treatment were as follows:

B0 = Biocatalist was formulated without lignocellulolytic bacteria

B_{1234} = Biocatalist were formulated with lignocellulolytic bacteria [1)]*Bacillus subtilis strain BR$_4$LG,* [2)]*Bacillus subtilis strain BR$_2$CL,* [3)]*Aneurinibacillus sp strain BT$_4$LS, and* [4)]*Bacillus sp strain BT$_3$CL*

B1235 = Biocatalist were formulated with lignocellulolytic bacteria [1)]*Bacillus subtilis strain BR$_4$LG,* [2)]*Bacillus subtilis strain BR$_2$CL,* [3)]*Aneurinibacillus sp strain BT$_4$LS, and* [5)]*Bacillus sp strain BT$_8$XY*

B1245 = Biocatalist were formulated with lignocellulolytic bacteria [1)]*Bacillus subtilis strain BR$_4$LG,* [2)]*Bacillus subtilis strain BR$_2$CL,* [4)]*Bacillus sp strain BT$_3$CL and* [5)]*Bacillus sp strain BT$_8$XY*

B12345 = Biocatalist were formulated with lignocellulolytic bacteria [1)]*Bacillus subtilis strain BR$_4$LG,* [2)]*Bacillus subtilis strain BR$_2$CL,* [3)]*Aneurinibacillus sp strain BT$_4$LS,* [4)]*Bacillus sp strain BT$_3$CL and* [5)]*Bacillus sp strain BT$_8$XY*

B. Biocatalist Lignocellulolytic Bacteria

Biocatalist lignocellulolytic bacteria were produce with inoculated 10% lignocellulolytic bacteria consortium cultural with 90% biocatalist growth medium (Table 1). Biocatalist growth medium produced by combination of natural and chemical substrates/material. Biocatalist growth medium has been mixed homogeneously subsquently sterilized by steaming for 30 minutes. After the medium biocatalist begin cooling (T ± 40°C), medium ready to be used for the production biocatalist lignocellulolytic bacteria.

The growth of lignocellulolytic bacteria consortium on the biocatalist growth medium was carried out by homogeneously mixing in an anaerobic condition (sprayed with CO_2 gas). After the biocatalist mixture is homogeneous, it is put into a container "silo"(covered bucket). Furthermore, biocatalist will be fermented for 1 week at 37 - 39°C. After that, the biocatalist be dried by a stepwise drying method for 5 days, beginning drying at 40°C (for 2 days), followed at 45°C (for 2 days), and at 50°C (1 day).

TABEL I
COMPOSITION OF BIOCATALIST LIGNOCELLULOLYTIC BACTERIA

No	Bahan Penyusun Kultur Bakteri Padat	Persentase (%)
1	Lignocellullytic Bacteria Cultural	10,00
2	Corn Bran	20,00
3	Maisena Meal	40,00
4	CaCO3	10,00
5	Sugarcane/Molases	10,00
6	Citric Acid	5,00
7	Urea	1,50
8	ZA	1,00
9	Nutrient Broth Medium	1,00
10	Mineral-vitamin "Pignox"	0,50
11	Salt/NaCl	0,50
12	Carboxymethylcellulose/CMC	0,30
13	Tanic Acid	0,20
	Totally	100,00

III. The Quality of Lignocellulolytic Bacteria Biocatalyst

A. Evaluation of Amount of Bacteria Population on Lignocellulolytic Bacteria Biocatalyst

Evaluation of the type and number of bacteria that grow on biocatalysts are the totally bacteria, Lignolytic bacteria, cellulolytic bacteria, xylanolytic bacteria, amylolytic bacteria, and lactic acid bacteria. Bacterial population calculations using the *direct count method* using the growth medium "Nutrient Agar" added with 1% selective substrate (according to the type of bacterial test), namely tannic acid (for lignolytic bacteria), CMC

(cellulolytic bacteria), xylan (xylanolytic bacteria), amylum (for amylolytic bacteria), except for lactic acid bacteria using MRS media as a test medium.

B. Evaluation of Lignocellulolytic enzyme activity of Lignocellulolytic Bacteria Biocatalyst

Enzyme extract was collected from centrifuged liquid media culture in 12.000 rpm for 15 minutes at 4°C. Extracts enzyme were tested in three kinds of substrates that contained 1% CMC powder/xylan/Tannic Acid (as source of lignin) in 50 mM acetate buffer pH 5.5. Each substrate liquid in buffer was taken (8 ml), added 1 ml enzymes source, and 1ml aquadest. The mixture then were shaken by shaking bath, enzyme activity was measured in 30, 60, 180 and 360 minutes durations. Reduction sugar (glucose from CMC and xylose from xylan), or vanillin from tannic acid (lignin) produced from the reaction were the cellulase/xylanase or lignase enzyme activities (Efiok, 1996). For sugar reduction:1 ml of sample was added to 3 ml DNS reagent and 1 ml aquadest (Miller, 1959), for vanillin: 1ml of sample was added to 4 ml methanol, then measured the absorbent by spectrophotometer in wavelength (λ) 508,5 nm for glucose, 509 nm for xilosa and 279 nm for vanillin. Lignase/cellulase/xylanase enzyme activities was estimated by using vanillin/glucose/xylose calibration curve (Adney and Baker, 2008; Ghose, 1987). One unit (U) of enzyme activity was defined as 1 μmol of vanillin/glucose/xylose equivalent released per minute under standard assay condition (Irfan *et al.,* 2012; Lo *et al*., 2009).

C. The Effectivity of Lignocellulolytic Bacteria Biocatalyst as Starter Fermentation

Evaluation of the effectiveness of lignocellulolytic bacteria biocatalysts as a starter fermentation of agricultural waste is carried out through the production of rice straw silage. Rice straw silage was formulated using a mixture of 80% rice straw and 20% rice bran (*As fed*). The fermentation process is carried out by means of every 10 kg feed materials added 8 liters of biocatalyst solution consisting of 10 g biocatalyst, 100 ml molasses and 7.890 liters of clean water. The fermentation process is carried out using a plastic bucket covered (as a silo) and fermented for 2 weeks under an-aerobic conditions. After 2 weeks, rice straw silage was opened and evaluated of nutrient content (Dry matter/DM, Organic matter/OM, crude fiber/CF, crude protein/CP, ether extract/EE (*with AOAC methods*, AOAC, 1990) , invitro digestibility, and metabolic substrates (VFA and NNH3).

IV. Data Analysis.

Data were analyzed by analysis of variance/Anova, if there are significant differences (P≤0,05), followed by the analysis of Honestly Significant Different/HSD test (Sastrasupadi, 2000).

V. RESULTS AND DISCUSSION

The result showed that formulation of consortium of the probiotic lignocellulolytic bacteria from bali cattle rumen fluid and termites can produce high quality biocatalyst as lignocellulosic substrates degrader and so on production high quality feed based on agricultural waste (Table 2 – 4).

Utilisation the combination all of probiotic lignocellulolytic bacteria (B_{12345}) can produce high quality and effectivity biocatalyst with highest population of bacteria (totally bacteria, lignolytic, cellulolytic, xylanolytic, amilolytic, and lactic acid bacteria) (Tabel 2), higher lignocellulase (*ligninase, endoglucannase, exoglucannase, xylanase*) enzyme activies (Table 3) and with higher efectivity as starter fermentation of rice straw (Table 4), than followed by formulation biocatalyst B_{1235} as the second best quality of biocatalyst. Especially for the second best biocatalyst, B1235. These results repeat the results that have been obtained when the utilization of this bacterial consortium as a liquid biocatalyst (inoculant) in the development of a bali cattle-based agricultural waste farming business that the authors did when dissertation research.

TABLE II
BACTERIA POPULATION OF BIOCATALYST LIGNOCELLULOLYTIC BACTERIA

Variable	Treatments*					SEM***
	B_0	B_{1234}	B_{1235}	B_{1245}	B_{12345}	
Totally Bacteria (x10^8 CFU)	1,67a**	11,07b	12,73b	12,33b	13,20b	0,74
Lignolytic Bacteria (x10^8 CFU)	1,17a	9,27b	9,63b	9,30b	10,03b	0,41
Cellulolytic Bacteria (x10^8 CFU)	1,30a	10,10b	11,17b	10,60b	11,23b	0,47
Xylanolytic Bacteria (x10^8 CFU)	1,57a	10,37b	11,43b	11,17b	11,63b	0,60

*Notes: *Treatments: [1])Bacillus subtilis strain BR4LG, [2])Bacillus subtilis strain BR2CL, [3]Aneurinibacillus sp strain BT4LS, [4])Bacillus sp strain BT3CL, and [5])Bacillus sp. strain BT8XY; **Means in the same line with different letter differ significantly (P<0,05), ***SEM = Standard error of the treatmens and means*

TABLE III
LIGNOCELLULASE ENZYME ACTIVES FROM BIOCATALYST LIGNOCELLULOLYTIC

Variable	Treatments*					SEM***
	B_0	B_{1234}	B_{1235}	B_{1245}	B_{12345}	
Ligninase Enzyme Act. (IU)						
• 30 minute Incubation	0,207a**	0,824bc	0,833bc	0,797b	0,859c	0,010
• 1 hour incubation	0,143a	0,543c	0,551c	0,529b	0,562c	0,008
• 3 hour incubation	0,063a	0,233c	0,234c	0,227b	0,244c	0,004
• 6 hour incubation	0,044a	0,139c	0,141c	0,132b	0,143c	0,001
Endoglucannase E. Act. (IU)						
• 30 minute Incubation	6,442a	18,196b	18,672b	17,997b	18,722b	0,315
• 1 hour incubation	5,445a	10,088b	10,415b	9,837b	10,654b	0,217
• 3 hour incubation	2,522a	4,717c	4,727c	4,489b	4,769c	0,041
• 6 hour incubation	1,661a	2,573c	2,609c	2,412b	2,527bc	0,033
Exoglucannase E. Act. (IU)						
• 30 minute Incubation	6,764a	18,475bc	19,267c	18,103b	20,471d	0,277
• 1 hour incubation	4,247a	10,559b	10,699b	10,378b	11,050b	0,221
• 3 hour incubation	1,713a	4,013b	4,023b	3,910b	4,017b	0,082
• 6 hour incubation	0,996a	2,204b	2,213b	2,174b	2,231b	0,046
Xylanase E. Act. (IU)						
• 30 minute Incubation	42,49a	251,10b	266,92bc	263,25bc	277,04c	5,76
• 1 hour incubation	37,90a	141,74b	163,45c	156,00c	175,77d	2,72
• 3 hour incubation	16,80a	51,78b	60,68c	60,34c	64,78c	1,46
• 6 hour incubation	10,041a	29,617b	34,753c	34,477c	39,858d	0,36

Notes: *Treatments: [1]Bacillus subtilis strain BR4LG, [2]Bacillus subtilis strain BR2CL, [3]Aneurinibacillus sp strain BT4LS, [4]Bacillus sp strain BT3CL, and [5]Bacillus sp. strain BT8XY; **Means in the same line with different letter differ significantly (P<0,05), ***SEM = Standard error of the treatmens and means

The high bacterial population and the activity of the lignocellulase enzymes produced by the biocatalyst B_{12345} and B_{1235} have been able to produce high quality rice straw silage with high nutrient (protein and fat) content, low crude fiber / CF content and with high digestibility of dry matter and organic matter. and supported by high metabolite products as well (Table 4). This further confirms that B_{12345} and B_{1235} biocatalysts are superior biocatalysts capable of playing a role as a degrader of lignocellulosic compounds and starters in optimizing the utilization of agricultural waste as animal feed and other beneficial products.

TABLE IV
NUTRIENT CONTENT, DIGESTIBILITY AND PRODUCT METABOLIC WITH IN-VITRO ANALYSIS OF RICE STRAW SILAGE PRODUCE BY BIOCATALYST LIGNOCELLULOLYTIC BACTERIA

Variable	Treatments*					SEM***
	RSB_0	RSB_{1234}	RSB_{1235}	RSB_{1245}	RSB_{12345}	
Acidity & Nutrients Contents						
• Acidity (pH)	4,545a**	4,592a	4,599a	4,599a	4,713a	0,068
• Dry Matter (% fresh basis)	29,136a	29,353a	29,806a	29,041a	31,568a	1,107
• Organic Matter (% DM)	79,730a	80,952ab	82,845b	81,787ab	81,987ab	0,647
• Crude Protein (% DM)	6,520a	9,621b	9,869b	9,666b	9,676b	0,126
• Crude Fiber (% DM)	18,004b	15,435a	14,922a	15,293a	14,816a	0,337
• Ether Extract (% DM)	1,531a	4,199b	4,210b	3,381b	3,783b	0,320
Metabolic Product and In-Vitro Digestibility						
• VFA (mM)	116,96a	179,12b	179,27b	175,38b	187,65b	5,872
• NNH3 (mM)	11,369a	11,685ab	12,230b	12,089b	13,135c	0,148
• DM Digestibility (%)	46,924a	51,177b	52,758b	50,468b	52,923b	0,599
• OM Digestibility (%)	48,570a	53,593b	55,575b	53,800b	56,030b	0,703

Notes: *Treatments: [1]Bacillus subtilis strain BR4LG, [2]Bacillus subtilis strain BR2CL, [3]Aneurinibacillus sp strain BT4LS, [4]Bacillus sp strain BT3CL, and [5]Bacillus sp. strain BT8XY; **Means in the same line with different letter differ significantly (P<0,05), ***SEM = Standard error of the treatmens and means

VI. CONCLUSIONS

Based on the results of the study it can be concluded that the superior lignocellulolytic probiotic formulation from the rumen of Bali cattle and termites is capable of producing high-quality biocatalysts and with high effectiveness as a starter for fermentation of agricultural waste. B12345 biocatalyst formula is the best formula that is capable of producing quality biocatalysts

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Fuzzy Logic type-2 Based Liquid Waste Aerator Control Design

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Abstract— Wastewater treatment carried out both biologically/BOD and chemically/COD requires oxygen produced by aerator machines. The determination of aerator working time is a problem that occurs in many wastewater treatment plants. In general, aerator work time is done manually, so that using electrical energy becomes wasteful. The aim of this research is to design an aerator working time control system but liquid waste remains at safe limit quality. The aerator control system used is a fuzzy logic controller type-2. Two input variables are used COD and liquid waste volume, aerator working time as output. The advantages of type-2 Fuzzy Logic controller (FLC) over type-1 have the ability to provide more accurate output at higher input uncertainties. The results obtained that the design of the system can be applied well and in accordance with the set point with the average length of aerator work time 0.85 hours faster and can reduce the use of electrical energy 10.3% compared to FLC type-1.

Keywords— Aerator Control, Fuzzy Logic type-2, electricity consumption

I. INTRODUCTION

The aerated reduction process of BOD (Biological Oxygen Demand) and COD (Chemical Oxygen Demand) by aerobics as oxygen generators is generally produced by aerator engines. Based on preliminary research data, the IPAL Suwung aerator is still operated manually for 11 hours per day. The long operation time of the aerator manually causes the use of electric power to become wasteful [1]. To meet the oxygen requirements in accordance with the input characteristics of the treated wastes, an intelligent regulation of the length of time the aerator works is needed, so that the loss of electrical energy can be reduced.

The development of modern control technology using aeration control system strategies with different treatments shows that the consumption of electrical energy for the treatment with aeration controlled systems is reduced by around 30% [2]. Methods with fuzzy logic techniques can be applied to handle complex nonliner processes that prove to be useful tools for researchers [3]. The results of research on the design of wastewater treatment on / off and control by PID, it turns out that the easiest and most effective is the fuzzy logic control method [4]. Research on the evolution of fuzzy logic controllers (FLCs) type-2 which is able to handle uncertainty in water level regulation. The results show that type-2 FLC overcomes the problem of complexity, and handles uncertainty models better than type-1 [5]. Most applications face a high degree of uncertainty that can affect the operating system. This research develops a different approach that can deal with existing uncertainties and reduce the effect it has proven, that FLC type-2 performance is better [6], [7]..

II. METHOD AND PROCEDURES

A. Fuzzy Logic Controller type-2 Model

The fuzzy inference system used in the liquid holiday controller is the Mamdani method. In the Mamdani method, to obtain the output required 4 stages, namely the formation of fuzzy sets (fuzzification), application of function implications (rules), composition of rules, reduction and affirmation (defuzzification). The composition of

the rules uses the AND operator (subset), while for defuzzification the Centroid method is used. Model Fuzzy Logic Controller type 2 can be seen in Figure 1.
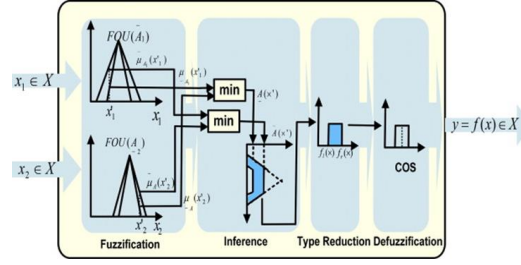
Fig. 1 Fuzzy Logic Controller type-2 Model

B. Design of Fuzzy Logic Controller Aerator type-2

The design of software for this system can be explained as follows. The design for the fuzzy logic controller uses two inputs and one output with the Sugeno type-2 fuzzy inference system. The input used is in the form of COD value and waste volume, while the output used is in the form of aerator working time, as shown in Figure 2.
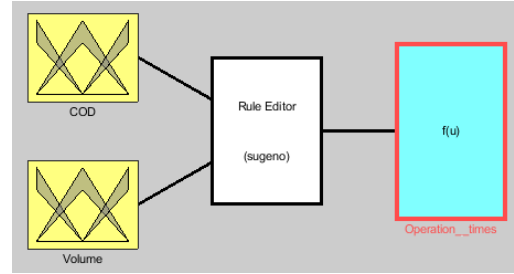
Fig. 2 Design Fuzzy Logic Controller Aerator type-2

The input consists of three quantization types of triangular member functions, the output uses three quantization types of linear functions, and consists of 9 rules. The reduction process uses the type KM (Karnik-Mendel) and continues with the defuzzyfication process [8]

The COD input variables and the volume of wastewater use 3 quantizations, as follows.

1. 50 to 100 Under Normal COD	1. 7,500 to 30,000 Under normal volume
2. 100 to 150 Normal COD	2. 30,000 to 40,000 Normal volume
3. 150 to 250 Upper Normal COD	3. 40,000 to 50,000 Upper Normal volume

The membership function of the two input types is triangular, as shown in Figure 3
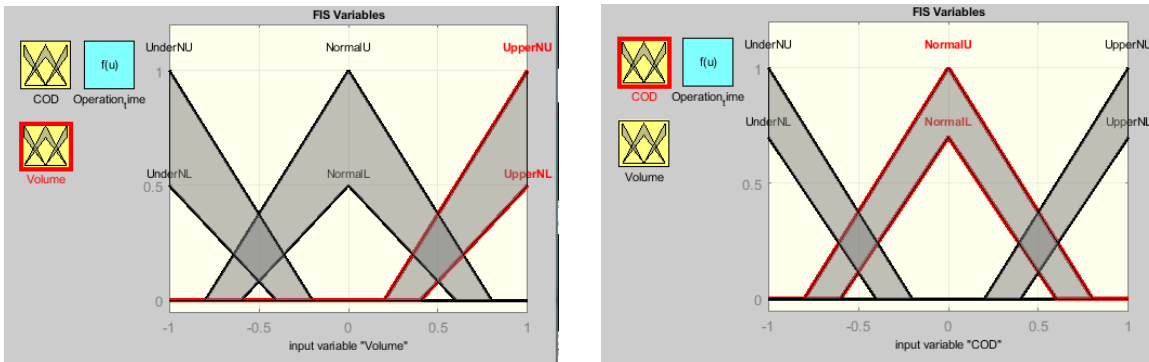
Fig. 3 Design Input of Fuzzy Logic Controller Aerator type-2

018-2

Three quantizations for the output variable are short, medium, and long. Variable output lengths of aerator work time are 3 to 4 hours short work time, 4 to 6 hours moderate work time, and 6 to 7 hours long work time.

The output function time of the aerator working time is linear and 9 rules, shown in figure 4.
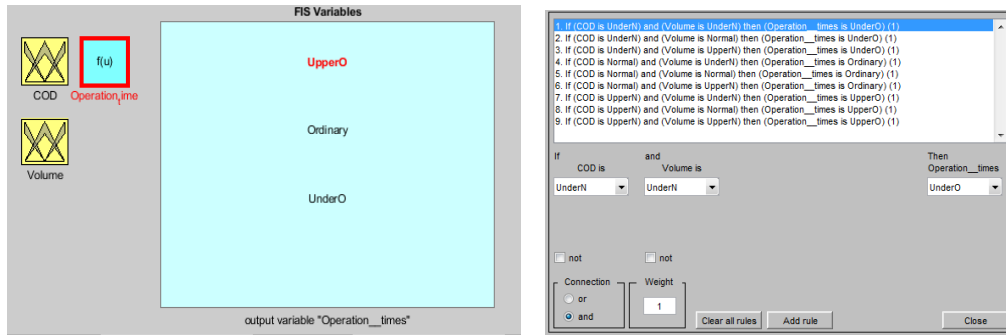
Fig. 4 Design Output and Rules of Fuzzy Logic Controller Aerator type-2

Output surface view for the type 2 fuzzy logic controller (FLC) design with 2 (two) inputs and 1 (one) output can be seen in Figure 5.
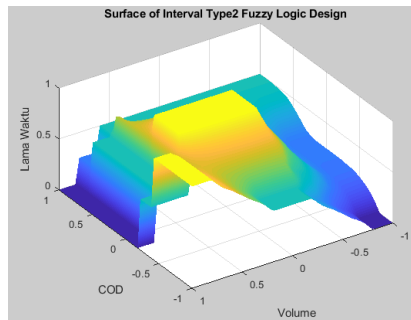
Fig. 4 Surface View of Fuzzy Logic Controller Aerator type-2

III. RESULTs AND DISCUSS

The simulation results in this study consist of 30 daily data in the form of COD (mg/L) and volume (m^3), while the output results in the form of work time/Long_operation (hours) and electrical energy consumed.

TABLE I
THE SIMULATION RESULTS OF FUZZY LOGIC CONTROLLER AERATOR TYPE-2

Parameter	Unit	Simulation Result									
		1	2	3	4	5	6	7	8	9	10
COD_1	mg/L	114	132	130	144	44	230	230	68	132	130
COD_2	mg/L	60	180	72	136	712	156	168	230	268	86
COD_3	mg/L	118	124	130	175	85	98	62	214	208	186
Volume_1	m^3	8,556	8,909	8,825	9,188	7,691	8,091	9,634	13,057	9,774	8,900
Volume_2	m^3	9,951	10,397	14,005	9,718	9,011	24,775	24,775	24,924	11,122	9,941
Volume_3	m^3	10,704	16,581	14,340	14,991	13,922	10,806	35,498	31,917	26,858	14,880
Long Op_1	hours	5	5.7	5.6	5.9	4	7	7	4.5	5.6	5.6
Long Op_2	hours	4.2	7	4.6	5.7	7	6.1	6.4	7	3	5
Long Op_3	hours	5	5.2	5.4	6.8	5	5	4.2	7	7	7
Energy_1	KWh	525	598.5	588	619.5	420	735	735	472.5	588	588
Energy_2	KWh	441	735	483	598.5	735	640.5	672	735	315	525
Energy_3	KWh	525	546	567	714	525	525	442.1	735	735	735
Energy Total (KWh)											17,798.6

Based on table 1, the average COD is 160.7 mg/L, with the smallest value of 60 mg/L and the largest is 712 mg/L. The average volume of 14,391.4 m^3, with the smallest value of 7,691 m^3, and the largest was 35,498 m^3, while the average length of aerator work was 5.8 hours, with the smallest value of 3 hours and the largest of 7 hours. When compared with FLC type-1, the average length of aerator working time is 6.8 hours, indicating that it is 1 hour longer than FLC type-2. The average energy consumption per day is 607.3 KWh, with the lowest energy use value of 315 KWh and the largest of 735 KWh. While the average daily consumption for FLC type 1 is 713.5 KWh greater than 3.186 KWh than type-1. The total energy consumption is 18,218 KWh for FLC type-2 and 21,405 KWh for type-1, this means there is a decrease of 9.1%, whereas based on real conditions, the electrical energy consumption is 35,145 KWh,

Fuzzy logic controller design type 2 is in accordance with the setting points with the following explanation. When the smallest COD value is 60 mg / L and a volume of 9,951 m3 as input produces an operating duration of 3 hours, this means that the inferior system has worked accordingly when the COD value is low (0 to 100 mg / L) and a small volume (7,500 to 30,000) produces short duration of operation (3 to 4 hours). When the COD value is 268 mg / L and the volume of 11,122 m3 as input produces a 7 hour operating duration, this means that the inferior system works well when the COD value is very high (> 200 mg / L) and a small volume (7,500 to 30,000) produces output long operation (6 to 8 hours). This is due to the selection of predetermined basic rules that are adjusted to the characteristics of COD data, volume and duration of aerator work time

The difference in electricity consumption between real conditions and type-1 based fuzzy logic settings obtained 13,739.7 KWh, this means a decrease of 39.1%. The difference in electricity consumption between real conditions and type-2 based fuzzy logic settings was obtained at 18,218 KWh, this meant a decrease of 48.2%. When compared between type-1 and type-2 FLC, the average length of aerator working time was 1 hour and the average energy consumption was 9.1%.

IV. CONCLUSION

The design of controlling the duration of aerator work operations based on fuzzy logic can be applied correctly. Control with two inputs in the form of COD value and volume provides output in the form of aerator operating time that corresponds to the setting point, with an average operating time of 5.8 hours. There was a decrease in the use of electrical energy by 48.2% after applying fuzzy-type 2-based logic control and 9.1% of FLC type-1.

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Good Faith Principle and Its Implementation for Credit Agreement Loans in Banking Financial Institutions in Bali

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Abstract—The understanding of good faith principles in loan agreements between bank as a creditor and consumer as a debtor is to honour the loan agreement being made based on trusts and commitments, in accordance to the terms and conditions, to carry through the Agreement successfully. The percentage of non-performing loans (NPL) in Bali Community Bank (*Bank Perkreditan Rakyat/BPR*) is 8,7 percent. There is a need for a Research to establish the causes of NPL and establish the effectiveness of Bank. The research was conducted using the empirical juridical methods, using prescriptive data analysis, presented as qualitative and systematic. It examined the current Banking Laws and its implementations also scrutinized further the existing Loan Agreements. The research indicated, there were high risks of NPL influenced by internal and external factors, by the willingness and lack of understandings in the implementations of the Loan Agreements. The aim of the Research is to gain a better understanding of the importance of good contractual agreements and its implementations using the Good Faith Principles and the current Banking Laws. In addition, in Bali there is also the principle of *Karmapala*. The application of the above will minimize further the risks of NPL.

Keywords— Banking Financial Institutions, Credit Agreements, Good Faith Principles, Implementations

I. INTRODUCTION

Lending money through bank financial institutions is one of the solutions to the problem of capital adequacy in developing its business. The risk of bad credits is often faced by many banks and this can affect the ability of a bank to turn a profit.[1] According to Banking Law No 10 Year 1998 regarding to the previous Amendment to the Banking

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[1] Zakiyah Dwi Poetry dan Yulizar D Sanrego. (2011). Pengaruh Variabel Makro dan Mikro Terhadap NPL Perbankan Konvensional dan NPF Perbankan Syariah. *Tazkia Islamic Finance and Business Review 6 (2)*, doi: http://dx.doi.org/10.30993/tifbr.v6i2.53. h. 79.

Law No 7 Year 1992 Article 1 No 2, the function of a bank is as an Agent of Trust, Agent of Development and Agent of Service.[2] To function properly, it is important for a bank to maintain a healthy capital in order to run their business.

There are 12 *BPR* in Bali having problems with bad loans, according to the Head of Region 8, Bali and East Tenggara Financial Services Authority (*Otoritas Jasa Keuangan/OJK*), Elyanus Pongsoda.[3] In many occasions, the collaterals are not enough to cover the losses resulting from bad loans.[4] This also influenced the higher number of NPL's in Bali than the national average. In June 2019, the statistics shows Bali NPL's is 8,7% and the National NPL's is 7,25%.[5]

II. METHOD AND PROCEDURE

This Study was conducted using an Empirical Juridical Methodologies. The research was based on field study collected as primary data from the general population related to the subject as a first source.[6] This Study examined in detail of Contract Law. Data were collected from a few BPR's in Bali: BPR Nusamba, BPR Dana Master Dewata in Karangasem and BPR Artha Budaya in Tabanan. Secondary data was also sourced from primary law data, contractual laws, the Law Dictionary and Encyclopedias.

III. RESULTS AND DISCUSSION

Agreements in Indonesian Law is regulated in Article 1313 Book III of the Civil Code (ICC). In Indonesia, there are Law Principles need to be followed in relation to a legal contract. The principles of consensus, binding power, freedom to enter to a contract, fairness and good faith. There needs to be an understanding of the content of the agreement has been derived from consensus between parties. Furthermore, Good Faith Principle is one of the important principles in a legally bind contract[7] as both parties agreed to enter to a contract based on faith and trust, be that of creditor or debtor, must carried throughout the agreement successfully.

Application of Good Faith Principle in Contractual Law in Indonesia can be found in Article 1338 par (3) of the ICC which states every agreement must be based on Good Faith Principle. It was based on classical theory of Contractual Law whereby agreement based on the Good Faith Principle can be applied with the condition of meeting the requirements as regulated in Article 1320 of the ICC. This application is different compared to contractual agreement such as the Netherland, France and Germany whereby the application of the Good Faith Principle is in stages of negotiation, signing and during the term of the contract.[8]

Article 1 No 2 of the Banking Law stated the main function of bank as financial institution is giving out credits to the general population who needs loans. Banks made profits from the interest derived from the loans. This will make the return from the risks of loans is equally worth taking.[9] The definition of credit is "the service of providing money or that of equivalent to account, based on trust or on an agreed terms and conditions on a loan. This requires debtor to pay the loan in an agreed time frame with interest"[10].

Article 2 of the Banking Law also implies the Good Faith Principle which regulates the banking principles based on a democratic economy with cautiousness. Based on the stipulations on Article 8 of the Banking Law, to avoid bad credit in the future, banks prior giving out loans must be based on the 4P's and 5C's formulas, which are Personality, Purpose, Prospect and Payment,[11] and Character, Capacity, Capital, Collateral and Condition of

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[2] Liza Amelia dan Doni Marlius. (2018). Pengendalian Kredit dalam Upaya Menciptakan Bank yang Sehat pada PT. Bank Pembangunan Daerah Sumatera Barat Cabang Utama Padang. *INA-Rxiv Papers*, doi: 10.31227/osf.io/kpc64. h. 3.
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[4] *Ibid.*
[5] *Ibid.*
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[10] Based on Article 1 No. 11 of the Banking Law
[11] *Ibid.*64.

Economy.[12] Therefore, in principle of giving out credits from banks to debtor must be based to two principles with required Good Faith: Trust and Prudential Principles.[13]

It is legally binding, when a Deed of Credit Agreement signed between bank and customer front of a Notary. This also applies to the BPRs. However, before signing the agreement by all parties, Made Kandera[14], revealed the mechanism of the process prior to signing the Credit Agreement whereby all prospective debtor must be given information of available credit facilities at the BPR. The bank must study and analyze the business loan proposal using the 4P and 5C formulas. Once the loan is approved the final step is the signing of the credit contract. Similar procedure also being applied in BPR Nusamba Manggis[15]. Ni Wayan Karwini[16] also stated the stages of giving credit application in her bank are: credit proposal, survey, analysis, credit committee, decision (approve/reject).

Credit agreements that are being used at this BPRs were made in the form of a standard contract. I Made Kandera stated the mechanism of his bank in giving out credit starts with explaining the necessary information on the requirements of the credit. Once the application is received, the bank then conducts a credit analysis on the ability of the loan applicant. If it is approved, the Bank will issue the result of the credit analysis in a letter of Credit Approval/Credit Agreement. This will be followed up with on the location checking to the business/living premises to monitor the information given to the bank and to see the premises as collateral is still exist. Monitor the activities of the debtors for six months or more, continuously until the loan is paid back. These steps are similar to the other two BPR's mentioned previously.

The research also found high percentage of NPL due to the following factors:

a. There is a slight willingness of the debtor to pay back the loan as agreed in the credit agreement.
b. There is also a lack of comprehension on the information given of the credit facilities.
c. Natural disaster. The eruption of Mount Agung in 2017 had a big impact resulting many of NPL owing to businesses own by debtors. The *OJK* Board Commissioner issued a relaxation policy No 20/KDK.03/2017 based on POJK No 45/POJK.03/2017 regarding to the Special Treatments to Credits or Bank Funding to certain areas in Indonesia that are affected by Natural Disaster for three years starting from 29th December 2017.[17]

Other policy, bank try to solve the NPL with a sociological approach. In Bali where majority is Hindu they believe in the philosophy of *Karmapala* which for every action there will be an equal reaction. When this approach fails, bank give more time to debtor to payback the installment, rescheduling, reconditioning or restructuring the loan. If all efforts to settle the loan had been exhausted and fails, they will file the case to Small Claim Court. This in accordance to Regulation No. 4 Year 2019 (Amendment of Regulation No. 2 Year 2015) regarding to Settlement of Small Claim (*PERMA*).

IV. CONCLUSIONS

In principle, the insertion of Good Faith Principle in Credit Agreements by Financial Banking Institutions is in accordance with Article 1338, Number 3 Book III of the ICC. However, the provisions of Good Faith Principle have not been regulated specifically in the Banking Law.

Good Faith Principle in financial banking institution have been implemented in accordance with Contract Law, starts at the beginning of credit application, consultation and analysis, signing of the agreement and during the loan term. However, statistically the NPL percentage in Bali Province is still high which is 8,7%.

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[12] *Ibid.* p.64-65
[13] *Ibid.* p.66
[14] The President Director of BPR Danamaster Dewata Karangasem, interviewed on 09th July 2019
[15] Ni Luh Sari Megawati an interview on 9th July 2019
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Granular Optimisation Formulation of Ethanol *Ipomoea batatas* L. Leaves Extract

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Abstract—Formulation optimisation is the critical step of tablet or capsule formulation to obtain enough doses. While the granulation process should prevent the stability of anthocyanin and meet the pharmaceutical requirement for the further production process. Avicel 101 and amylum sweet purple potato have been used for the adsorbent. Optimisation aimed to have good combination of an absorbent and concentrated extract. A mixture of Avicel and amylum could absorb the water content of the extract. Drying in the oven on 40 ºC induced drying granule. Drying granule has an appropriate pharmaceutical parameter for direct pressing tablet or filling capsule. But granule has hygroscopic properties. It needs further optimation.

Keywords— Ipomoea batatas L., granul formulation,

I. INTRODUCTION

Sweet potatoes (Ipomea batatas L.), which was found in Aan Village, Banjarangkan District, Klungkung Regency, Bali, has red color of sweet potato leaves and indicates high levels of anthocyanin. Anthocyanin has a good function for health such as preventing the risk of colon cancer, liver cancer, antidiabetic and high antioxidants [1,2]. Formulations of traditional medicines in solid dosage forms generally use active ingredients in the form of dry extracts [3].

The used active ingredient should have low hygroscopicity, good compressibility and flow rate. Hygroscopicity is a property that easily absorbs water and induce moisture or moisture content. High hygroscopicity can cause poor flow properties in the powder [3]. Drying techniques can be used to reduce the water content in granules. Dryers should be able to absorb moisture [4]. The adsorbent is usually added to thick extracts for drying technique. This method is ease to do and not degraded active ingredients [5].

The commonly used adsorbents are lactose, avicel, aerosil, starch such as sweet potato starch, cassava starch and potato starch, magnesium carbonate, and maltodextrin [6]. In this study, we have used some type adsorbents and the ratio of extracts to study the adsorbents affect on characteristics of the granules.

II. METHOD AND PROCEDURE

The leave of Ipomoea batatas were collected from Aan Village, Banjarangkan District, Klungkung Regency. Taxonomy determination of sample was carried out at the Indonesian Institute of Sciences (LIPI), UPT "Eka Karya" Botanical Garden Conservation Center, Bedugul, Tabanan, Bali.
One Kg of sample was steamed and macerated with ethanolic solvent for 24 hours. The macerate was filtered and concentrated with rotary evaporator to obtain a sticky extract. Table 1 show the combination formula between avicel

pH 101, purple sweet potato starch and sticky extract. Each combination formula was 50 grams. The formula was mixed homogeny and sifted by 10 mesh, then drying in oven at 40 oC for 12 hours.

The granule was determinate anthocyanin content (TAC), moisture content (MC), flow time (FT), silent angle (SA), and the particle size distribution (PSD).

Table I.
Combination Avicel pH 101, purple sweet potato starch and sticky extract

Formula	Sticky extract	Sweet purple potato stark	Avicel PH 101	% MC	%TAC
F1	1.0	1.0	0.0	6.37	14.58
F2	1.0	0.8	0.2	4.54	15.08
F3	1.0	0.6	0.4	4.51	14.65
F4	1.0	0.4	0.6	3.73	13.40
F5	1.0	0.2	0.8	8.70	12.39
F6	1.0	0.0	1.0	9.37	12.39

III. RESULTS AND DISCUSSION

Table 2 present the moisture and anthocyanin content of granule. Moisture contains ranged between 3.73 – 9.37% and their TAC between 12.39-14.58%. The MC should be under 5%[4,6]. Reducing TAC caused by adding adsorbent was in above the tolerable TAC limit. Based on MC the F3-4 were determinate furthermore their flow time (FT), silent angle (SA), and the particle size distribution (PSD) (Table 2 and 3). The particle of F3-4 concentrated between 40-60 mesh and all formula introduced homogenies particle distribution. The F2 possessed lower fines particle. Fines should lower then 10% to prevent the granule with good flow time. The F2 was possible for capsule and tablet production[4].

Tabel II.
The Flow time and silent angle

Formula	Flow time (gram/second)	Silent angle (°)
2	5.57±0.56	33.47±2.25
3	5.48±0.52	36.26±1.47
4	6.51±0.55	32.77±2.18

Tabel III.
Present particle size distribution (PSD)

mesh	F 2	F 3	F 4
20	0.35	0.40	0.75
40	34.80	27.95	22.60
60	48.40	47.55	41.15
80	8.85	14.80	15.10
Fines	4.70	11.10	17.65

IV. CONCLUSION

The use of a combination of purple sweet potato starch adsorbent and Avicel PH 101 has been able to help the drying process of purple sweet potato extract to produce a dry extract. The combination of purple sweet potato starch and avicel PH 101 at a ratio of 0.8: 0.2 is the best combination.

V. ACKNOWLEDGEMENT

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Growth Promotor and Mineral mixed Increased Immunoglobulin levels and Body Weight of Bali Cattle

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Abstract—The use of growth promotors and mineral mixed in bali cattle is commonly used by farmers. The low growth and susceptibility of bali cattle to the disease that caused the phenomena. The aims of this study to measure immunoglobulin levels and body weight of Bali cattle, after injection of growth promoter and mineral mixed. The research conducted on the I Ketut Mupu breeding centre. Samples of 64 bali cattle were group into 4 which each group contains 16 samples, namely: young males, adult males, young females and adult females. Sixteen bali cattle were divided into four treatments: without growth promotors and mineral mixed (H0M0), growth promotors injected, without mineral mixed (H1M0), without growth promotes with mineral mixed (H0MI) and growth promotors injected with mineral mixed (H1M1). At the beginning of the study, all samples were vaccinated with SE vaccine. Bodyweight was measured and the beginning and the end study. Levels of immunoglobulin (Ig) A, G and IgE were measured at the end of the study. The results showed that growth promoters could increase IgG levels of young bali cattle, and mineral mixed can increased IgE levels. Growth promoters and mineral mixed can increase IgA levels and body weight of young bali cattle.

Keywords— bali cattle, mineral mixed, growth promotorIgA, IgG, IgE.

I. INTRODUCTION

Bali cattle is one of Indonesia's original genetic resources and is the best beef cattle in Indonesia. Bali cattle provide the biggest contribution to the development of the livestock industry because of the quality of meat that contains less fat with a percentage of carcasses of more than 50%. Bali cattle are easy to adapt so that its spread and found in every part of Indonesia, and also found in southern Asia, Southeast Asia, Australia, and even Hawaii. The bali cattle's rising in Bali, it expands from traditional, intensive (stall) and semi-intensive. The growth performance of bali cattle is considered to be low and susceptible to several diseases such as Jembrana Disease. Weight gain ranges 0.3 kg/day [1], and the number is small, as a comparison, other crosses Brahman and Simental Breeds grow around 1.3 -1.5 kg/day.

Development and growth with a good immune response, influenced by external and internal factors, which interact with each other. External factors that can affect growth are places by way of maintenance, the physical environment and the biotic / vegetation environment [2]. Internal factors are more associated with Insulin-like Growth Factor levels, which can trigger growth hormone formation [3]. Growth hormone is an internal factor in cows called Bovine Growth Hormone has a significant role in the growth, lactation and development of the mammary glands [4]. Bali cow growth hormone levels are lower than other cows in the world. The low levels of growth hormone cause the body size of Bali cattle smaller than other cows, and the high levels of these hormones depend on the growth promoter [5].

Therefore, efforts are needed to increase the growth and immune response of Bali cattle by providing growth promoters and mixed mineral treatments and carried out on farms with good management. This research will prove by giving growth promoters, and mixed minerals can increase the bodyweight of Bali cattle and antibody/immunoglobulin (Ig). G, E and IgA. Levels.

II. MATERIALS AND METHODS

The research conducted on the I Ketut Mupu breeding centre. Samples of 64 bali cattle were divided into four groups by gender and age. Sixteen bali cattle were divided into four treatments: without growth promotors and mineral mixed (H0M0), growth promotors injected, without mineral mixed (H1M0), without growth promotors with mineral mixed (H0MI) and growth promotors injected with mineral mixed (H1M1). At the beginning of the study, all samples were vaccinated with SE vaccine. Bodyweight was measured and the beginning and the end study. Levels of immunoglobulin (Ig) A, G and Ig E were measured at the end of the study.

Samples

The study was conducted for six months at the UD Mupu Merta farm in the Bangli Regency of the Province of Bali. A total of 64 bali cattle, each sample is grouped by gender and age. Young male Bali cattle (16 cattle), adult male (16 cattle), young female (16 cattle) and adult female (16 cattle). Sixteen Bali cattle were divided into four treatments. Control/H0P0: 4 cattle without hormones and additional food, four cattle were given additional hormones, without additional feed (H1P0), four cattle were not given hormones with additional feed (H0PI), and four cattle were given hormones with additional feed. As much as 5 g / cattle / day, minerals mixed with composition: calcium carbonate (50%), Phosphorus (25%) Mg (0.35%) Iodine (0.20%) Potassium (0.10%) Cu (0, 15%) Sodium chlorine (23.05%) Zing (0.20%) and Mg (0.15%). While growth promoters were injected intramuscularly at the start of the study. Every month bodyweight measurements are taken. At the end of the study, immunoglobulin (Ig) A, G and IgE levels were measured in the serum by ELISA test.

Body Weight Measurement

Bali cattle body weight was weighed at the beginning and end of the study. Weight gain (PBB) is obtained by reducing the final body weight with the initial weight of Bali cattle.

Measurement of immunoglobulin levels

The presence of immunoglobulin detected by ELISA (*Enzyme-Linked Immunosorbent Assay)* using a commercially ELISA Kit (Glory Science Co., Ltd., 2016). The kit procedure is based on a solid-phase indirect ELISA. A positive result is indicated by the development of a blue colour. The reaction stopped by adding the stop solution, the colour changes to yellow. The result is read by a microplate photometer, where the optical density is measured at 450 nm (Glory Science Co., Ltd., Catalog #:14543)

III. RESULT AND DISCUSSION

Growth promoter injection and mixed mineral administration significantly ($P \leq 0.05$) can increase body weight of young Balinese bulls and young females but have no effect on mature Bali cattle ($P \geq 0.05$). Complete data is presented in Table.1.

TABLE. I
Bali cattle body weight gain

	H0M0 (kg)	H1M0 (kg)	H0M1 (kg)	H1P1 (kg)
Young Male	27.25±1.85	29.88±12.95	40.0±1.63	41.63±5.33
Adult Male	12.88±4.17	17.38±1.89	15.88±6.74	26.75±4.27
Young Female	22.25±4.41	22.138±2.14	28.138±13.3	31.758±6.46
Adult Female	11,63±3.38	16,63±7.76	17,75±4.27	20,78±6.62

H0M0: without growth promotor dan mineral mixed, H1M0: growth promotor without mineral mixed, H0M1: mineral mixed without growth promotor, H1M1: growth promotor dan mineral mixed

Feeding without injection growth promotor can only increase body weight gain in young male Bali cattle. Giving mixed minerals and growth promotors is believed to cause changes in the body metabolism of Bali cattle and affect many physiological processes in the tissues and organs of the body [7]. However, in this study, maximum growth

occurred in young animals. In animals that are growing, growth hormones can increase production efficiency, reduce fat deposition, stimulate muscle growth, increase the efficiency of feed use, increase organ growth, and promote bone growth [8]. Growth hormone regulates liver cells in biochemical reactions related to the growth and development of all organs of the body [9]. Through tyrosine kinase activation in the liver, IGF-1 is produced, which regulates metabolism by accelerating the transport of amino acids through cell membranes into the cytoplasm [10]. The increase in amino acids causes the speed of protein synthesis, increasing the number of cells and accelerate the rate of growth [11].

Mixed minerals added to feed increase growth [12]. Mixed minerals such as calcium are important in muscle function, while phosphorus is an important mineral for carbohydrate, protein and fat metabolism and in muscle and nerve function, while the other minerals can increase the appetite of bali cattle. The nutrients obtained will be distributed for basic life and weight gain.

The results of the research on the effect of giving growth promoters and mixed minerals on immunoglobulin (Ig) G levels in male and female Balinese cows at young and adult ages are presented in Table.2.

TABLE II
IgG Level

	Control (ng/ml)	H (ng/ml)	P (ng/ml)	HP (ng/ml)
Young Male	0.248±0.114	0.158±0.011	0.236±0.089	0.204±0.068
Adult Male	0.128±0.003	0.144±0.008	0.140±0.009	0.145±0.025
Young Female	0.153±0.009	0.186±0.042	0.140±0.006	0.148±0.005
Adult Female	0.148±0.003	0.144±0.010	0.142±0.010	0.159±0.001

Control /H0M0: without growth promotors and mixed mineral, H1M0: growth promotors without mixed mineral,
H0MI: mixed mineral without growth promotors, H1M1: growth promotors and mineral mixed

Giving mixed minerals can increase IgE young female Bali cattle. Ig A young male Bali cattle who was given a growth promoter and mixed mineral was higher (P ≤ 0.05) compared to control and Bali cattle who was only given hormones and additional food. The combination of hormones and supplementary feeding only affects young male Bali cattle.

Giving mixed minerals can increase IgE levels of young female Bali cattle. IgA level in young male Bali cattle who was given a growth promoter and mixed mineral was higher (P ≤ 0.05) compared to control and Bali cattle who was only given hormones and additional food. The combination of hormones and supplementary feeding only affects young male Bali cattle.

Table 2 shows the injection of growth promotor and mixed minerals in young and adult male Bali cattle, young and adult females, had no effect on IgG levels.

TABLE III
IgA level in Bali cattle

	Control (ng/ml)	H (ng/ml)	P (ng/ml)	HP (ng/ml)
Young Male	0.225±0.063	0.193±0.063	0.176±0.063	0.323±0.158
Adult Male	0.132±0.015	0.180±0.063	0.150±0.063	0.192±0.020
Young Female	0.154±0.014	0.187±0.063	0.185±0.063	0.185±0.063
Adult Female	0.179±0.019	0.237±0.072	0.223±0.049	0.224±0.044

Control /H0M0: without growth promotors and mixed mineral, H1M0: growth promotors without mixed mineral
H0MI: mixed mineral without growth promotors, H1M1: growth promotors and mineral mixed

Table 3 shows the growth promotor injection, and mixed mineral administration in young or adult male Bali cattle, young and adult females had no effect on IgA levels; this was due to the absence of antigens that triggered their formation. IgA serves to protect the mucous membrane from viruses or bacteria. Increased production is triggered by the cleanliness of cows, cages and the environment, or cows exposed to more antigens, thereby stimulating the formation of antibodies in the form of IgA [13] [14].

The level of IgE of bali cattle is not affected by the growth of promotor injection or mixed mineral. (Table 4). Young Bali cattle, with the addition of mixed minerals in their feed, have the highest levels of IgE.

TABLE IV
IgE Level

	Control (ng/ml)	H (ng/ml)	M (ng/ml)	HM (ng/ml)
Young Male	0.325±0.031	0.242±0.098	0,347±0.045	0.317±0.031
Adult Male	0.288±0.014	0.300±0.014	0.319±0.012	0.328±0.014
Young Female	0.283±0.020	0.264±0.325	0.550±0.074	0.331±0.020
Adult Female	0.301±0.113	0.340±0.090	0.274±0.015	0.301±0.113

Control /H0M0: without growth promotors and mixed mineral, H1M0: growth promotors without mixed mineral
H0MI: mixed mineral without growth promotors, H1M1: growth promotors and mineral mixed

Micronutrients found in additional food can increase antibodies / Ig A. Zn is an important micromineral that is needed by the body to maintain and maintain the health of livestock [15]. Zn is needed in tiny amounts but must be present in the feed, because Zn cannot be converted with other nutritional ingredients. Zn plays a role in a variety of enzyme activities, growth, cell deflation and optimization of the function of the immune system [16]. Zn deficiency causes disruption of the function of the general system, such as decreased: B cells and T cells, hypersensitivity reactions, phagocytosis and decreased cytokine production [17]

Giving growth promoters and mixed minerals can increase IgA levels, especially in young Bali cattle. High levels of IgA caused by minerals contained in mixed minerals, namely: Calcium carbonate (50%), Phosphorus (25%) Mg (0.35%) Iodine (0.20%) Potassium (0.10%) Cu (0.15%) Sodium chlorine (23.05%) Zing (0.20%) and Mg (0.15%). Whereas the mineral IgG level is not functioning, because the levels are obtained from the parent. IgG circulates in the body and is abundant in the blood, lymph system, and intestines. These compounds will carry blood flow directly to where the antigen is located and inhibit it once it is detected [18]

This compound has a strong antibacterial and antiviral effect and neutralizes toxins, a function that causes IgG levels to increase [19]. IgG can enter between cells and get rid of microorganisms that enter the cell [17]. The reason for this is that cattle raised with this semi-intensive system are free from several diseases such as Jembrana disease, Septicemia Epizootica [20]. Antibodies in the form of IgG are able to protect the body from the disease. IgG is the only antibody that can be transferred through the placenta from the mother because of its ability and small size; this causes higher levels of IgG in young cattle [19]. Ig E Bali cattle can be increased by administering mixed minerals. The level is highest compared to IgG and IgA. This situation is in contrast to other cattle. Generally, the least amount of IgE is found [21]. The Bali cattle immune system overreacts to environmental antigens, triggering the release of histamine as an allergic response, thereby increasing IgE levels.

IV. CONCLUSION

Giving hormones and additional food can significantly increase the bodyweight of young bali bulls. Supplementary feeding may increase levels of IgG and IgE, whereas levels of Ig A can be increased by giving hormones and additional food. The level of IgE (0.316 ng / ml) of Bali cattle was found to be the highest compared to IgA (0.200 ng / ml) and IgG (0.164 ng / ml).

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Pathological Impacts Due To the Existence of Plastic Waste In Rumen of Bali Cattle Slaughtered at Traditional Slaughterhouses

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Abstract—Plastic waste in the cattle rumen is still found, but there is no definitive report on the prevalence and impact in the tissues of the bali cattle. This study aims to determine the prevalence of plastic waste in cattle rumen, heavy metal contamination and its impact on cattle tissues. The object of the study used 100 bali cattle which were slaughtered at several traditional slaughterhouses in Denpasar City. After the cattle are slaughtered, the rumen section is examined for any plastic waste. Then body tissues including blood, liver, kidney, lungs, spleen, intestine,and myocardium are taken for examination of lead and cadmium heavy metals, and for histopathological examination. The heavy metal measurement was carried out at the Analytical Laboratory of Udayana University. Those tissues for histopathological examination was fixed in buffer neutral formalin (BNF) as long as 24 hours, then processed for preparation according to the stages for the hematoxylin eosin (HE) staining. The results of the examination of the rumen section were found 9 rumens (9%) containing plastic waste.. Measurement result of heavy metal in cattle rumens that containing plastic waste is lead = 0.841 ± 0.522 ppm and cadmium is not detected. Histopathological examination in the liver, kidneys, lungs, spleen and intestine, were found varies lessions of degeneration, inflammation and mild necrosis. The conclusion is the prevalence of plastic waste in the rumen of bali cattle slaughtered in traditional slaughterhouses is 15%, with lead levels are 0.841 ± 0.522 ppm with various histopathological lesions such as degeneration, inflammation and mild necrosis.

Keywords− Heavy metals, histopathology, plastic waste, rumen.

I. INTRODUCTION

The presence of plastic waste in the digestion of most rumen is indicated of a bad cattle environment. The prevalence of cattle rumen containing plastic waste in Nairobi Kenya receives more than 30% [1]. Rumen inspection results on cattle slaughtered at slaughterhouses in Bali still found plastic waste and other inorganic materials. Enter the plastic waste into the beef rumen which is strong because of forage wrapped in plastic.

The health status of cattle is very much determined by the factors of food sources and the environment. The results of studies of cattle kept at the final disposal site of Denpasar City found the presence of lead contamination in their blood [2] and some of them in the rumen found plastic waste (unpublished data). Urban waste consists mainly of inorganic material that is difficult to degrade, so that it becomes a threat to the animals foraging there. Some of the inorganic materials that are widely studied in cows that are kept in landfills are the presence of heavy metals lead and cadmium. Both of these heavy metals are very dangerous to human health when consuming polluted

beef [3]. The difficulty in tracing the origins of cattle slaughtered at the slaughterhouse, so the presence of plastic waste in the rumen indicates that the rearing cattle are in an environment with a lot of inorganic material.

The impact of the presence of plastic waste in the rumen of cattle, reportedly can disrupt the physiological and histopathological body tissues [4]. Metabolic irregularities due to intake of contaminated feed including plastic waste, will make animals more sensitive to infectious diseases. Hepatotoxic due to toxicity originating from inorganic substances, can cause a decrease in cattle immunity (5). From this background, the problem to be investigated is the prevalence of rumen containing plastic waste, hematologic profile and histopathological features of liver, kidney, spleen, and lung tissue.

II.   METHOD AND PROCEDURE

II.1. Sample of research

The study used a sample of 100 of cattle, which were slaughtered at a traditional slaughterhouse in the Banjar Bersih, Darmasaba Village, Badung Regency. From each of these cattle were taken the blood, liver, kidney, spleen, lung and muscle tissues.

II.2. Hematology Profile Examination

The examination of the hematological profile was carried out at the Denpasar Veterinary Center, using the Auto Analizer (Refloton (R)) method. The variables examined in the hematological profile were: total erythrocytes, hemoglobin (hemoglobin), MCV (mean cell volume), white blood cells (lymphocyte percentage) , monocytes, and basophils).

II.3. Measurement of Heavy Metal Content

Examination of lead and cadmium heavy metals content was carried out at the Analytical Laboratory of Udayana University. The method used is an atomic absorption spectrophotometer (AAS) [6]

II.4. Making Histopathology Preparations

Fresh tissue taken (liver, kidneys, spleen, lungs and muscles) is fixed in 10% formalin neutral buffer (NBF) for 24 hours. Furthermore, it is processed for the preparation of histopathological preparations by hematoxylin eosin (HE) staining according to the Kiernan method [7].

II.5. Data Analysis

Data on hematologic profiles, measurements of heavy metal levels and histopathological analysis were tabulated and analyzed descriptively qualitatively.

III.   RESULT AND DISCUSSION

III.1 Hasil

From the examination of 100 rumen's cattle, 9 of them contain plastic waste. Plastic waste found in the form of ropes or broken plastic bags. Thus the prevalence of plastic waste in cattle rumen is 9%. The results of examining the blood profile of cattle whose rumen contains plastic waste are presented in Table I.

TABLE I
HEMATOLOGY PROFILE OF CATTLE WHOSE RUMEN CONTAINS PLASTIC WASTE

No	Parameters examined						
	E	Hb	MCV	L	Lf	Mn	Bf
	$(10^6/mm^3)$	(g/dL)	(cc x10^{12}	$(10^3/uL)$	(%)	(%)	(%)
1	7,84	12,6	54,1	11,91	86,8	6,5	6,8
2	5,56	10,6	56,3	7,77	80,9	7.1	5,5
3	6.02	11,5	55,3	7,10	81,5	6,9	4,9
4	4,95	10,0	57,0	7,69	83,9	10,3	5,6
5	5,25	10,5	56,0	9,66	80,5	9,1	6,1
6	4,98	10,3	54,5	6.50	84,4	4,5	4,5
7	6,85	14,0	56,5	6,85	88,3	7,4	2,4
8	6,75	14,0	51,4	6,75	81,2	4,7	11,4
9	6,81	13,9	54,9	6,81	82.5	5,0	4,9
Mean	*6,11*	*12,0*	*55,11*	*8,40*	*83,3*	*6,8*	*5,8*
Normal	5-8	9-14	50-60	8,0	58	4	0-5

Information:

E = erythrocytes, Hb = Hemoglobin, MCV = Mean corpuscular volume, L = leukocytes, Lf = Lymphocytes, Mn = Monocytes, Bf = Basophils

The results of the measurement of lead levels indicate variations in the level of contamination. No cadmium contamination was found in all tissues. Complete levels of lead in each network can be seen in Table II.

TABLE II
LEVELS OF PB HEAVY METALS IN COW TISSUE WITH RUMEN PLASTIC WASTE

No	Lead level in the blood and tissues of cattle (ppm)						
	Blood	liver	Kidney	Spleen	Lungs	Intestine	Muscle
1	1,922	0,991	0,782	0,998	0,776	0,589	0,012
2	0,488	0,322	0,131	0,346	0,334	0,248	0,000
3	2,843	0,688	0,448	0,898	0,555	0,182	0,002
4	2,764	0,656	0,618	0,788	0,654	0,212	0,041
5	2,228	0,743	0,622	0,994	0,777	0,228	0,032
6	1,388	0,876	0,569	0,980	0,687	0,437	0,012
7	0,046	0,023	0,014	0,086	0,077	0,042	0,000
8	0,884	0,644	0,486	0,884	0,682	0,224	0,004
9	2,089	1,192	0,984	0,999	0,741	0,324	0,008
Mean	1,628 ±0,990	0,682 ±0,347	0,517 ±0,299	0,775 ±0,331	0,587 ±0,236	0,276 ±0,158	0,012 ±0,015
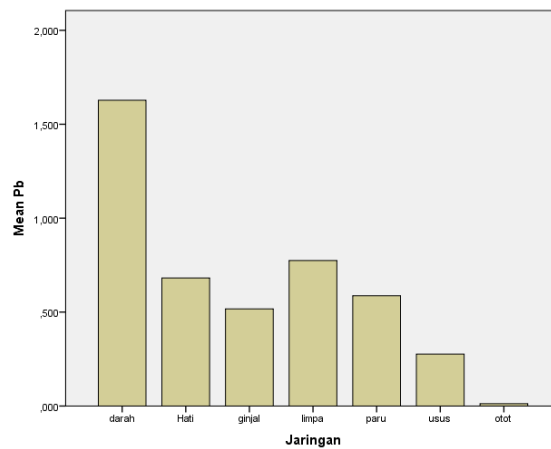
Figure 4.1. Comparison of lead level in the blood and tissues of cattle. Lead level in the blood highest and in the muscle lowest.

Histopathological changes observed obtained results that vary greatly from mild to moderate. A description of the histopathological changes in each tissue is presented in Table 3.

TABLE III
HISTOPATHOLOGICAL CHANGE OF THE TISSUES OF CATTLE

No	Histopathological change				
	Congestion	Fat Degeneration	Inflammation	Necrosis	Others
1	Liver, kidney, lungs	Liver, kidney	Liver, kidney, lungs, intestine	-	-
2	Liver, kidney, lungs	Liver, kidney	Liver, kidney, lungs, intestine	intestine	-
3	Liver, kidney, lungs	Liver, kidney	Liver, kidney, lungs, intestine	intestine, Lungs	-
4	Liver, kidney, lungs	Liver, kidney	Liver, kidney, lungs, intestine	intestine	-
5	Liver, kidney, lungs	Liver, kidney	Liver, kidney, lungs, intestine	Intestine	-
6	Liver, kidney, lungs	Liver, kidney	Liver, kidney, lungs, intestine	Liver, intestine	-
7	Liver, kidney, lungs	Liver, kidney	Liver, kidney, lungs, intestine	intestine	-
8	Liver, kidney, lungs	Liver, kidney	Liver, kidney, lungs, intestine	Liver, kidney, intestine	-
9	Liver, kidney, lungs	Liver, kidney	Liver, kidney, lungs, intestine	-	-

III.2. Discussion

The prevalence of plastic waste in the rumen as much as 9% shows that there are still cattle farms in the environment where there is plastic waste. This prevalence data is much lower than that reported in Kenya at 30.42% [1]. With the issuance of Bali Governor Regulation No. 97 of 2018 concerning restrictions on disposable plastic waste heaps, it is expected that the prevalence of plastic waste in cattle rumen in Bali can decrease.

Based on hematological profile data, it was found that the percentage of leukocytes especially lymphocytes and monocytes was higher than the normal standard. This shows that there is an inflammatory response in the body of a cattle in its rumen containing plastic waste. Particles of plastic components can cause various negative impacts in the body's physiological system, even to the point of immunosuppression [8]. Inflammatory response can be caused by damage to cells that can cause tissue necrosis. The lead tends to be higher in the blood than in tissues, because lead is substituting for Fe in hemoglobin, and incidentally gets bound in the tissue [9]. Variations in lead levels between tissues indicate differences in endurance or connective tissue with lead. There is a character of each tissues in binding lead [10]. The level of lead in the tissue, there is a difference with the results reported [11] which states the liver and kidney contain the highest lead. While the results showed the highest in the spleen and lungs. The spleen is the body's defense organ as well as a hemopoietic organ (blood forming). If it is associated with the mechanism of lead in the substitution of Fe in hemoglobin, then the hemopietic tissue is most damaged by contamination of lead. This is consistent with what was reported that heavy metals will accumulate in tissues that act as hemopoietic [9]. Ather researcher reports that lead is accelerating the absorption of spleen erythrocytes, so that lead becomes accumulated in the spleen [12]. There are similarities with the results of this study that lead levels in muscle (meat) are the lowest [13]. In fish it was reported that the lowest tissue velocity as a place of lead accumulation was in the muscles [14].

V. Conclusion

1. The prevalence of plastic waste in cattle rumen at traditional cattle slaughterhouses is 9%
2. The hematological profile of cattle which in their rumen contains plastic waste shows an increase in leukocytes, especially lymphocytes and monocytes
3. The levels of lead contamination in the body tissues of cattle whose rumen contains plastic waste sequentially from the highest are blood, spleen, liver, lungs, kidneys, intestines and muscles. No heavy metal cadmium (Cd) was detected in the body tissues of cattle whose rumen contained plastic waste.
4. Histopathological changes in the body tissue of cattle whose rumen contains plastic waste is dominated by changes in congestion, inflammation and fatty degeneration in parenchymous tissue. Necrotic lesions are generally mild in some tissues.

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Implementation Of Tabu Search Algorithm In Traveling Salesman Problem (Case Study: Tour Travel In Bali)

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Abstract—Bali offers many world-class tourist locations. With so many tourist attractions in Bali scattered in nine regencies/cities, resulting in tourists/travel agents encounter obstacles arranging travel schedules to tourist sites. The problem that arises is choosing the sequence of tourist sites to be visited and choosing the shortest route. These problems can result in reduced comfort and the effectiveness of tourist holidays in Bali. This research tries to offer alternative solutions to determine the shortest route to several tourist sites so that the tour series in Bali becomes more effective. The problem in this study can be categorized as a Traveling Salesman Problem (TSP) case. This study uses the Tabu Search algorithm to obtain optimal solutions and succeeds in getting solutions based on the shortest mileage for 19 natural tourism destinations, culinary tourism, and cultural tourism in Bali.

Keywords— *Bali tourism, Shortest path, Tabu Search, Traveling Salesman Problem.*

I. INTRODUCTION

The illustrated of TSP concept in tourism destinations as follows. A tourist departs from one tourism destination and visits each other once and only once, and returned to the site when he departed. The aim is to minimize the cummulative distance traveled from the trip. From graph theory can be used to illustrate the problem *G=(V, A))* where *V* represents the collection of cities and *A* is a collection of tracks between the two cities visited [1]. And can be formulated as follows [2].

$$\text{minimize} \quad z = \sum_{i \in V} \sum_{j \in V} l_{ij} x_{ij} \tag{1}$$

with:
    l_{ij} : distance between destination i and destination j
    x_{ij} : decision variable, 1 if tourist visit from destination i to destination j, 0 if not.

The constraint function is

$$\sum_{i \in V} x_{ij} = 1, with \quad j \in V \tag{2}$$

$$\sum_{j \in V} x_{ij} = 1, with \quad i \in V \tag{3}$$

$\tilde{x}$ is a vector of decision variable x_{ij} and form the Hamiltonian cycle

$$x_{ij} = \{0,1\}, with \quad i, j \in V \tag{4}$$

An objective function of the problem showed in formula 1, which aims to minimize the total distance travel of the tourist. Formula 2 and 3 to guarantee the route formed is a legal route. Formula 4 indicates the decision variable range. In this study, unsymmetrical TSPs were tried, with indications $l_{ij} \neq l_{ji}$.

II. METHOD AND PROCEDURE

The following is given a general framework of the taboo search algorithm in pseudo-code notation [3].

1. Init $x^* \leftarrow x$
2. If $(S(x) - T) =$ null then
    If $c(x) < c(x^*)$ then $x \leftarrow s_k(x)$,
    $x^* \leftarrow x$
   else
    $k \leftarrow k+1$
    select $s_k \in S(x)-T$ such that $s_k(x)=OPTIMUM(s_k(x):s \in S(x)-T)$
3. if Stopping criteria meet with x^* convergen, or $S(x) - T=$ null then
    stop
   else
    update T (as subsequently identified) and return to Step 2.

III. RESULT

The following are the results of this study. This study took 19 samples of tourist sites, both natural tourism, culinary tourism, shopping tourism, and cultural tourism. The starting and ending points are taken at the Udayana University Campus, Jalan Jenderal Sudirman, Denpasar. Table 1 shows the names of tourist sites with node notation on the graph which will be optimized to get the shortest distance to be traveled by tourists.

TABLE 1
DOTS (NODES) ON GRAF

Nodes	Name of Site	Information
0	Sudirman	Starting/Ending Point
1	Taman Ayun	cultural tourism
2	Kebun Raya Bedugul	natural tourism
3	Teman Jogger	shopping tourism
4	Pura Alas Kedaton	cultural tourism
5	Pura Tanah Lot	cultural/natural tourism
6	Tanjung Benoa	natural tourism
7	Garuda Wisnu Kencana	natural tourism
8	Pantai Dream Land	natural tourism
9	Pura Uluwatu	Cultural/natural tourism
10	Kedonganan Jimbaran	culinary tourism
11	Candi Dasa	natural tourism
12	Taman Ujung	Cultural/natural tourism
13	Tirta Gangga	cultural tourism
14	Pura Besakih	cultural/natural tourism
15	Kertagosa	cultural tourism
16	Barong Batu Bulan	cultural tourism
17	Celuk	shopping tourism
18	Tampak Siring Kintamani	cultural tourism
19	Sukawati	shopping tourism

The actual latitude (y) and longitude (x) are mapped/projected in the spatial coordinates (y) and (x) shown in figure 1. An application has been made to calculate the problem of traveling salesman problem using the Tabu Search algorithm by finding the shortest path of the 19 tourist locations referred to by using 500 iterations that produce the best cost 372 km. And mapping for the shortest route to all tourist sites is shown in figure 1.
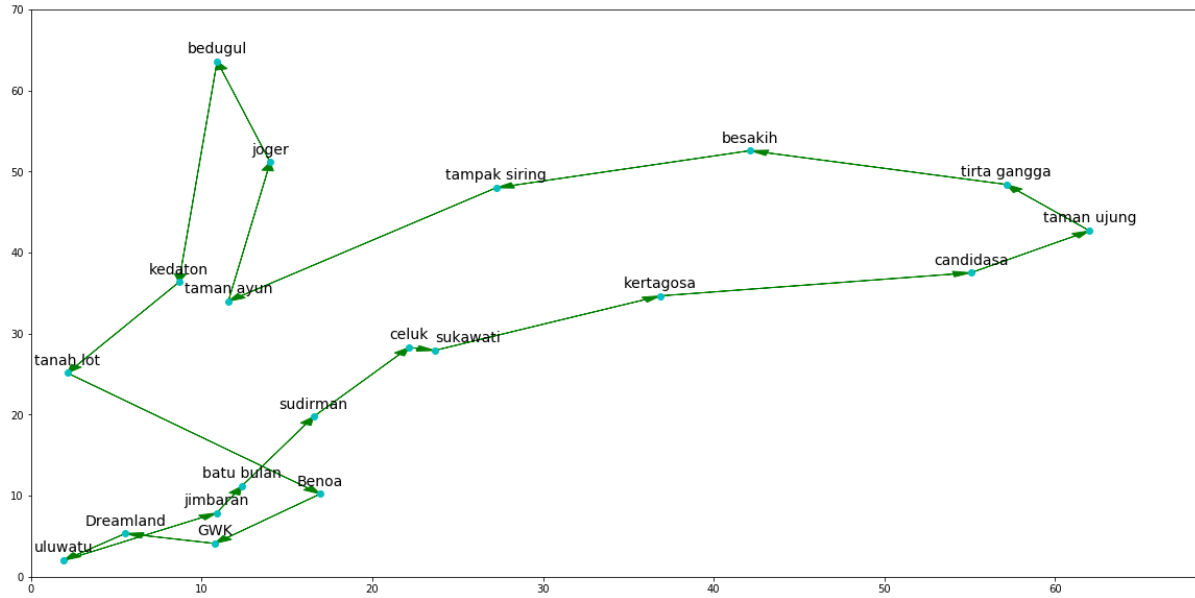
Fig. 1 The shortest route search results for 19 tourist locations

IV. DISCUSSIONS

Figure 1 shows the sequence of visits to tourist sites. If sorted from the original location and the final location, then the sequence of visits generated is as follows:

[Sudirman(0)→Perak Celuk(17)→Sukawati(19)→Kertagosa(15)
→Candi Dasa(11) →Taman Ujung(12)→Tirta Gangga(13)→Pura Besakih(14)
→Kintamani(18)→Taman Ayun(1)→Teman Jogger(3)→Bedugul(2)
→Alas Kedaton(4)→Tanah Lot(5)→Tanjung Benoa(6)→GWK(7)
→Dreamland(8)→Uluwatu(9)→Kedonganan(10)→Batu Bulan(16)→ Sudirman(0)]

Convergence was achieved in the 500th iteration and optimal global search was seen with not too large iterations finding the smallest best cost value. The best cost is the shortest total distance from the Tabu Search algorithm by 372 km which is the shortest total distance from travel routes to 19 tourist sites.

V. CONCLUSIONS

Tabu Search algorithm succeeded in finding the shortest route from 19 tourist locations used the example in this study by producing a Best Cost value of 372 km.

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In Silico Antiatheroscelosis Activity of Terpinen-4-ol from *Zingiber cassumunar* roxb. Rhizome through RCT Mechanism

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Abstract— Atherosclerosis is a chronic inflammatory disease which characterized by a fat deposit along the inner walls of arteries that causes thickening and a decreased elasticity of the arteries. Atherosclerosis can be treated by prevention of plaque formation and plaque regression. The prevention of plaque formation is carried out by an anti-inflammatory mechanism, while the plaque regression by *Reverse Cholesterol Transport* (RCT) mechanism. Terpinen-4-ol is an identity compound and one of the main constituents of the bangle rhizome (Zingiber cassumunar Roxb.) has an anti-inflammatory activity. The purpose of this research is to determine the mechanism and affinity of terpinen-4-ol compounds with PPAR-α, PPAR-γ, and LXR-α target proteins as antiatherosclerosis through plaque regression with RCT mechanism. This research was conducted by performing databases and target proteins preparation, molecular docking validation method, preparation and optimization of 3D structure of test compounds, and docking with target proteins. The docking results are the binding energy and hydrogen bonds between test compounds and target proteins. The smaller the binding energy, the stronger and more stable the bond between test compounds and target proteins are formed. The results showed that terpinen-4-ol has an affinity with PPAR-α, PPAR-γ, and LXR-α proteins with binding energy -5.8 kcal/mol, -5.4 kcal/mol and -5.44 kcal/mol respectively. Test compunds formed hydrogen bond with PPAR-α and PPAR-γ proteins while not forming with LXR-α protein. Based on these results terpinen-4-ol has potential as antiaterosclerosis through plaque regression by the mechanism of RCT with hydrogen bond formation and other interactions with PPAR-α, PPAR-γ, and LXR-α proteins.

Keywords— Antiatherosclerosis, In silico, RCT, Terpinen-4-ol.

I. INTRODUCTION

Atherosclerosis is a chronic inflammatory disease characterized by a buildup of fatty plaque on the inner walls of the arteries which causes thickening of the arteries and decreased elasticity [1][2]. Atherosclerosis can be treated in 2 ways: prevention of atherosclerotic plaque formation and decay of atherosclerotic plaque [3][4]. Prevention of atherosclerotic plaque formation can be done by anti-inflammatory mechanisms [1]. Terpinen-4-ol is an identity compound and one of the main constituents of the bangle rhizome (Zingiber cassumunar Roxb.) [5][6]. Terpinen-4-ol in Melaleuca alternifolia essential oil and bangle rhizome ethanol extract is known to have anti-inflammatory activity [7][8]. Atherosclerotic plaque decay is carried out through a Reverse Cholesterol Transport (RCT) process mediated by High Density Lipoprotein (HDL) where cholesterol in peripheral tissues is transported by HDL to the liver to be metabolized [9]. Specific processes of cholesterol efflux with the RCT pathway are cholesterol efflux to apoA-I mediated by ABCA1 and cholesterol efflux to mature HDL mediated by ABCG1 [9]. PPAR-α and PPAR-γ play an important role in the process of cholesterol efflux, where PPAR-α and PPAR-γ will induce LXR-α receptors which then activate ABCA1 and other genes involved in cholesterol efflux [9][10]. PPAR-γ can also directly

activate the expression of the ABCG1 gene that plays a role in cholesterol efflux to mature HDL [10]. Preliminary research is needed to determine the mechanism of terpinen-4-ol from bangle rhizome in its activity as an antiaterosclerosis through RCT. This research was conducted with the method in silico in computational chemistry. The in silico method can predict molecular interactions between a protein and a ligand. This test is done by docking the test compounds (terpinen-4-ol) and the target protein (PPAR-α, PPAR-γ, and LXR-α) which will then produce data on the affinity of the bond between the ligand and the protein [11].

II. MATERIAL AND METHOD

A. Material

The materials used in this research are PPAR-α protein (pdb id: 2REW), PPAR-γ (pdb id: 2F4B), LXR-α (pdb id: 3IPQ) which is downloaded from https://rcsb.org/pdb/ home / home.do and the 3-dimensional structure of terpinen-4-ol created and prepared using the HyperChem 8 program.

B. Method

Molecular docking performed includes the preparation of 3D structures of proteins using chimera 1.10.1 software, optimization of the 3D structure of test compounds using hyperchem 8 software (semi-empirical AM1), molecular docking method validation and molecular docking to the protein PPAR-α (pdb id: 2REW) , PPAR-γ (pdb id : 2F4B), LXR-α (pdb id : 3IPQ) using Autodock 4.2. software. The lower the binding energy, the stronger and more stable the bond between the protein and test compounds. All processes are carried out in a set of computers with Windows 10, 64 bit specifications.

III. RESULT AND DISCUSSION

The terpinen-4-ol structure is drawn and optimized using the Hyperchem 8 program with the semiempirical calculation method on the AM1 model (Austin model 1). The AM1 model is a very accurate model because the parameters taken into account include electronic properties, geometry optimization, total energy, and heat generation [12]. The total energy of the single point calculation results obtained is -2763.598572 kcal / mol and the value of the optimized energy is -2778.27771 kcal / mol. The lower the energy value of the optimization results shows that the compound has an interaction in the form of greater inter-atomic attraction forces while the repulsion between atomic forces becomes increasingly minimum so that the conformation of compounds obtained is more stable [12].

PPAR-α protein (pdb id: 2REW), PPAR-γ (pdb id: 2F4B), LXR-α (pdb id: 3IPQ) were prepared by separating the native ligand from the protein structure using the Chimera 1.10.1 program (TABLE I). It aims to provide a pocket that will be used as a space for the terpinen-4-ol to attach to the target protein. In the process of protein preparation, in addition to selecting the chain to be used, also carried out removal of water molecules (H_2O) around the protein structure. It is intended that water molecules do not interfere with the docking process, so it can be ascertained that only ligands interact with proteins [13]. The validity of the molecular docking method is known by docking the native ligand redocking to the targeted protein using the Autodock 4.2 program.

The redocking process is done by the semirigid method, which regulates that the macromolecules are rigid so that there is no change in the shape of the binding site during the redocking process while the ligands to be docking are flexible [13]. Validation parameters in molecular docking are RMSD (Root Mean Square Deviation) values. RMSD shows the comparison of native ligand conformation from docking with native ligand conformation from crystallographic measurements . The limit of acceptable RMSD values is ≤ 3Å [14]. The RMSD values obtained for PPAR-α, PPAR-γ, LXR-α were 1.89Å; 1 Å; and 0.89 Å respectively (TABLE II). Based on these results, the method used can be said to be valid so that the terpinen-4-ol docking process can be carried out.

Based on the results of redocking, it is known that the native ligand binding energy with PPAR-α, PPAR-γ and LXR-α proteins are respectively -11.28 Kcal / mol; -10.81 Kcal / mol; and -14.6 Kcal / mol. In addition, residues that form hydrogen bonds with native ligands can be observed. In PPAR-α proteins, native ligands form hydrogen bonds with residues of His440 and Tyr464. In PPAR-protein protein, hydrogen bonds are formed with His449 residue. Two hydrogen bonds are formed between the native ligand with the LXR-α protein which occurs with Arg305 and Leu316 residues (TABLE III). Other interactions observed in redocking also include van der Waals

forces and electrostatic interactions. Visualization of interactions that occur between native ligands and target proteins is shown in Figure 1.

TABLE I
3-DIMENSIONAL STRUCTURE OF TARGET PROTEINS AND NATIVE LIGANDS
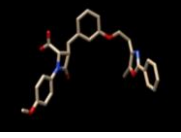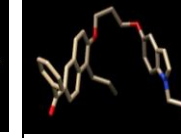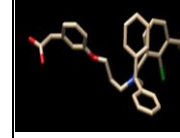
PPAR-α		PPAR-γ		LXR-α	
Protein structure	Native Ligand	Protein structure	Native Ligand	Protein structure	Native Ligand

TABLE II
RMSD VALUE OF NATIVE LIGAND-PROTEIN

No	Protein	RMSD (Å)
1	PPAR-α	1,89
2	PPAR-γ	1
3	LXR-α	0,89

(a)   *(b)*   *(c)*
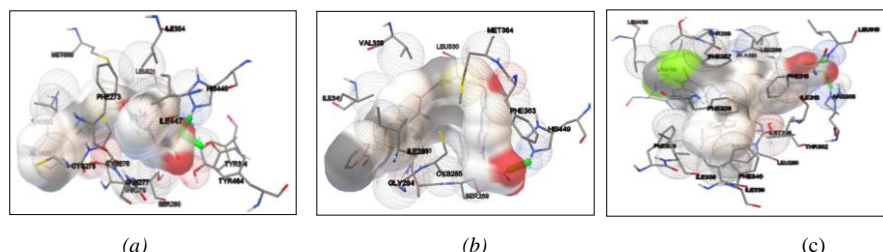
Figure 1. Interaction between native ligand and protein PPAR-α (a), PPAR-γ (b) and LXR-α (c).

Based on Figure 1, it can be seen the interactions that occur between native ligands and target proteins include hydrogen bonds (green cylinders), van der Waals forces (striped balls), and electrostatic interactions. Electrostatic interactions that occur due to O atoms (red parts), N (blue colored parts), Cl (light green parts), and F (brownish yellow parts). In addition, the volume of the compound is shown by the gray circle that surrounds the compound.

TABLE III
BAINDING ENERGY AND HYDROGEND BOND BETWEEN LIGAND AND PROTEIN

No.	Protein	Ligand	Binding Energy (kkal/mol)	Residu	Fungsional Groups
1	PPAR-α	Native Ligand	-11,28	His440	HE2-O38
				Tyr464	HH-O38
2	PPAR-γ	Native Ligand	-10,81	His449	HE2-OXT
3	LXR-α	Native Ligand	-14,6	Arg305	HE-O36
				Leu316	HN-O37
4	PPAR-α	Terpinen-4-ol	-5,8	Tyr314	OH-H
				Tyr464	HH-O
5	PPAR-γ	Terpinen-4-ol	-5,4	Cys285	O-H
6	LXR-α	Terpinen-4-ol	-5,44	-	-

The docking of terpinen-4-ol molecule in the target protein is carried out using a validated method. The results obtained from docking terpinen-4-ol in the form of bond energy and type of interaction (hydrogen bonds). The bond energy formed is the calculation (scoring function) of the conformation of the ligand (I) formed in a macromolecule (E) during equilibrium conditions (conformational search). Based on the two variables, it is calculated (scoring function) the value of the complex [E + I] = [EI] which is known as bond energy or Gibbs energy (ΔG). The energy is related to the affinity of the ligand for protein. Low bond energy values indicate stable ligand-protein complexes [14]. Based on this, the test compound conformation was selected which has the lowest bond energy and interacts with amino acid residues at the binding site. Based on the docking-4-ol docking results, it

can be seen that the binding energy of the 4-ol terpinen with the target protein is higher than the native ligand binding energy of the target protein, thus its affinity to the protein is weaker than the native ligand. Terpinen-4-ol can form hydrogen bonds with Tyr314 and Tyr464 residues in PPAR-α proteins, with Cys285 residues in PPAR-γ proteins and do not form hydrogen bonds with LXR-α proteins (TABLE III). In addition to hydrogen bonds, there are also other interactions such as van der Waals forces and electrostatic interactions. Visualization of interactions that occur can be seen in Figure 2.

(a)   (b)   (c)
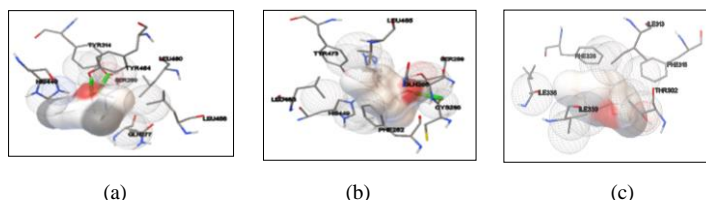
Figure 2. Interaction between terpinen-4-ol and protein PPAR-α (a), PPAR-γ (b) and LXR-α (c).

IV. CONCLUSION

Terpinen-4-ol has the potential as atherosclerosis through interaction with PPAR-α, PPAR-γ and LXR-α proteins with successive bond energy values of -5.8; -5.4 and -5.44 kcal / mol, so they can play a role in the decay of fat plaque through the RCT mechanism.

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Study on Bali Traditional Food in its Development as Fuctional Food of Bangli Regency

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Abstract—The area of Bali is rich in traditional food and drinks that are spread throughout the regencies / city. The purpose of this study is to inventory the types of traditional food, snacks and drinks; analyze the chemical composition and determine the traditional food that has the potential to be developed into functional food in Bangli Regency. The study was conducted by survey method in traditional food-producing villages in Bangli Regency. The respondents were traditional food producers. The villages and respondents were selected by purposive sampling method. The products produced by respondents were sampled to be analyzed for their chemical composition in the Food Analysis Laboratory of the Faculty of Agricultural Technology, Udayana University. The survey results show that there are 56 types of traditional food consisting of 17 foods, 34 types of snacks and five types of drinks in Bangli Regency. Chemical composition analysis was performed on 43 types of traditional food. Water content, ash, fat, protein, carbohydrates and crude fiber and the energy produced varies according to the type of food. Traditional drink of *loloh* contain vitamin C of 1.58 - 9.68 mg / 100 ml, total acids 0.32 - 0.97% and antioxidant activity 262.71 - 289.59 mg / l GAEAC. *Bebean* and *loloh cemcem* are potential to be developed into functional food.

Keywords: traditional Balinese food, crude fiber and antioxidant activity.

I. INTRODUCTION

The area of Bali which is famous as a tourism area is rich in traditional foods and drinks which are spread throughout the regencies and cities. Little is known about the data on the number and types of traditional foods and drinks in Bali at this time. Based on the results of a survey conducted in 1999 by the Center for Traditional Food Studies at Udayana University in the Bali area, as many as 281 types of food inventory were taken, 174 snacks and 73 types of drinks [1]. In Bangli Regency, there were reported inventory of 31 types of food, 30 types of snacks and four types of drinks. Of the total 528 types of food, snacks and drinks, only 50 (9.47%) types of food, snacks and drinks were studied further, especially in terms of nutritional value, while the remaining 478 (90.53%) had not been studied. Data collection on traditional Balinese food is very important because it is possible that currently several types of food are no longer produced (extinct) and vice versa, namely when the previous inventory was not recorded but is currently reprocessed because it is believed by the community to have health benefits. Data collection on traditional Balinese food has been carried out in Gianyar Regency in 2013 [2] and in the city of Denpasar in 2018 [3].

Traditional food has a very strategic value in helping to accelerate the process of diversifying nutritious and balanced and safe food consumption. This is because there are many types of traditional food and have sufficient nutritional value, and are safe for consumption because food processing in general does not use harmful chemical additives. In addition, the materials used are local not imported so that the procurement of the materials does not depend on other regions or countries. At present there is a tendency for people (including domestic and foreign tourists to come to Bali) to choose natural foods including traditional foods because of the smaller risk of health problems compared to consuming modern foods which are generally rich in fat and sugar which are at high risk of causing heart attacks and diabetes.

Based on these considerations, it is necessary to carry out an inventory of Balinese traditional foods, especially in Bangli Regency and an assessment of aspects of formulation, processing methods, nutrient content,

crude fiber and antioxidant activities. From the results of this study further determined the types of traditional food that have the potential to be developed into functional food. Data collection on the amount and type of traditional food produced in Bangli Regency and its assessment is a priority in this year's research because Bangli Regency is currently actively developing tourism including culinary tourism. The purpose of this study is to determine the types and chemical composition of traditional food and determine the type of traditional food that has the potential to be developed into functional food in Bangli Regency.

II. METHODS AND PROCEDURES

A. *Research Location and Respondents*
The survey was conducted in Bangli Regency. In each sub-district two villages were set up to serve as research sample areas. Chemical composition analysis was carried out at the Food Analysis Laboratory of the Faculty of Agricultural Technology, Udayana University, on Jl. P.B. Sudirman, Denpasar.

Respondents are traditional food processors or traders in the sample villages. Determination of sample villages and respondents is done randomly, namely purposive sampling [4] with the consideration that the sample villages have traditional food producers or traders, while the respondents are producers or traders who can provide the necessary information.

B. *Research Implementation*
The survey began with an inventory of the name of the processor / trader, the type of traditional food that is processed or sold and the address of the residence or place of sale based on information obtained from the Village Head. Subsequently interviews were conducted with producers producing or selling these traditional foods. The survey was conducted by visiting and interviewing the respondent directly using a list of questions prepared in advance. The information expected from respondents was mainly the types of traditional food that are processed or sold. Traditional foods that have been inventoried based on the results of the survey are taken samples of the products and then taken to the Laboratory for further chemical composition analysis which includes nutrient content, namely: water content by heating in the oven, ash content by incandescent in muffles, protein content by semi-micro method of Kjeldahl, fat using the Soxhlet extraction method, and carbohydrates in the amount calculated by the *Carbohydrate by different* method [5]. Crude fiber with acid-base analysis method and antioxidant activity with spectrophotometric method [6]

C. *Research Materials and Data Analysis*
The main chemicals used are: NaOH, H_2SO_4, boric acid, HgO, Na_2SO_4 and concentrated HCl and traditional food from respondents to be analyzed for their chemical composition in the laboratory. The data obtained were analyzed by descriptive methods to obtain conclusions from this study.

III. RESULTS AND DISCUSSION

A. *Types of Traditional Food in Bangli*
The results of a survey of traditional food types (food, snacks and drinks) in Bangli Regency are presented in Table 1. From Table 1 it is known that in Bangli Regency there are 56 types of traditional food consisting of 17 types of food, 34 types of snacks and five types of drinks.

Table I.
Types of traditional food in Bangli Regency

Food	Snacks	Drinks
Urutan base kuning, sambel karud, sambel bongkot, taluh pindang, be gerang sambel matah, lawar nangka kacang, be guling, oret,semuuk, nasi sela, jukut urab, bebean, betutu, be keren, jukut undis, be nyat-nya and *bubuh,*	*Godoh sela, kulek, pulung ubi, pisang rai, kaliadrem, jaja lukis, jaja laklak, jaja kebis-kebis, cendol, jaja lempog, jaja daldalan, jaja matahari, jaja bekayu, klepon, klepon ubi ungu, donat ubi ungu, sumping waluh, bantal, jaja mendut, jaja lapis, jaja getuk, jaja kiping, jaja uli, jaja gina, jaja batun duren, kueku, jaja kupo, jaja satuh, jaja iwel, sumping, timus, jaja pulung-pulung, sumping sela ungu* and *apem.*	*Loloh cemcem, loloh teleng, loloh jarak, loloh kunyit asem* and *loloh kunyit matemu.*

B. *Chemical Composition of Traditional Food in Bangli*

Of the 56 traditional foods, 43 were taken for analysis for their chemical composition which included water content, ash content, protein content, fat content and carbohydrate content, except for 3 (three) types of drinks (*loloh*) no chemical composition analysis was conducted as stated above, but the content of vitamin C, total acid and antioxidant capacity were analyzed, while the remaining 13 types of traditional food were not analyzed for their chemical composition with certain considerations.

Based on 40 traditional food and snacks samples analyzed for their chemical components (Table 2) it is known that the water content ranges from 1.29% (*sambel karud*) to 83.17% (*cendol*), ash content 0.17% (*jukut urab*) to 3.95% (*be nyat-nyat*), protein content 0.30% (*pulung-pulung*) to 24.76 (*be gerang sambel matah*), fat content 0.23% (*jaja kebis-kebis*) to 70.97% (*sambel karud*), carbohydrate content 0.46% (suckling pig) to 71.99% (*jaja uli*) and crude fiber content 0.56% (*jaja matahari*) to 17.88% (*sambel bongkot*). For traditional drinks (*loloh* cemcem, *loloh jarak* and *loloh teleng*) vitamin C content is 1.58 to 9.68 mg / 100 ml, total acid is 0.32 - 0.97% and antioxidant activity is 262.71 - 289.59 mg / 1 GAEAC. Based on the content of vitamin C and the antioxidant activity produced by *loloh*, then *loloh cemcem* has the potential to be developed into functional food that has functional properties as an antioxidant. *Bebean* is also potential to be developed into functional food because the nutrient content and crude fiber are quite high.

Energy is calculated using the Atwater factor (4-9-4) which is 1 g carbohydrate (4 kcal), 1 g fat (9 kcal) and 1 g protein (4 kcal) [7]. According to the Regulation of the Minister of Health of the Republic of Indonesia No.75 of 2013, the average Energy Adequacy Rate for Indonesia's population is 2150 kcal. Traditional food in Bangli produces energy ranging from 69.56 kcal / 100 g (*cendol*) to 742.20 kcal / 100 g (*sambel karud*) or can fulfill around 3.24% - 34.52% of Energy Adequacy Rate.

Table II.
Moisture content, ash content, protein content, fat content and carbohydrate content of 40 types of food and traditional snacks in Bangli Regency

Traditional food types	Water (%)	Ash (%)	Protein (%)	Fat (%)	Carbohydrate (%)
1.Godoh Sela	44.63	0.80	4.40	8.92	41.26
2.Kulek	72.67	045	0.36	0.58	25.93
3.Pulung Ubi	47.12	0.89	2.48	2.47	47.04
4.Pisang Rai	62.46	0.60	2.81	0.57	33.56
5.Urutan Base Kuning	19.59	1.17	11.39	60.75	7.10
6.Sambel Karud	1.29	1.87	6.53	70.97	19.34
7.Sambel Bongkot	57.17	2.02	3.33	25.71	11.77
8.TaluhPindang	66.84	0.91	18.08	11.52	2.65
9.Be Gerang SambelMatah	49.14	3.34	24.76	17.50	5.26
10.Lawar nangkakacang	66.84	1.23	5.81	15.18	10.95
11.jaje lukis	61.01	1.29	5.52	1.09	31.09
12.Jaje laklak	65.62	0.23	3.73	0.50	29.92
13.Jaje Kebis-kebis	58.95	0.29	3.16	0.23	37.37
14. Cendol	83.17	0.60	1.10	0.92	14.21
15. Jaje Lempog	63.11	0.58	3.57	0.97	31.77
16. Babi Guling	62.20	1.22	23.96	12.16	0.46
17. Oret	70.99	1.25	10.43	7.51	9.83
18. Semuuk	64.60	2.13	1.62	0.69	30.97
19. Jaje daldalan	2.18	1.36	7.30	18.93	70.23
20. Jaje matahari	17.75	0.77	4.78	22.27	54.43

21. Jukut Urab	78.44	0.17	7.50	7.47	6.42
22.Klepon ubi ungu	56.80	0.60	3.30	1.03	38.26
23. Nasi sele	61.87	0.36	4.77	1.74	31.26
24. Sumping waluh	61.01	0.61	2.78	1.07	34.53
25. Bantal	47.31	0.68	4.75	3.93	43.33
26. Mendut	45.88	0.71	4.32	4.28	44.81
27. Lapis	60.26	0.46	3.97	1.49	33.84
28. Getuk	64.13	0.81	2.41	2.93	29.73
29. Jaje kiping	4.68	1.25	7.23	21.57	65.27
30. Jaje uli	4.62	1.09	7.80	14.50	71.99
31. Batun duren	22.88	0.39	4.09	10.72	61.92
32. Kueku	45.83	0.86	6.07	2.50	44.75
33. Kupo	35.68	0.52	3.54	2.49	57.76
34. Bubuh	78.62	0.40	5.45	5.52	10.01
35. Timus	49.13	0.98	2.51	3.52	43.86
36. Pulung-pulung	51.76	0.89	0.30	5.87	41.17
37. Sumping sele ungu	58.30	0.46	2.24	3.33	35.66
38. Be nyat-nyat	58.90	3.95	21.52	1.,53	2.09
39. Jaje gina	4.11	0.37	7.57	21.51	66.44
40. Bebean	68.99	1.82	10.13	4.51	14.55

IV. CONCLUSION

The survey results show that in Bangli Regency the number of traditional foods is 56 types consisting of 17 types of food, 34 types of snacks and five types of drinks. The chemical composition of traditional food in Bangli namely water content, ash content, fat content, protein content, carbohydrate content and crude fiber content varies greatly according to food type. The energy produced ranges from 69.56 kcal / 100 g (*cendol*) - 742.20 kcal / 100 g (*sambal karud*) or can meet around 3.24% - 34.52% Energy Adequacy Rate (AKE). Drinks (*loloh*) containing vitamin C 1.58 - 9.68 mg / 100 ml, total acid 0.32 - 0.97% and antioxidant activity 262.71 - 289.59 mg / l GAEAC. *Bebean* and *loloh cemcem* are potential to be developed into functional food.

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Lymphocyte Function-Associated Antigen-1 and Dicer1 Expressions in Colorectal Cancer

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Abstract—Colorectal cancer incidence has greatly increased in Indonesia due to dietary changes that could affect the epigenetic mechanism including microRNA expression. Dicer1 is a major regulator of microRNA biogenesis and stabilizes DNA methylation in colorectal cell lines, hence cancer growth is more progressive. Most of colorectal cancer metastasis to liver. Previous in vivo study on mice showed LFA-1 (Lymphocyte Function-Associated Antigen-1) had a role in liver endothelium destruction in liver metastasis. Therefore this research was aimed to examine the Dicer1 expression and β2 sub unit LFA-1 in colorectal cancer patients in Sanglah General Hospital. Thirty three FFPE tissue of Colorectal Cancer Patients were obtained from Pathological Anatomy at General Sanglah hospital. From histological grading, the samples were divided into low grade (18 samples) and high grade (15 samples) colorectal cancer. The expression of Dicer1 was assessed by immunohistochemistry and LFA-1 expression was assessed by qRT-PCR. The study showed mostly of low grade tumor (94.4%) had low expressions of LFA-1. While in high grade tumor showed 60% of low expressions and 40% of moderate and high expressions of LFA-1. Dicer1 expression in low grade colorectal cancer mostly had low expression (66.7%) with no moderate and high expression. While the high grade of colorectal cancer had 40% of low Dicer1 expression and 40 % of moderate and high Dicer1 expressions. In conclusion, The expression of Lymphocyte Function-Associated Antigen-1 and Dicer1 were higher in high grade than low grade of colorectal cancer patients.

Keywords— Colorectal cancer, Dicer1, Lymphocyte Function-Associated Antigen-1

I. INTRODUCTION

Colorectal cancer is the third most common malignancy in the world [1]. The incidence of colorectal cancer in Indonesia has highly increased due to a change in diet toward westerners who are lower in fiber and high in fat [2]. Several lifestyles including dietary patterns have been identified as modifying epigenetic patterns [3]. Epigenetics can change the regulation of gene expression without involving changes in DNA sequences [4]. Epigenetic mechanisms consist of DNA methylation, histone modification, and microRNA (miRNA) [5].

MicroRNA is predicted to control the activity of genes that encode proteins for more than 60% in mammals and participate in regulation almost all cellular processes [6]. The main regulators in miRNA biogenesis are Dicer and Drosha, but Drosha's expression was not related to cancer stage [7], prognosis,

and outcome in the treatment of colorectal cancer patients [8]. In addition, Dicer can also stabilize DNA methylation in colorectal cancer cell lines [9], hence if DNA hypermethylation occurs in tumor suppressor gene, the cancer growth will be more progressive. Dicer expression was increased in colorectal cancer especially in stage III compared to stage II. Thus Dicer's expression is related to the progression of cancer at an advanced stage which has the potential for metastasis [7]. Colorectal cancer those who experience metastasis are often the cause of death with more than 50% occuring in the liver [10], [11]. In liver metastasis, expression of the β2 integrin Lymphocyte Function-Associated Antigen-1 (LFA-1) subunit which acts to impair liver endothelial activation, tumor cell retention, release cytokines, and development of metastasis to the liver of mice in *in vivo* study [12].

Based on the facts above, this study examined the expression of Dicer1 and LFA-1 to assess the possibility of Dicer1 as prognostic factor in colorectal cancer, especially early detection of possible metastasis in colorectal cancer patients.

II. METHODS AND PROCEDURES

The research was carried out after obtaining ethical clearance approval from Medical Research Ethics Commission, Faculty of Medicine, Udayana University (No. 1606/UN14.2.VII.14/LP/2019). Thirty three colorectal cancer tissues with formaline-fixed paraffin-embedded were obtained from specimens of colorectal patients as a tissue archive in the Department of Pathology Anatomy, Sanglah Hospital/Faculty of Medicine, Udayana University. The tumor grade were used 2-tiered grading system to minimize subjective examination, i.e. low grade (50% gland formation) which included well and moderately differentaited and high grade (< 50% gland formation) [13]. These tissues were processed at Department of Histology, Faculty of Medicine, Udayana University for qRT-PCR and immunohistochemical examinations.

Dicer1 expression by immunohistochemistry were assessed using light microscope with 400x magnifications. Cancer cells expressing Dicer1 will be brown in cytoplasm and assessed using optilab viewer. Intensity of colorectal cancer cell's cytoplasmic staining with value of 0-3 that reffered to no staining (0), weak (1), moderate (2), and strong (3). While, the expression of LFA-1 were assessed using qRT-PCR with primer that target Itgb2 gene to assess β2 integrin LFA-1 subunit, i.e.:
Itgb2 Forward: ATGTGGGCCCACACTCACTGC
Itgb2 Reverse: TTAACAAAAGGCAGCACCGT

III. RESULTS

Histology grading from tissue samples that received from Department of Pathology Anatomy were divided into low grade (well and moderate differentiation) from eighteen samples and high grade (poorly differentiated) from eight samples. Seven tissue samples from the histologic variants, i.e. mucinous and signet ring cells that were included in high grade because they had a worse outcome than conventional adenocarcinoma [13], [14]. Hence, the total samples used in this research were thirty three samples.

A. LFA-1 Expressions

The LFA expressions were divided into low, moderate, and high expression. The study showed mostly of low grade tumor (94.4%) had low expressions of LFA-1, while in high grade tumor showed 60% had low expressions and 40% had moderate and high expressions of LFA-1 (Table I).

TABLE I
THE EXPRESSION OF LFA-1 IN COLORECTAL CANCER PATIENTS

Histological grade	LFA-1 expressions (number)			Total (number)
	Low	Moderate	High	
Low grade	17 (94.4%)	1 (5.6%)	0	18
High grade	9 (60%)	5 (33.3%)	1 (6.7%)	15

B. *Dicer1 Expressions*

Dicer1 expressions from immunohistological staining showed its intensity from cytoplasmic staining of colorectal cancer cells with value of 0-3 that reffered to no staining, weak, moderate, and strong, respectively (Fig. 1). The study showed Dicer1 expression in low grade colorectal cancer mostly had low expression (66.7%) and with no moderate and high expression. While the high grade of colorectal cancer had 40% of low Dicer1 expression and 40 % of moderate and high expressions (Table II).

This result was in line with previous study that showed Dicer expression is increased in colorectal cancer especially in stage III compared to stage II. Thus Dicer1's expression is related to the progression of cancer at an advanced stage which has the potential for metastasis [7]. Colorectal cancer those who experience metastasis are often the cause of death with more than 50% occurring in the liver [10], [11]. In *in vivo* study, the expression of the β2 integrin LFA-1 subunit could impair liver endothelial activation, tumor cell retention, release of cytokines, and development of metastases to the liver [12]. However, this study found that high grade tumor had 60% low expression of LFA-1. This result could due to some histologic variants, i.e. mucinous and signet ring cells that were included in high grade. From previous study found that mucinous variant was usually metastasis into peritoneum, not into liver tissues [14].
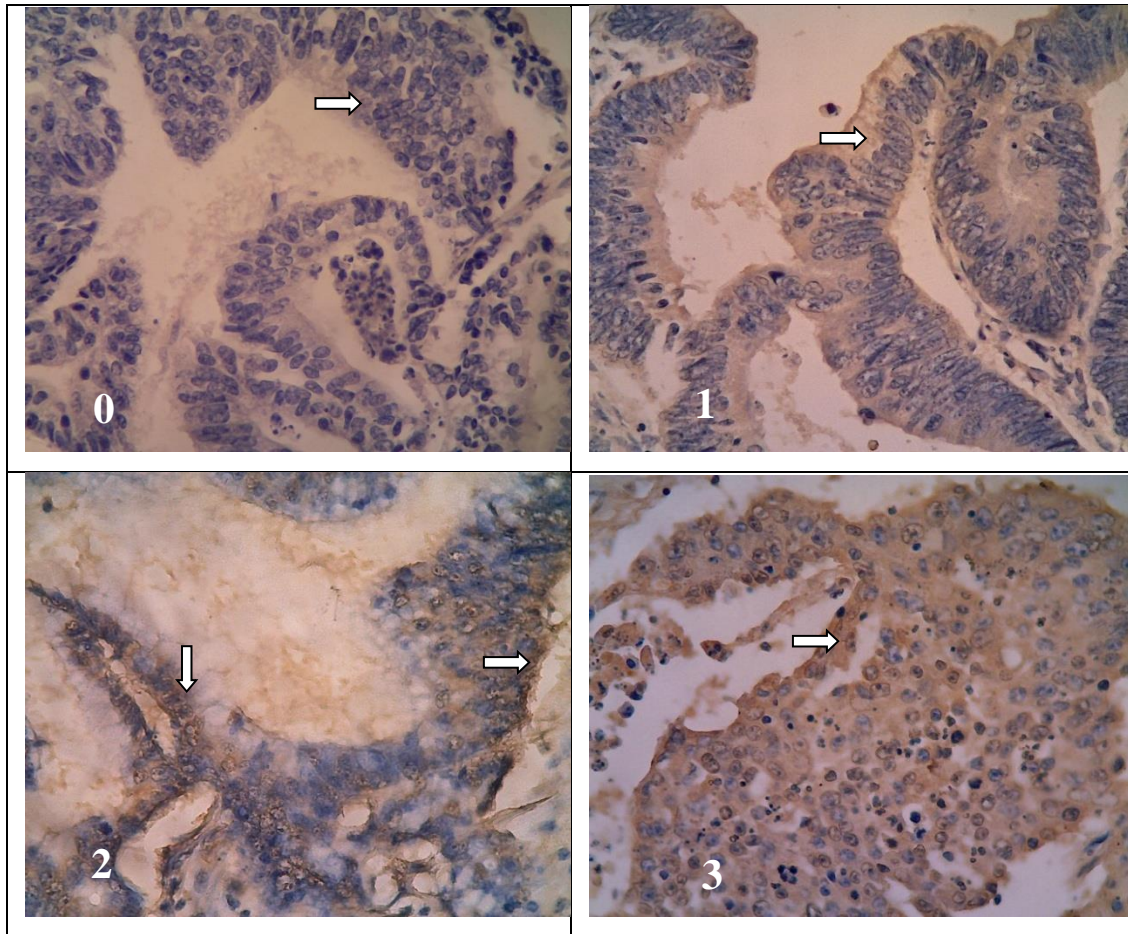
Fig. 1 Dicer1 expressions with immunohistological staining showed cytoplasmic staining of colorectal cancer cells (arrow) in 400x magnification with value 0 (no staining), 1 (weak), 2 (moderate), 3 (strong).

TABLE II
DICER1 EXPRESSIONS OF COLORECTAL CANCER

Histological Grade	Dicer1 Expressions				Total (number)
	0	1	2	3	
Low grade	6 (33.3%)	12 (66.7 %)	0	0	18
High grade	3 (20.0%)	6 (40.0%)	3 (20.0%)	3 (20.0%)	15

IV. CONCLUSIONS

The expression of Dicer1 and LFA-1 relatively higher in high grade than low grade of colorectal cancer patients.

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Monitoring ground surface displacements induced by volcanic activity of Mount Agung using SBAS-DInSAR

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Abstract— Mount Agung is the largest volcano on the island of Bali in Indonesia. It had been in a rest condition since 1963. However, Mount Agung began to show volcanic activity with intense seismicity in August 2017. The intense seismicity peaked in early October 2017, although the volcano did not erupt until November 21, 2017. From November 25 to 29, 2017, intense explosive eruptions with rapid lava effusion occurred and 140,000 people had to evacuate the area. The aim of this study is to update the ground surface displacements due to the volcanic activity of Mount Agung by means of Differential Interferometric Synthetic Aperture Radar (DInSAR), which was applied to measure the displacement behavior of this volcano in 2017. In addition, the capability of DInSAR to detect the behavior due to volcanic activity is also investigated. The Small Baseline Subset DInSAR (SBAS-DInSAR) is employed in this study to conduct multi-temporal analyses. In total, 154 data images were taken by the Sentinel-1A and -1B satellites (operated by the European Space Agency: ESA) from October 2014 to July 2019 and are used in this study. It is found that the displacement increased from May to November 2017, and that it increased again from May to July 2019 after having decreased for about one and a half years. This study demonstrates the applicability of DInSAR for detecting ground surface displacements induced by volcanic activity.

Keywords— Ground surface displacements, Mount Agung, SBAS-DInSAR, Volcanic activity.

I. INTRODUCTION

Mount Agung is the largest volcano on the island of Bali in Indonesia. It is located in the eastern part of Bali and its elevation is about 3018 m above sea level (measured by ALOS World 3D-30m DEM). The location and elevation of Mount Agung are presented in Fig. 1. Mount Agung had been in a period of rest since 1963. However, Mount Agung began to show signs of activity with intense seismicity, measurable ground surface displacements, and thermal anomalies in the summit crater [1]. Although the seismic activity peaked in late September to early October 2017, the eruption of Mount Agung did not occur until November 21, 2019 [1]. The most massive eruptions with rapid lava effusion occurred between November 25 and 29, 2017, and 140,000 people had to evacuate the area [1]. Smaller and more infrequent explosions continued until June 2019.

The main purposes of this research are to measure the present ground displacements induced by the volcanic activity of Mount Agung by means of Differential Synthetic Aperture Radar (DInSAR) and to investigate the applicability of DInSAR for monitoring the ground displacements induced by this volcanic activity. The Synthetic Aperture Radar (SAR) data provided by Sentinel-1A and -1B are used. A Small Baseline Subset (SBAS) DInSAR [2] time series analysis is employed to generate the spatial distribution and temporal transition of the ground surface displacements.

Although DInSAR was applied to monitor the ground displacements induced by the volcanic activity of Mount Agung by [3] from April to November 2017, using the DInSAR stacking method, this research employs more SAR data than [3] (154 SAR images taken from October 7, 2014 to July 31, 2019) and utilizes a SBAS-DInSAR time series analysis.
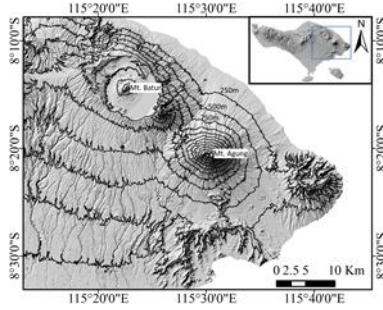
Fig. 1 Location of Mount Agung and elevation presented by contour lines.
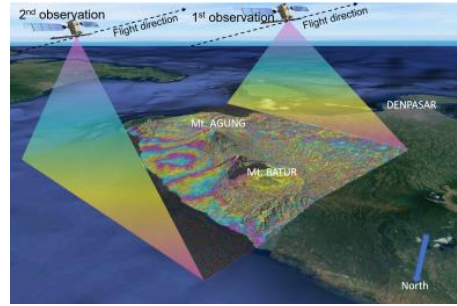
Fig. 2 Schematic view of SAR satellites observing Mount Agung.

II. Outline of Dinsar and SBAS Time Series Analysis

A. Basic concept of SAR

Synthetic Aperture Radar (SAR) is a radar system using an antenna mounted on an aircraft or artificial satellite. It is a kind of active remote sensing system, whereby SAR transmits electromagnetic waves and receives the reflected electromagnetic waves from the Earth's surface. The reflected electromagnetic waves are stored in digital form in a complex number data format [4]. It contains the amplitude and phase of the reflected electromagnetic waves [4]. The most important advantages of SAR are that it can be used for day-night time observations, is independent of the weather conditions, and does not require the use of any devices in the area being observed.

One of the principle applications of SAR is differential SAR (DInSAR). DInSAR is often used for measuring the displacements of the Earth's surface over a vast area in the direction of the satellite's line of sight (LOS). To conduct a DInSAR analysis, at least two sets of SAR data are required. Those SAR data are obtained from the same or an identical SAR satellite which observes the same area on the Earth's surface at different time acquisitions and satellite positions. A schematic view of DInSAR is presented in Fig. 2.

To obtain the surface displacements, a DInSAR analysis requires topographical (Digital Elevation Model/DEM) information on the monitored area. DEM is used to remove the topographic phase component from the interferometric phase. To obtain reliable displacement results by DInSAR, several errors should be removed, i.e., orbit inaccuracies, atmospheric delays, and noises [5].

B. SAR dataset

In this research, the SAR dataset from the Sentinel-1A and Sentinel-1B satellites (operated by the European Space Agency: ESA) is employed to monitor the displacements of Mount Agung. The SAR images used in this research comprise 154 scenes. The SAR images were taken from October 7, 2014 to July 31, 2019 in the descending orbit direction. Detailed information on the SAR dataset is presented in Table 1.

TABLE I
SENTINEL-1A AND -1B SAR DATASET

Satellite name	Sentinel-1A and -1B
Number of SAR data images	154 scenes
From (date)	October 7, 2014
To (date)	July 31, 2019
Orbit direction	Descending
SAR sensor direction	Right-looking
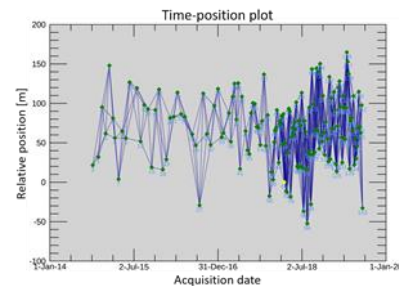
Fig. 3 Combinations of SAR pairs for SBAS-DInSAR analysis.

C. SBAS-DInSAR method

The Small Baseline Subset (SBAS) DInSAR time series analysis [2] is employed to obtain the spatial distribution and temporal transition of the surface displacements. SBAS-DInSAR utilizes a series of SAR images and conducts multiple DInSAR processing to produce several interferograms. The number of possible combinations of SAR pairs for multiple DInSAR processing is based on the threshold of the spatial and temporal baselines. In this research, the temporal baseline threshold is 36 days and the spatial baseline threshold is 250 meters. The thresholds generate the sets of combinations shown in Fig. 3.

III. RESULTS AND DISCUSSION

The spatial distributions of the LOS displacements, taken every six months from November 12, 2014 to July 31, 2019, are presented in Fig 4. The displacements are shown in red-green-blue. Red indicates the areas moving toward the satellites, green indicates no movement, and blue indicates the areas moving away from the satellites.
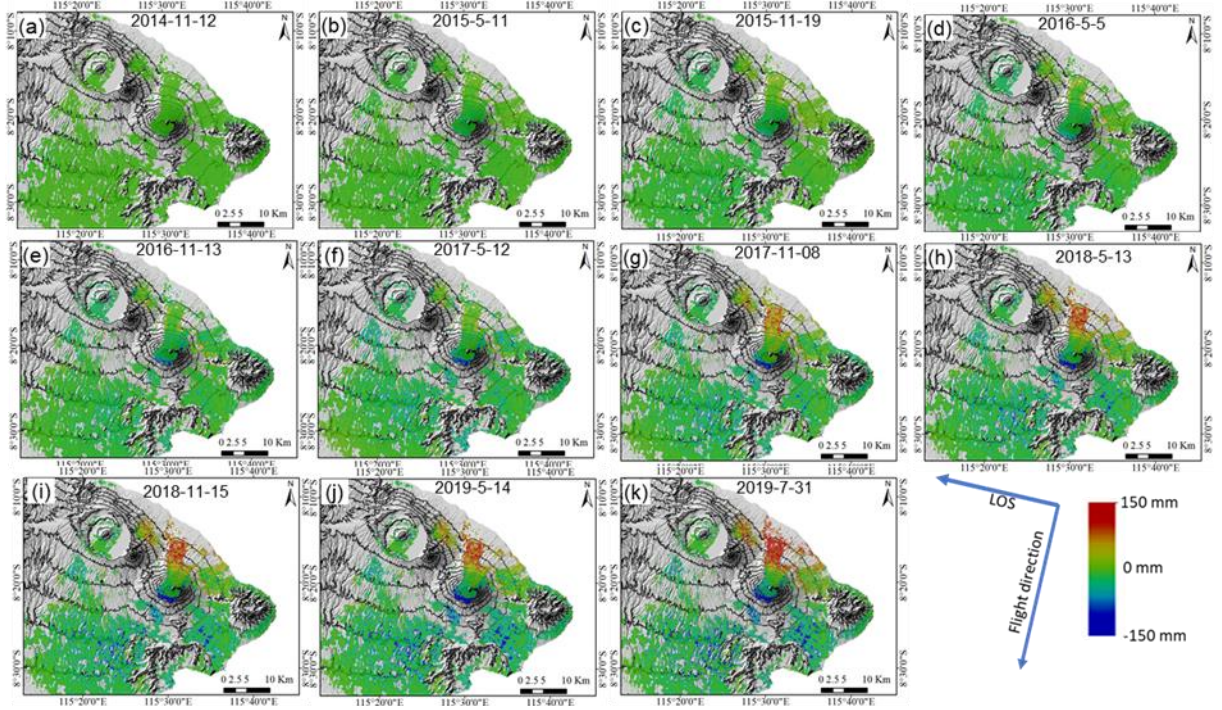
Fig. 4 Spatial distributions of LOS displacements obtained by SBAS-DInSAR every six months from November 12, 2014 to July 31, 2019: (a) November 12, 2014, (b) May 11, 2016, (c) November 19, 2015, (d) May 5, 2016, (e) November 13, 2016, (f) May 12, 2017, (g) November 8, 2017, (h) May 13, 2018, (i) November 15, 2018, (j) May 14, 2019, and (k) July 31, 2019.

It can be seen that no significant displacements were detected by SBAS-DInSAR from November 12, 2014 to May 12, 2017 (Figs. 4a-f). However, significant displacements were detected from May 12, 2017 to November 8, 2017 (Figs. 4f-g). The results from [3] for April to August 2017 (Fig. 5a) are seen to be similar to the results in Figs. 4a-f. This means that there were no significant displacements before August 2017. The results from [3] for August to November 2017 are similar to the results given in Fig. 4g.

The spatial distributions in Fig. 5 are better than those in Fig. 4. This is because Fig. 5 only uses the SAR data from the limited period of April to November 2017, while Fig. 4 uses the SAR data from October 7, 2014 to July 31, 2019. Thus, the present research provides better temporal transition of the displacements given in Fig. 6.

Fig. 6a presents the temporal transition of the displacements at selected points. The locations of the selected points are shown in Fig. 6b. Information on the elevation (WGS84 ellipsoid reference) of each point is provided (Figs. 6a and b). Point AGUNG-1 is located at the top of Mount Agung (highest elevation is 2905.33 m) and point AGUNG-13 is located at a low elevation (76.36 m).

It can be clearly seen that the displacements at points AGUNG-1 to AGUNG-7 are strongly affected by tropospheric delays. Periodical displacement behavior is shown. The tendency for such behavior is related to the elevation of each point; lower elevations are less affected by tropospheric delays (Fig. 6a). The displacements at points AGUNG-8 to AGUNG-13 are probably real displacements, because such periodical behavior could not be detected at these points. The elevations of points AGUNG-8 to AGUNG-13 are lower than those of the other points; this means that the effects of tropospheric delays are smaller than at points AGUNG-1 to AGUNG-7.

The displacements at points AGUNG-10 to AGUNG-13 indicate that there were no remarkable displacements before May 2017. However, SBAS-DInSAR detected significant displacements occurring from May to November 2017, and they increased again from May to July 2019 after a decrease in activity for one and a half years. This is closely related to the seismic activity of Mount Agung.
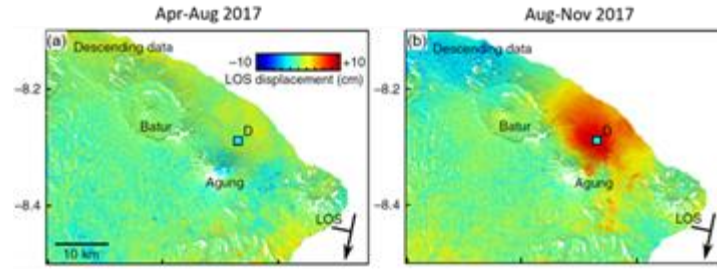
Fig. 5 Spatial distributions of LOS displacements obtained from [3]: (a) April to August 2017 and (b) August to November 2017.
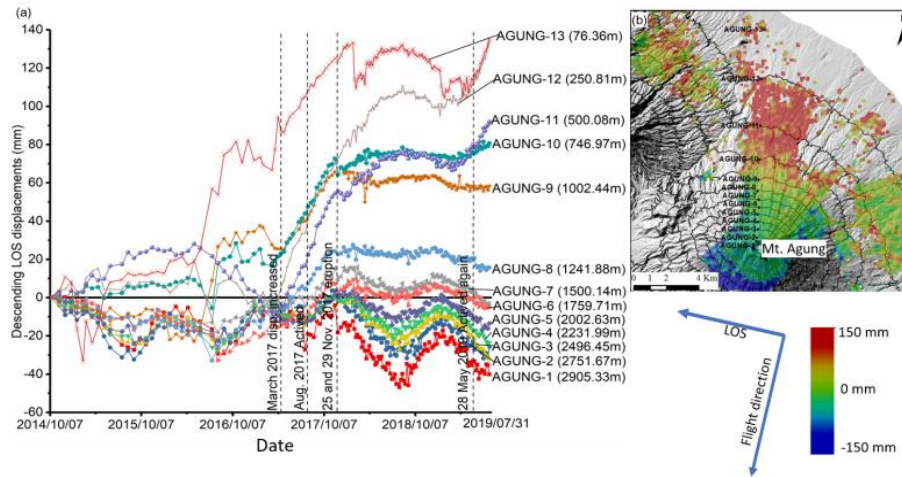
Fig. 6 Time transition of LOS displacements obtained by SBAS-DInSAR at selected points from October 7, 2014 to July 31, 2019: (a) time transition of LOS displacements and (b) location of selected points. The elevation of each point is the height from the WGS84 ellipsoid reference.

IV. CONCLUSIONS

This research has presented the monitoring results of ground displacements induced by the volcanic activity of Mount Agung by means of SBAS-DInSAR. The results indicated that there had been no remarkable displacements before May 2017. However, significant displacements were detected by SBAS-DInSAR from May to November 2017, and they increased again from May to July 2019 after a decrease in activity for one and a half years. Although tropospheric delays remain in areas of high elevation, SBAS-DInSAR presents reliable measurement results for the region surrounding Mount Agung (areas of lower elevation).

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Balinese Character Recognition using Template Matching Method

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Abstract—Balinese script is national culture that deserves to be preserved. This Balinese script has been learned from the elementary school but after that young generation is unwiling to learn because one character with another has almost the same shape. This problem problem can be overcome by making an application Balinese characters recognition. This applicaton can be used as a medium for recognition and learning Balinese character. Balinese character recognition developed by using digital image processing techniques. This application consists of two stages, the registration stage and recognition stage. Process at the registration stage, the input image will be extracted using the curve and projection profile method and then the fitur will be stored in database. Process at the registration stage, same as registration stage but the feature will be compare by using template matching method. This method was chosen because it can find out Balinese script patterns that are easy to recognize and compare. The Template Matching Method is calculated the distance using the Euclidean Distance Method. The success rate of this application is 91,9%.

Keywords— Balinese script, image processing, recognition process, template matching, euclidean distance.

I. INTRODUCTION

Balinese script is Balinese culture. The alphabet is etymologically derived from Sanskrit, the root of the word a 'no' and ksara 'destroyed'. Literacy is something that is not annihilated /permanent/lasting, but also called letters. Something eternal, because of the role of characters in documenting and perpetuating a communication event in written form. The script that is carved on stone to be written on palm leaves and copper plates, gloom and past glory can be restored with literal evidence [1]. National culture that deserves to be preserved, it is necessary to introduce a Balinese script system that can be used as a medium of recognition and learning [2]. Previous research is Learning Applications for Introduction to Balinese Literacy Using Template Matching Method that obtains 95.45% admin system accuracy and 86.25% user system [3]. This study uses feature extraction method used in this study, namely the Envelope Method which has the ability to process the extraction of features properly and the results obtained have a high degree of accuracy. The value obtained in the feature extraction process is used in the distance calculation process using the Euclidean Distance Method to calculate the average and matching values using the Template Matching Method by comparing the values in the database by using the smallest value to get accurate results.

II.   RESEACH METHOD

The research methodology used to get the results as expected is the first stage of the application, which is to convert the input image into binary or black and white. The second stage is image segmentation using the Projection Method to get one literary image by calculating the row and input column values. The third stage is to resize the image

to 32 x 32 pixels. The fourth stage is feature extraction using the Envelope method by calculating the values of TopBootoms and LeftRight Literacy. Feature values obtained from the calculation of the Envelope method stored in the database. The fifth stage is done by matching the Template Matching method by calculating the value of the smallest distance from the feature value using the Euclidean Distance Method and getting the results of the Literacy decision. Figure 1 shows Enrollment Process of Recognition Aplication.
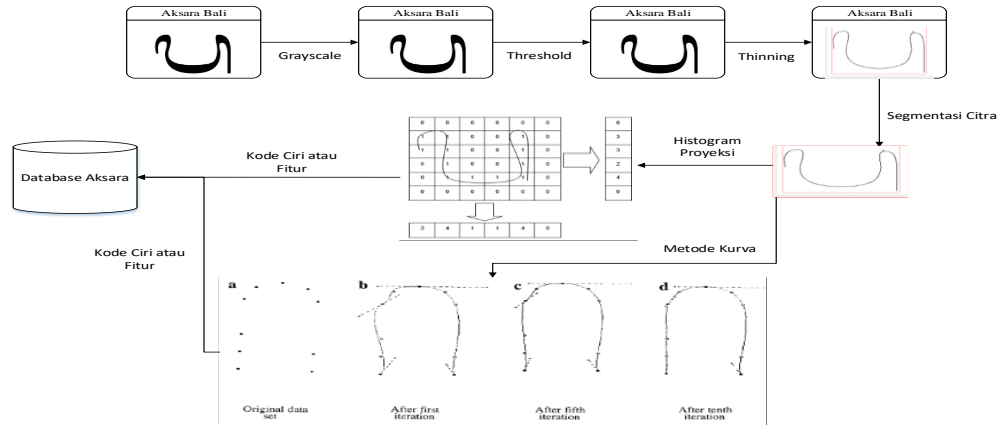
Figure 1. Enrollment Process of Recognition Aplication

The steps taken are inputting Balinese characters obtained from the segmentation results and then resizing or scaling automatically. The next steps is followed by the grayscale process, if the grayscale process is complete it will be forwarded to the threshold process against the image. If the image has been completed at the threshold then proceed with the thinning process, to manage the image to be just one pixel in size. The image is completely clean and has become just one pixel image, so the projection of the projection histogram and curve matching is done to obtain the characteristic values of the Balinese script feature, then stored in the database as a reference image.
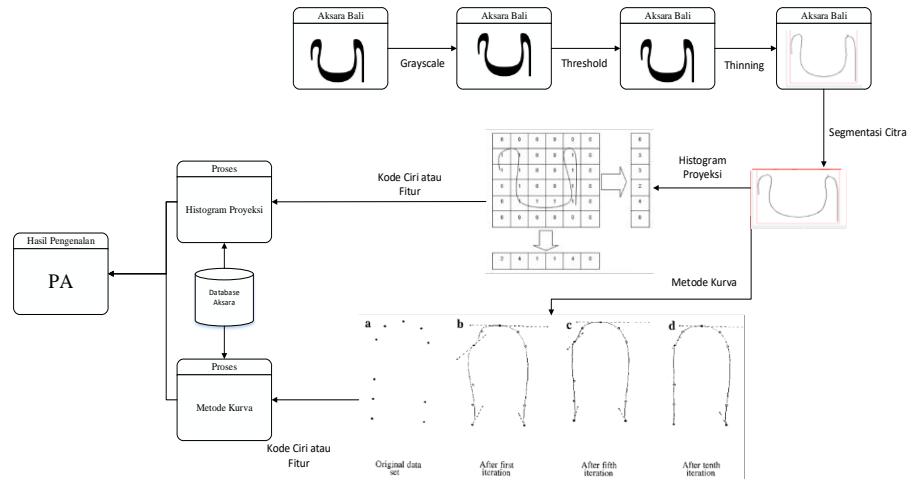
Figure 2. Recognition Process

The first process at the recognition steps is the image input process of Balinese script is resize or scaling automatically. The next stage is the same as the Balinese script enrollment steps, but the difference lies only in the matching process of the results of the new image feature with the reference image that uses 2 methods, namely the projection histogram method and curve matching. If the characters can be recognized and the level of similarity with the reference letters is very close, it will produce an outline in the form of Latin letters from the meaning of the script.

3. RESULTS

Tests performed on the Balinese recognition include user interface testing and accuration of recognizing Balinese characters.

3.1. Application Interface Testing

This test aims to find out the success of the application to recognize Balinese characters that have been stored in the database. This test is also used to obtain performance analysis data from the application. The first stage of this test is input the image of Balinese script by pressing the image input button.

Figure 3. Display of Balinese Script Image that has been inputted

Figure 3 is a display when the image input process has been completed then proceed with image preprocessing, including grayscale, threshold, thinning, and scaling of Balinese script.
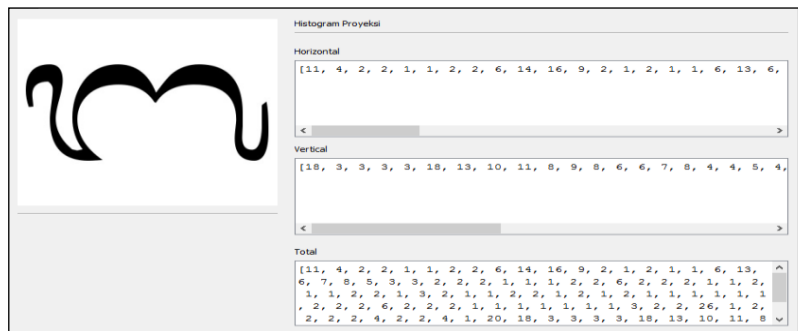
Figure 4. Nga character feature extraction vector

In Figure 4 show the feature extraction of Nga character with Horizontal, Vertical projection and combination of the two characteristics. The stored feature vector data that will be used in matching and recognizing Balinese character, by comparing data test with data training that already stored in database.

3.2. Analysis System

Analysis of the Balinese Character application is based on the level to recognize Balinese character input that can identified correctly. The success ratio of the application is calculated based on the number of successful recognizing divided by the number of recognition processes multiplied by one hundred 100% [4].

$$\%Success\ Rate = \left(\frac{Success\ recognize}{Total\ recognize\ process}\right) x\ 100\% \tag{1}$$

Before check the success rate of application, the application is tested first by input Balinese character from the Lontar segmentation results, and obtaining data as shown in Table 1 below:

TABLE 1. BALINESE CHARACTER TEST DATA

Character Name	Total Character	Recognized Character	False Recognized Character	False Rejection Character
A	6	6	0	0
Adeg-adeg	9	9	0	0
Ba	13	12	1	0
Ca	7	0	3	4
Carik	11	11	0	0
Cecek	12	12	0	0
Da	12	12	0	0
Ga	9	9	0	0
Gantungan E	13	13	0	0
Ha	5	5	0	0
Ja	8	6	0	2
Ka	12	12	0	0
La	6	6	0	0
Li	7	7	0	0
Ma	7	7	0	0
Na	7	7	0	0
Nga	6	6	0	0
Ngi	5	5	0	0
Ni	6	6	0	0
Nya	9	9	0	0
Pa	8	4	4	0
Ra	8	8	0	0
Ri	6	6	0	0
Sa	7	6	1	0
Su	7	7	0	0
Ta	8	8	0	0
Tang	6	2	2	2
Tur	6	6	0	0
Tya	6	6	0	0
Wa	7	7	0	0
Ya	8	7	1	0
Sucess Rate	247	227	12	8
		91,9%	4,9%	3,2%

The system cannot recognize the Balinese character due to several cause that is the character input from the segmentation process has a small size, many hangers (gantungan) in one Wianjana script, the similarity form between Balinese script "Na" and Balinese script Hanger "Ka" has exactly the same thing.

4. DISCUSSION AND CONCLUSION

Balinese Character Recognition process consist of two stages that is the enrollment process and the recognition process. In the enrollment process, preprocessing is performed by using thinning process and then feature extraction using the Invariant Moment and Curve Method to get unique patterns from each Balinese script. Data results of the calculation will be used for do the literacy process. In the recognition process the template matching method is used by using euclidean distance so that the results have the closest distance. Curve method gets the level of success ratio with a percentage of 91.9%. Accuracy in the recognition process is affected when image acquisition, where there is a distance from one character to another.

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MARKET ORIENTATION AND PRODUCT INNOVATION AS A PREDICTOR OF DECISION OF FUNDING AND FINANCIAL PERFORMANCE
(Study on Small and Medium Industries in Badung Regency)

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Abstract—The research examines the influence of Market Orientation and Product Innovation on Funding Decisions and Company's Financial Performance, the influence of Funding Decisions on Financial Performance, and Funding Decisions as a mediation of the influence of Market Orientation and Product Innovation on Financial Performance. The population of this research is all of the Leading SMIs in Badung Regency. In accordance with the Regional Industry Core Competition that Badung has a Potential for Excellence in the Herbal Product Industry. The number of SMIs Herbal Products in Badung Regency is 110 units. The samples taken by census. Data were analyzed using variance based or component based methods with Partial Least Square (PLS). The findings of this study: Market Orientation and Product Innovation have a significant positive effect on Funding Decisions; Market Orientation and Product Innovation have a significant positive effect on Company's Financial Performance; Funding decisions have a significant positive effect on financial performance; and Funding Decisions are able to mediate the influence of Market Orientation and Product Innovation on the Company's Financial Performanceial Performance.
Keywords—Market Orientation, Product Innovation, Funding Decisions, Company's Financial Performance

I.   Introduction

Bali is one of the famous tourist destinations in foreign countries. The entrance of Bali tourism is in Badung Regency. These conditions provide a positive climate for the growth and development of the Small and Medium Industry (SMIs), which supports the tourism sector. On the other hand SMIs experience problems in improving their performance. Competition in business requires companies to be able to understand and understand what is needed by consumers (Pripty and Alimehmeti, 2017). Jyoti and Sharma (2012) find Market Orientation has a positive effect on marketing performance. The problems faced by SMEs also low productivity in the creation of new products, due to lack of creativity and innovation. Babkin et al. (2015) found that innovation is a new process that is able to be created by companies to develop products, create new products, or make updates on the production and distribution processes, so that they are able to compete to obtain new market segments. The results of research that show that product innovation can improve performance, some studies find the opposite results, namely product innovation can not improve the performance of SMIs. Guisado-González et al. (2013).

The controversy over the findings of Market Orientation and Product Innovation towards Performance, becomes the Research Gap of this research by including the Funding Decision of the company as a mediator, which shows how the company finances the company's investment and operations by always producing Innovative and market-oriented products. Market Orientation and Product Innovation that get sufficient funding is expected to improve the performance of SMIs. Research shows that Funding Decisions have a positive effect on the

company's financial performance found by Ahmad and Abdullah (2012). This research is developing an integrated model of the influence of Market Orientation and Product Innovation, Funding Decisions on Financial Performance.

II.   LITERATURE REVIEW AND HYPOTHESIS

Market orientation is very valuable, rare, not interchangeable, and cannot be replicated perfectly, which is considered as one of the internal capabilities and resources that can potentially create competitive advantage (Zhou et al., 2008). Market-oriented companies are well-positioned to develop and improve the company's position to be more distinctive (relative to competition) in the long run. Companies that are always Market-oriented will need large capital for funding. Limitation of the company's own capital, causes the company to use debt in its funding decisions.

H1: Market orientation has a positive effect on Funding Decisions

Shahbaz et al. (2014) suggested that the performance of SMIs is the process by which the organization achieves the desired results by using several parameters set by the organization, and then measuring its performance. Market orientation can improve company performance positively has been found by Zainul et al. (2016). This condition shows that increasing the company's market orientation, it will be able to improve company performance.

H 2: Market orientation has a positive effect on the Company's Financial Performance

Product innovation is the introduction and development of new types of goods or services that are different from before and complement the shortcomings of the prior art with more emphasis on quality (Atalay et al, 2013). Limitation of the company's own capital, causes the company to use debt in its funding decisions. This is reinforced from the results of indepth interviews conducted to the Chairperson of the Bali Indonesian Textile Association and the Chairperson of the Bali Wood Industry Association (Anik Puspitaningsih et. all. 2015), where the owner who wants his business to be able to survive in the long term and in a sustainable manner will try to make business development such as product innovation development, looking for something new related to the development of the business.

H 3: Product Innovation has a Positive Influence on Funding Decisions

Atalay et al. (2013) states that product innovation is the introduction and development of new types of goods or services that are different from before and complements the shortcomings of the prior art by emphasizing quality. SME performance is a concept that is used to measure a company's performance on a product (Nasution, 2014). Babkin et al. (2015) found that innovations can be created by companies to develop products, create new products, or make updates on the production and distribution processes so that they are able to compete for new market segments. Parkman et al., (2012) found that product innovation had a positive effect on marketing performance.

H 4: Product Innovation has a positive effect on the Company's Financial Performance

Many researches related to the Funding and Financial Performance Decisions of the company have been conducted and obtained mixed results. Gatsi (2012) conducted research in the banking sector on the Ghana Stock Exchange. The results of this study indicate that the Funding Decision has a positive effect on Financial Performance.

H 5: Funding Decisions have a positive effect on the Company's Financial Performance

III.   RESEARCH METHODS

This study uses three types of variables, are made operational variable definition as follows.

1) Market Orientation (X1), uses indicators from Herrero et al. (2017), which is measured using indicators include. Customer Orientation (X11), Competitor Orientation (X12), Interfunctional Coordination (X13)

2) Product Innovation (X2), uses indicators from Atalay et al. (2013) which is measured using indicators include : the company innovates to develop attractive product designs (X21), the company seeks to develop product quality that is better than its competitors (X22), the company always develops better product technology (X23)

3) The Funding Decision (Y1) referred to in this study is the capital structure used in the Leading SMIs in Badung Regency. Referring to Anik Puspaningsih (2015) as measured by indicators: a) Percentage of total debt usage compared to total assets (Y11) b) Percentage of total debt usage compared to total capital (Y12) c) Percentage of use of long-term debt with total own capital (Y13)

4) Company Financial Performance (Y2), is the level of achievement or achievements of the company within a certain period of time at the Leading IKM in Badung Regency. This variable was developed from research conducted by Wiagusini et al (2019) a. Profit growth (Y21), which is the average growth of company profits in the last three years. b. Asset growth (Y22), which is the average growth of a company's assets in the last three years, Sales volume growth (Y23), is the average growth of company sales in the last three years.

The population in this study were all Leading SMIs in Badung Regency. In accordance with the Regional Industry Core Competition that Badung has Potential Leading in the Herbal Products Industry such as SPA Products and Scrubs. The number of IKM Herbal Products in Badung Regency is 110 units. The number of

SMIs Herbal Products in Badung Regency is 110 units. The samples taken by census. Data were analyzed using variance based or component based methods with Partial Least Square (PLS).

Results and Discussion
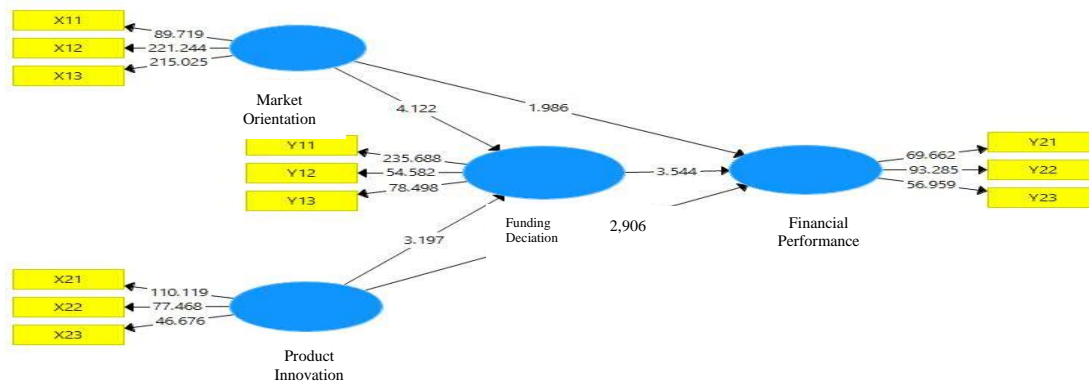
Figure 1: Partial Least Square (PLS)

The results of data analysis using PLS in Figure 1, show that the influence of Market Orientation and Product Innovation has a significant positive effect on Funding Decisions. Market Orientation, Product Innovation and Funding decisions have a significant positive effect on a company's Financial Performance, in detail presented in Table 1

TABLE I
Hypothesis Test Results

Relationship Between Variables	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	t Statistics (|O/STERR|)	P Values	Information
Market Orientation -> Funding Decisions	0.525	0.519	0.127	4.122	0.000	Significan
Market Orientation -> Financial Performance	0.268	0.279	0.135	1.986	0.048	Significan
Product Innovation -> Funding Decisions	0.421	0.428	0.132	3.197	0.001	Significan
Product Innovation -> Financial Performance	0.249	0.245	0.086	2.906	0.004	Significan
Funding Decisions -> Financial Performance	0.446	0.441	0.126	3.544	0.000	Significan

IV. CONCLUSIONS

Based on the results of the analysis it can be concluded that: (1) Market orientation has a significant positive effect on Funding Decisions; (2) on the Company's Financial Performance. (3) Product innovation has a significant positive effect on Funding Decisions; (4) Product innovation has a significant positive effect on the Company's Financial Performance; (5) Funding Decisions have a significant positive effect on the Company's Financial Performance. (6) Market Orientation and Product Innovation as Predictors of Funding Decisions and Corporate Financial Performance. (7) Funding Decisions are able to mitigate the Effect of Market Orientation and Innovation on Company Financial Performance.

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UTILIZATION THE PROBIOTIC LIGNOSELULOLITIC BACTERIA AS MICROBIAL PROTEIN FEED

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Abstract− Development of competitive and sustainable livestock business are purpose of a study. Production of microbial proteins functional feed through formulations of probiotic lignocellulolytic bacteria from bali cattle rumen fluid and termites whom the results Dissertation study by Mudita (2019) are a strategy developed in overcoming the problem of quality feed supply and high prices of functional feed for livestock. The first period study (2019) was carried out through production and evaluation of quality of 5 microbial proteins functional feed (F0, F1234, F1235, F1245, and F12345) which use probiotic lignocellulolytic bacteria isolated Bali cattle rumen and termites namely 1) *Bacillus subtilis strain* BR4LG, 2) *Bacillus subtilis strain* BR2CL,3)*Aneurinibacillus sp strain* BT4LS, 4) *Bacillus sp strain* BT3CL, and 5) *Bacillus sp. strain* BT8XY. The results showed that the use of probiotic lignooselulolytic bacteria was able to produce higher quality nutrients contents of microbial proteins functional feed (F1234, F1235, F1245, and F12345) compared than without probiotic lignooselulolytic bacteria (F0). It was concluded that the utilization of probiotic lignocellulolytic bacteria was able to produce high quality microbial protein functional feeds

Keywords— *Probiotic Lignocellulolytic Bacteria, Microbial Protein Feed Functional, Nutrients Content, Digestibility*

I.   INTRODUCTION

The development of competitive and sustainable farms still faces various problems, mainly due to the low quality and continuity of the availability of quality local feed and the prohibition of the use of antibiotics, especially on poultry farms. In addition, efforts to import quality feed also face obstacles due to the high price of quality feed, especially functional feed such as amino acid sources. Application of technology through the use of microorganisms, especially superior lignocellulolytic bacteria from the rumen fluid of bali cattle and termites, is potential to be developed as functional feed for Microbial Proteins which doubles as a source of amino acids and probiotics.

Mudita (2019) has succeeded in isolating and selecting superior lignocellulolytic bacteria from the rumen of bali cattle and termites that have a high enough crude enzyme protein and the ability to degrade lignocellulose compounds and high enzyme activity, including: 1) Bacillus subtilis strain BR4LG, 2) Bacillus subtilis subtilis BR2CL strain, 3) Aneurinibacillus sp BT4LS strain, 4) Bacillus sp BT3CL strain, and, 5) Bacillus sp. BT8XY strains based on preliminary studies and various references show that similar bacterial isolates play a role as probiotics and are commonly used as direct fed microbial / DFM

(microbial protein feed) (Dewi, 2014; Block, 2006; Khan et al., 2016). Dewi et al. (2014) showed that superior cellulolytic bacteria from termites have the potential as probiotic agents that have the ability to grow in a variety of temperatures, pH and concentrations of bile salts (NaDC). Block (2006) revealed that rumen bacteria have a very high amino acid profile that is even higher than milk or other food / feed protein sources. Wester et al. (2004) and Thasana et al. (2010) revealed the bacteria Bacillus subtilis and Bacillus sp. is a beneficial bacteria / Generally Recognized as Safe (GRAS) which has a role in producing food or medicine.

Utilization of microbes / bacteria individually or consortium as functional feed Microbial Protein will have a dual function that is in addition to having a direct role as a source of protein / amino acids, it also has a role as a probiotic so that it will reduce dependence on the use of antibiotic products in livestock business. However, the effectiveness of a bacterial consortium is largely determined by the activity and synergism of the work of the bacterial consortium, so that effective and synergistic formulations will produce functional microbial protein functional feeds. So research to obtain a synergistic bacterial consortium formula is very important to be carried out.

II.   MATERIALS AND METHODS

Location, Lignocellulolytic Bacteria, Experimental Design

A research has been carried out at Sesetan Public Laboratory and feed and nutrition Laboratory of Animal Science Faculty, Udayana University. Probiotic lignocelulolytic bacteria use in this study are lignocellulolytic bacteria isolated from Bali cattle rumen and termites were results Mudita Dissertation study (2013-2019), namely [1]*Bacillus subtilis strain BR4LG,* [2]*Bacillus subtilis strain BR2CL,* [3]*Aneurinibacillus sp strain BT4LS,* [4]*Bacillus sp strain BT3CL,* and [5]*Bacillus sp. strain BT8XY.*
A study followed Completely Randomized Designed with five treatments and six replicates. The treatment were as follows:

F_0 = Feed Microbial Protein was formulated without probiotic lignocellulolytic bacteria

F_{1234} = Feed Microbial Protein were formulated with lignocellulolytic bacteria [1]*Bacillus subtilis strain BR_4LG,* [2]*Bacillus subtilis strain BR_2CL,* [3]*Aneurinibacillus sp strain BT_4LS, and* [4]*Bacillus sp strain BT_3CL*

F_{1235} = Feed Microbial Protein were formulated with lignocellulolytic bacteria [1]*Bacillus subtilis strain BR_4LG,* [2]*Bacillus subtilis strain BR_2CL,* [3]*Aneurinibacillus sp strain BT_4LS, and* [5]*Bacillus sp strain BT_8XY*

F_{1245} = Feed Microbial Protein were formulated with lignocellulolytic bacteria [1]*Bacillus subtilis strain BR_4LG,* [2]*Bacillus subtilis strain BR_2CL,* [4]*Bacillus sp strain BT_3CL* and [5]*Bacillus sp strain BT_8XY*

F_{12345} = Feed Microbial Protein were formulated with lignocellulolytic bacteria [1]*Bacillus subtilis strain BR_4LG,* [2]*Bacillus subtilis strain BR_2CL,* [3]*Aneurinibacillus sp strain BT_4LS,* [4]*Bacillus sp strain BT_3CL* and [5]*Bacillus sp strain BT_8XY*

Feed Microbial Protein

Feed Functional Microbial Protein were produced in this study were 4 types (F1234, F1235, F1245, and F12345) and 1 control (functional feed without lignocellulolytic bacterial isolates / F0) made by inoculating 50 ml of probiotic lignocellulolytic bacterial isolates (according follow the treatments) into every 1 kg of basal feed (natural bacterial growth media) and molasses added to the dry matter content of functional food products 50-60% (water content 35-40%) (Tables 1-2). Furthermore, the functional feed mixture will be fermented under anaerobic conditions for 1 week. After that, it is continued with a gradual drying process using an oven with a temperature of 40 - 60°C to a functional dry matter content of ± 85% (generally takes 4 - 5 days). Functional feed that has dried is ready to be used for further research.

Evaluation of Nutrient Content of Microbial Protein Feed

Evaluation of Nutrients content of microbial protein feed in this study included dry matter/DM, organic matter/OM, crude fiber/CF, crude protein/CP, and ether extract/EE. Evaluation using proximate analysis (Weende) with the AOAC methods (1995). Crude protein was analyzed by the Kjeldahl semi-micro method using Vapodest-Gerhardt equipment (AOAC Official Method 984.13),

TABLE I

Composition of Basal Feed "Natural Bacteria Growth Media"

No	Material	Composition (%)
1	Corn Bran	30,0
2	Wheat Bran "Pollard"	45,0
3	Soya Meal	15,0
4	Sugarcane/Molases	8,8
5	Salt / NaCl	1,0
6	Mineral-Vitamin "Pignox"	0,2
	Totally	100,0

TABLE 2

Formulation of Feed Microbial Protein

Microbial Protein Feed	Lignocellulolytic Bacteria Culture (ml)					Media Pembawa (g)	Larutan Inokulan	
	B1	B2	B3	B4	B5		Air (ml)	Molases (ml)
F_0	-	-	-	-	-	1000	500	100
F_{1234}	12,5	12,5	12,5	12,5	-	1000	500	100
F_{1235}	12,5	12,5	12,5	-	12,5	1000	500	100
F_{1245}	12,5	12,5	-	12,5	12,5	1000	500	100
F_{12345}	10	10	10	10	10	1000	500	100

Keterangan: B_1=Bacillus subtilis strain BR_4LG, B_2=Bacillus subtilis strain BR_2CL, B_3=Aneurinibacillus sp strain BT_4LS, B_4=Bacillus sp strain BT_3CL, dan B_5=Bacillus sp. strain BT_8XY

Evaluation of Amino Acid Profiles from Functional Feeds

The profile of amino acid of the functional feeds were analyzed in this study are three best of microbial protein feed which has the highest quality based on protein content, crude fiber fat, digestibility of dry matter and organic material in vitro and metabolite products produced. The analysis uses the HPLC (High Performance Liquid Chromatography) separation method which will be carried out at the Integrated Laboratory, IPB

Data Analysis.

Data were analyzed by analysis of variance/Anova, if there are significant differences ($P \leq 0,05$), followed by the analysis of Honestly Significant Different/HSD test (Sastrasupadi, 2000).

III. RESULTS AND DISCUSSION

The study showed that utilization probiotic lignocellulolytic bacteria isolates from bali cattle rumen and termites can produce feed microbial protein with high quality showen nutrient contents with high contents of crude protein, extract ether and lower crude fiber (Table 3).

The production of high quality microbial protein functional feed especially in the treatment of F12345, F1235 and F1234 is a response to the synergistic microbial activity contained in the formula which is indicated by the presence of high microbial population, high lignocellulase enzyme activity and high degradation ability of the substrate from bacterial consortium formula (Mudita, 2019).

The high microbial population will certainly increase the supply of nutrients, especially fat, protein and amino acids from the functional feed. Moreover, coupled with the high degradation ability of lignocellulosic substrate, it will certainly increase the usefulness of the functional feed as indicated by the high digestibility of dry matter and organic matter and the high production of fermented metabolites as well.The results of this study further confirm the functional formula of microbial protein feed by utilizing lignocellulolytic probiotic bacteria to be able to produce high-quality functional feed

TABLE 3

Nutrient Content, *in-vitro* Digestibility and Product Metabolic Fermentation of Microbial Protein Feed

Variable	Treatments*					SEM***
	F_0	F_{1234}	F_{1235}	F_{1245}	F_{12345}	
Acidity & Nutrients Contents						
• Acidity (pH)	5,164a	5,106a	4,773a	5,052a	4,798a	0,150
• Dry Matter (% fresh basis)	68,862a	68,466a	68,967a	69,065a	69,451a	0,403
• Organic Matter (%)	94,230a	94,277a	94,120a	94,223a	95,001a	0,470
• Crude Protein (%)	14,221a	18,932b	19,192b	19,237b	19,246b	0,284
• Crude Fiber (%)	5,087b	3,002a	2,973a	3,000a	2,886a	0,142
• Ether Extract (%)	6,148a	8,350b	9,092b	8,715b	9,099b	0,297
• Nitrogen Free Extract (%)	64,583a	60,085b	59,091b	59,924b	60,682b	0,619

Notes: *Treatments: [1]*Bacillus subtilis strain BR4LG,* [2]*Bacillus subtilis strain BR2CL,* [3]*Aneurinibacillus sp strain BT4LS,* [4]*Bacillus sp strain BT3CL,* and [5]*Bacillus sp. strain BT8XY;* **Means in the same line with different letter differ significantly (P<0,05),* ***SEM = Standard error of the treatmens and means*

TABLE 4

Profile of Amino Acids The Best Quality of Feed Microbial Protein

Amino Acids	Microbial Protein Feed		
	F12345	F1235	F1234
• Aspartic Acids	1,69	1,43	1,37
• Glutamic Acids	2,96	2,23	2,19
• Serin	0,94	0,72	0,71
• Glisine	1,11	0,91	0,88
• Histidin	1,13	1,03	0,94
• Arginin	0,93	0,88	0,82
• Treonine	0,79	0,71	0,62
• Alanine	0,69	0,53	0,59
• Proline	0,92	0,84	0,82
• Tirosine	1,05	0,98	0,91
• Valine	0,73	0,62	0,60
• Methionine	0,88	0,86	0,76
• Sisteine	0,76	0,68	0,62
• Isoleucine	1,07	0,92	0,88
• Leucine	1,21	1,22	1,09
• Phenilalanine	0,80	0,71	0,73
• Lisine	1,26	1,17	1,11

IV. CONCLUSIONS

the utilization of probiotic lignocellulolytic bacteria was able to produce high quality microbial protein functional feeds. Formula F12345, F1235 and F1234 are best formula for production feed microbial protein.

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Tensile Properties of Indonesian Wild Silk Cocoon Fiber

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Abstract—In this study 3 types silkworm cocoons from Indonesian source will be used as material to make biocomposites for bullet resistant vest. The 3 types of the cocoons come from the species of Bombyx mori, Attacus atlas, and Cricula trifenestrata. the cocoon then is degummed to obtain silk. The silk obtained is then combined with particulate of silicon carbide (SiC) to form biocomposites that can withstand the brunt of bullets. Prior to that purpose, the tensile test for each fiber should be tested for it tensile strength to provide data of mechanical properties of the fiber.It is found that average tensile strength of the fiber obtained from cocoon of Bombyx mori having highest tensile strength (230.99 MPa), followed by Cricula thrifenestrata (162 MPa) and the last is Attacus atlas (101.23 MPa).
.
Keywords— biomaterial , cocoon, Indonesia, silk, tensile strength, wild.

I. INTRODUCTION

Indonesia is reach with natural resource of wild silk. In this research 3 types of wild silk fiber namely Bombyx mori, Attacus atlas, and Cricula trifenestrata. The *Cricula trifenestrata* is a pest for plantation of as reported by Rojak [1]. In India also reported *Cricula trifenestrata* as a pest [2]. The cocoon of *Cricula trifenestrata* have interesting color that gold like as presented in Fig.1.

| (a) | (b) | (c) |
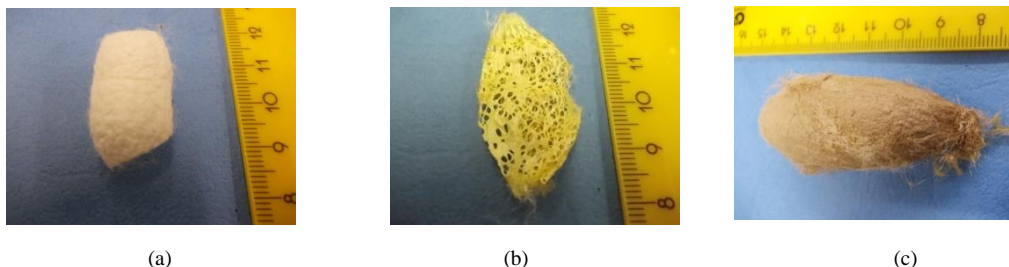
Figure 1. The cocoons of wild silk. A. Bombyc mori, b. *Cricula trifenestrata* and c . Attacus atlas obtained from Indonesian source

More interesting properties of the silk is that the mechanical properties exceed all natural polymer and synthetic materials [5]. It is well known that *Bombyx mori* silk is biocompatible as biomaterial and has been used commercially as sutures in biomedical. It is reported that *Bombyx mori* is suitable for 3-D scaffolding material which is make possible for the cell spread along the fiber and after that covered all the surface and grow to fill the

gap to form the structure of the tissue [3,4,5]

The silk should be degummed in order to fine fiber will be obtained. It is common for *Bombyx morri* cocoon to be degummed by boiling in hot water bath [6].

But degumming technique by boiling in water is not working well for *Cricula trifenestrata*. Other protocols for degumming for the *Bombyx mori* such as by using LiBr solution [5,7,8], Formic acid [9], and urea [10 were not suitable for degumming the wild silk cocoon of *Cricula trifenestrata*. Therefore deguming method should be studied as first step in order possible to use the *Cricula trifenestrata* and Attacus ataas as future biomaterial instead *Bombyx mori*.

This research introduce tensile strength of the fiber obtained from 3 types of Indonesian wild silk to be recorded as reference material for future application in Biomaterial. This work is continuation in detail our previous work [11] in effort to utilize wild silk cocoons as biomaterial

II. METHODS AND PROCEDURES

The cocoon of *Bombyx mori, Attacus atlas* and *Cricula trifenestrata* obtained from Indonesia a (Fig.1) was incubated in water and NaOH solution in concentration range from 0.001 to 1 M and boiled for 1 1hour. The samples then were shaken for about 10-20 seconds. The insoluble fiber then was washed in water (70°C). The tensile test was carried out as described else where [12, 13, 14]. The tensile test was performed with screw test stand at a constant cross head speed. A balance attached to the lower end of the sample was used to measure load as replacement of conventional load cell. Single fibers about 5 cm long was taken from degummed material and were glued across cardboard frame with distance length 30 cm as defining a gauge length. The test was performed under condition of 60% relative humidity and 30°C.

III.   RESULTS

. Tensile properties of *Bombyx mori* fiber degumming by NaOH as stress-strain curves is presented in Fig. 2. The modulus elasticity is about 3110.52 MPa. The ultimate tensile strength is obtained about 230.99 MPa together with value of failure strain about 0.08.
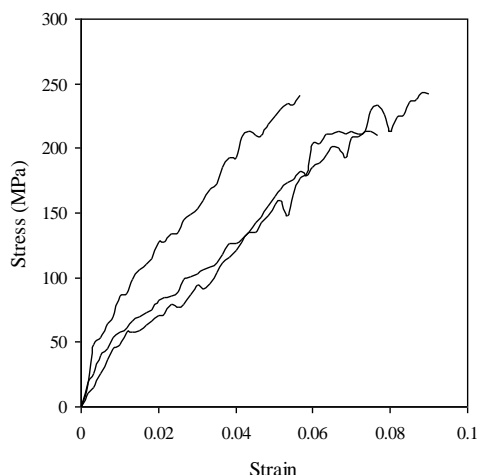
Figure 2. The representative of stress-strain curve of 3 single fibers of *Bombyx mori* degummed from the Cocoon by using NaOH

Tensile properties of *Cricula trifenestrata* fiber degumming by NaOH as stress-strain curves is presented in Fig. 3. The modulus elasticity is about 3110.52 MPa. The ultimate tensile strength is obtained about 230.99 MPa together with value of failure strain about 0.08..
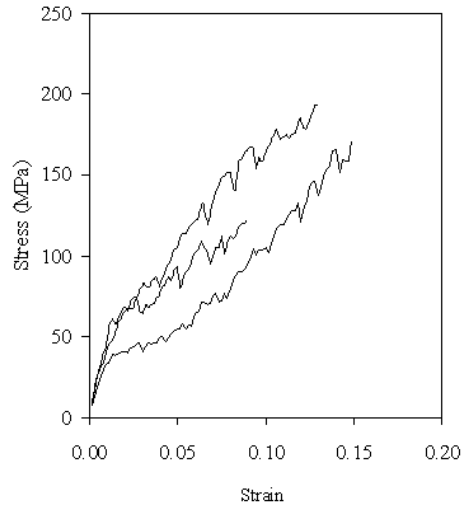
Figure 3. The representative of stress-strain curve of 3 single fibers of *Cricula trifenestrata* degummed from the Cocoon by using NaOH

Tensile properties of Attacus atlas fiber degumming by NaOH as stress-strain curves is presented in Fig. 4. The modulus elasticity is about 604.74 MPa. The ultimate tensile strength is obtained about 101.23 MPa together with value of failure strain about 0.17
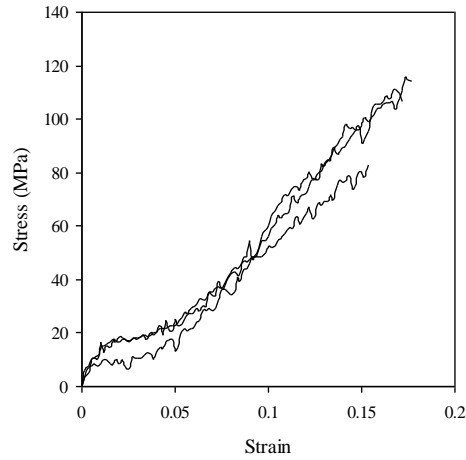
Figure 4. The representative of stress-strain curve of 3 single fibers of Attacus atlas degummed from the Cocoon by using NaOH

Previous publications informed that some type of the silks from the cocoon of *Bombyx mori* [15], *Attacus atlas* [16], *Antheraea mylitta* [17] and *Samia cynthia* [18] were proofed have good biocompatibility properties as also silk from the cocoon of *Cricula trifenestrata* as reported in this article

IV. CONCLUSION

It is found that average tensile strength of the fiber obtained from cocoon of *Bombyx mori* having highest tensile strength (230.99 MPa), followed by *Cricula thrifenestrata* (162 MPa) and the last is *Attacus atlas* (101.23 MPa).

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THE EFFECT OF SHELF LIFE OF PACKED RED CELL (PRC) AGAINST POTASSIUM LEVELS AND TRANSFUSION EFFICACY IN PATIENTS RECEIVED PRC TRANSFUSION

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Abstract— Packed Red Cell (PRC) is one of blood components that plays an important role in health services. During storage, erythrocytes undergo changes or damage to cells known as storage lesions. This can affect the function, viability of erythrocytes, biochemical changes and affect the efficacy after being transfused to the patient. Objective: To determine effect of PRC shelf life on potassium levels and PRC transfusion efficacy in patients who received PRC transfusion. Method: This study involved adult patients who received PRC transfusion with shelf life less than 14 days and more than 14 days who were willing to participate in the study and didnot receive blood components other than PRC on the same day. Then each group was tested for potassium and hemoglobin levels before and 24 hours after PRC transfusion. Results: Patients who received PRC with shelf life less than 14 days had potassium level before transfusion 4.06±0.49 mmol/L and 24 hours after transfusion 3.95±0.35 mmol/L. Patients who received PRC with shelf life more than 14 days had potassium level before transfusion 4.24±0.47 mmol/L and 24 hours after transfusion 4.11±0.42 mmol/L. The mean of PRC transfusion efficacy in patients received PRC with shelf life less than 14 days was 1.32±0.33 g/dl and in PRC with shelf life more than 14 days was 0.79±0.32 g/dl. Conclusions: There was no difference in potassium levels before and after PRC transfusion and there was significant difference of PRC transfusion efficacy in both groups.
Keywords— PRC transfusion, shelf life, potassium level, PRC efficacy.

I. INTRODUCTION

Blood transfusion currently plays an important roles in health services and one of the most often given is Packed Red Cell (PRC). The safety of administering PRC transfusion is determined by various factors, from the donor health condition, the preparation process, the quality of component storage and the accuracy of the pretransfusion testing that carried out before the blood component is transfused to the patient. [1,2,3]

PRC derived from collection of fresh Whole Blood (WB), containing erythrocytes in various stages of erythrocytes age ranging from young erythrocytes (reticulocytes) to erythrocytes that will experience destruction. During storage, all erythrocytes getting older, and the decrement is related to storage temperature. These cells experience damage and loss of function when transfused to the patients. Various changes in erythrocytes during storage that can affect the function and viability of erythrocytes are known as storage lesion.[1,4,5]

During storage, erythrocytes can undergo morphological changes in the form of echinocytic spines and blebbing from microvesicles. Biochemical changes include glucose consumption, lactic acid accumulation, loss of potassium and getting calcium, loss of hemoglobin-bound nitric oxide, decrease ATP concentration and 2,3-DPG. Functional changes that occur include decreased ability to transport oxygen and the ability of erythrocytes to survive in patient's circulation and remain intact. It is necessary to measure the quality of PRC component during storage as a quality control requirement for blood transfusion services. It is also necessary to know the effect of using these components in patients. In Indonesia, a few studies that have examined the effect of PRC component that are stored for a certain period of time after being transfused to the patients. [1,5,6]

Based on this background, this study was conducted to determine the effect of PRC shelf life on various biochemical changes, especially potassium levels and PRC transfusion efficacy in patients who received PRC transfusion.

II. METHOD

A. Study Design

This study was an observational analytic study using a cross sectional study design. The subjects were divided into two groups, a group of patients who received PRC transfusion with shelf life less than 14 days and a group of patients who received PRC transfusion with shelf life more than 14 days. Then each group was measured for potassium levels and PRC transfusion efficacy by measuring hemoglobin levels before transfusion and 24 hours after transfusion. Eligibility criteria were adult patients over 18 years old and willing to participate in this study. Patients who receives transfusion other than PRC on the same day were excluded in this study.

The study was conducted in all inpatient rooms in Sanglah hospital and Blood Bank Sanglah hospital.

B. Procedure

Patients fulfilled eligibility criteria who submitted a request for PRC at the Blood Bank, were took 4 ml of blood (2 ml for potassium examination and 2 ml for hemoglobin level examination) before and 24 hours after the PRC transfusion. Previously also carried out an evaluation of the PRC component by taking samples from the PRC blood bag both with a shelf life of less than 14 days and a shelf life of more than 14 days for the examination of potassium and 2,3-DPG.

III. RESULT AND DISCUSSION

A. Subject Characteristics

Based on research conducted from June 2019 to September 2019, data were obtained from 54 subjects who received PRC transfusion with shelf life less than 14 days and more than 14 days, with basic characteristic as listed in Table I.

TABLE I BASIC CHARACTERISTICS OF RESEARCH SUBJECTS

Characteristics	PRC Transfusion With Shelf Life Less Than 14 Days	PRC Transfusion With Shelf Life Less Than 14 Days
Total subjects	27	27
Age		
18 – 45 year	5 (18,5%)	9 (33,3%)
46 – 65 year	8 (29,6%)	8 (29,7%)
> 65 year	14 (51,9%)	10 (37%)
Sex		
Male	13 (48,1%)	14 (51,9%)
Female	14 (51,9%)	13 (48,1%)
Blood Group		
O Rhesus D positive	12 (44,4%)	12 (44,4%)
A Rhesus D positive	12 (44,4%)	10 (37%)
B Rhesus D positive	3 (11,2%)	5 (18,6%)
AB Rhesus D positive	0 (0%)	0

As for the basic and laboratory characteristics of the PRC component, it is listed in Table II.

TABLE III BASIC AND LABORATORY CHARACTERISTICS OF PRC COMPONENT

Characteristics	PRC With Shelf Life Less Than 14 Days	PRC With Shelf Life Less Than 14 Days
Age of PRC (days)	6,63 ± 3,14	18,56 ± 3,66
Potassium level of PRC (mmol/L)	6,63 ± 3,14	13,53 ± 5,71
2,3-DPG level of PRC (µmol/mL)	4,57 ± 4,97	0,60 ± 0,45

B. Potassium Level in Patients Receiving PRC Transfusion

The results of potassium levels before and after PRC transfusion in subjects who received PRC transfusion with shelf life less than 14 days and subjects who received PRC transfusion with shelf life more than 14 days, are shown in Table III.

TABLE IIIII MEAN DIFFERENCE OF POTASSIUM LEVEL BEFORE AND AFTER PRC TRANSFUSION

Group of subjects	Mean potassium level (mmol/L)		mean difference of potassium level	p value
	Before PRC transfusion	After PRC transfusion		
PRC transfusion with shelf life less than 14 days	4,06 ± 0,49	3,95 ± 0,35	0,11	0,188*
PRC transfusion with shelf life more than 14 days	4,24 ± 0,47	4,11 ± 0,42	0,13	0,059*

*significant p value < 0,05

Mean potassium levels in group of subjects who received PRC transfusion with shelf life less than 14 days and group of subjects who received PRC transfusion with shelf life more than 14 days as shown in Table III were normally distributed (p> 0.05) and the variants were also homogeneous (p > 0.05).
Group of subjects who received PRC transfusion with shelf life less than 14 days, had mean potassium level before PRC transfusion were 4.06 ± 0.49 mmol/L and after PRC transfusion were 3.95 ± 0.35 mmol/L. Paired t-test obtained p value = 0.188 (p> 0.05) which means there is no significant difference in potassium levels before and after PRC transfusion.
Group of subjects who received PRC transfusion with shelf life more than 14 days, had mean potassium level before PRC transfusion were 4.24 ± 0.47 mmol/L and after PRC transfusion were 4.11 ± 0.42 mmol/L. Paired t-test obtained p value = 0.059 (p> 0.05) which means there is no significant difference in potassium levels before and after PRC transfusion.

C. PRC Transfusion Efficacy

The results of PRC transfusion efficacy in subjects who received PRC transfusion with shelf life less than 14 days and subjects who received PRC transfusion with shelf life more than 14 days, are shown in Table IV.

TABLE IVV DIFFERENCE OF PRC TRANSFUSION EFFICACY IN GROUPS OF SUBJECTS WHO RECEIVE PRC WITH SHELF LIFE LESS THAN 14 DAYS AND MORE THAN 14 DAYS

	Group of subjects		p value
	PRC transfusion with shelf life less than 14 days	PRC transfusion with shelf life more than 14 days	
PRC transfusion efficacy (g/dL)	1,32 ± 0,33	0,79 ± 0,32	0,000*

* significant p value < 0,05

PRC transfusion efficacy in group of subjects who received PRC transfusion with shelf life less than 14 days and group of subjects who received PRC transfusion with shelf life more than 14 days as shown in Table IV were normally distributed (p> 0.05) and the variance was also homogeneous (p > 0.05).

Group of subjects who received PRC transfusion with shelf life less than 14 days, had PRC transfusion efficacy 1.32 ± 0.33 g/dL and group of subjects who received PRC transfusion with shelf life more than 14 days had PRC transfusion efficacy 0.79 ± 0.32 g/dL. Independent t-test obtained p value = 0,000 (p> 0.05) which means there is a significant difference PRC transfusion efficacy in both groups.

IV. CONCLUSION

There was no difference in potassium levels before and after PRC transfusion in patients who received PRC transfusion with shelf life less than 14 days and more than 14 days. There was significant difference of PRC transfusion efficacy that patients who received PRC with shelf life less than 14 days had a higher efficacy than patients who received PRC with shelf life more than 14 days.

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The Changes of Gut Microbiota in Colorectal Cancer (CRC) Patients

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Abstract—Nowadays, the incidence and mortality rates of colorectal cancer (CRC) are very high. Data from World Health Organization (WHO) shows the high rates of worldwide incidence and colorectal cancer mortality. Regarding to local data in Denpasar-Badung, Bali, shows that colorectal cancer becomes a big problem in our society. The type of gut microbiota is strongly influenced by the type of diet and environment. Thus, the diversity profile of gut microbiota for Indonesia, especially in Bali, would be different from other countries. Nowadays, the latest generation of microorganism sequencing method has been developed, which makes it possible to identify microorganisms that previously could not be cultured. Therefore, the researcher want to find out how the diversity profile of microbiota in colorectal cancer patients in Bali. The participants in this study consisted of 6 colorectal cancer patients and 6 healthy controls. The selected participants were those who met the following criteria: aged 18 years or older, living in Bali at least 1 year, ethnicity, not in antibiotic treatment, with no history of using antibiotics during the past 1 month. The design of this study is descriptive and analytical *cross-sectional* studies. The participants who met the inclusion and exclusion criteria signed an informed consent, then they were given a pot of stool and took a blood draw. The expected result of this research is by understood the diversity of microbiota can provide new possibilities in the discovery of new diagnostic tools, biomarkers and therapeutic interventions for colorectal cancer.

Keywords: gut microbiota, colorectal cancer, healthy control, feces, NGS

1. INTRODUCTION

The current incidence and mortality rate from colorectal cancer (CRC) is very high. Data from the World Health Organization (WHO) shows that worldwide incidence and colorectal cancer mortality is high. Colorectal cancer is the third most frequent cancer in the world with 1.36 million new cases in 2012 and high mortality. (1) Colorectal cancer is one of the most common cancers in Asia. The burden of the TRC has increased rapidly in several developed Asian countries such as Singapore, Japan and South Korea; with a 2-4-fold increase in incidents over the past few decades. (2) The age-standardized incidence rate (ASR) of TRCs in Southeast Asia was 15.2 per 100,000 men in 2012. (3)

Data on TRCs in Indonesia is still lacking (4) In Indonesia, it is estimated that the number of new TRC cases was 27,772 cases in 2012. This is the highest number of new TRC cases in Southeast Asia, with an ASR of 12.8 per 100,000 people for both sexes. Colorectal cancer is the second most common cancer in men in Indonesia after lung cancer, with an ASR of 15.9 / 100,000 and the third most common cancer in women after breast cancer and cervical cancer with ASR 10.1 (1) Although in Indonesia the incidence rate TRC is lower than in developed countries, but a large population (255 million) results in a very high number of patients suffering from TRC.

Regarding local data in Denpasar-Badung Bali, based on data from medical records of patients treated at Sanglah Hospital, Wangaya Hospital, Puri Raharja Hospital, Surya Husada Hospital, Prima Medika Hospital, Balimed Hospital and Kasih Ibu Hospital, and data from the pathology department Anatomically, we found an increase in the incidence of TRCs from 2010 to 2014. The incidents of TRCs from 2010, 2011, 2012, 2013 and 2014 per 100,000 population were 17.50, 21.45, 28.69, 29.01, 43.17, respectively. This picture shows that colorectal cancer is a big problem for our society.

One of the main mechanisms of the process of occurrence of cancer in humans is the presence of chronic inflammation that follows chronic infection. The role of certain pathogenic germs in colorectal cancer

carcinogenesis has been studied for a long time. Fusobacterium nucleatum, Escherichia coli, Enterococcus faecalis, Streptococcus gallolyticus, and enterotoxigenic Bacteroides fragilis are microorganisms that are noted as early triggers of the development of colorectal cancer. In animal studies, these microorganisms are thought to have a causal relationship in the carcinogenesis of colorectal cancer. (5) But in humans there has been no research that has proven a definitive causal relationship with colorectal cancer, and there is no research that proves that if these microorganisms are removed it can prevent colorectal cancer. .

At this time, the latest generation of microorganism sequencing methods has been developed, which makes it possible to identify microorganisms that previously could not be cultured. And this new technology can help analysis of genetic data in large intestinal microbiota. Dysbiosis, such as a decrease in diversity of intestinal microbiota, is often found. (6) An increase in fusobacterium and a decrease in bacteria that produce butyrate are also thought to play a role. How big is the role of intestinal microbiota in the pathogenesis of colorectal cancer is still unclear.

2. FORMULATION OF THE PROBLEM

Based on the background above, the problem formulation in this study is "1. What is the picture of intestinal microbiota in colorectal cancer patients in Bali?, 2. Is there a difference in the appearance of intestinal microbiota in patients with colorectal cancer compared with healthy controls. "

3. RESEARCH PURPOSES

Based on the problem formulation above, the purpose of this study is to find out the profile and diversity of intestinal microbiota in Balinese.

4. BENEFITS OF RESEARCH

This research is very important in the academic field, namely knowing the epidemiological aspects of intestinal microbiota and knowing the relationship of diversity of intestinal microbiota to the occurrence of colorectal cancer. as well as having practical benefits for knowing the diversity and profile of intestinal microbiota in colorectal cancer patients, so that it is expected to be further utilized in the prevention of colorectal cancer events associated with changes in intestinal microbiota.

5. RESEARCH METHODS

The design of this study was a descriptive exploratory and cross-sectional analytic study. The study was conducted at Sanglah Hospital Denpasar in 2019. The samples used for this study were 2 groups, namely the colorectal cancer sufferer group and the normal colonoscopy group. The number of samples needed are 6 people with colorectal cancer and 6 people with normal colonoscopy. So the total sample is 12.

6. DISCUSSION RESULT

This research is still waiting for the results of the sample NGS from a third party. But the expected outcome of this study is to know the diversity of bacteria present in samples of colorectal cancer patients and healthy patients. Dysbiosis, such as decreased diversity of intestinal microbiota is often found. Increases in fusobacterium and decreases in bacteria that produce butyrate are also thought to play a role. So by knowing the diversity of sample intestinal microbiota, further action can be taken to prevent further symptoms of colorectal cancer. by understanding the diversity of microbiota, it can provide new possibilities in the discovery of new diagnostic tools, biomarkers and therapeutic interventions for colorectal cancer.

7. CONCLUSION

This research is still waiting for the results of the sample NGS from a third party. But the expected outcome of this study is to know the diversity of bacteria present in samples of colorectal cancer patients and healthy patients. Dysbiosis, such as decreased diversity of intestinal microbiota is often found. Increases in fusobacterium and decreases in bacteria that produce butyrate are also thought to play a role. So by knowing the diversity of sample intestinal microbiota, further action can be taken to prevent further

symptoms of colorectal cancer. understanding the diversity of microbiota can provide new possibilities in the discovery of new diagnostic tools, biomarkers and therapeutic interventions for colorectal cancer

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The Capture of CO_2 and H_2S from Biogas using Activated Carbon

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Abstract—Biogas is one of the abundant renewable energy sources. The main component of biogas is methane. But in biogas, there are also impurities such as CO_2 and H_2S. The presence of these impurities can reduce the quality of biogas. One method used to reduce the content of CO_2 and H_2S is by adsorption using activated carbon. The purpose of this study is the adsorption of CO_2 and H_2S from biogas with activated carbon made from bamboo swat with physical activation and with different nitrogen flows (200, 350 and 500 milliliters per minute). The results showed that activated carbon activated by 350 milliliters per minute flow had the highest adsorption ability and was able to reduce the CO_2 content from biogas by 22.50%, while the activated carbon which was activated with a 200 milliliters per minute nitrogen flow had the highest adsorption ability to H_2S and can reduce H_2S content from biogas up to 665.90%.

Keywords— Activated carbon, CO_2, H_2S, biogas

I. INTRODUCTION

The main energy source in the world today is very dependent on fossil fuels which are non-renewable energy. Petroleum is even predicted to dominate the world's primary energy mix until 2050 [1] Fossil fuels contribute 94% to the national energy mix, which consists of 47% oil-based, 21% natural gas and 26% coal [1]. The imbalance in the use of petroleum-based energy compared to natural gas, even though Indonesia is one of the countries that has the 14th largest natural gas / natural gas (NG) reserves in the world.

Natural Gas (NG) is a relatively inexpensive energy source compared to petroleum because its exploration costs are cheaper and environmentally friendly because the emissions produced are far lower than petroleum [2]. The largest composition of NG is methane (CH_4) with a content of about 85-95% [3], so NG is considered to have a composition similar to methane. Besides being obtained naturally, NG can also be obtained from biogas. Biogas composition generally contains CH_4, CO_2, H_2, N_2, and H_2S. The CO_2 content in biogas makes it difficult to ignite the biogas, while H_2S can cause engine components or gas stoves to rust quickly, so CO_2 and H_2S before use must be minimized or even eliminated. To increase the methane content, various purification methods are carried out to remove or reduce impurities such as H_2S and CO_2. One method that can be used to capture H_2S and CO_2 is the physical adsorption method. By this method CO2 is adsorbed physically using adsorbents, one of which is activated carbon. This technology serves to capture CO_2 gas and then store it so that it does not escape back into the atmosphere [4,5]. Activated carbon has a high adsorption ability because it is a material with high porosity and pore surface area [6]. Activated carbon is a non-polar adsorbent or hydrophobic adsorbent because it binds more gas than water [7]. This process does not require large energy, the capture time is relatively fast and has a large selectivity [8,9].

From these problems, this study aim is manufactured of activated carbon from bamboo which is activated physically using different nitrogen flow rates. The activated carbon produced is used for purifying H_2S and CO_2 from biogas.

II. METHODE AND PROCEDURE

2.1. Activated carbon production

The precursor to be used is swat bamboo (Gigantochloa verticillata). This bamboo is known to have a chemical composition that contains hemicellulose (14.97%), lignin (22.99%), and cellulose (44.22%) [10]. Bamboo is dried and cut into small pieces. Small pieces of bamboo are inserted into the carbonization reactor, then heated in an electric kitchen to a temperature of 700^OC for 120 minutes. The product of this carbonization is charcoal which is then formed into powder and meshed with 60 mesh. The activation process is carried out by inserting the powder into the activation reactor and heated in an electric kitchen to a temperature of 750^OC for 60 minutes. During the activation, nitrogen is flowed into the reactor at various flow rates of 200, 350 and 500 milliliters per minute. Samples are left in the kitchen until they reach room temperature. The activated carbon produced is coded AC200-FA, AC350-FA, and AC500-FA for nitrogen flow of 200, 350 and 500 milliliters per minute, respectively.

2.3. Setting of experiment

The equipment was set up as shown in Figure 1. Biogas from the digester is stored in a gas bag and flowed with a pump through a flow meter. The gas flow of 500 milliliters per minute is regulated in the flow meter and directed to a multi-gas detector, which is arranged by a valve. The CO_2 and H_2S measured on the multi-gas detector was then recorded. Furthermore, the activated carbon is placed in a glass tube. The gas is directed into the glass tube and the CO_2 and H_2S are measured.
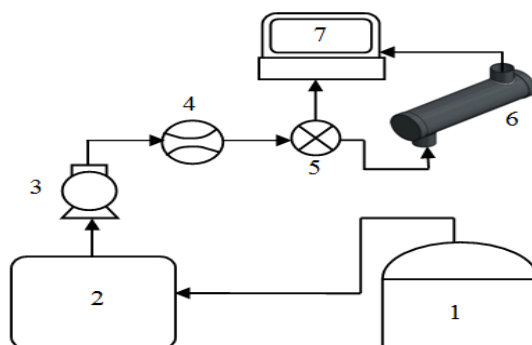
(1) Digaster, (2) Gas bag, (3) Pump, (4) Flow meter, (5) Valve, (6) Glass tube, and (7) Multi-gas detector

FIGURE 1. SET UP OF EQUIPMENTS

III. RESULTS AND DISCUSSION

Adsorption of CO_2 and H_2S from biogas on activated carbon is shown in Figure 2 and Figure 3. Initially, biogas contains CO_2 of 34.3% and H_2S of 301 ppm. After being passed into activated carbon, the amount of CO_2 and H_2S has decreased. In Figure 2 it is shown that activated carbon activated with a 350 milliliters per minute nitrogen flow (AC350-FA) contains the lowest CO_2 (28%) followed by AC200-FA (28.35%) and AC500-AF (29.3%). This shows that AC350-FA activated carbon has the best ability to capture CO_2 compared to AC200-FA and AC500-FA activated carbons with an adsorption capacity of 6.3%, 6%, and 5%, respectively.

Figure 3 (A) shows the measurement of H_2S without and with activated carbon, and in figure 3 (B) is the amount of H_2S that can be absorbed by activated carbon. H_2S biogas content of 301 ppm has decreased very sharply after being passed into activated carbon. For H_2S adsorption, activated carbon activated with a nitrogen flow of 200 milliliters per minute (AC200-FA) has the highest adsorption ability compared to AC350-FA and AC500-FA activated carbons. Its adsorption ability is 261.7 ppm, 258 ppm, and 246.4 ppm for AC200-FA, AC350-FA, and AC500-FA activated carbon, respectively.

(A)

(B)
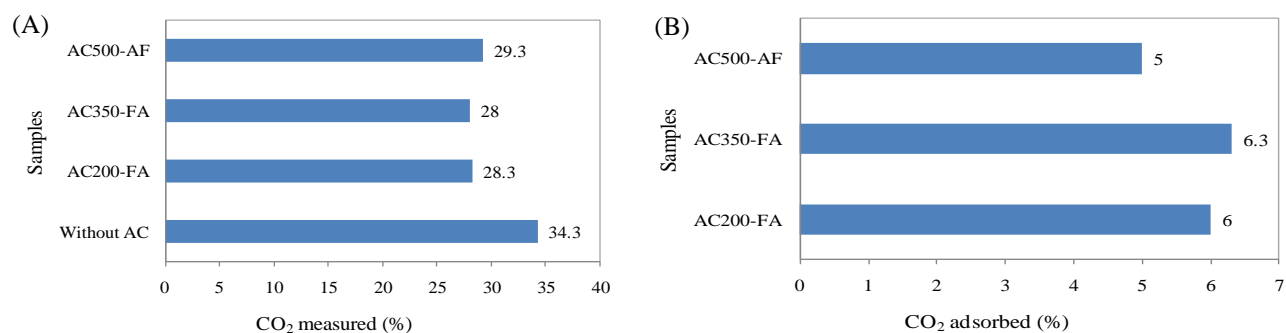
FIGURE 2. CO$_2$ ADSORPTION (A) CO$_2$ MEASURED (B) CO$_2$ ADSORBED

(A)

(B)
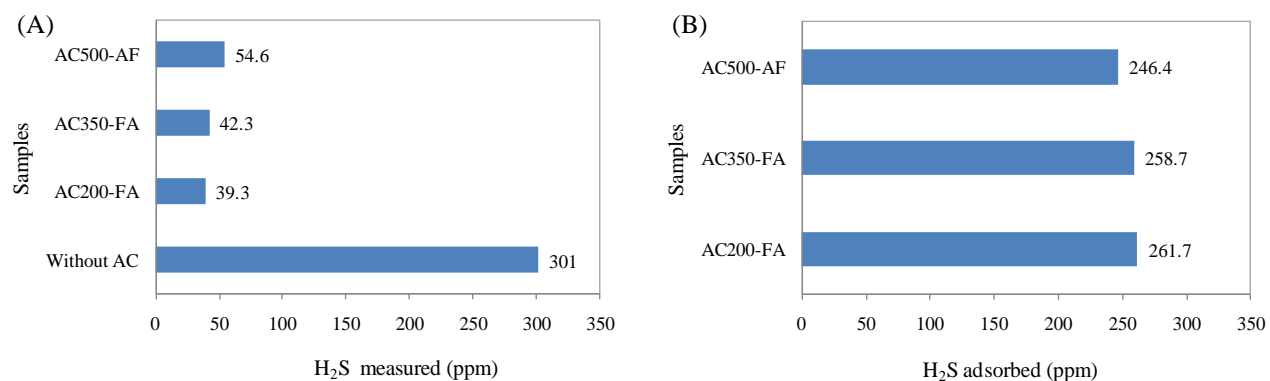
FIGURE 3. H$_2$S ADSORPTION (A) H$_2$S MEASURED (B) H$_2$S ADSORBED

(A)

(B)
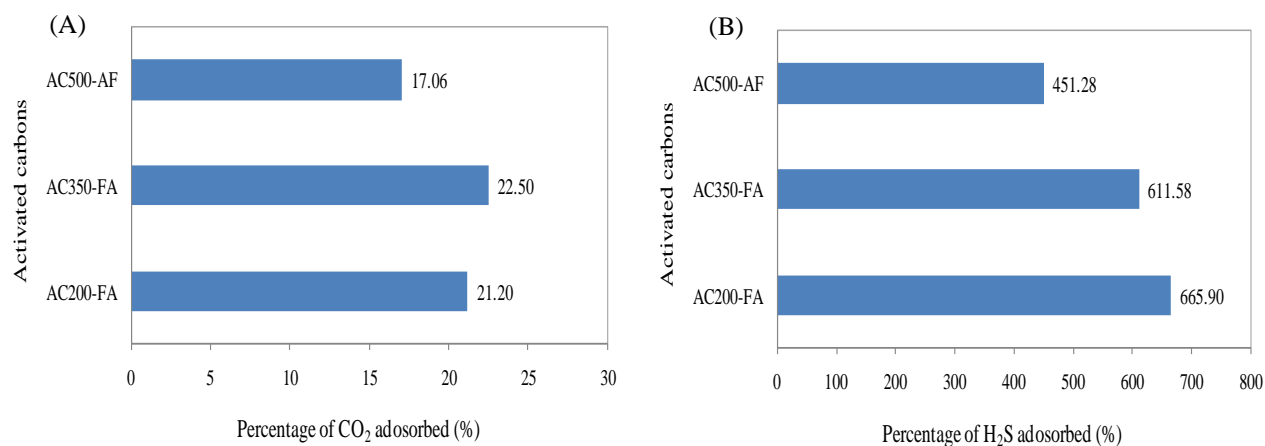
FIGURE 4. (A) PERCENTAGE OF CO$_2$ ADSORBED (B) PERCENTAGE OF H$_2$S ADSORBED

Figures 4 (A) and (B) show the percentage of CO_2 and H_2S adsorption by each activated carbon. It can be seen that the highest percentage of adsorption of activated carbon against CO_2 occurs in AC350-FA activated carbon, followed by AC200-FA and AC500-FA which are respectively 22.50%, 21.20%, and 17.06%. As for H_2S, AC200-FA activated carbon with 665.90% adsorption percentage is the highest compared to AC350-FA and AC500-FA with values of 611.58% and 451.28%, respectively.

IV. CONCLUSIONS

Activated carbon from bamboo swat activated by different nitrogen flow rates can absorb CO_2 and H_2S from biogas. The highest adsorption for CO_2 and H_2S is found in different activated carbon. For CO_2, the highest adsorption is obtained in AC350-FA, while the highest adsorption for H_2S is found in AC200-FA activated carbon.

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Production And Eggs Quality Of Isa Brown Gaves Ration Flour Skin Dragon Fruit (*Hylocereus Polyrhizus*) Fermentation

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Abstract—The objective of this study was to study production and egg quality of Isa Brown received a fermented dragon fruit meal ration (Hylocereus polyrhizus) for 8 weeks. The design used was Completely Randomized Design (CRD) with 3 treatments, 5 replications in which each replication consisted of 10 chickens so that the total chicken used was 150 heads. The treatment given were: R0: ration without fermentation dragon fruit skin flour, R1: ration with 5% fermentation dragon fruit skin flour, and R2: ration with 5% fermentation dragon fruit skin flour, + 1% Calcium.Variabel observed: egg production , egg weight, FCR, exterior and interior egg shell weight, egg thick, HU. The results showed treatment of R0; R1, and R2 are not significantly different ($P> 0.05$) consumption , yolk colours, pH, index, but egg production, egg weight, *HU,* egg shell thickness·R1 and R2 is significantly different ($P<0.05$) than R0. Conclude this research that quality of egg Isa Brown gaves ration fermentation flour skin dragon fruit (*Hylocereus Polyrhizus*) 5% (R1) and ration with 5% fermentation dragon fruit skin flour + 1% Calcium (R2) increase the egg production and egg quality (egg weight, *HU,* egg shell thickness).

Keywords— *Egg weight, dragon fruit flour, HU, production, quality and yolk color.*

I. INTRODUCTION

Many factors interact affecting to optimal production of the Isa Brown Layer. However, the maintenance of Isa Brown chickens faced with the variety of problems such as the increasing feed prices are enough sharply, because the feed is a primary need at a cost of approximately 60-70% . The high price of feed is indirectly require that farmers are looking for alternative feed ingredients so it can lower the feed costs and maximize revenues.

According Dewi et al. (2017) and Ahmad (2005) sacharomyces cerevisiae yeast can increase fibrous fiber digestibility and can act as a probiotic in poultry . Another benefit of fermentation products is to suppress the enzyme activity of *3-hydroxy-3-methylglutarylCo-A* reductase that serves to synthesize cholesterol in the liver (Tanaka et al., 1992). Application of feed technology is absolutely must be applied in the optimization of waste utilization. Application of supplementation technology utilizing superior *sacharomyces cerevisiae* origin of yeast is very potential developed. According Mustika (2014) dragon fruit peel is agricultural waste which has not been widely used by the community, especially in Indonesia. According Citramukti (2008) part of dragon fruit 30-35% is peel and still rarely or even not been fully utilized and have reported peel dragon fruit contains high antioxidant and contents phenolics in the dragon fruit peel amounted 28.16 mg/100 g, in addition to having antioxidant and anthocyanins.

Research on dragon fruit peel for livestock feed is still rarely done according Mustika *et al.* (2014) dragon fruit peel can be given up to the level of 1% and can be given up to the level of 4%, without have negative effects on the body of livestock. Dewi et al. (2017) used 5, 7% dragon fruit peel fermentation by *Sacharomyces cerevisiae* increase performance broiler chickens at 5 week and Dewi et al. (2018) gave significant to increased productivity Lohman Brown 23 aged. But shell quality alittle bit thin than commercial ration.

Egg quality can be ensured by supplementing additives or nutrients in the diets of laying hen. Dietary optimum nutrient retention and utilization, especially calcium retention is very important for profitable layer farm. Lower deposition of calcium may lead to poor egg shell, creates huge broken eggs or unmarketable eggs which ultimately decreases the profit level of farmers. Thus, the layer farmers fall into huge economic losses. From the description above, the researcher using dragon fruit peel meal without and fermented plush calcium as a feed ingredients in diets for production and egg quality Isa Brown.

II. MATERIALS AND METHODS

A. Animal, ration and Feeding Treatment

This research conducted over 8 weeks and this research is located in Teaching Farm, Campus Animal Science Campus, University of Udayana and Nyuh Tebel Regency, Amblapura City. A total 150 of 85 weeks with everage body 1702.30 ±10.5 g were kept in individual cages of 40 x 40 x 45 cm .

B.Diets

Diets is used in this research was independently prepared by recommendation Scott *et al.* (1982) which consists of yellow corn, fish meal, soybean meal, rice bran, dragon fruit peel meal, dragon fruit peel meal fermented, coconut oil, premix and CaCO3. Diets given is iso energy (2,900 Kcal/kg) and iso protein (20%), and commercial ration.

C. Instrument

Instrument used is a diet and drinking water torch, lighting cage, machine grinding feed, knife, bowl, spoons stirrer, scissors, paper labels, markers, plastic bags, oven, stove, pans, trays, thermometer, wood, wire, sprayer and digital scales.

D. Research Methods

There are two stages making process meal dragon fruit peel, first making of dragon fruit peel meal is fresh dragon fruit peel chopped small, then dried and grinded up into flour. Second process namely the making of dragon fruit peel meal fermented with *Saccaromyces Sp.* In the process of fermentation, solution is ready for use. Fermentation process dragon fruit peel chopped small , be dried, inserted in plastic then moistened with solution fermentation, closed tightly (3-5 days), after it is dried, ground into flour and ready for use.

E.Research Design

The design used was *Completely Randomized Design* (CRD) with 3 treatments, 5 replications in which each replication consisted of 10 chickens so that the total chicken used was 150 heads. The treatment given were: R0: ration without fermentation dragon fruit peel flour, R1: ration with 5% fermentation dragon fruit peel flour, R2 : ration with 5% fermentation dragon fruit peel flour, + 1% Calcium

F. Variable Observed

Variabel observed: egg production , egg weight, FCR, exterior and interior egg shell weight, egg thick, HU.

G.Data analysis

Data were analyzed statistic by ANOVA and when there are significant differences continued test Duncan.

III. RESULTS AND DISCUSSION

The everage of egg production for eight weeks (85-93 wk age) is shown in Table 1. Diet without fermentation dragon fruit peal flour produced significantly lower (P<0,05) egg production (HD%) as compared to both diet R1 dan R2 . Increase egg production because the diet with contain of fermentation dragon fruit peal

flour have antioxidant is the role of the improved laying healty. That material having the antioxidant content of livestock can reduce the effects of free radicals such as increasingfeed consumption. According Mustika *et.al.* (2014) it is because free radicals can cause oxidative stress in livestock resulting in lower feed consumption. Oxidative stress is a state of imbalance between the amount of free radicals and antioxidants in the body, that can trigger the occurrence cell damage and lowered immune system (Nurliyana *et al*., 2010).This is presumably due to the same nutrients supply, such as protein, energy and fat, derived from the similar amout of feed consumption. The amount of energy , protein, and fat consumptions can affect egg production . energy and nutrient needs for the formation of eggs are obtained from the feed intake(Chazvinian *et al.,* 2011).

The results showed treatment of R0; R1, and R2 are not significantly different (P> 0.05) fead convertion ratio yolk colours, pH, index, but egg production, egg weight, *HU,* egg shell thickness ˙R1 and R2 is significantly different (P<0.05) than R0 (Table 1). Haugh unit were found higher (p<0,05) treatment R1 (ration with 5% fermentation dragon fruit peal flour), R2 (ration with 5% fermentation dragon fruit peal flour + 1% Calcium) because of the ration R1 and R2 contain fermentation dragon fruit peal flour have antioxidant , laying han healty according Metin et al. (2017) that supplementation of herbal extract powder could improve the HU of eggs in laying hens and supplementation of 4% *F*.velutipes mycelium media at 5 to 10% in layer diets had no significant effects on FCR.. Further results reported that the dietary combination of protein , methionine and choline did not significantly effect Haugh Unit.

TABLE 1
Effect of Treatment for Egg Production And Egg Quality Lohmann Brown

Variable	Treatment			SEM
	R0	R1	R2	
Egg Produktion (%)	68.00b	70.00a	72.00a	0.15
Feed conversion	2.02a	1.79a	1.76a	0.02
Egg Quality				
egg weight (g/egg)	65.76 b	66.15a	66.82a	1.05
egg index	80.6a	82.13a	83.39a	1.02
shell weight (g/egg)	5.91a	6.12a	6.35a	0.024
egg shell thicknes	0.379b	0.389a	0.390a	0.06
yolk colour	9.5a	10.00a	10.00a	0.03
pH	6.79a	6.45a	6.48a	0.02
HU	91.19b	93.33a	94.05a	0.5

Note: 1)R0 : ration without fermentation, R1: (ration with 5% fermentation dragon fruit peal flour),
R2 (ration with 5% fermentation dragon fruit peal flour + 1% Calcium)
2)Values with the same superscript in the same row showed differences did not significant (P>0,05)
3) SEM : *Standard Error of The Treatment Means*

Eggs weight produced by each bird of laying during the study R1: ration with 5% fermentation dragon fruit peal flour and R2: ration with 5% fermentation dragon fruit peal flour + 1% Calcium significantly increased (P<0,05) than treatment R0. The high yield of egg weight increased it is because due to the effect of supplemental 5% fermentation dragon fruit peal flour + 1% Calcium to reduce ,

The result R1and R2 diet resulted no significant effect to eggshell weight (P>0,05) compared to the R0 diet. But the treatment R1and R2 gave eggshell thickness increased significantly effect (P<0.05) than R0. The eggshell thickness had significant effect for treatment R1 :ration with 5% fermentation dragon fruit peal flour and , R2 :ration with 5% fermentation dragon fruit peal flour + 1% Calcium .The quality of eggshell thickness can be influenced by many factors including mineral, calcium , magnesium and phosphorus are the major in organic constituents of eggshell (King'Ori, 2011). According to Kebreab *et al* (2009) the higher calcium intake can improve the quality of the eggshell. The fermented fruit of dragon fruit skin contains various flavonoid compounds, thiamin, pyridoxine, cobalamin, phenolic, polyphenols, carotene, phytoalbumin and betalain. Dragon fruit husks have catechins that function as antioxidants and antibacterials (Mustika et al., 2014). Factors that influence feed conversion are physical form of ration, body weight, nutrient content of rations, environment where maintenance, strain and sex. The method of fermentation in his research probiotic corn flour increases in the digestive tract of

chicks and decreases pathogenic microorganisms. Fermentation increases chicken immunity and improves chicken performance.The eggshell thickness had the same relative value because the treatment diets have relatively similar Ca dan P contents .The quality of eggshell thickness can be influenced by many factors including mineral, calcium , magnesium and phosphorus are the major in organic constituents of eggshell (King'Ori, 2011). According to Kebreab *et al* (2009) the higher calcium intake can improve the quality of the eggshell.

IV. CONCLUSION

Conclude this research that quality of egg Isa Brown gaves ration fermentation flour skin dragon fruit (*Hylocereus Polyrhizus*) 5%   and ration with 5% fermentation dragon fruit skin flour + 1% Calcium increase the egg production and egg quality (egg weight, *HU,* egg shell thickness).

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Pura Langgar Development Strategy as a Tourist Attraction and Interfaith Solidarity in Bangli Regency

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Abstract— *This study aims to formulate the development strategy of Pura Penataran Agung Dalem Jawa Bunutin or also known as Pura Langgar as a tourist attraction as well as a vehicle for solidarity among religious believers. Pura Langgar is located in the village of Bunutin, Bangli Regency, Bali, a complex of places of worship for Hindus in which there are also places of worship for Muslims in the form of langgar buildings with traditional Balinese style of architecture. The existence of this temple contains a uniqueness that reflects the acculturation process between Balinese (Hindu) and Islamic culture in the past. The existence of Pura Langgar is an interesting phenomenon to study, because in addition to being a tourist attraction as well as being expected to be a vehicle for interfaith solidarity, especially Hindus and Muslims. This research is descriptive qualitative. Data collection was carried out using field observation techniques, in-depth and structured interviews, focus group discussions, literature, and documentation. Data analysis was performed using a SWOT analysis of internal and external environmental conditions that influence the formulation of strategies. Based on an analysis of internal and external environmental conditions, the development strategy of Pura Langgar can be formulated as a tourist attraction as well as a vehicle for solidarity among religious believers, among others, the establishment of a tourist attraction management agency and enhancing the quality of human resources; increase understanding of multicultural ideology; building a marketing system based on digital information technology; develop marketing cooperation networks with travel agents; and environmental management and improvement of facilities and infrastructure to support tourist attraction*

Keywords—strategy, development, Langgar Temple, solidarity, tourist attraction, Hinduism, Islam

I. INTRODUCTION

Bali Island is also known by the nickname "Pulau Seribu Pura" [1]. Among the thousands of pura or temples scattered in Bali, there are a number of temples that are classified as popular among domestic and foreign tourists, such as Pura Besakih, Pura Tanah Lot, Pura Taman Ayun, Pura Uluwatu, and Pura Kehen. In addition, Pura Penataran Agung Dalem Jawa Bunutin or also known as Pura Langgar in Bangli Regency also began to attract tourists. Since 2018, the Bangli Regency Government has designated Pura Langgar as one of the attractions of spiritual / cultural tourism along with several other temples in Bangli Regency [2]. The stipulation of Pura Langgar as a tourist attraction is inseparable from its uniqueness. that is, the existence of the langgar building which functions as a place of worship for Muslims. The existence of this langgar building is what causes Pura Penataran Agung Dalem Jawa Bunutin also commonly called Pura Langgar.

The development of the Pura Langgar as a tourist attraction is expected to be of benefit to the community, preservation of cultural heritage, and as a vehicle for interfaith religious solidarity, particularly between Hindus and Muslims. This is considered important considering that the Indonesian people are concerned with different needs for development that is full of unity and a nation that achieves optimal results in development. Moreover, with the increasingly widespread issues of SARA (ethnic, religious, racial, and intergroup)

nuances that have plagued the Indonesian Nation, efforts to enhance and foster a sense of unity and nation related to the agenda are urgently needed [3]. These efforts are not only carried out through politics, but also socio-culture, specifically tourism. In this context it is expected to become a vehicle for fostering mutual understanding and mutual support in the form of interfaith solidarity. Through tourism, the relationship of mutual understanding and mutual support for diversity is not only limited to the local level, but also at the national and international level [4], [5].

Development of Pura Langgar as a tourist attraction and vehicle for religious solidarity should be in accordance with the goals of the World Tourism Organization's Articles of Association that support tourism development in the direction of economic development, international relations, promotion, welfare, and consideration of universal values of human rights and fundamental freedoms for all people, without differences in race, sex, language or religion [6].

II. METHODS AND PROCEDURES

This study uses a qualitative descriptive method. Data collection is done by using observation techniques, in-depth interviews, focus group discussions, and literature studies. Observations were made to obtain an overview of the existing conditions of the tourist attraction of Pura Langgar and various events that represented the fraternal relations between religious believers. In-depth interviews were conducted with a number of informants to gain an understanding of the history and meanings related to the existence of Langgar Temple. Focus group discussions are conducted by involving stakeholders to obtain information about strengths, weaknesses, opportunities, and threats that affect the development of Pura Langgar Tourism Attraction. Literature study is carried out by examining previous literature which can provide inspiration as well as a reference for this study.

III. RESULTS AND DISCUSSION

A.   *Potential Tourism Attraction of Pura Langgar*
Pura Langgar has a number of uniqueness which is potential enough to be developed as a tourist attraction. The types of potential referred to are as follows.

B.   *History of the existence of Langgar Temple.*
Pura Langgar is a cultural heritage that has a unique historical background. The true existence of the Pura Langgar is related to the story of Prince Wilis, a descendant of King Blambangan who was enthroned in Bunutin Village, Bangli. After the death of Prince Wilis, the throne was inherited by his eldest son, I Dewa Mas Blambangan. Not long ago the reign suddenly I Dewa Mas Blambangan suffer pain that is difficult to cure. Finally, the family carried out the ritual to beg for healing to the ancestors. In the middle of the ritual, one of them experienced a trance and asked to make a langgar. The request is believed to have come from their ancestors in Blambangan who embraced Islam. After that by I Dewa Mas Bunutin, a Langgar was built inside the castle's exhibit area. The existence of this langgar caused Pamerajan Agung Bunutin to become known as Pura Langgar or Pura Penataran Agung Dalem Jawa Bunutin [7].

C.   *Hindu and Islamic Sacred Building Complex.*
The existence of Pura Langgar is unique and interesting because in the temple complex there is a langgar building as a place of worship for Muslims. Unlike the architectural forms of temples in Bali in general, the architecture of the Pura Langgar building resembles a two-story, four-door, and two-story roof. That said, the two levels of the roof symbolize the Shari'a that governs the life and worship arrangements of Muslims, while the two steps symbolize the path to God. The carved building in every corner has a door on each side that characterizes Muslim prayers. This temple is also equipped with several facilities such as ablution and prayer for Muslims.

D.   *Religious Rituals.*
Aside from being a Hindu holy place, especially for the Puri Agung Bunutin extended family, not a few Muslims are taking the time to visit and pray at this holy place. Every 210 days, namely on the day of Wrespati Umanis Wuku Dungulan, the temple is held a pujawali ceremony. In addition, once a year, a month before Nyepi (around the February of the Islamic calendar) also held a ritual of Titi Mamah. This ritual is

reminiscent of the Idul Qurban ceremony, where a red-haired calf is slaughtered and parts of its head are sacrificed by banning it to the bottom of the pond, while the meat is distributed to residents. This ritual was attended by the Puri Agung Bunutin extended family and residents of the surrounding community, including Muslims.

IV. DEVELOPMENT STRATEGY

A.   Strength
(1)   Pura Langgar has a high unique value that reflects Hindu and Islamic acculturation;
(2)   Inside the temple complex facilities are available for prayer and ablution for Muslim tourists;
(3)   Legally formal Pura Langgar has been designated as an attraction for spiritual / cultural tourism;
(4)   In Bunutin Village there are a number of other potential tourist attractions as a support;
(5)   Bunutin Village has a village-owned enterprise that can be involved in managing tourism attractions;
(6)   Community commitment to develop Pura Langgar as a tourist attraction;
(7)   Hospitality or hospitality of a high population of guests or tourists;

B.   Weaknesses
(1)   Even though it is located on a major highway, access from the main road to Pura Langgar is relatively narrow;
(2)   Supporting tourist attraction facilities such as parking lots and toilets are still inadequate;
(3)   Signed or marking about the existence of Pura Langgar as a tourist attraction is still relatively lacking;
(4)   The environmental conditions around the temple are relatively less organized;
(5)   Lack of promotion efforts and information services to tourists about the existence of Pura langgar;
(6)   Not yet established the management body of the tourist attraction of Pura Langgar;
(7)   Limited local human resources who have competence in the field of tourism.

C.   Opportunities
(1)   Increased interest of tourists, especially domestic tourists to conduct spiritual or religious tourism;
(2) The high tourist recognition of Langgar Temple as a vehicle for interfaith religious solidarity;
(3) There are incentive funds from Badung Regency for tourism development;
(4) The development of multiculturalism ideology both at national and global level;
(5) There is a lot of information about the existence of Pura Langgar on the internet media
(6) The development of information technology-based media that can support the marketing of tourist attractions.

D.   Threats
(1) Increasing issues of radicalism and intolerance that can disrupt religious harmony;
(2) Increased competition between tourist attractions that offer traces of Islam on the Island of the Gods.

E.   SWOT Matrix

INTERNAL EXTERNAL	STRENGTHS	WEAKNESS
	• Has a high level of uniqueness.	• Access to the temple is relatively narrow
	• There are religious facilities (Muslim).	• Limited supporting facilities.
	• Has a formal legal status.	• Environmental conditions are less organized.
	• Supported by other tourist attractions.	• Signed inadequate attractiveness
	• The existence of BUMDES	• Lack of promotion
	• High community commitment	• There is no management body

	Population hospitality	Limited tourism human resources.
OPPORTUNITIES	**STRENGTHS - OPPORTUNITIES (SO)**	**WEAKNESSES - OPPORTUNITIES (WO)**
• The increasing trend of religious tourism. • High testimony about the existence of Langgar Temple • There is an incentive fund. • The issue of multiculturalism • Lots of information about Pura Langgar on the internet • Advances in I.T.	• Creation of community-based religious tourism products.	• Environmental management and improvement of facilities and infrastructure. • Building an information technology-based marketing system
THREATS	**STRENGTHS -THREATS (ST)**	**WEAKNESSES – THREATS (WT)**
• Increasing issues of radicalism and intolerance; • Increased competition between religious tourism attractions.	• Increase understanding of multicultural ideology. • Establish cooperation in the creation of integrated tourism products.	• Establishment of a management body and improvement of human resources quality

F.   Strategy Formulation
SO   : the creation of community-based spiritual tourism products based on the spirit of multiculturalism;
ST   : increase understanding of multicultural ideology and build marketing cooperation;
WO   : environmental management, infrastructure improvement, information technology-based marketing system;
WT   : the establishment of a Tourist Attraction Management Agency and improving the quality of human resources.

V. CONCLUSIONS

Pura Langgar is a cultural heritage that has unique values that have the potential to be developed as a tourist attraction. The unique values referred to, among others, are reflected in the history of its existence which reflects the dynamics of inter-king-king relations in Bali and Java in the past; and the presence of the langgar in the temple complex that reflects the Hindu-Islamic acculturation of the past. This fact gives an indication that Langgar Temple has the potential to be developed as a tourist attraction, as well as a vehicle for religious solidarity. The strategies that need to be taken include the establishment of a tourist attraction management body and improving the quality of human resources; increasing understanding of multicultural ideology that carries a spirit of mutual respect for differences in unity; the creation of community-based spiritual tourism products; development of marketing systems based on digital information technology; development of marketing cooperation networks with travel agents; and environmental management and improvement of facilities and infrastructure to support tourist attraction.

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Pysical Modeling of Coastal Structure at Batu Mejan Beach

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Abstract— The purpose of this study is to investigate the effect of the breakwater as a coastal structure on the wave energy that propagates towards the beach at Batu Mejan Beach. The research was carried out with a physical model at Hydro Laboratory owned by Civil Engineering of Udayana University. The Wave Flume and Wave Generator are used to simulated the supporting parameters needed for planning. Several scenarios of the water depth (d), wave height (H) and period (T) and structure dimensions (B) are simulated to investigated the transmission wave and reflection waves. Simulation results show that the energy of transmission waves and reflection waves that occur are reduced more than 5% of the incoming waves. Thus, this beach structure can be used as an alternative in reducing erosion that occurs in Batu Mejan Beach.

Keywords— Physical model, breakwater, transmission wave, reflection wave, Batu Mejan Beach.

I. INTRODUCTION

The beach is part of the coastal region which forms the boundary between the land and sea waters. Beaches have a dynamic nature because beach space is able to undergo rapid changes in response to natural processes and human activities. One of the natural factors that influence the dynamic coastal environment is beach erosion. Coastal erosion is caused by unbalance between supply and sediment transport capacity, resulting in a coastline retreat from its original position. Oceanographic conditions such as ocean waves and their generation, wave deformation, breaking waves and ocean currents also play an active role in the process of erosion and sedimentation of the coast. One of the efforts in overcoming this situation is artificial protection called submerged breakwater. Breakwater is an infrastructure that functions to break the wave by absorbing some of the wave energy. The wave energy that travels to the armor layer will partly reflect, partly will be transmitted as a transmission wave and partly will be destroyed (dissipation) through the breaking of the wave. The distribution of the amount of wave energy that is reflected, destroyed and transmitted is influenced by the characteristics of the incident wave (period, height, depth of water), the type of building wave damper (smooth or rough surface, pass water or not pass water) and the geometric of the building damper (slope, elevation, and the top of the building) [1].

According to the Bali Provincial Environmental Agency [2], Bali has a coastline of 436.50 km, but 91.07 km has eroded. Batu Mejan Beach has eroded with a coastline retreat rate of 0.5 m to 1.0 m / year [3]. To overcome this, the government has made hard protection beaches by building coastal safeguards in the form of revetments along the shoreline. The presence of the revetment has not been effective because of structural failure due to scouring at the toe protection of the revetment. Pujianiki et al. [4] have designed a submerged breakwater to reduce the scour at toe protection. In the design, four models were made with variations in width and elevation of the breakwater peak, then selected with the minimum coefficient of transmission and cost. Before the structure is applied, a physical testing model in the laboratory is needed to determine the impact of structure application in the field later. Purpose of this study is to examine the impact of the submerged breakwater on the transmission wave in Batu Mejan Beach. It is

expected that from this research will obtain references and alternatives of breakwater.

The basic concept of physical modeling is to reshape problems or phenomena in the prototype on a smaller scale, so that the phenomena that occur in the model will be similar to that prototype. There are 3 criteria that must be met by the model in accordance with the nature of the observed phenomenon that is geometrical congruent, kinematic congruent and dynamic congruent. A geometric congruent is a similarity where the shape in the model is the same as the prototype shape but the size can be different. The comparison between all lengths of models and prototypes is the same. In a perfect geometric the horizontal direction length scale (length scale) and vertical direction length scale (height scale) are the same, whereas in the distorted model the length scale and height scale are not the same. A kinematic construct is a congruence that meets the geometric and geometric criteria and the ratio of velocity and acceleration of flow at two points on the model and prototype in the same direction is the same. The speed scale is given n_u notation, the acceleration scale is n_a, and the time scale is n_T. A dynamic is a congruence that meets the geometrical and kinematic criteria, and the comparison of forces acting on the model and prototype for all flows in the same direction is the same. In this study, we will use the same length scale as the high scale (undistorted models) and use Froude congruence. Dimensional numbers are used to express the relationship between parameters and are used to describe the results of research. To determine the dimensionless numbers can be done with dimensional analysis. Some methods commonly used for dimensional analysis are Basic Echelon Method, Buckingham Method, Rayleight Method, Stepwise Method and Langhaar Method. In this study, the Langhaar method is used because the variables that have relatively little influence and the method are structured [5].

Batu Mejan Beach, Canggu, Badung Regency, Bali Province is located in the southern part of Bali as shown in Figure 1. Current conditions at Batu Mejan Beach indicate damage occur at toe of the revetment.

(a)   (b)

Fig. 1 Location of the study (a) and existing condition at Batu Mejan Beach (b).

II. METHOD AND PROCEDURE

Two Dimensional (2D) physical modeling research was conducted at the Hydro Laboratory owned by Civil Engineering Udayana University. In conducting this research, the laboratory equipment used consisted of a wave flume tank measuring equipped with manual wave drive as shown in Figure 2. The wave motion created by the wave generator is a flap type wave generator engine which is driven by an electric motor capable of generating variation of regular waves height and period. Wave dumper is used to reduce the energy at the end of the flume. The model of the structure placed in the middle of the flume as shown in Fig. 3.

To be able to find out the effect of several variables on planning parameters, several simulation models are carried out. To meet the requirements for scaling all variables, a geometric scale of 1:100 is used. Model testing is carried out with the following steps:

1. The model is placed in a wave flume equipped with a wave generator. The model is installed at a certain distance from the position of the wave generator.
2. The stroke and wave period are set in the wave generator system,
3. The wave generator is turned on at a predetermined stroke, then readings of the incoming wave height (Hi) and the transmission wave height (Ht) simultaneously at each predetermined point.

4. Running height of incoming waves (Hi) and transmission wave height (Ht) are carried out for each stroke variation.
5. After running, the wave generator is turned off and continued with the next stroke variation by following steps 4-6 for all models.

Fig. 2 Wave flume.
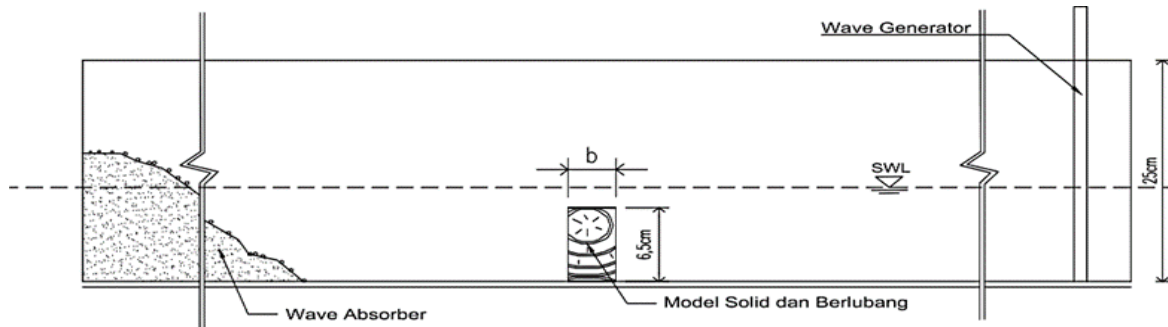
Fig. 3 Model.

Data analysis in this research was carried out in several stages, namely:
1. Calculate the height of the incident waves, namely H_{max} and H_{min}
2. Calculate the wave height before hitting the structure (H_i).
3. Calculate transmission wave height (H_t)
4. Calculate wavelength.
5. Calculating the transmission coefficient (K_T)
6. Graph the relationship between Hi / gT^2 with K_T on each stroke.

III. RESULTS AND DISCUSSION

The main data observed and recorded during laboratory testing is wave height in front of the model and behind the model. From the results of the experiment and recording the wave height at each point of the observation location is taken value maximum Hmax and minimum wave height Hmin, in front and behind model. Recording using a measuring instrument in the form of a ruler with a reading scale up to accuracy mm. Incoming wave height (Hi) depends on how big the maximum and minimum wave height (Hmax or Hmin) infront of model. This, it is based on the theoretical basis that the magnitude of the waves comes the same with Hmax added by Hmin then the results of the sum are divided 2. The result of the division is the magnitude of the incident wave height (Hi). And behind the model called transmission wave Ht. Incident wave that hits an obstacle will reflected in part or in full, this wave phenomenon is called a wave reflection. Reflection wave height Hr determine by subtracting Hmak by Hmin divided by 2. Coefficient transmission determine by Ht/Hi and Coefficient reflection determine by Hr/Hi.
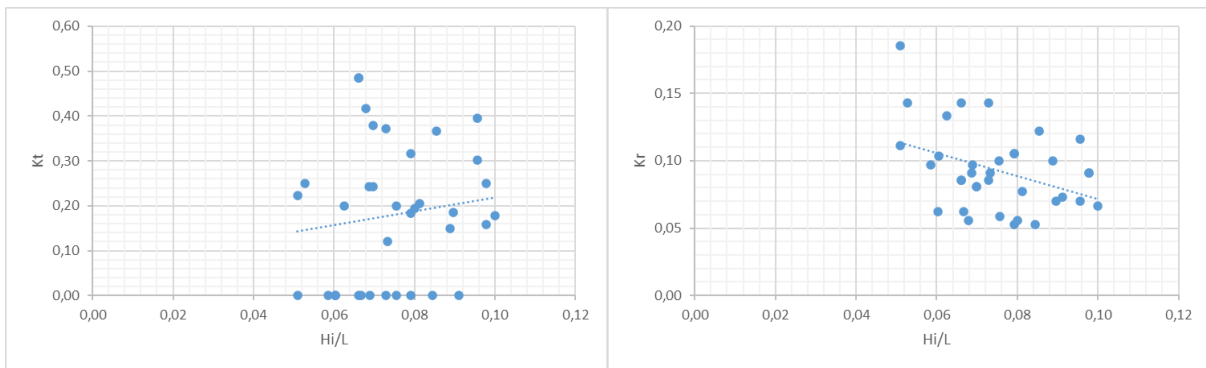
Fig. 4 Kt and Kr.

Result of the simulation are shown in Figure 4, which indicated that the wave energy reduces 15% -50% after passing the submerged breakwater. Kt equal to zero mean there are no overtopping wave. Kt increases with increasing Hi/L. In another case reflection wave occur 5% - 15% and decreases with increasing Hi/L. The results of this simulation show that the structure of wave breaker is effective in reducing the wave energy that moves to shore and the wave reflection decreases with increasing wave height.

IV. CONCLUSION

Submerged breakwater is effective in reducing the wave energy that moves to shore and the wave reflection decreases with increasing wave height.

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Q-Marker identification Ethanol Purple Sweet Potato Extract after Steamed Treatment

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Abstract— Steamed of purple sweet potato could prevent anthocyanin degradation. The Purple sweet potato was copped in 1 cm^3 cubical form and then steamed for 15 minutes. The heated prevents biomarkers degradation and increases their recovery in comparison to no heating treatment. TLC-Fingerprint was used to identify the biomarker of antioxidant agent of sweet purple potato. The steamed also induced and increasing total flavonoid content.

Keywords— Flavonoid, Ipomoea batatas L., TLC-Fingerprint

I. INTRODUCTION

The global market for herbal medicines has increased by 7% every year[1]. According to the estimate of the World Health Organisation (WHO), the demand for medicinal plants is likely to rise from the current $14 billion a year to $5 trillion in 2050[2]. WHO herbal medicine is required by phytochemical standardization, better known as phytochemical chromatographic fingerprint (PCFP)[3,4].

The composition of active herbal medicinal compounds is influenced by several factors, such as species, variety, cultivation, geography and climate of growth, harvest time, post-harvest processing methods, and preparation of the phytotherapy, including sorting, extra spring and formulation at the production stage[5]. Efforts to guarantee quality and safety require the application of quality assurance and quality control (QA / QC) in the processing and production processes such as the application of cGMPs (current Good Manufacture Practices), while in the cultivation of medicinal plants also applies GACP (Good Agriculture and Collection Practices). Application of quality assurance and quality control, cGMP, and GACP will bring traditional medicine known as modern phytotherapy drugs[6].

Phytochemical fingerprinting has been used for identification and quality control of phytotherapy drugs. Q-marker refers to a series of natural or processing or preparation resultant compounds contained in herbal medicine and their products[7]. Ideally the phytochemical fingerprinting method is able to provide fingerprints that repress all bioactive compounds. Q-marker is closely associated with the efficacy and safety of herbal medicine[8]. Marker / biomarker compounds are separated using chromatographic techniques[9]. Q-marker identification can use several

chromatographic method like HPLC, GC-MS, and TLC fingerprint. TLC is the standard fingerprint method for herbal analysis because of its simplicity, rapidity and economy. A significant advantage of TLC is that it can provide the light and fluorescence images, get different levels of profiles, corresponding integral data with chromatography scanning, digital processing, and ability to perform on-site inspection test[4,10,11].

Biomarkers are secondary metabolites of herbal medicine that have been tested both in preclinical and clinical phase tests as active compounds having pharmacological effects. While chemical markers that are used as markers or identities of such herbal medicine. Therefore in the Q-marker identification is needed to control a quality herbal medicine, such Ipomoea batatas.

II. MATERIAL AND METHODS

Purple sweet potato tuber was obtained from Pupuan Village, Tegalalang District, Gianyar Regency, Bali. The chemicals and solvents were an analysis degree (from Merck-Germany), such as ethyl acetate, formic acid, acetic acid, water, and DPPH reagent.

Hundred gram of fresh sample was direct extracted and steamed before extraction. The steaming was for 15 minutes in boiling water. Then was macerated with 500 ml with ethanol 95%: citric acid 3% (85:15). Allowed to stand for 24 hours then filtered.

The ethanol extract was applied to a TLC plate G60 F254with a volume of 20 µL using CAMAG Autosampler. Then, the plates were drained and developed into a CAMAG Automatic Developing Chamber with ethyl acetate: formic acid: acetate acid, aquadest (100:11:11: 26 v/v/v/v) as mobile phase[12]. After the mobile phase reached the finish line (80 mm) and air-dried plates were removed. Furthermore, the plates were detected with CAMAG TLC visualizer in UV lamp 254 nm, 366 nm, and visible light, and then the plate was dyed with DPPH reagent

III. RESULT AND DISCUSSION

Figure 1 presented the chromatogram of both direct extracted and steamed tuber purple sweet potato. The peaks of 1 to 4 showed red dull to violet colour under white lamp. Their spectra possessed maximum peak on range 510-530 nm. This colour and maximum peak of their spectra indicated that the peaks were anthocyanin[13–15]. Peaks identification were made by AlCl3/HCl, ammonia, and NaOAc/H3BO3 reagent. This reaction presented all detected peak were flavonoid. Peak 5-9 were positive to AlCl3, and it indicated flavonol group[16]. All peaks were positive to DPPH reagent. These showed that the detected flavonols and anthocyanins were active electron scavenging antioxidant.
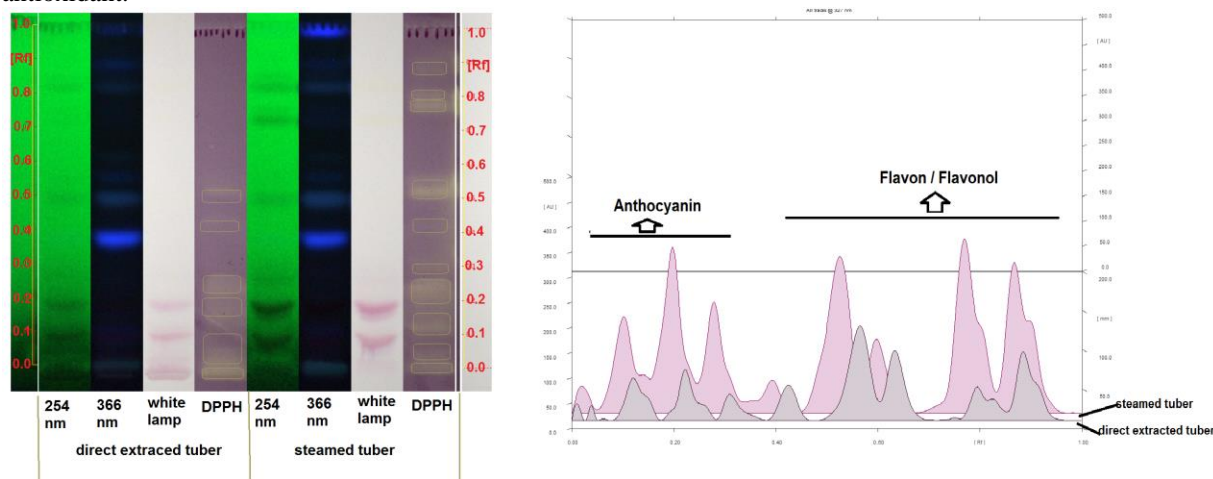
Fig 1. The TLC-chromatogram of ethanolic extract of direct extracted and steamed purple sweet potato tuber.

Steaming of sweet potato tuber increased AUC of flavonoid recovery. Steaming introduced cell destruction of tuber; this induced an increasing penetration of solute while extraction; on the other hand, steaming induced deactivation of peroxidase enzyme[13]. Deactivation of this enzyme cut a degradation anthocyanin contains in purple sweet potato tuber. The steaming before increased recovery of anthocyanin into 3.5-fold higher than direct extraction.

TABLE 1
AREA UNDER THE CURVE (AUC) OF EACH DETECTED FLAVON/FLAVONOL AND ANTHOCYANIN PEAKS

Peak Number	Rf-value	AUC		DPPH	
		direct extracted	steamed	direct extracted	steamed
1	0.02	247.8	1078.8	+	++
2	0.1	2598.2	5857.2	++	+++
3	0.2	2829.4	10775.9	++	+++
4	0.28	1389.5	6784.2	++	+++
5	0.39	1855.7	1757.7	+	++
6	0.53	6611.9	12202.1	++	+++
7	0.6	3955.2	4333.9	+	+
8	0.77	2315.5	13001.5	+	+++
9	0.87	4250.8	11637.7	+	+++

IV. CONCLUSION

Flavonoid of purple sweet potato tuber was active electro scavenging antioxidant. The TLC system could separate flavonoid contains purple sweet potato tuber, so this TLC fingerprint could be directly reflected the Q-marker of sample. Steaming increased flavonoid recovery of extraction.

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SEMIOTICS OF TOURISM:
AN APPLIED LINGUISTIC STUDY

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Abstract–This study related to structure, system, and practice of using signs. It is carried out as follows: determining signs in tourism; determining the locus and focus; rationality of the study; determining method of processing data; classifying, interpretative analysis, making conclusions. The study finds (1) tourism icon (qualisign) as a sign (signifier), (2) tourism index (sinsign) as a sign of dominance, and (3) tourism symbol (legisign) as tourism sign with rules, conventions, or tourism code;2) tourism signs system includes (1) frame of interpretation (semantics) as a sign (meaning / concept) of tourism, (2) facility of sign (syntactic) as a relation of signs both paradigmatic and syntagmatic, and (3) norms a sign (pragmatic) as an effect of a sign interpreted by a traveler;3) the practice of tourism signs includes (1) communication of signs (qualisign), namely the relationship of signs to rules, conventions or tourism codes, (2) the practice of the power of signs which are domination practices (sinsign) signs in the form of connotations and denotation and acceptance by tourists, (3) sanctions for tourism signs (legisign), namely the practice of conventions or agreement on signs of tourism.

Keywords— practice, semiotics in tourism, signs, structure, system

I. INTRODUCTION

Cultural tourism has become the most important regional development policy for tourism by the provincial government of Bali since the early 1970s [1][2]. Evidently, Bali tourism has been able to become a key agent in building and reconstructing Balinese culture produced on a global scale in the context of the tourism industry. Culture cannot be separated from tourism activities which also involve cultural elements [3].

The practice of cultural tourism in Bali is reflected in the development of potential cultural-based localities and cultural signs as commodities to attract tourists; for example, folklore, art, tradition, inheritance, and even local geography are managed to become tourist attractions[4]. It can be observed that tourism activities in Bali rely heavily on cultural and artistic offerings in addition to natural tourism and spiritual tourism which are packaged in the performing arts, painting, sculpture and the art of crafts [5]. Cultural commodities are reflected in the production of cultural signs in tourism domain.

In fact, Bali's tourism practices are indeed dominated by the production of cultural signs to shape the image of cultural tourism. Production of tourism signs appears in various aspects such as language, art, and religion, and others that are used to communicate certain meanings. Tourism signs are identified as something that refers to something other than itself and requires tourists to interpret it actively according to the cultural codes they have [7] [8].

Linguistically, tourism signs can be used as objects of Semiotic studies to interpret signs, relationships between signs, and the use of signs in tourism activities. These signs can not be meaningful by themselves, tourists organize their experiences visually, then the experience is used as a view in interpreting their heritage activities. The link between semiotics and tourism is seen when tourists build interpretations of cities, landscapes, and culture as a sign / sign system [9] [10].

Practically,the use of appropriate signs by the tourism industry can provide regional, social or cultural characteristics, in order to capture targeted market segments [11]. For this reason, a study of the production of signs in Bali tourism practices needs to be studied in order to build understanding for stakeholders, investors, local

communities and tourists about the structure of signs, sign systems, and the practice of using signs of tourism in Bali.

Based on the background of the problem, the research problem can be formulated as follows: (1) what is the production of signs (sign structures) in the Bali tourism industry, (2) what is the institutionalization of signs (sign systems) in the Bali tourism industry, and (3) what is the use of signs in the Bali tourism industry.

II. METHOD AND PROCEDURES

This study uses a qualitative approach to identify and interpret the signs in tourism practice. The sign phenomenon is explored naturally in the context of its use and meaning in social interactions [12]. For this reason, tourism semiotics research focuses on the study of the nature of the existence of signs as a representation of objects, ideas, situations, circumstances, feelings, etc. related to the tourism industry.

Semiotic data types are classified into three data types, namely (1) Bali tourism icon data, (2) Bali tourism index data, and (3) Bali tourism symbol data. Data sources are obtained from three levels, namely (1) semantic level, (2) syntactic level, and (3) pragmatic level.

Tourism semiotic data is collected through text, advertisements, news, and other signs in the context of tourism. Data collection is done by listening (observation) and documentation studies (text, advertisements, tourism news) by recording past events in the form of writings, drawings, or monumental works from producers or users of signs in the context of tourism. In-depth interview techniques were also carried out on tourism actors who were purposively selected as producers of signs [13].

Research that uses semiotics analysis tool, studies the signs and signs that are commonly used in certain domains and understand the rules of use. The researcher breaks down the meaning carried by these signs. The basic idea of using semiotics is finding rules that govern human behavior. Briefly, the sequence of semiotic analysis can be explained as follows: (1) Why does the sign have meaning to me?, (2) What does the sign mean for other people?, (3) Why does the sign have meaning for others?[14][15]

III. RESULT AND DISCUSSION

In general, semiotic research related to advertising and tourism marketing as has been done by [16]. recent research on semiotics focuses on issues of representation and authenticity in tourism and its relation to a number of signs of power was carried out. Previous research applied structuralist perspectives from the theories of Sausure, Peirce, and Barthes.

A. Structure of signs in tourism

Identification of tourism signs is based on a comprehensive understanding of the basic elements of signs in semiotics, namely sign, levels of signs, and sign relations. The first, sign structure is a signifier structure called qualisign. Qualisigns in tourism is an icon of airport, flights, hotels, restaurants, bars / cafes, travel agencies, tourist information, tourist attractions, tourist attractions, transportation, gift shops, motorcycle rentals, and surfboard rentals. Secondly, the structure of the dominance of tourism signs (Sinsign) in the form of an index that includes signs of tourist origin that are dominated by marking hotels, restaurants, gift shops, and travel agents; and thirdly, the legitimacy structure of tourism signs (legisign) in the form of conventional symbols and agreements that are often found in the realm of hotels, restaurants, bars / cafes, and travel agencies. The following triadic model explains tourism sign elements.

TABLE I
TRIADIC MODEL EXPLAINS TOURISM SIGN ELEMENTS

Structure / Category	Signification: Representamen	Domination: Object	Legitimation: Interpretan
Firstness: autonomous	Qualisign: Proper sign of airport, hotel, restaurant, bar/cafe, travelling, tour activity, tourist attraction, transport, transaction	Icons: copy, likeness, similarity	Rheme: isolated from the context

| Secondness: connected with reality | Sinsign: Token, experience, behavior, comparison | Index: agreement and causal | Dicent: Sign from actual existance |
| Thirdness: connected with rules, conventions or codes | Legisign: Type, memory, medium, communication | Symbol: convention and agreement | Argument: Combination of two premises |

B. *System of signs in tourism*

Signs, reality, and meaning in tourism can be examined by semiotics. Signs of the reality of tourism are constructed by tourists before taking a tour. The center of tourism is the impression of tourists (tourist gaze) where tourists enjoy a tourism destination through the impression and experience of travel. The impression and experience of the tour are constructed through signs.

The basic assumption of tourism semiotics is (1) there is an impression (gaze) before tourists take a tour. The choice of travel is determined by how tourists construct signs of tourism in a tourism destination and (2) construction of tourism signs determines the choice of tourism destinations by tourists to travel.

This research states the sign system as a means between signifier (forms) can be interpreted as a signified (concept / meaning) by the reader. The first level of the system is frame interpretation of signs (semantic level) which includes the meaning of signs at the airport, hotel, restaurant, bar / cafe, travel agency, tourist information, tourist attractions, attractions tourism, transportation, gift shops, money changers, motorcycle rentals, and surfboard rentals. The second level is facility for creating tourism signs syntactically (paradigmatic-syntagmatic level) which include linkages of signs with other signs, and the third is sign norms tourism signs (pragmatics) related to the effects of tourism signs for interpreters (tourists). The following model explains category of tourism sign system.

TABLE II
CATEGORY OF TOURISM SIGN SYSTEM

Sign System Level	Frame of Interpretation	Facility	Norm
Semantics	Medium: Interpretation of meaning	Relation: paradigmatic-syntagmatic Relation between signs	Effect: Usage and Effect of the signs

Syntaxtics	Modals: Creation of signs	Relations between creation of signs	Effect of creating sign
Pragmatics	Rules: Rules of creating signs	Regulation between signs	Effect of sign rules

C. *Practice of tourism signs*

Tourists are interpreters of tourism signs to construct travel experiences. Research on how tourists construct travel experiences is also carried out. This research states that tourism signs are produced by the manufacturer and reproduced by tourists to get an impression and experience. The practice of production and reproduction of signs can be analogous to the concept of consumption. Signs in tourism activities are not only seen as a frozen sign. This can be characterized by consumption behavior that is not only related to economic exchange. How to see, do tours, and how to look at things direct the emergence of the concept of consumption. Consumption of signs can be analyzed through the quality of signs.

This research proposes three practice categories of signs in tourism. Firstly, communication of signs (qualisign), namely the relationship of signs with rules, conventions or tourism codes. Secondly, the practice of the power of signs namely the practice of domination (sinsign) signs in the form connotations and denotations and accepted by tourists. Thirdly, sanctions for tourism signs (legisign), namely the practice of conventions or agreements on signs of tourism. The following model explains category of tourism sign practice.

TABLE III
CATEGORY OF TOURISM SIGN PRACTICE

Practice of Sign Elements	Communication acts	Power	Sanction
Qualisign	Acts of creating and interpreting signs	Practice of sign domination	Effect of sign legitimation
Sinsign	Acts of connecting between signs	Practice of sign domination connected to other signs	Effect of legitimation among signs
Legisign	Acts of connecting signs to convention or codes	Practice of signs domination connected to convention or codes	Effect of legitimation connected to convention or codes

IV. CONCLUSION

Based on the results, it can be concluded as follows:1) the structure of tourism signs includes (1) tourism icon (qualisign) as a sign (signifier), (2) tourism index (sinsign) as a sign of dominance, and (3) tourism symbol (legisign) as tourism sign with rules, conventions, or tourism code;2) tourism signs system includes (1) frame of interpretation (semantics) as a sign (meaning / concept) of tourism, (2) facility of sign (syntactic) as a relation of signs both paradigmatic and syntagmatic, and (3) norms a sign (pragmatic) as an effect of a sign interpreted by a traveler;3) the practice of tourism signs includes (1) communication of signs (qualisign), namely the relationship of signs to rules, conventions or tourism codes, (2) the practice of the power of signs which are domination practices (sinsign) signs in the form of connotations and denotation and acceptance by tourists, (3) sanctions for tourism signs (legisign), namely the practice of conventions or agreement on signs of tourism

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Small Scale 2 Stroke Engine of Electric Generator with Flexible Fuel Biogas or Gasoline

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Abstract—Treatment of organic waste through an anaerobic digester process is well known in Indonesia. Through this process organic waste is processed in an airtight chamber with useful side product of biogas and slurry which can be used for fertilizer. Organic waste is usually generated by livestock and farming which are located in mountainous or inland areas that are not reached by the State Electricity Company (PLN) electricity grid. For this reason, it is necessary to develop a small and lightweight generator engine so as to facilitate transportation to these remote areas. Besides the small size of the machine will be able to reduce manufacturing costs so that prices can be affordable and easy maintenance techniques. The 2 Stroke generator engine fueled with biogas can still be operated with gasoline to anticipate if the biogas runs out or is still in the process of making it in a digester. Flexible 2-stroke generator engine of biogas or gasoline with 750 watt capacity has been successfully created at the University of Udayana and furthermore the biogas flexible 2-stroke electric fuel generator engine is ready to proceed through the downstream process so it is ready to enter the market.

Keywords— electric generator, flexible fuel, biogas, gasoline, small scale, 2-stroke engine,

I. INTRODUCTION

Three major challenges addresses to biogas as a fuel; disposal of biological waste, a renewable source of energy, and harnessing methane as a greenhouse gas emanating from decomposing biomass [1]. Compared to other biofuels like alcohols and biodiesel, the production of biogas requires less processing effort and cost [2].

The generation of biogas for electricity production contributes to increase the energy consumption produced from renewable resources and for reduction of greenhouse gas emissions. The production of biogas can also reduce the environmental impact and the emission of methane because biogas fuel can be produced from the decomposition of organic waste deposited in biodegradable matters, waste from agricultural, rubbish dumps, industrial and extractive activity, urban waste and other extractive activity [3].

The following technologies can be employed for the conversion of biogas in to electricity: dual-fuel engine, stirling engine, gas turbine, micro gas turbine, high or low temperature fuel cells, combination of a high temperature fuel cell with a gas turbine, spark-ignition engine. Commonly, four-stroke spark-ignition biogas engines were originally developed for natural gas. Then, they were adapted to the special features of biogas. A power unit of an internal combustion engine is the preferred solution for biogas fuel; in fact, in Europe, 50% are spark-ignition engine, about 50% are dual-fuel engines while micro gas turbines and fuel cells are seldom to be found [3].

Alternative method is the homogeneous charged compression ignition (HCCI) mode. A homogeneous mixture of

biogas and air is inducted and compressed by the piston until its auto-ignites. This concept combines the benefits of spark ignition (SI) and CI engines, the onset of combustion cannot be controlled directly [4].

Method to convert 4 stroke gasoline engine of general small size electric generator was introduced and widely applied [5]. The biogas should be desulfurized prior to be used as a fuel of internal combustion engine [6,7]). Desulfurization will make biogas free from H_2S to avoid lubricant of engine become acidic [8] and corroded the engine part.

In the 2 stroke spark ignition (SI) engine, power is produced once during 2 strokes of the piston, has ports which makes it's design Simpler, completes 1 rotation of crankshaft after completing one cycle. Addition of lubricant in the fuel is required for 2 stroke SI engine, A bump or protuberance is be needed on top side of piston, Air-fuel-lubricant mixture enters through inlet port & travels to combustion chamber passing through crankcase [9]. Two stroke engines noise are louder comparatively to 4 stroke engine.

Biogas can be used as a fuel to run 2 stroke SI engine by adding mixer of biogas, air, and lubricant together with carburetor so that the engine still can keep using gasoline if necessary. The compression pressure should be set in other can be operate both by using gasoline or biogas. In this research the effect ratio of CH_4 and CO_2 in the biogas to fuel consumption of 2 stroke single cylinder (63 cc) engine of 750 watt electric generator was investigated.

II. METHODS AND PROCEDURES

The engine type is 2 stroke single cylinders (63 cc) with air-cooling. The compression pressure was set to reach 1000 KPa in order can be operated both with biogas or gasoline. The rated current is 2.9 Ampere, voltage result: 220V/50Hz/1Ph, Output is 750 Watt. Addition component of biogas-lubricant-air mixer was added in to the carburetor to facilitate the use of biogas as a fuel as can be seen in Fig. 1. The engine is still can be orated fully by using gasoline by arrangement as can be seen at Fig. 2.

Fig. 1. Familiar 2 stroke single cylinder (63 cc) engine of 750 watt electric generator. This small electric generator was set to be fuelled with biogas.

If the electric generator in Fig. 1 will be operated with biogas as a fuel, the valve no.4 in Fig. 2 should be closed and the valve no 1, 2 and 3 should be opened and arranged. The biogas, lubricant, air will be mixed in the mixer chamber (5). When the biogas is not available in the plant, the electric generator is still can be operated by using gasoline as a fuel by fully open the valve no. 1 and close valve no.2 and 3. The valve no. 4 then is opened to let the mixture of gasoline and lubricant entering the carburetor (6).

The biogas was prepared from batch system of anaerobic digester. About 500 liter slurry of cow dung (50% cow dung + 50% water) was put inside anaerobic digester with batch system. The daily biogas production was collected in the 200 liter bag capacity. In total it was obtained about 17 bags until the end of batch system operation. Since this is a batch system the composition of the biogas are different from each bag. The moisture and H_2S content in the biogas then were removed after that biogas composition is measured. From the result of biogas composition measurement, the ratio of CH_4 and CO_2 from each biogas bag is calculated. The biogas then is used to fuel the electric generator and finally fuel consumption of each different CH_4 and CO_2 ration of biogas is obtained. The result is presented in table and graph for easy analyses.
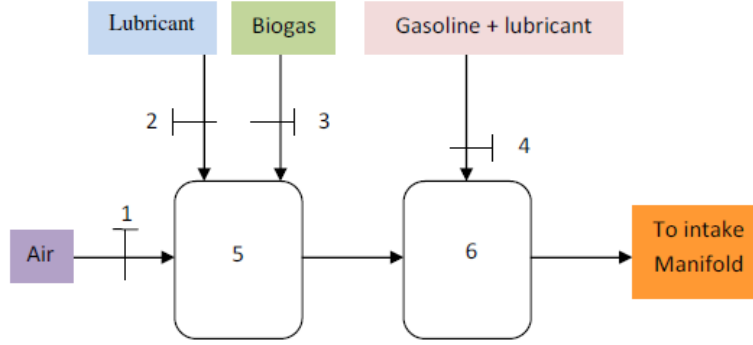
Fig. 2. Schematic arrangement of biogas-lubricant-air mixer in series with original carburettor 1. Control valve of air, 2.Control valve of lubricant, 3. Control valve of biogas, 4. Control valve of gasoline + lubricant, 5. Mixer chamber of biogas-lubricant-air mixture, 6. Carburettor.

III. RESULTS

The effect of CH_4 and CO_2 ratio in the biogas to the fuel consumption of 2 stroke single cylinder (63 cc) engine of 750 watt electric generator is presented in Table 1. It is found that the biogas fuel consumptions are high and fluctuate in the range of CH_4 and CO_2 ratio of 1.095-1.295. This high consumption rate is due to carbon dioxide reduces heating value and energy density of biogas on volume basis and waste the pipeline capacity. The presence of CO_2 results in reduced flammability range and flame velocity compared to pure methane. Biogas resists knocking in SI engines by virtue of its high-self-ignition temperature [10]. The fluctuation is caused by high different in density between CH_4 (0.656 kg/m^2) and CO_2 (1.980 kg/m^2). The high range different of density make the gases are difficult to be mixed homogenously.

TABLE 1. THE EFFECT OF CH_4 AND CO_2 RATIO IN THE BIOGAS TO BIOGAS CONSUMPTION OF 2 STROKE SINGLE CYLINDER (63 CC) ENGINE OF 750 WATT ELECTRIC GENERATOR

Biogas Sample	Biogas Composition			Biogas consumption (liter/minute)
	CH_4 (% vol)	CO_2 (% vol.)	CH_4:CO_2	
1	31	25	1.095	22.8
2	44	34	1.240	58.3
3	46	42	1.294	35.1
4	52	34	1.302	15.4
5	67	30	1.400	14.1
6	66	25	1.405	12.5
7	66	40	1.410	16.0
8	56	43	1.425	16.3
9	56	40	1.529	12.1
10	55	34	1.618	11.4
11	55	39	1.650	12.3
12	57	40	1.667	9.1
13	59	42	1.771	9.8
14	55	33	1.800	9.3
15	59	30	1.939	9.4
16	62	35	1.967	9.1
17	63	35	2.233	10.9
18	64	33	2.640	10.1

The biogas consumption then decrease moderately in the range of CH_4 and CO_2 ratio 1.302 - 1.650 with just small fluctuation to occur. The optimum decrease in biogas consumption are in the range of 1.667 - 1.967 with the biogas consumption in the range of 9.1-9.8 liter/minute. This is due to performance analysis of SI engine using biogas showed a significant improvement in performance by reducing CO_2 [10].

If the CH_4 and CO_2 ration increase in the range 2.33 - 2.640, the full consumption are found increase a little bit and reach range of 10.1-10.9 liter/minute. These are due to the engine speed increase and reach maximum upper limit speed to obtain maximum voltage that is required (220 volt). The governor of the engine then needs to be adjusted.

It is suggested to increasing performance of this system can be improved in the future by involving the integration of concentrated photovoltaic, biomass and hydrogen energy resources for rural sustainable electrification

is known as Bio-CPV. This cleaner and efficient power generation technique is capable of electrifying a village with least economic investment. The biogas generator with the addition of hydrogen possesses the constant output with high efficiency, regardless of fluctuating photovoltaic power [11].

IV. CONCLUSION

The CO_2 in the biogas is no need to be removed entirely for the fuel of 2 stroke single cylinder (63 cc) engine of 750 watt electric generator since the cost to purify biogas from CO_2 is about costly. The ratio of CH_4 and CO_2 in the biogas in the range of range of 1.667 - 1.967 will yield optimum efficiency that reach biogas consumption in the range of 9.1-9.8 liter/minute.

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Contact Width and Contact Stress Evaluation of Three-Layer Metal Gasket

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Abstract—Contact width, contact stress, and surface roughness are important parameters related to the leakage behavior of corrugated metal gasket. In this study the material layer's effect, the thickness of the surface layer (0.1mm, 0.2mm, 0.3mm) were investigated to determine contact width, contact stress, force per unit length of three-layer corrugated metal gasket 0-MPa mode on flange surface roughness 3.5 µm. Contact width and contact stress were determined through finite element analysis. The force per unit length was obtained by the product of the contact width and the average contact stress. The force per unit length used to evaluate the gasket performance. The simulation result compared with gasket single layer (SUS304) and indicated that gasket with material layer Cu, 0.1 mm thickness layer has the highest force per unit length and therefore this gasket is better than the others

Keywords— Contact width, contact stress, force per unit length, surface roughness, layer, metal gasket, corrugated.

I. INTRODUCTION

Saeed et al. [1] proposed a super seal gasket, a new metal gasket that incorporates strategically placed circumferential annular lips. The lips, owing to the spring effect of the metal, from seal line with flanges. The result justifies the selection of contact area with a reasonable evaluation creation as a design parameter to optimize 25A metal gasket for leakage performance but the limit size of contact area as a design parameter in that study was not defined yet. Haruyama et al. [2] investigated the limit size of contact width as a 25A size metal gasket design parameter. The quantitative evaluation of the helium leak rate and contact width of the gasket which has no leak by the water pressure test had been clarified. Hence, the contact width can be used as the main parameter to optimize the gasket design. The leakage can be reduced by increasing the contact width. C.Y. Lee et al. [3] used pressure-sensitive paper to measure the contact width and pressure profile of the lip seal due to its accuracy, speed, and economic cost.

Choiron et al. [4] studied a validity method using pressure-sensitive paper for gasket contact width and shown the similar trend data between experiment and simulation. Nurhadiyanto et al. [5] optimized the gasket based on elastic contact stress (0-MPa mode) and plastic contact stress (400-MPa mode) considering forming effect. The research found that gasket 400- MPa mode design was better than gasket 0-MPa mode based on the helium leak test. The Helium leak test showed that gasket 0-MPa mode was not leaked on the 100KN axial force while the gasket 400-MPa mode was not leaked on the 80KN axial force. Haruyama et al. [6] developed a gasket model that includes the flange surface roughness effect. The contact width, contact stress, and force per unit length for a gasket in contact with a flange having different surface roughness levels were obtained through the simulation. The leakage performance improved with an increase in the contact width and contact stress. The slope of the force per unit length increased with a decrease in the surface roughness level. The slope of the force per unit length for a gasket in 400-

MPa mode was higher than that for one in 0-MPa mode. Furthermore, the helium leakage test result suggests that gasket in 400-MPa mode superior to that in 0-MPa mode. Haruyama et al. [7] studied the real measurement result of contact width, area when the surface roughness is considered and local contact stress has been examined through numerical analysis and the distribution of contact stress has been clarified. Then the gap between the result of the contact area measurement through surface observation and the result of numerical analysis is proved to be small. Nurhadiyanto et al. [8] studied the real contact stress and contact width when leakage started on the 25A-size metal gasket. The result justified that the real contact width and average contact stress when the leakage started to occur were 0.195 mm and 800MPa, respectively. All previous studies mentioned above using a single material, namely SUS304. The single material gasket can only form a macro seal due to the surface finish of the flanges and because that would reduce the ability to seal gaskets. From the previous study [6], it is also known that gasket single layer 0-MPa mode for flange surface roughness 3.5 μm still leakage because of low contact width. Further development is necessary to improve gasket sealing performance. One way is by providing upper and lower layers with the soft material to enlarge the contact width, therefore, it will cover the surface roughness flange. Karohika et.al [9 – 12] studied the parameters that affect the process of forming metal gaskets, the type of die affects the product, the defects that occur in the process of forming and its sealing performance. Haruyama et.al [11] proposed a three-layer corrugated metal gasket with SUS304 as base metal and the surface layer (Al, Cu, Ni) using gasket dimension from previous research [5].

In this research aims to investigate the effect of material layer (Al, Cu) and thickness of the surface layer (0.1mm, 0.2mm, 0.3mm) to determine contact width, contact stress and force per unit length of 25-A size three-layer corrugated metal gasket 0-MPa mode on flange real surface roughness 3.5 μm. Contact width and contact stress were obtained by simulation. The force per unit length was obtained by the product of the contact width and the average contact stress.

II. MATERIAL AND METHOD

Fig. 1 shows a corrugated metal gasket which is to be inserted between flanges and axisymmetric models of the three-layer corrugated metal gasket. The gasket dimension used is gasket 0-MPa mode with detailed information of this gasket on [5]. Three layers of sheet metal assumed to be fully bound; consequently, the delamination interface is beyond the scope of this paper.

Contact width = a+b+c+d
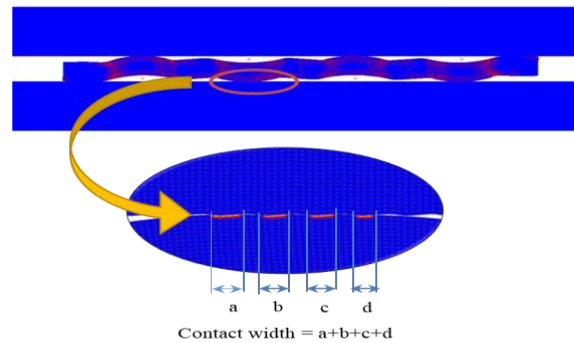
Fig.1 Schematic section of gasket-flange and axisymmetric model gasket

In this study, a gasket is divided into two processes by using forming and tightening simulation. The gasket was modeled as deformable bodies and then the deformation mode was investigated using finite element method analysis software. First, using two-dimensional assumptions, an axis-symmetric model was adopted for the forming process simulation in the axial direction between the upper and lower dies. Second, the gasket shape produced by mold press then compressed in the axial direction between the upper and lower flanges to simulate the relationship between the axial force, average contact stress contact width, and force per unit length. The upper and lower dies are assumed to be rigid bodies. The upper and lower flanges materials are SUS304 and assume as deformable bodies.

The flange surface roughness measurement based on the JISB0601-2001 standard [14]. A Handysurf E-35B was used to measure the surface roughness. The equipment calibrated first, to avoid experimental error due to the surface roughness. Using this device, all functions automatically set the ideal values for the measurement range, evaluation length, the cut-off value, and recording magnification according to the measurement conditions. This

setup allows the conditions of measurement, parameter values and data of the profile curve to be directly transmitted to a personal computer.The data processing transformed into Microsoft Excel software. The output result contains the average surface roughness Ra, maximum surface roughness Rz, and another parameter. Furthermore, the output result can be obtained in the form of a roughness curve.

In this study, we analyze a flange having surface roughness values 3.5μm. According to the explanation above, the surface roughness was modeled as a real rough surface. The real surface roughness of the flange was measured using a Handysurf E-35B. Through the surface roughness measurements, we obtained the average roughness (Ra) and the mean spacing of profile irregularities (RSM). Then, both Ra and RSM were used to model the surface roughness of the flange. The average roughness describes height asperities and RSM describes the wavelength of the surface roughness.

III. RESULT AND DISCUSSION

The average contact stress and contact width evaluation were performed only for the convex portion of the gasket, which is effective at reducing the leakage. Based on [6] the lower and upper contact represented by convex 2 and 3 because it has a higher contact width than those for convex 1 and 4.

(a) (b)
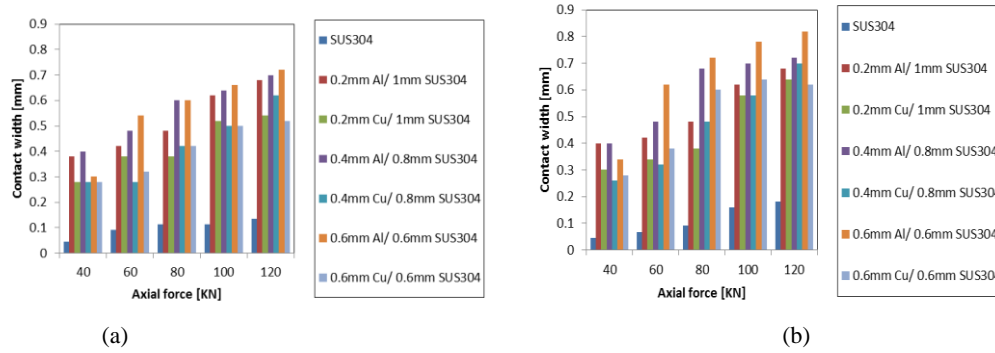
Fig.2 The contact width versus axial force for upper contact (a) and for lower contact (b)

Fig.2 shows the simulation result for upper and lower contact width at 40-120KN axial force. The figures show that the gasket three-layer has a higher contact width than single layer SUS304. The contact width increases with the axial force. The gasket three-layer with the Al surface layer has the highest contact width.

Fig.3 shows the simulation result for upper and lower average contact stress at 40-120KN axial force. The figures show that gasket single layer has the highest average contact stress at any axial force. The average contact stress increase for a certain axial force and then decrease until axial force 120KN.

The simulation result in upper and lower contact for force per unit length is shown in Fig.4. The figures show all gasket three-layers have a higher value than single layer SUS304 for both upper and lower contact. The gasket three-layer 0-MPa mode with material layer Cu, 0.2 mm thickness of the surface layer has the highest value of force per unit length; therefore this gasket will give better sealing performance than a single layer SUS304.

(a) (b)
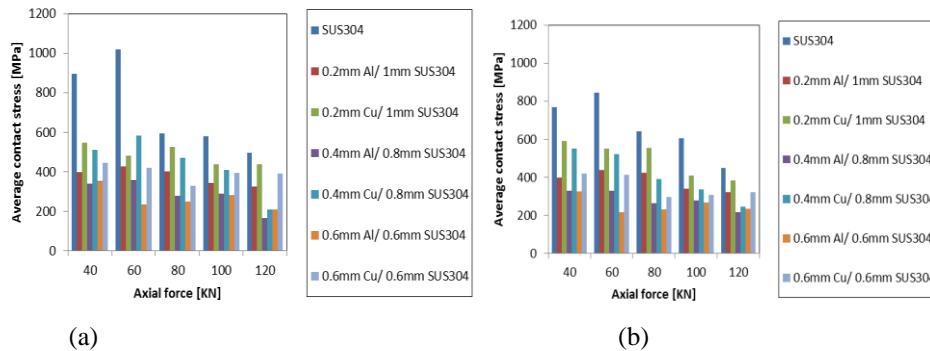
Fig.3 The average contact stress – an axial force for upper contact (a) and lower contact (b)

IV. CONCLUSION

This paper investigated the surface layer material and thickness of the surface layer affecting the contact width, contact stress, and force per unit length of the three-layer corrugated metal gasket. Based on the simulation result, we could conclude that:

1. The contact width for gasket three-layer 0-MPa mode 0.6mm Al is higher than the others. Gasket single layer SUS304 has the highest average contact stress for 40-120KN axial force
2. The finite element analysis predictions provide a helpful reference for the design of three-layer corrugated metal gasket, but experimentation to verify them is recommended.

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The Effect Of High Performance Work System On Employee Creativity And Organization Performance In Micro, Small And Medium Enterprises (MSMES) In Tabanan District

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Abstract—The research objectives are: (i) analyzing the effect of High Performance Work System (HPWS) on UMKM Employee Creativity, (ii) analyzing the effect of High Performance Work System (HPWS) on UMKM Organizational Performance, (iii) analyzing the effect of Employee Creativity on UMKM Organizational Performance, and (iv) analyze the effect of the High Performance Work System (HPWS) on Organizational Performance through the Creativity of UMKM Employees. The method used in this research is descriptive by using SEM PLS analysis. The sample in this study were 100 MSMEs. The results showed that: (i) high performance work systems have a positive and significant effect on employee creativity, (ii) high performance work systems have positive and significant effects on organizational performance, (iii) employee creativity has positive and significant effects on organizational performance, and (iv) employee creativity has a significant role as a mediator between the relationship between high performance work systems and organizational performance. The implication of the results of the study is, To improve organizational performance, the high performance work system and employee creativity must be improved. Increased high performance work systems and employee creativity are expected to improve the organization's MSME performance in Tabanan Regency.

Keywords— Employee creativity, high performance work system, organization performance

I. INTRODUCTION

A number of developing countries recognize the importance of SMEs in driving economic growth in a country [6] [9]. Economic growth is due to the role of SMEs in providing employment opportunities, and to more evenly distribute income levels [11]. However, in the development of SMEs, there are still a number of obstacles and challenges, including in improving the competence of human resources (HR).

Some MSME problems in Tabanan Regency are; lack of capital, limited raw materials, lack of technical production and expertise, difficulties in product marketing, lack of managerial skills, lack of financial management knowledge, and a less conducive business climate. To minimize these limitations, then in the development of human resources, high performance systems (HPWS) and employee creativity (Employee Creativity) are needed to be able to improve organizational performance (Organizational performance).

Stated that creativity is very important and is needed so that organizations can live sustainably and Organizational performance is influenced by employee creativity [8] [12]. State that high performance work systems (HPWS) have a significant influence on organizational performance [2][4]. This implies that the better the HPWS in an organization, the organizational performance will increase. Thus, a study on "The Effect of High

Performance Work System on Employee Creativity and Organizational Performance on Micro and Small and Medium Enterprises (MSMEs).

II. METHODS AND PROCEDURES

Questionnaire, a data collection technique that is carried out by giving structured questions to the research respondents regarding their responses to the various variables studied. Interview, data collection techniques conducted by conducting in-depth question and answer to research respondents to obtain more accurate and complete data because it involves further explanation of the questionnaire that has been distributed. Observation, direct observation of the research object so that it understands the conditions and implementation of variable characteristics.\

Definition of Operational Variables : 1) High Performance Work System (X) : Selection (X1), Training (X2), Performance evaluation (X3), Job description (X4), Career planning (X5), Employee participation (X6), Compensation (X7); 2). Employee Creativity (Y1) : The Role of Ambiguity (Y1.1), Role of conflict (Y1.2), Self-reliance (Y1.3), Job satisfaction (Y1.4), Creativity (Y1.5); 3). Organization Performance (Y2) : Growth (Y2.1), Provitability (Y2.2), Customer satisfaction (Y2.3), Employee satisfaction (Y2.4), Social performance (Y2.5), Environmental performance (Y2.6)

Data analysis method : Descriptive analysis functions to describe or give a picture of the object under study through sample data or population as it is, without conducting analysis and making conclusions that are generally accepted (Hair et al, 2010). Descriptive analysis is intended to determine the characteristics and responses of respondents to the question items on the questionnaire. The data analysis method chosen to answer the purpose of this study is the SEM PLS (Structural Equation Model-Partial Least Square) method.

III. RESEARCH RESULTS AND DISCUSSION
A. Description of the variable high performance work system (HPWS)
Respondents' perceptions of HPWS variables were considered quite good with an average score of 2.51. Of the 7 (seven) indicators, all of them scored quite well. Indicators of UMKM employees always participate in various activities carried out by UMKM which have the highest value of 2.67, while the career planning indicator (promotion) of an UMKM employee refers to the performance appraisal that is carried out regularly having the lowest value of 2.34
B. Description of employee creativity variables
Respondents' perceptions of employee creativity variables are considered quite good with an average score of 2.51. Of the 5 (five) indicators, 4 (four) indicators are considered quite good and 1 (one) indicator is considered not good, that is, the indicator for each MSME employee certainly has no role conflict in the organization. Indicators of each UMKM employee are given the opportunity to demonstrate their ability to have the highest value of 2.73, while the indicator of each UMKM employee is certainly not to have a role conflict in the organization having the lowest value of 2.33
C. Description of the organization performance variable
Respondents' perceptions of the organization performance variable were considered quite good with an average score of 2.48. Of the 6 (six) indicators, all were considered quite good. Indicators in the last 5 (five) years of customer satisfaction over MSME products always have the highest value with a value of 2.73, while indicators in the last 5 (five) years of MSME sales have always increased and in the last 5 (five) years of MSME employees always do pem activities
D. Evaluate the outer model or measurement model
Q-square value <0 indicates that the model lacks predictive relevance. Based on the calculation, 99.63 percent of the Organization Performance variable is explained by the variable high performance work system and employee creativity, while the remaining 0.37 percent is explained by variables not included in the model.
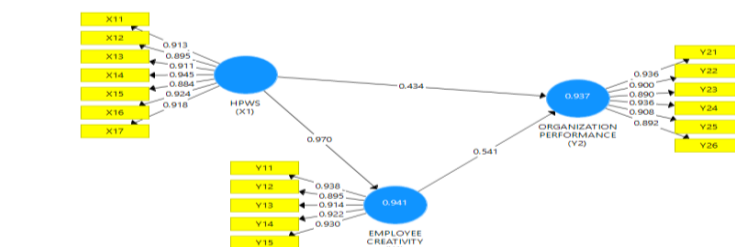
Fig 1. Hypothesis Test Path Results Chart

E. Effects of high performance work systems on employee creativity

Referring to the results of hypothesis testing it is proven that the variable high performance work system has a positive and significant effect on the variable of employee creativity. The results of this study are in line with research conducted by: [3], [13] and [5], stated that the High Performance Work System had a positive and significant effect on employee creativity. Stated that the High Performance Work System had a significant positive effect on employee creativity [10].

F. Effects of high performance work systems on organizational performance

Referring to the results of hypothesis testing it is proven that the variable high performance work system has a positive and significant effect on the variable organizational performance. The results of this study are in line with research conducted by: [7], [5], stating that high performance work systems have a positive effect significant on organizational performance. High performance work system had a significant positive effect on organizational performance [4] nad [14].

G. Effect of employee creativity on organizational performance

Referring to the results of hypothesis testing it is proven that the variable employee creativity has a positive and significant influence on the variable organizational performance. The results of this study are in line with research conducted by: [12] [8] stated that employee creativity has a significant positive effect on organizational performance. While [15] and [16] stated that employee creativity had a significant positive effect on organizational performance.

H. The indirect effect of high performance work systems on organizational performance through employee creativity

The test results prove that the variable high performance work system has a positive and significant effect on organizational performance through employee creativity. The results of this study are in line with research conducted by: [1] and [12] states the High Performance Work System (HPWS) has a significant positive effect on Organizational Performance through Employee Creativity. Whereas [4] High Performance Work System (HPWS) had a not significant positive effect on Organizational Performance through Employee Creativity.

IV. CONCLUSIONS

Based on the purpose of the study, the formulation of the problem, the results of the research and the discussion that has been presented, the following conclusions can be drawn:

1. High performance work systems have a positive and significant effect on employee creativity. This means that the better the high performance work system, the MSME employee creativity in Tabanan Regency also increases.
2. High performance work systems have a positive and significant effect on organizational performance. This means that the better the high performance work system, the higher the performance of MSMEs in the Tabanan Regency.
3. Employee creativity has a positive and significant effect on organizational performance. This means that the better employee creativity the organization performance of MSMEs in Tabanan Regency increases.
4. Employee creativity has a significant role as a mediator of the relationship between high performance work systems and organization performance. This means that the better the high performance work system will improve the employee creativity and organizational performance of MSMEs in Tabanan Regency.
5. To improve organizational performance, the high performance work system and employee creativity must be improved. Increased high performance work systems and employee creativity are expected to improve the organization's MSME performance in Tabanan Regency.

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The Influence Of Tourism And Individual Culture On Attitudes And Community Empowerment In The Development Of Tourism In Nusa Penida, Klungkung Regency

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Abstract—*The development of tourism in the Nusa Penida Region, has had an impact on increasing tourist visits to Nusa Penida. The host, which used to be a community that has a livelihood as a fisherman, is now dominantly engaged in the tourism sector. Efforts to empower the poor to increase empowerment through sectoral and regional programs are less effective because lack monitoring and are not sustainable. Poverty cannot only be analyzed by an economic approach but a behavioral approach that is strongly influenced by the powerlessness of the community from social and cultural aspects. This study is an explanatory study using the survey method for poor households in Nusa Penida. The results of the study indicate that tourism is the most powerful factor determining the formation of attitudes to escape poverty compared to culture. The attitude of the community as mediation is important to determine that tourism is an opportunity to get out of poverty. Intention to progress and take risk sharing from a job into an entrepreneurial attitude that grows strong in the community. The findings of tourism research and attitudes have become important roles in empowering communities out of poverty. The Nusa Penida community has shown that 82% switch livelihoods in the tourism sector, especially tourist drivers. Limited sample research in coastal villages, which has the consequence of generalizing the results of the study, it is important to expand the sample to all villages in Nusa Penida.*

Keywords—attitude, empowerment, individual culture, tourism

I. INTRODUCTION

Inequality of income among the people residing in tourism areas is inseparable from the issue of proverty. Arsyad (2004) stated that developing countries were experiencing significant economic growth in the 1960s but they did not contribute with equal significance to the alleviation of proverty. Inequality occurs when the community is lack in good human resources, when the individuals comprising the community embrace unproductive culture, and when there is only a dim prospect for business. In such condition, urbanization of people from countrysides to cities will take place, and this, in turn, will result in the increasing percentage of slum areas, crimes, poverty, and unemployment. Tourism development and economic growth are interrelated in alleviating poverty (Bryden, 1973). Poverty is not independent of all other things but comes from the interaction between various aspects—especially culture and economy—existing in an individual. Efforts that have been made to empower the poor by improving their capacity through sectoral program are still lacking in their effectiveness and tend to miss the right target community because such program is carried out partially. Poverty cannot be analyzed by economic approach alone, but it should also be seen from the aspect of community behaviour influenced by the environment and the feeling of helplessness (Suartha, 2013:3). One

of the sectors with high sustainability potential is tourism (Ashley, *et al,*2001). It is beneficial for economic growth, especially in improving the economy of poor households through empowerment (Suardana, *et al*, 2016.

The residents of Nusa Penida in 2018 reached 47,448 people, with 86.7% of them make a living as divers, homestay and hotel managers, restaurant and eatery managers, or by offering transportation services. This number experienced an average growth of 60% from that in 2015 when people mainly worked as seaweed farmers. That year, Nusa Penida was the most poor area in Klungkung, but it is not anymore now. The growth of tourism sector has finally reached Nusa Penida Visits to Nusa Penida in 2017 reached 293,364 which increased 10.23% from the previous year with an average increase during five years amounted to 19.11%; and the average increase in foreign tourists visiting Nusa Penida for the last 5 years is higher than that of tourists visiting Bali Island for the same period. Poverty in this district is not only caused by those natural factors but also by mental and cultural attitudes. Local culture-based empowerment programs have been conducted by the government in its effort to alleviate poverty in the area, and sustainable livelihood approach is implemented on farmers. People utilize this condition as an opportunity to develop tourism. Barren and unproductive areas are turned into exotic tourism spot by ornamenting the areas with beautiful corals. It turns out that this condition presents an excellent chance of empowerment in the community so that it can contribute positively to the increase of their economy. Based on this, the problem of this research is set to investigate how tourism influences the changing in attitude and community empowerment in the tourist area of Nusa Penida.

II.   THEORETICAL CONSIDERATION

The research on tourism and poverty in macroeconomic perspectives had been carried out by numerous experts Ashley *et al*, 2001; Eyben *et al* (2008). The findings from Anwar (2012) indicated that tourism: (1) has significant impact on improving the economy of the poor in Bangladesh, (2) is able to maintain the social value of local culture from foreign influences, and (3) is able to raise community income and welfare. Critical analysis on the role of tourism in reducing poverty in Bangladesh showed that: (1) The dynamics of tourism with excessive and uncontrolled use of land and other natural resources resulted in rocketing price of land and other commodity prices, (2) utilization of strategic land owned hereditarily by the locals and bought by investors at cheap price, caused the poor people to lose their land and be driven out of their birthplace. In addition, Karim et al (2012) found that tourism industry has become one of global industries that is monopolized by developed countries and has penetrated nearly all of the developing ones. In behavioral perspective, studies were conducted by Suartha, 2015;; Sen, 1998. Wood's (2005) found that sustainable *pro poor tourism* development in Peru provided the most effective role in regional planning participation. Scheyvens and Momsen (2008) stated that almost all countries in small archipelago depended on tourism as a source of income for the development of their country.

III.   METHOD AND PROCEDURES

This research is quantitative in nature. Quantitative research paradigms can be divided into two: descriptive quantitative research and explanatory quantitative research. The current research uses explanatory quantitative paradigm based on hypotheses. The research samples were taken at villages that had poor households and the tourism in the area is flourishing. Based on the criteria, the villages selected as sampling areaswere Ped Village, Sakti village, Bunga Mekar illage, Suana Village, Batununggul Village, Toyapakeh Village, and Kutampi Village. There were 250 samples taken, distributed in each target village. Of each village,as many as 50 target families were selected as samples. The data was then analyzed using Partial Least Square (PLS).

IV.   RESULT AND DISCUSSION

Based on analysis with SEM modeling using Partial Least Square (PLS), the data must fulfill the outer model requirement by measuring convergent validity, discriminant validity, and average variance extraracted (AVE) and composite reliability. Based on PLS data processing, the outer model has fulfilled the convergent validity criteria, in which all indicators show loading factor above 0.50. Prior to discussing the significance of direct influence of each of the exogenous variables on endogenous variables in the research model, validity of model needs to be discussed first. There are three criteria in using techniques of data analysis with *Smart PLS* to measure the *outer model*, and these criteria are *convergent validity*, *discriminant validity*, and *average variance extracted (AVE)* and *composite reliability*. *Convergent validity* refers tothe proportion of loading factor for each of the construct. The results of data processing indicate that the outer model value has fulfilled the convergent validity criteria with loading factor above 0.50. In evaluating measurement of construct reliability, composite reliability value, that determines internal consistency with value set to be above 0.60 and compares AVE root with correlation between constructs with the value set to be above 0.50. The results of inner model testing can determine the relationship among constructs by comparing the significance

value and R-square of the research model. The value of R- square attitude variable of 67% variability of attitude construct is explained by tourism and individual culture, while 33% of community attitude is explained by variables outside the model. The attitude of society in breaking free from poverty might be influenced by household capacity or the size of assets owned. However, those factors are not featured in this study. Similarly, empowerment variable has R-square of 71% which means that 71% variability of community empowerment is caused by tourism, individual culture and attitudes to end their cycles of poverty. Meanwhile, 29% is caused by variables outside the model. Hypothesis testing ofpathcoefficient or influence of tourism on attitudes, individual cultures on attitudes, and attitudes towards empowerment is presented in Table 1.

TABEL 1.
RESULT FOR INNER LOADINGS

	Original Sample (O)	Sample Mean (M)	Stdr Dev.	T Statistics (|O/STERR|)	P Values
Tourism->Attitude	0,636	0,609	0,100	6,387	0,000
Tourism -> Empowerment	0,292	0,277	0,103	2,833	0,005
Individual Culture ->Attitude	0,286	0,320	0,105	2,736	0,006
Individual Culture -> Empowerment	0,073	0,071	0,079	0,928	0,354
Attitude ->Empowerment	0,550	0,567	0,119	4,637	0,000

Source: Data Processing, 2019.

A. The Influence of Tourism Development on Community Attitude

The results showed that the effect of tourism on community attitudes showed coefficient of 0.636, with t-statistic value of 6.387. T-statistic value is greater than the t-table value of 2.201, which indicates that there is a significant positive influence between the variable of tourism development and the community attitude. This suggests that the better the tourism development in Nusa Penida is, the stronger the community's attitude towards freeing themselves from poverty and working in tourism sector becomes. It is also strengthened by the opinion of the community stating that since the development of tours at Klingking Beach, Angels Billabong and Broken Beach, tourist visits have increased sharply to the mainland of Nusa Penida. In one day, the average visit reaches 1,200 people who come just to take a selfie in those places. This provides the community opportunity to improve business in tourism services. Bunga Mekar Village, Sakti Village, Batukandik Village and Klumpu Village were once dry lands for farmers, but now 85% of the people depend their livelihood on tourism by working as tour guides, drivers, merchants, and setting up accommodation business in Broken Beach, Angels Billabong and Klingking Beach. Meanwhile in Suana, Toyapakeh, Ped, and Kutampi, 90% of the residents on these villages run their own hotels, homestays, restaurants, and transportation rentals. This desire to earn more is immensely strong within the society, and dry natural conditions become the driving factor leading them to strive for quitting the farming work.

B. The Influence of Tourism Development on Community Empowerment

The tourism development and community empowerment have positive and significant impacts on the empowerment of the community with path coefficient value of 0.292 and t-statistic value of 2.833. The t-statistic value is greater than the t-table value of 0.005, indicating that there is significant influence between tourism variable and empowerment. The path coefficient indicates that tourism has presented the community with various business opportunities, better earnings, and improved skills, all in tourism sector. The government with its empowerment programs and micro business loans supports this opportunity, so people can increase their income. Tourism has proven that people who used to work in seaweed farming have dramatically changed their livelihoods into hotel employees, villa owners, transportation service providers, snorkling and diving rentals, and many more. Assets in the form of privately owned land is turned into business or accommodation for guests. Currently there have been 256 accommodation choices in Nusa Penida. With the current competition trend, these accommodation places have an average occupancy of 80% each day with guests staying up to 3 days. This finding supports the research by Ashley *et al* (2006) and Cattarinich (2001) and Suardana (2016) stating that tourism plays a very positive role in increasing income of the poor.

C. The Influence of Culture on Community Attitude

The analysis shows that individual culture in society has a significant influence on the attitudes of the community itself. The path coefficient shows a value of 0.286 with a t-statistic value of 2.736, which is greater than 0.005. This

indicates that individual culture positively affects the attitude of society. This demonstrates that the more individuals find themselves unenthusiastic about and unwilling to progress, and choose to take resigned stance instead, the stronger is the community attitude about not wanting to free themselves from poverty. Positive individual cultures must be preserved as an internal drive that encourages people to change. The willingness to stop poverty, the desire to make progress and to be open to others is a very defining factor of individual advancement in Nusa Penida. This research also supports Sen theory (1998) arguing that poverty appears in less fortunate households living in a culture that fosters unwillingness to change.

D. *The Influence of Culture on Community Empowerment*

Individual culture shows positive and significant effect on community empowerment. The path coefficient value is 0.072 with t-statistic of 0.928, greater than 0.005. This means that individual culture of society that was believed to hinder progress in the community, such as feeling of inferiority, laziness, dependence on the help of others, has a rather insignificant influence on the formation of community empowerment according to the previous analysis. This indicates that the stronger is the individual culture of the community, the more increasingly capable and empowered it is to exploit its potential. This empowerment has also been enjoyed by the community in tourism sector. Residents of Nusa Penida are now able to acquire new skills, to get a decent life and able are to interact with others or other businesses. Measured from various self potentials, the people of Nusa Penida have now been able to plan their lives, to direct themselves and to bear responsibilities in family and in society. Entrepreneurship grows stronger and people are encouraged by the success of others.

E. *The Influence of Attitude on Community Empowerment*

The community attitude about breaking free from poverty has positive and significant impact on its empowerment with efficient regression of 0.550. This means that the strength of community attitude determines the level of empowerment received by the community. The achievement of empowerment is demonstrated by the condition of increased knowledge, improved accessibility, participation in social economic activities and the rising income. The factor that still has a lower value in this is increased knowledge. This condition is admitted by the community, saying that young people in Nusa Penida can only reach senior high school level and work training. People prefer to work than to continue their study to further studies. Beside it is caused by the fact that the area is located rather further away from city access, high school facilities are also unavailable. Currently there is only one Senior High School and one Vocational School, and there is one college of tourism.

V. CONCLUSION

Based on the description of research results and discussion, it can be concluded that tourism has positive and significant impact on the attitudes and empowerment of society. The better the tourism development is, the stronger the community attitude about breaking free from poverty is. Similarly, positive individual culture has positive and significant effect on community attitudes and empowerment. The better-established individual culture of society is, the stronger the community empowerment gets. Tourism has influenced the community to utilize their own opportunities and the environment as an entrepreneurial opportunity. The efforts of community creativity through sustainable household entrepreneship continue to be built as agent of change of the village. That can be done by developing environmentally friendly tourism products and providing excellent creativity.

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THE PROSPECT OF YOUNG GENERATION IN DEVELOPING DIGITAL CONTENT (Case Study in The Tourism Village of Badung Regency)

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Abstract - Tourism village promotion efforts that have been claimed by the Badung Regency government are intensively, both through print media and electronic media. Some tourist villages scattered in Badung Regency show an encouraging impact on the visit, but there are also tourist villages that are stagnant. Today, tourists do not only expect fast information, but also expect information to be packaged in an interesting travel experience. Young people are pioneers in creating new trends and they understand how to connect with others online in sharing information. This young generation can make trends, provide comments, and even create content that attracts potential tourists. They also play a role as contributors to tourism content, with the use of hashtags, information is more easily found by potential tourists. The tourists are attracted by the content by presenting a mixture of videos and sounds that contain stories, animations, and socio-cultural attractions of the local community that is packed into virtual reality.

Keywords— digital content, tourism village, virtual reality, young generation.

I. INTRODUCTION

The Information content is very important for the credibility of the tourism village so that it can describe the real situation in the tourism village and it is important to support the preparation of digital tourism village promotional materials in Badung Regency which is applied to VR. This content will be embedded into smartphone devices in the form of mobile applications to facilitate tourists accessing them (Bae, 2010; Lee et al., 2013; Torun, 2011; Wang D., 2011). Tourists can enjoy promotional shows of rural tourism in Badung Regency with the help of additional hardware in the form of VR glasses complete with headsets.

In terms of tourism village products, the government strongly encourages efforts to strengthen the participation of young people as one form of creative tourism to increase community income. One problem in encouraging efforts in this direction is that promotions are still conventional and this promotion is considered to be less effective and efficient. The Ministry of Tourism claims that digital media is a solution amid the inefficiencies of conventional media. This is reasonable given that currently, 70 percent of tourists have used digital media (Kompas, 2019).

Today the entry of the digital era has brought new space for tourism to continue to be creative and provide added value. Especially for young people who are very well versed and familiar with current digital trends. Besides, the digital age has had an impact on the role of young people who not only expect information quickly but also expect information to be packaged attractively. Print and electronic media such as brochures and websites have limited packaging with two-dimensional technology. This article tries to focus on how the prospects of young people in filling promotional content for tourism villages in Badung Regency can be told in virtual reality (VR) media. This content will add value to the tourist village and provide new experiences for tourists.

II. METHOD

Research to uncover the prospects of young people in building digital tourism content using a qualitative approach. This approach is a way to find out more deeply the phenomena based on the experiences and views of the younger generation. Data needs in the study were met with observations and interviews with young people in the tourist village. They were chosen purposively because of their knowledge, which is expected to provide comprehensive information about digital tourism content. The data collected is grouped according to the purpose of the study and then analyzed descriptively.

III. RESULT AND DISCCUSSION

The Government of Badung Regency in 2019 prioritizes the development of five tourism villages in the Badung Regency, Bali, namely Bongkasa Pertiwi, Sangeh, Mengwi, Carangsari, and Pangsan, targeted to be completed in 2020 with the concept of the National Development Planning Pattern, which is comprehensive and patterned. The Badung Regency Government has to date been working on a feasibility study that will be followed up with a master plan. The government which its concept of development, has formed a tourism awareness group in each tourism village. Government assistance in the form of grant funds will later go to the village owned enterprises. Through this grant, it can carry out independent activities by utilizing the available potential, both the resources and the materials used must be purchased from the village itself.

An important consideration for attracting tourists to visit tourist villages in Badung Regency, one of them is the model of tourist travel buying behavior. According to Mayo and Javis in Beccari et al (2014) revealed that the behavior of travel there is a problem- solving process that ends with an evaluation. Tourist motivation can arise from within or from outside tourists. To meet the needs of tourists who will visit tourist villages in Badung regency, it is important to do an information search and image evaluation to be able to describe the actual condition of the tourist village to which tourists are visiting. Tourists certainly find this information through travel agents, print media, advertisements, and other media and based on the experiences of other tourists. While the tourist decisions are obtained from the consideration of facilities and services offered by the tourist village such as access to transportation and accommodation. The experience and satisfaction of tourists after a trip to the tourist village will influence the next purchase decision. When tourists share their travel experiences in Bali through digital media, this will have a positive impact on the confidence of the traveling experience as a promotional and satisfaction power of tourists themselves (Dickinson et al, 2014).

Socially, economically, as well as demographically, the tourism village in Bandung regency has significant resources for young people. In this study, 75 percent of young people in the age range of 10 to 24 years were active in social media. Youth groups actively participate in social media. They participated in promoting the potential of rural tourism through social media networks. Young people are pioneers in creating new trends and they understand how to connect with others online in sharing information. This young generation can create trends, throw comments, and even create content that attracts potential tourists. The role of young people is very large in influencing the market which gives them the nickname as a trendsetter. In the digital world, there are factors of followers, fans, and friends (Kotler, 2019). In the commitment of prospective tourists to the enthusiasm of tourism village products, they will be very instrumental in these factors. Tourists who have visited tourist villages will share authentic experiences on social media. In the present era, this commentary becomes very important as a basis for decision making for tourists. Young people here also play a role as contributors to tourism content, with the use of hashtags, information becomes easier to find by potential tourists. The creation of new content that is rich in quality information will make the internet more rich in benefits (Kotler, 2019). Internet culture has provided space for young people to be creative and transparent in producing creative content. Young people here work voluntarily to share village tourism content on social media. The role of tourists in assessing content is very important here. They are interested in creating content by presenting video and sound mixes that contain stories, animations, and socio-cultural attractions of the local community. If the quality of the content is high, it will naturally spread quickly to social media and will get a quick public reaction too. Thus, the creation of quality content by young people requires consistency to not only prioritize viral content but be able to attract potential tourists to visit.

IV. CONCLUSION

Young people are pioneers in creating new trends and they understand how to connect with others online in sharing information. This young generation can make trends, provide comments, and even create content that attracts potential tourists. They also play a role as contributors to tourism content, with the use of hashtags, information is more easily found by potential tourists. The tourists are attracted by the content by presenting a

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The Self-Regulatory Model for Trademark Registration in Bali Tourism Destination: One Corporation One SMEs

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Abstract— This study aims to discuss the efforts of increasing protection of trademark registration for creative SMEs products in Bali tourism destinations by using the Sister Corporation approach based on self-regulatory models. This study used socio-legal research. The study shows that one of the factors causing the low number of registrations for small companies Bali tourism destination is the factor of cost. Although the government has already provided an incentive for registering the trademark for Small Companies, it seems the participation of relevant parties is still needed to enhance trademark registration for the protection of SME's creative product. Under the TRIPs Agreement and the Indonesian Trademark Act, the protection of trademark based on the first to file system or the registration system. The Self-Regulatory Model seems a relevant model to be implemented as the legal basis for implementing the Sister Corporation approach in order to increase trademark registration for the protection of small companies, by promoting the concept of One Corporation One SMEs, One big corporation support one trademark registration for a small company.

Keywords— The Self-Regulatory Model, Trademark Registration, Bali Tourism Destination, Ore Corporation-One Company.

I. INTRODUCTION

Small and medium-sized enterprises (SMEs) are considered as a new economic resource in the era of the fourth revolution industry (the 4,0 era)[1], even more, providing dynamic labor for better job,[2] including in Bali tourism destination areas. The existence of SMEs with innovative-creative products in supporting the development of tourism in Bali is important to get legal protection, one of which is from the aspect of trademark legal protection, particularly through trademark registration. However, in reality, the number of registered trademark ownership for SMEs in Bali is still low, far from the number of SMEs itself. For example, Denpasar City has 30.840 SMEs until 2019 it only 67 of the SMEs owning the registered trademark.[3] Of course, it is very small when compared to the number of SMEs itself that has already offer their invasion products either conventionally or through advanced internet technology, such as through a website, and moreover through Instagram and Facebook. The 4,0-era

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characterized by the Internet of Thing (IoT)[4]. Actually, the legal protection of trademarks through trademark registration will greatly affect the legal certainty of marketing SMEs products in the global market, because its presence also has the potential to become a franchising corporation, such as ACK Fried Chicken and other local Fried Chicken which currently develop widely in Bali. Besides, the importance of protecting SMEs through the trademark regime is to avoid another party's claims for claims of counterfeiting of brands. Therefore, this study is relevant to be carried out with the aim to examine factors that are causing the low registration of trademarks for SMEs in Bali as well as to discuss regulatory models that are relevant protecting SMEs in the context of trademark law.

II.RESEARCH METHOD

This study used the so-called socio-legal method, that comprehensively explores the existing condition of trademark registered of SMEs in the Balinese tourism destination in supporting their innovative product that are offered to both local and global marketplace. In Normative contests, several legal materials are examined namely: TRIPs Agreement, Madrid Protocol, the Paris Convention as well as the new Indonesian Trademark Law. Empirically, this study is conducted at the Regencies of Bali Province Indonesia, by questioning the SMEs representative, the Corporation, the Government Office of Cooperative and SMEs at the Regency level, as well as public societies. By using the so-called socio-legal approach, it is relevant to find out the alternative solution in order to improve the registered trademark of SMEs in Bali in order to get more protection through regulatory model concerning trademark incentive registration as well as self- regulatory modal among the cooperation and the SMEs.

III. RESULT AND DISCUSSION

3.1. Legal Certainty for the Business of SMEs Through Trademark Registration

Tourism based on Article 3 the UN World Tourism Organization is a factor of sustainable development. From that regulation it can be understood that tourism takes full account of economic, social and environmental impacts, that not only for current but more importantly for the future generations as well as addressing both the needs of visitors, the industry, including host communities.[5] The social-economic impact of host tourism become one of the factors of sustainable tourism. It is undeniable that the development of tourism activities is strongly influenced by the development of global technology, such as the internet. Through this global phenomenon seem to leads to cultural homogenization. Such as the universal acceptance of global products such as food as well as clothing.[6] In the context of the development of tourism in Bali, one of the products offered by small companies in global tourism is Balinese traditional culinary such as *Betutu* and even *Babi Guling*. Surprisingly it can be accepted without obstacles by the tourists even though they come from western culture. It is a real example of cultural homogenization in a culinary, that turning point from the west to east. Currently, Balinese traditional culinary can be considered as one of the new icons of the tourism destination in Ubud Bali.[7] Besides culinary products, other products such as from coffee to spas are widely developed to support Bali's tourism activities. Of course, with the development of products that have entered this global market through the advanced of internet technology, legal protection, especially from trademark law, should be one of the priorities that must be carried out by the tourism industry, including SMEs.

The trademark protection becomes very important for SMEs in Bali who offer their product to the global marketplace, for legal certainty and to avoid claims from other parties who behave in bad faith claiming that the trademark belonging them. In addition, there are at least 4 trademark functions are to prevent third parties from using trademark illegally as stipulated in Article 16 TRIPs agreement, to distinguish goods and services in relation to trademark reputation[8], as bank credit guarantees, and as a foundation to be a franchising business. By

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understanding the functions of a trademark that not only bring legal certainty for the owner but also an opportunity to be chain business, then, of course, there is no more reason not to registering trademark of SMEs. The big corporation may develop from small companies, multinational companies may start from SMEs. Trademark protection in Indonesia based on registration mechanism, or so-called "first to file system" as stipulated under Article 1 and Article 4 until Article 26 of the Law No. 20 of 2016 Concerning Trademark,[9] in conjunction to Article 15 of TRIPs Agreement.[10] To register a trademark, it is important to differentiate the product from other parties' products.[11] In fact, several SMEs have realized the importance of trademark protection through the registration process. For example, *Dian Tenun Endek* from Klungkung, also *the Warung Nasi Ayam Kedewatan*. In this context, actually the government has played important role to encourage the registered trademark of SMEs by providing an incentive for trademark registration. However, the number of trademarks registered is still relatively small compared to the number of SMEs in Bali. Therefore, it seems needed the more parties involved in providing an incentive for registering a trademark. The more parties supporting incentive for the trademark registration, the more SMEs getting legal certainty for their business-related to trademark protection that not only occur at present but also in the future as part of sustainable tourism in the contexts improving social-economic of society.

3.2. Enhancing the Self- Regulatory Model in Providing Incentive for Trademark Protection of SMEs

The economic analysis related to intellectual property has been emphasized on providing incentives and granting exclusive rights for the intellectual creative works, such as patentability provides an incentive to produce inventions.[12] The law and economic analysis theory from Richard Posner become relevant to use in exploring the legal protection intellectual property works that are produced by SMEs to support tourism activities in Bali, this is not only intellectual property related to patent but also other such as copyrights and trademark by providing exclusive rights for incentive. Based on standard economic theory has been recognized that intellectual property rights as an essential tool to incentivize creative investments.[13] Reward theory also considered an essential theory in rewarding a creative and innovative work of human beings. The essence of reward theory is innovation, reward, and incentive.[14] In order to improve exclusive rights for earning reward for a sum of royalty fee, or in other situation to avoid claim from bad faith of third party that claiming trademark belongs to them related to creative and innovative works of SMEs in Bali, it seems legal protection should be improved by registering trademark for their product then they will get legal protection. The empirical study shows that one of the obstacles in owning trademark protection for SMEs is related to the cost. There are still deemed that registering a trademark needs high cost, meanwhile they are still as a micro-entrepreneur and operating business at local level.[15] As an alternative solution, by increasing stakeholders' understanding of the importance of working together, even helping each other including in supporting the SMEs in getting their trademark protection by supporting them through providing incentive budget for trademark registration. Helping each other in human life can be understood from the Balinese philosophy of Tri Hita Karana. This Balinese philosophy guides people to live in harmony, a balanced relationship between human and God, human and fellow humans, as well as human and nature.[16] Developing community-based tourism through sister corporations as part of what so-called corporate social responsibility (CSR) becomes relevant in this context. Thus, it means the big corporation helps the small entrepreneur to develop properly including in managing trademark for their business.

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[9] The Law No. 20 of 2016 Concerning Trademark, https://www.dgip.go.id/images/ki-images/pdf-files/merek/uu_pp/UU%20no%2020%20tahun%202016%20tentang%20Merek1.pdf

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[16] Jan hendrik Peters & Wisnu Wardana, 2013, *Tri Hita Karana The Spirit of Bali*, Kepustakaan Populer Gramedia, Jakarta, p. 341-388.

The CSR activities for the SMEs actually have already conducted in Bali, such as the ITDC provides CSR for several SMEs in Bali but it does not specific to encourage trademark registration. It seems developing CSR activities for SMEs trademark registration can emerge as a great activity both for big corporations and SMEs. In these contexts, it can be in the form of the Self -Regulatory model among the parties involved. The self-regulatory model, such as in the form of the memorandum of Understanding (the MOU) usually give faster result rather than only rely upon the government regulation because the government regulation takes a long time to be enacted as a legal instrument. Meanwhile, the MOU can exist whenever the business sector involved needs it. The more corporation uses the self-regulatory model to help the small entrepreneur in getting their exclusive rights upon their creative works, the more trademark protection will occur for SMEs in Bali. It least, it is expected one big corporation helping one small entrepreneur.

IV. CONCLUSION.

The finding of this study shows that the number of trademark registration on the small entrepreneurs in Bali tourism destination is still low compared to the number of SMEs. Based on the TRIPs Agreement and the Indonesian Trademark Act, the exclusive rights, the trademark protection exist based on the first to file system or the registration mechanism. As consequences, from the trademark protection perspective, it can be considered a lack of legal certainty for them that have no trademark. Although the government has already provided an incentive for registering the trademark for small companies, still limited budgets deemed causing the small number of trademark registration. As an alternative solution, the Self-Regulatory Model seems a relevant model to be implemented for helping SMEs in order to increase trademark registration for the protection of small companies by providing the Memorandum of Understanding model between the big corporation and small company as part of the sister corporation concept.

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Tilapia (*Nilochromis niloticus*) Production and Nutrient Absorption of Aquatic Plants in Cages of Batur Lake Bali

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Abstract— The research purpose was to study the production development of tilapia fish (*Nilochromisniloticus*) as well as the ability of some aquatic plants to absorb nitrate and phosphate content in the cages of BaturLake, Bali. Measuring the level of fish growth, nitrate and phosphate solubility were carried out in the field. The specific growth rate (SGR) of tilapia that was kept for 8 months was 0.5% per day. Feed convertion ratio (FCR) was 2.27. There were 4 plants tested namely Parakeet flower (*Heliconia psittacorum*), Papyrus (*Cyperus haspan*), Celery (*Apium graveolens*) and Mint (*Mentha piperita*). Celery plants with a density of 4 plants / 0.16 m^2 can reduce nitrate content by 2.224 ppm for two months. Mint, Parakeet flower and papyrus plants at a density of 2 plants / 0.16 m^2 were able to reduce nitrates most effectively reaching 5,868 ppm, 5,110 ppm and 7,250 ppm, respectively. Celery plants with a density of 4 plants / 0.16 m^2 can reduce the value of phosphate solubility by 0.594 ppm within two months. For mint and Parakeet flower plants at a density of 2 plants / 0.16 m^2, the most effective way to reduce phosphate content of 0.392 ppm and 0.498 ppm respectively. Papyrus plants, at a density of 4 plants / 0.16 m^2, was the most effective way to reduce phosphate solubility by 0.406 ppm within two months.

Keywords— celery, mint, nitrate, papyrus, phosphate.

I. INTRODUCTION

Tilapia have beneficial properties, which are easy to breed, grow fast, thick meat, tolerant of various aquatic environments, can live and breed in fresh and brackish water and have a broad response to food. On the basis of these good characteristics, in 1969 this fish was introduced from Taiwan to Indonesia as a cultured fish and has developed throughout Indonesia [1]. Another feature of tilapia aquaculture is that it has a high salinity tolerance [2], which was originally cultivated in fresh water, later has been widely tried in brackish water and even in salt water. Related to the effect of salinity, further found that an increase in salinity from 0 ppt-30 ppt did not affect the survival of tilapia juvenile, but affected its daily growth rate. The daily growth rate of tilapia juvenile increases with an increase in salinity [2].

In freshwater, the cultivation of tilapia in floating net cages (FNC) has been widely carried out, especially in lakes and reservoirs. Lake Toba is already famous for its floating cage culture, some of which are already on company scale. Aquaculture activities in reservoirs are often create problems because in certain seasons there are massive fish deaths such as case in Cirata, Saguling and Jatiluhur Reservoirs.

There are some problems that exist in fish farming by floating net cage system. One of them is excess food and fish fesses that is not completely decomposed in lake waters will cause enrichment of nutrients such as nitrate and

phosphate content [3]. This nutrient if excess value in the water will cause eutrophication in the form of phytoplankton blooms and aquatic plants. Specifically regarding efforts to reduce nitrate and phosphate content, it can be done by utilizing aquatic plants with the concept of aquaponics [4]. The definition of aquaponics is a combination of aquaculture systems and hydroponic plant cultivation. In this system, fish and plants grow in one integrated system, and create a symbiotic between the two [5].

The location of the community cage in Lake Batur is placed on the edges of a shallow lake. This is to make it easier to install anchors so that the cage is not moving around. Other location criteria chosen by the community are in the quieter part of the water. The ideal location is also protected from storms and easily accessible by fish farmers [6], [7]. Furthermore, the presence of floating cages operated in the waters of Lake Batur, is thought to have accelerated the process of eutrophication in lakes originating from excess feed and from the manure of fish kept. Nitrate and phosphate content increases, which then needs to find a solution to reduce it. One of them is by placing water plants in a controlled manner which serves to reduce the level of nutrients in the lake and to improve aesthetics. Another thing is also as additional income from economically cultivated aquatic plants.

Some aquatic plants have been able to reduce the nutrient content especially nitrate and phosphate in the waters [8], [9], [10]. Thus the research at Lake Batur on trial production of tilapia as well as nutrient uptake of nitrates and phosphates to reduce the levels in the lake waters becomes important. This is to restore the function of the lake as the main water reserve. Moreover, if the lake waters are too fertile, will make wild aquatic plants grow uncontrolled and the organic material they produce will make the lake getting shallow.

II. METHODS AND PROCEDURES

A. Fish Culture

This research was carried out in FNC which is located in the village of Trunyan, Lake Batur Bali. The study was conducted from September 2018 to May 2019. Three units of cage were used with a length of 4 meters, width 4 meters and 4 meters deep. Each cage was given the treatment of adding 8-12 cm Tilapia juvenile with a density of 84 heads/m^2. During the culturing period, fish are fed twice a day by using artificial feed (pellet) with a minimum protein content of 30%. Fish weight measurements were carried out on a scale and carried out at the beginning and end of aquaculture. This is because in the lake it was avoided to do regular weight measurements to prevent stress on the fish. In addition to measuring the weight of fish, a total weight of feed given to the end of the aquaculture process is also measured. The data obtained were continued to be analyzed using several parameters to determine the effectiveness of fish culture in floating cages: Survival Rate (SR), Spesific Growth Rate SGR) and Feed Convertion Ratio (FCR).

B. Aquatic Plant Nutrient Uptake

Experiments carried out on the ability of Nitrate and Phosphate absorption were the Celery Plant (*Apium graveolens*), Mint Plant (*Mentha piperita*), Parakeet flower (*Heliconia psittacorum*) and Papyrus (*Cyperus haspan*). Plants were placed in a floating container so that the lake water in the container was not related to the whole lake water. With the same container volume and water content in each container, the treatment given to each type of plant was as follows: Treatment 1 = 2 plants / containers (0.16 m^2), Treatment 2 = 4 plants / containers (0.16 m^2), Treatment 3 = 8 plants / containers (0.16 m^2) and Treatment 4 = without plants (Control).

III. RESULT

The results of the study set out in Table 1 show that at the beginning of juvenile culture there were 5% of fish died due to stress, so that their graduation (SR) was 95%. These fish were kept for 8 months with the size of the weight of the fish harvested between 200-300 grams per head. Fish survival at harvest was 40%. The specific growth rate (SGR) of fish reaches 0.5% / day. The total final weight of fish at harvest was 371 kg by consuming feed for 8 months at 850 kg. Thus the feed convertion ratio (FCR) was 2.27. Economically, the total production cost for one cycle (8 months) was IDR. 9,565,000 and the sale of fish during the harvest of IDR. 10,388,000. In this case the net profit obtained was IDR. 823,000.

TABLE I
FISH CULTURE RESULTS IN ENVIRONMENTALLY FRIENDLY FNC IN LAKE BATUR

Number	Parameter	Value	
		Early	**Finish**
1	Fish weight	5 – 10 gram	200 – 300 gram
2	Survival (SR)	95%	40%

3	Long culture	-	8 months
4	Spesific Growth Rate (SGR)	-	0.5% / day
5	Total Final Weight of harvest	-	371 Kg
6	Total feed	-	850 Kg
7	Feed Convertion Ratio (FCR)	-	2.27
8	Total Production Cost of 1 cyclus	-	IDR. 9,565,000
9	Total income	-	IDR. 10,388,000
10	Net profit	-	IDR. 823,000

The results of research on the ability of four types of plants to reduce the nutrient content of nitrate and phosphate in Lake Batur waters were different. Celery plants, with a density of 4 plants / 0.16 m^2, showed the smallest increase in nitrate content in the waters, reaching only 1,775 ppm or 20.9% during two months of culture. It seems that the data did not indicate that celery plants can reduce the concentration of dissolved nitrates in Lake Batur water. On the other hand, in the control of no plants, the waters of Lake Batur in the same two-month period, the nitrate solubility content increased by 3.999 ppm or 74.5% of the nitrate solubility condition at the beginning of the observation. This means that celery plants have been able to reduce the increase in nitrate solubility by 2.224 ppm after being corrected with the control conditions. Precisely Celery plants which were planted with a density of 8 plants / 0.16 m^2 have the lowest capability of 1,018 ppm. For Mint, Parakeet flower and Papyrus plants, at a density of 2 plants / 0.16 m^2 it can reduce the highest nitrate content with values of 5.863 ppm, 5.110 ppm and 7.257 ppm, respectively. In this case the most ineffective density for mint and Parakeet flower plants was the same as Celery plants at 8 plants / 0.16 m^2.

In terms of reducing the phosphate content in Lake Batur waters, the Celery plants did not show a striking difference between the plants treated at densities of 2, 4 and 8 plants / 0.16 m^2. However, it tends to be at a density of 4 plants / 0.16 m^2 which had an effective ability that reaches 0.594 ppm to reduce the value of phosphate solubility within two months after being corrected by its control conditions. In the control condition (without plants), in the same two months, there was a change in the increase in phosphate values of 0.453 ppm or 152.5% of the phosphate solubility condition at the beginning of the observation. For Mint and Parakeet flower plants, the most effective plant density to reduce phosphate was at a density of 2 plants / 0.16 m^2 with values of 0.392 ppm and 0.498 ppm, respectively. For Papyrus plants, the most effective plant density to reduce phosphate was at a density of 4 plants / 0.16 m^2 with a value of 0.406 ppm.

IV. DISCUSSION

Maintaining fish in Lake Batur with a culture period of 8 months, resulted a final weight of 200-300 grams /head with FCR 1: 2.27. This FCR shows the results of less effective feed conversion. Research conducted on Tilapia in the waters of the Paku River reservoir in Kampar Kiri District, Riau Province for 3-4 months obtained a production of 200-250 kg with FCR 1: 1.5 [11]. The comparison of these two locations shows that the growth of Tilapia in Lake Batur is quite slow. Information from several fish farmers in Batur Lake stated that at the beginning of the cage was operated and the number was not much, to achieve the same weight enough with culture time of only 4 months. Later, the time to reach 8 months which makes waste of time and cost of feed. Fish survival in Lake Batur was only 40%. This was likely due to the large number of bird pests in the beginning of culture. In the Paku River Reservoir received 80-90% survival rate [11]. Tilapia fish farming conducted in ponds received survival rate of 95.7% [1] and with a water recirculation system obtained 70.7% of survival rate [12]. This shows that the fish culture system in Lake Batur needs to find a solution to increase the percentage of survival rate.

Decrease in nitrate levels by plants, at a density of 2 plants per container (0.16 m^2) showed that the most effective was the Papyrus plant reaching 7,257 ppm then the mint plant 5,863 ppm, then the parakeet flower plant 5.11 ppm and Celery plants 1,535 ppm. For the density of 4 plants per container, the most effective was the Parakeet flower plant of 5,432 ppm. When viewed from the economic benefits, Celery and Mint plants will be more economically valuable compared to Papyrus and Parakeet flower plants. Research conducted using *Hydrilla verticillata* in containers found that *Hydrilla verticillata* was able to reduce nitrate levels (from 0.06 ppm to 0.04 ppm) [8]. Biofilter research in the recirculation system on water quality found that Lettuce plants were able to reduce nitrate levels starting in the fourth week while Mustard plants were able to reduce nitrate levels from the fifth week [9]. While *Cyperus alternifolius* and *Sagittaria sp*. had not been effective in reducing nitrogen because the observations show there is no difference from the treatment without plants [14].

In terms of phosphate reduction, by plants, at a density of 2 plants per container showed that the most to the less effective were Celery plants reaching 0.529 ppm, Parakeet flower 0.498 ppm, Mint plants 0.392 ppm and Papyrus plants are 0.187 ppm respectively. For the density of 4 plants per container, the most effective was also Celery plants at 0.594 ppm. It seems to reduce phosphate levels, Celery is most effective at both densities of 2 and 4 plants per container, besides also having good economic value. A number of aquatic plants tested in reducing

phosphate found that *Pistia sp* and water hyacinth (*Eichornia crassipes*) plants were able to reduce phosphate by 60.62% and 92.68% respectively which was higher than with the ability of plants *Salvinia sp*, *Lemma sp* and *Spirodela sp* [15]. Using *Hydrilla verticillata* in containers found that *Hydrilla verticillata* plants were able to reduce orthophosphate levels (from 0.15 ppm to 0.062 ppm) at the end of the experiment for 28 days [8]. *Cyperus alternifolius* and *Sagittaria sp*. effective in reducing orthophosphate [14]. Whereas biofilter research in the recirculation system, found that Lettuce and Mustard plants were not effective in reducing phosphate levels [9].

V. CONCLUSION

Culture of tilapia in floating net cages of Lake Batur was not yet optimal with a longer culture period. The survival of fish that was kept is still low (40%) that needs a solution. Celery plants with a density of 4 plants / 0.16 m^2 were effective in reducing nitrate solubility of 2.224 ppm and phosphate solubility of 0.594 ppm within two months. At a density of 2 plants / 0.16 m^2, Mint, Parakeet flower and Papyrus plants were able to reduce nitrates more effectively, which were 5,868 ppm, 5,110 ppm and 7,250 ppm respectively. For mint and Parakeet flower plants at a density of 2 plants / 0.16 m2 were effectively reduce the value of phosphate of 0.392 ppm and 0.498 ppm, respectively.

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Criminal Action of Department of Corruption That Become Public Attention in Gianyar District

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Abstract—Based on the corruption court decision Number: 42 / TPK / 2015 Pidsus / PN DPS, it was decided together with some of the Gianyar Regency Government Civil Servants (PNS) who were sentenced to 1 (one) year village prison supported by people in need law (*incraht van gewijsde*). This study aims to determine the consideration of imposing a sentence, to know the juridical implications of the issuance of a court decision and to know the legal opinion of the case of this official trip. This research is juridical or doctrinal research but still supported by non-doctrinal or empirical. The results of this study found a court ruling against each defendant sentenced to 1 (one) year each and no other additional penalties considering that he was a low-level employee who did not have a permit, therefore there were also those who were classified as young. The Gianyar Regent Decree Number: 887/2654 / BKD / 2015 concerning the Temporary Dismissal of Civil Servants was issued, but again the Gianyar Regency Regent Decree Number 1504 / F03 / HK / 2018 dated 10 December 2018 could be dismissed in the hope of being a Civil Servant Civil Legal opinions on this case are given from academics and lawyers. Reflecting on the problems it poses to corruption The value of the country's losses is small, an easier, faster and easier process is needed and in terminating.

Keywords—Corruption, Gianyar Regency, Public Attention

I. INTRODUCTION

The problem of corruption is no longer a new problem in legal and economic problems for a country because the problem of corruption has existed since thousands of years ago, both in developed and developing countries, including in Indonesia. Corruption has crept and sneaked in various forms, or *modus operandi*, which undermined the country's finances, the country's economy and harmed the interests of the people. Corruption in Indonesia continues to increase from year to year. Both of the number of cases that occurred and the amount of state financial losses. The quality of corruption committed is also more systematic with a scope that enters all aspects of the life of the community, business people and state officials from the executive, judicial and legislative branches.

One of the government's efforts in enforcing the law to eradicate corruption is to make policies. These various policies are contained in various laws and regulations, including the Decree of the People's Consultative Assembly of the Republic of Indonesia Number XI / MPR / 1998 concerning the Implementation of a clean and Corruption-Free, Collusion and Nepotism State; Law Number 28 of 1999 concerning State Administration that is clean and free of Corruption, Collusion and Nepotism, as well as Law Number 31 of 1999 concerning Eradication of Corruption Crimes as amended by Law Number 20 of 2001 concerning Amendments to Law Number 31 of 1999 concerning Eradication of Corruption. With the enactment of the Act, it is hoped that more and more corruption cases will be revealed. In fact this is so, but there are times when many lower class employees are netted who actually seem to be victims due to their ignorance of their duties or assigned by superiors turned out to be fatal because of being dragged into corruption cases, and even they were fired disrespectfully even though they exactly wanted retirement, with a long period of work but do not get pension rights so that the public's attention is considered not to reflect a sense of justice.

Public attention is usually focused on who is the culprit, usually those who hold positions let alone positions that are very prestigious both from their echelons and public positions held, but this time the public's attention is focused on very low actors such as non-serving government employees and groups 1 or 2 especially before retirement, such as the case in the Regency of Gianyar totaling 14 people who have been sentenced to 1 (one) year each. They still feel innocent because they are invited to do comparative studies with official travel, they have already done, so they have absolutely no intention to gain profit or enrich themselves. After being suspended for a while, then at the end of 2018 the Governor of Gianyar Decree was issued in which they were dishonorably discharged, this is what has become the public's attention especially in Gianyar Regency, which seems to question where the sense of justice lies. This is because the affected employees are invited to participate by their superiors as a reward for work that has been done honestly, so that the concerned does not know that cases will arise, because they merely carry out what their superiors want. So they have no intention at all to benefit, let alone enrich themselves by being invited to take the official trip. In this connection criminal sanctions which are intended to provide protection against legal norms, have a preventive function, when legal norms have not been violated. But once the violation occurs, the working power of criminal sanctions changes and at the same time becomes repressive.[1]

Based on a report submitted by an NGO in Gianyar to the Bali Regional Police, the case was investigated and investigated, then further prosecution was tried by the Denpasar Corruption Court, which was finally based on Decision Number 42 / Pid.suus.TPK / 2015 PN Denpasar, Court of Action Corruption penalty has been sentenced to 1 (one) year imprisonment which has permanent legal force against 14 (fourteen) government employees in the Gianyar Regency Government. With the punishment of the 14 civil servants / government employees liven up in the Gianyar Regency Government because many people think that the government employees is actually innocent. Because it might require a study that examines how the law can provide a sense of justice for everyone.

Based on the background of the problem above, the problem can be formulated as follows:
1. What is the basis for the consideration of Corruption Judges in imposing sentences on revenue service employees in Gianyar Regency with a sentence of 1 (one) year imprisonment?
2. What are the juridical implications of the Corruption Court's ruling which has sentenced him to prison for 1 (one) year and has permanent legal force?
3. How and from where have you given legal opinion on official travel cases that have become a public concern in Gianyar Regency?

II. METHODS AND PROCEDURES

Research is a scientific activity related to analysis and construction carried out methodologically, systematically and consistently. This research is a legal research with juridical or doctrinal aspects but it is also supported by non-doctrinal or empirical, in which the problem will be judged empirically that is looking for incompatibility between das sollen and das sein the gap between theoretical conditions with legal facts or theoretical gaps with the world reality. Data analysis method used in this study is a qualitative analysis method. After the data is analyzed, the conclusion will be drawn with the deductive thinking method.

III. RESULTS AND DISCUSSION

1) *Basic Considerations of the Corruption Judge in Passing Sentences on Revenue Service Employees in Gianyar Regency with a One-Year Prison Criminal Sentence.*

If we depart from (iustitia) comes from the word "fair" which means: not one-sided, impartial, impartial to the right, properly, not arbitrary. Justice is all things that are pleasing with attitudes and actions in human relations, justice contains a demand that people treat each other in accordance with their rights and obligations. By paying attention to the sense of justice, the Corruption Judge sentenced an employee of the revenue service in Gianyar Regency with a sentence of 1 (one) year imprisonment due to the perpetrators of lower class employees, who were completely unaware of the orders from their superiors for working visits which resulted in imprisonment and even dismissed as Civil servants and most of those involved in this case are still relatively young, and with a relatively short work period of between 6 to 10 years. Unless there is one person who already has a term of employment of more than 25 years, and even at the time of this case the concerned person has sent his retirement application.

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2) Juridical Implications with the Corruption Court Verdict that Has Sentenced the Jail to One Year and Has Permanent Hokum Power.

There are four related concepts in the proof, first, an evidence must be relevant to the dispute or case being processed. Second, a proof must be accepted automatically relevant. Third, there is the principle of law which requires that evidence is not admitted in a way that is against the law. Especially in the context of criminal law, even though an evidence is relevant and can be accepted from the point of view of the public prosecutor, the evidence can be set aside. Fourth in the context of the court, any relevant and acceptable evidence must be evaluated by the judge. Juridical implications of the Corruption Court's decision which has sentenced him to prison for 1 (one) year and has permanent legal force together with 14 civil servants in the Gianyar Regency Government who were sentenced to 1 (one) year imprisonment that has been legally binding (incraht van gewijsde). In the Court's ruling, it was decided that the 14 civil servants were declared to have committed a criminal act of corruption together or participated in illegal acts that were detrimental to the country's finances, so that the defendants were each sentenced for 1 (one) year , and there are no additional penalties such as revoked rights as civil servants.

3) Juridical Implications with the Corruption Court Decision which has Sentenced the Jail to One Year and Has Permanent Legal Strength.

There are four related concepts in the proof, first, an evidence must be relevant to the agreement or case being processed. Second, a proof must be accepted automatically relevant. Third, there is a principle of law which requires that evidence not admitted be obtained against the law. Especially in the context of court law, even though it is relevant and acceptable evidence from the point of view of the public prosecutor, the evidence can be set aside. Fourth in court, every relevant and acceptable evidence must be evaluated by a judge. Juridical implications with the existence of a Corruption Court decision that has sentenced him to prison for 1 (one) year and has a permanent security law together with 14 civil servants in Gianyar Regency Government who were sentenced to 1 (one) year imprisonment which has permanent legal force (incraht van gewijsde). In the court ruling, it was decided that the 14 civil servants were declared to have committed a criminal act of corruption together or participated in violating state law, so that the defendants were each sentenced to each for 1 (one) year, and not there are other additional penalties such as revoked rights as civil servants.

4) Legal Opinion Against Official Travel Cases That Have Been Public Attention In Gianyar Regency.

Even though the perpetrators of official travel cases have committed a violation of norms (disturbance to the rule of law) that is intentionally or unintentionally carried out by a perpetrator, where the sentence imposed on the perpetrator is necessary for the maintenance of the rule of law and the guarantee of the public interest "or as de normovertreding (verstoring der rechtsorde), waaran de overtreder schuld heeft en waarvan de bestraffing dienstig is voor de handhaving der rechts order en de benhartigining van het algemeen welzijn there is an element of error, so someone can only be convicted if there is an element of error (the principle of no criminal without error). This principle implies that even if someone's actions are against the law, they cannot be convicted if there is no intention, in this case the perpetrators have no intention of enriching themselves or others, in fact these eight people have absolutely no intention and have no wealth because of civil servants, they are full of dedication and serve the government.

IV.CONCLUSIONS

The Corruption Judge in imposing sentences on revenue service employees in Gianyar Regency paid attention to the principle of justice. Juridical implication with the existence of a Corruption Court decision that has permanent legal force and legal opinion on a case in the principle of criminal law can be declared a criminal act is an element of error, so someone can only be convicted if there is an element of error (the principle of no criminal without error). The need for a simpler, faster and simpler resolution process for small losses of corruption. In conducting dismissal of the State Civil Apparatus it is necessary to look at the element of error and the government employees background. In order to avoid criminal acts of corruption, it is necessary to promote anti-corruption education.

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Traffic Noice Modelling at Signalised Intersection

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Abstract— The increasing number of motorized vehicles in Denpasar City will further increase the burden of traffic and cause various traffic problems such as traffic jams, accidents, and pollution. Noise or noise pollution is unwanted noise from a business or activity at a certain level and time that can cause human health problems. Until now there has not been much research on noise levels at signalized intersections in developing country cities and the effect of distance on traffic noise levels is unknown. This research needs to be done, which is to determine the level of noise at the signal intersection due to motorized traffic, and analyze the effect of distance on the level of traffic noise. Based on the analysis results obtained the average noise due to traffic at the intersection of Jalan Teuku Umar - Mahendradata Denpasar which occurred at 07.00-19.00 with a distance of 1 meter from the roadside at 78.12 dBA and at a distance of 40 meters from the roadside at 67.43 dBA, so that the area is categorized as noisy (> 60 dBA). Analysis of the effect of sound level meter placement distance with a difference of 40 meters at the intersection of Jalan Teuku Umar - Denpasar Mahendradata, there is a significant difference between sound level meter 1 and sound level meter 2 with a difference value for Leq of 10.26875 dBA, L10 of 10.69583, L50 of 9.92500 dBA, and L90 of 8.85208 dBA.

Keywords— Distance, signalised intersection, traffic noise, traffic volume

I. INTRODUCTION

Noise is a major environmental issue affecting large numbers of people (European Environment Agency, 2014), particularly in urban areas. Urbanization, economic development and growth in motorized transport are drivers of the growing extent and intensity of environmental risk from road traffic noise. About half of the population already live in cities and this proportion will be two-thirds by 2050 (Montgomery, 2008). By 2025, more than half of the twenty-five megacities in the world will be in Asia, and located in the tropics or sub-tropics. Today, natural increase of population in city in developing countries accounts for some 60 per cent of that growth, and the transformation of rural settlements into urban places, a process known as 'reclassification', accounts for another 20 per cent or so. (UN Habitat, 2013).

According to UN Habitat (2016), the current urbanization model is unsustainable in many respects. The World Health Organization European Centre for Environment and Health, Bonn, produced a guidance document for quantitative assessment of the health risk of environmental noise (Fritschi, et.al., 2011). Many researchers have studied the effects of road noise traffic noise on health. The traffic noise exposure on sleep have both acute and long-term dimensions, and these are associated with different noise indicators. Acute effects link with event-related measures while overall sleep parameters link with Lnight, as a whole-of-night indicator. A meta-analysis of 13 subjective self-reported sleep disturbance studies from road traffic noise (9,603 individuals from: 8 studies from Europe, 2 from Canada, 2 from Japan and 1 from Turkey) was reported by Miedema and Vos (2007). The European Environment Agency (2014) reported that traffic noise as a major environmental health problem. Various noise prediction models have been developed to assess and predict noise propagation from road networks for free-flowing traffic conditions. However an important aspect of traffic noise study is the assessment of road intersections. Prediction of noise emissions for such scenarios is not adequately considered in standard noise modelling algorithms

as they don't accommodate the complexity of sources, traffic dynamics and road specifications near intersections (Lau, et.al., 2014).

Previous studies show difficulties in establishment of a successful model for emanated noise in interrupted traffic flows due to many direct and indirect influences. However, some researchers developed models for urban traffic noise exposure where the pattern of flow is naturally interrupted by signalized intersections and priority junctions. Jahandar, et.al. (2012) conducted study in two locations, most common types of intersections, crossroads and T-junctions. They found that the vehicles starting to move produce more sound than when they travel at a constant speed along the intersection. Arif and Ali (2014) identified the major sources of noise at road intersections and their relative contributions to overall noise level, and suggests possible mitigation measures. Results reveal that the level of noise at road intersections exceeds the allowable limit regardless of the traffic condition. Dzambas, et. al. (2014) examined the impact of the type of intersection on noise levels in residential areas. It was found that there were no significant differences in the noise level prediction for signal intersections, unsignalized intersections and roundabouts. Dzambas, et. al. (2014) suggest further detailed research taking into account various parameters. Quinones, et. al. (2016), evaluating the level of traffic noise at the intersection in Cartagena City, Colombia. It was found that the highest traffic noise level was 79.7 dB (A) and the intersection with the highest traffic volume did not have the highest noise level. Research on the level of traffic noise carried out in cities of developed countries is certainly different from the results of cities in developing countries, mainly because they have different traffic characteristics.

Until now there has not been much research on noise levels at signaling intersections in developing cities and the effect of distance on the level of traffic noise is unknown. This research needs to be done, namely to determine the noise level at the signal intersection due to motorized vehicle traffic, and analyze the effect of distance on the level of traffic noise.

II.   METHODOLOGY

Denpasar city is the most populous city in Bali, with population according to data of Bureau of Statistics) (2018) Denpasar city is 914.300 inhabitant and with the area of 127,78 Km^2. Noise level measurements are carried out using the Extech sound level meter SDL600 model. Sound level meter readings per second, grouped in 15-minute intervals. The position of the sound level meter and its settings are as follows:

1. Sound level meter is placed on a tripod so that the position of the microphone is 1.5 meters high on the ground with a certain distance from the edge of the road and put the other sound level meter along with a tripod with a difference of approximately 40 meters from the previous sound level meter.
2. Confronting the microphone towards the noise source in a perpendicular position.
3. Sound level meter is placed far enough away from buildings or high walls that can reflect sound.

III.   RESULTS AND DISCUSSION

A.   Traffic Volume

Recording traffic volume is carried out for 900 seconds (15 minutes), for one time recording and time together with noise level measurements. Data on recording traffic volume can be seen in Figure 1. It can be seen that the most traffic volume passes the intersection of Jalan Teuku Umar - Mahendradata is the MC (Motor Cycle) with the highest volume amounting to 2,760 which is in the interval of 07.30 - 07:45.
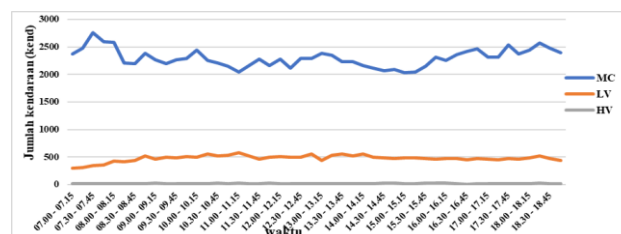
Fig. 1 Traffic volume

B. Relationship Between Noise Level and Traffic Volume

Figure 2 shows the relationship between Leq and traffic volume in units of vehicles / 15 minutes, where the form of the relationship is polynomial with the equation $y = 0,0002x2 - 0,4668x + 538,83$ and $R^2 = 0,1728$.
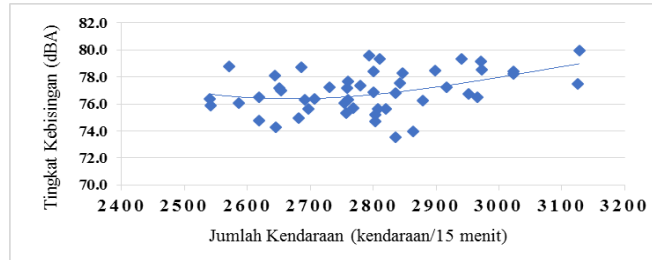
Fig. 2 Relationship between the number of motorized vehicles with noise levels Leq

Figure 3 shows the relationship between L10 and traffic volume in units of vehicles / 15 minutes, where the form of the relationship is polynomial with the equation $y = 0,0005x2 - 1,3229x + 1330,4$ and $R^2 = 0,2424$.
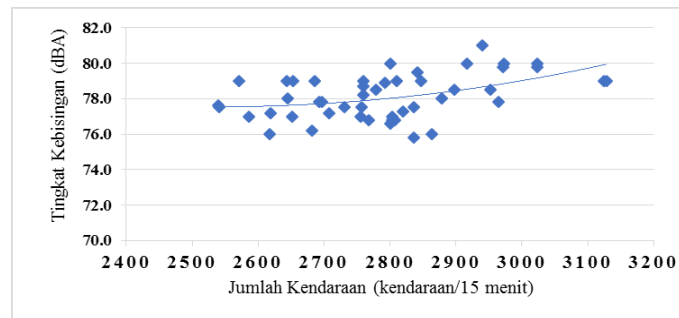
Fig. 3 Relationship between the number of motorized vehicles with noise levels L10

C. Multiple Linier Regression Model

Table 1 shows the traffic noise models at signalized intersection based on multiple regression model.

TABLE 1
TRAFFIC NOISE MODEL AT SIGNALIZED INTERSECTION

Traffic noise model	R^2
Y1 (Leq) = 66,727 + 0,004X1	0.213
Y2 (L10) = 68,784 + 0,004X1	0.279
Y3 (L50) = 55,954 + 0,007X1	0.368
Y4 (L90) = 51,494 + 0,007X1	0.411

where: Y = Traffic noise, X1=Motorcycle

From the results of the noise level analysis the largest coefficient of determination is shown by the L90 model of 0.411 or (41.1%). It shows that the percentage of the effect of traffic volume on noise is 41.1%, for the best noise model is L90 = 51.449 + 0.007X1 which means that only X1 (Motor Cycle) variables represent and significantly contribute to increasing noise by 51,494 dBA caused by an increase in MC volume of 0.007.

D. The Effect of Distance to Noise Level

Based on the Paired Sample T-Test method, it was found that there is a significant difference in average between sound level meter 1 and sound level meter 2 with a difference of 40 meters placement equal to Leq = 10.26875 dBA, L10 = 10,69583 dBA, L50 = 9.92500 dBA, and L90 = 8.85208 dBA.

IV. CONCLUSION

Based on the results of the research that has been done, conclusions can be drawn as follows. The average noise due to traffic at the intersection of Jalan Teuku Umar - Mahendradata Denpasar which occurred at 07.00-19.00 with a distance of 1 meter from the roadside of 78.12 dBA and at a distance of 40 meters from the roadside of 67.43 dBA, so that the area it is categorized as noisy (> 60 dBA). Analysis of the effect of sound level meter placement distance with a difference of 40 meters at the intersection of Jalan Teuku Umar - Denpasar Mahendradata, there is a significant difference between sound level meter 1 and sound level meter 2 with a difference value for Leq of 10.26875 dBA, L10 of 10.69583, L50 of 9.92500 dBA, and L90 of 8.85208 dBA. The model of traffic noise at the intersection of Jalan Teuku Umar - Mahendradata Denpasar is $Y = 51,494 + 0,007X1$ with $R2 = 0,411$, where $X1 = $ Motor Cycle (MC) already represents the type of variable or other modes (X2 and X3)

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Transaction Cost Efficiency Strategy in Village Credit Institutions (LPD) in Bali Province

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Abstract— Village Credit Institutions (LPD) are financial institutions owned by Pakraman villages (traditional villages) in Bali. The main business activity carried out by the LPD is lending. LPD can be said as a financial institution that provides access for all levels of society in Bali. This role further strengthens the reason for the importance of maintaining LPD efficiency as an MFI in order to remain sustainable. Yustika (2010) states that the efficiency of the institutional design of an organization or business unit can be measured using an analysis tool that is transaction costs. The main objective of this research is to formulate an LPD transaction cost efficiency strategy in the Province of Bali, linked to social capital owned by the LPD. To achieve these objectives, and associated with field phenomena, this research was conducted by identifying internal factors (strengths and weaknesses) and external factors (opportunities and challenges) of LPD transaction costs to be compiled into a SWOT matrix. Internal strategic factors related to the LPD transaction cost efficiency strategy include service quality, commitment and competence of the board, and lending policies. While external strategic factors include the development of the number of MSMEs, attitudes and character of the community, as well as competition between banks or other financial institutions. The results showed that several alternative strategies obtained from internal and external variables were in accordance with the company's position in the IE matrix, namely grow and build strategy.

Keywords—development strategies, SWOT analysis, transaction cost, Village Credit Institution/*Lembaga Perkreditan Desa* (LPD)

I. INTRODUCTION

A. Research Background

Village Credit Institutions (LPD) are financial institutions owned by Pakraman villages (traditional villages) in Bali. However, the legal position of the LPD cannot be compared to other financial institutions such as BPR, LKM, and cooperatives [1]. The main business activity carried out by the LPD is lending. LPD can be said as a financial institution that provides access for all levels of society in Bali. This role further strengthens the reason for the importance of maintaining LPD efficiency as an MFI in order to remain sustainable.

Institutionalization refers to efforts to design patterns of interaction between economic actors so that they are able to carry out transaction activities [2]. When it comes to objectives, institutions concentrate on creating economic efficiency based on the structure of economic, political and social forces between the actors. Institutionalization is believed by most economists to be a source of efficiency and economic progress [2].

Efficient or not the institutional design of an organization or business unit can be measured using an analysis tool that is transaction costs [2]. Transaction costs that arise in rural financial institutions in general and in LPDs are

such as negotiation fees, information costs, coercion fees, screnning fees, and if then with the strength of existing social capital with the Teacher Chess concept, these costs are expected to be minimized. Some examples of transaction costs, such as information costs can be minimized, because information about LPD can take advantage of the meeting (sangkep) that is followed by the custom village manners.

The main objective of this follow-up research is to formulate an LPD transaction cost efficiency strategy in Bali Province, linked to social capital owned by the LPD. To achieve these objectives, and associated with field phenomena, this research was conducted by identifying internal factors (strengths and weaknesses) and external factors (opportunities and challenges) of LPD transaction costs to be compiled into a SWOT matrix. The next step is to develop a TOWS matrix which is a transaction cost efficiency strategy based on the SWOT matrix.

II. METHODS AND PROCEDURES

A. Methods

Data collection techniques in this study are divided into: (1) research questionnaire; (2) interviews with community leaders and LPD management/managers; (3) FGD (Focus Group Discussion). The survey data collected was then tabulated and analyzed quantitatively and strengthened by the results of the elaboration on the results of the FGD and interviews.

This study uses a SWOT analysis technique, which in the initial stages is carried out identification of internal factors (strengths and weaknesses), as well as external factors (opportunities and challenges) to compile the SWOT matrix. Based on the matrix, a strategy that is appropriate for the cost efficiency of LPD transactions is then prepared.

B. Procedures

As explained earlier, this research aims to develop an LPD transaction cost efficiency strategy. This research phase includes FGD, analysis of FGD results, strategy evaluation, and refinement/revision of strategies.

III. RESULTS

A. Analysis of LPD Internal and External Factors

Based on the results of the FGD by involving the Chairperson of the Bali Province LPLPD (LPD Empowerment Agency), the Chairperson of the Bali Province LPD BKS Agency (LPD Cooperation Agency), as well as several LPD Chairpersons throughout the Province of Bali, strategic factors related to the efficiency of transaction costs can be developed to increase LPD performance. The internal and external factor are described in Table I and Table II.

B. SWOT Analysis Result

The SWOT analysis is preceded by compiling an IFE (Internal Factor Evaluation) matrix and EFE (External Factor Evaluation) matrix.

1) IFE Matrix (Internal Factor Evaluation): An analysis of the internal environment is carried out through the identification of internal LPD factors as previously described to determine the strengths and weaknesses of the LPD. After being identified, the weighting and rating of each factor is carried out. Based on the results of weighting and rating using the IFE matrix it can be seen that the total score of the IFE matrix is 3.43. The table of IFE matrix results can be seen in Table I. The total score indicates a strong position.

2) EFE Matrix (External Factor Evaluation): EFE matrix analysis is the result of identifying external factors in the form of opportunities and threats that affect the performance of the LPD. The result of multiplication between weighting averages and rating ratings will produce a total score. Based on the results of weighting and rating using the IFE matrix it can be seen that the total score of the EFE matrix is 3.54. The table of EFE matrix results can be seen in Table II.

3) Internal-External Matrix: Based on the results of the IFE and EFE matrices, it can be arranged later in the IE matrix. The average value of IFE was 3.43 and the average EFE was 3.54. The average value of IFE and EFE is obtained from the sum of the scores on each factor, where the score is obtained from the multiplication between the average rating and the average weight for each factor. This value shows the position of quadrant I, which shows the strategy needed for the company today is a grow and build strategy. Grow and build strategy shows that the

company needs a strategy to grow better and can develop the company to be better. The strategies that can be applied by companies today are intensive strategies, integrative strategies, and concentration strategies. IE matrix can be seen in Fig. 1.

TABLE I
INTERNAL FACTOR EVALUATION MATRIX

No.	Indicators of Internal Variable	Total	Weight (%)	Rating	Weight Value Rating
1	Capital	55	0.10	3.67	0.36
2	Productive assets	38	0.07	2.53	0.17
3	The amount of credit extended	55	0.10	3.67	0.36
4	Third-party funds	53	0.10	3.53	0.34
5	Loan interest rates	54	0.10	3.60	0.35
6	Credit distribution policy	58	0.10	3.87	0.40
7	Profitability	38	0.07	2.53	0.17
8	Liquidity	47	0.08	3.13	0.27
9	Service quality	60	0.11	4.00	0.43
10	Promotion of services	54	0.10	3.60	0.35
11	Quality of HR	42	0.08	2.80	0.21
12	Suitability of HR competencies	55	0.10	3.67	0.36
13	HR loyalty	55	0.10	3.67	0.36
14	Organizational culture	56	0.10	3.73	0.38
15	Commitment's and competence of employee	58	0.10	3.87	0.40
16	Administration and communication equipment	53	0.10	3.53	0.34
17	Accounting control system	38	0.07	2.53	0.17
	Total	554	1.00		3.43

TABLE II
EXTERNAL FACTOR EVALUATION MATRIX

No.	Indicators of External Variable	Total	Weight (%)	Rating	Weight Value Rating
1	Bali's economic growth rate	54	0.15	3.60	0.54
2	Interest rates on loans	54	0.15	3.60	0.54
3	Capital support from the government	38	0.11	2.53	0.27
4	Inflation	37	0.10	2.47	0.25
5	Community attitudes and character	59	0.16	3.93	0.64
6	Culture, customs and values of local wisdom	58	0.16	3.87	0.62
7	Development of the number of SMEs	60	0.17	4.00	0.67
8	Development of the number of financial institutions	54	0.15	3.60	0.54
9	Local government policy	37	0.10	2.47	0.25
10	Developmet of information technology	53	0.15	3.53	0.52
11	Competition among banks or other financial institutions	59	0.16	3.93	0.64
12	Community lifestyles	58	0.16	3.87	0.62
	Total	360	1.00		3.54
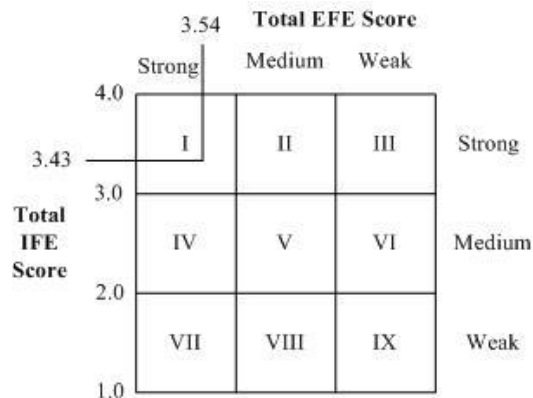
Fig 1. Result of Internal-External (IE) Matrix

C. *Analysis of LPD Development Strategies*

The SWOT matrix produces several alternative strategies obtained from internal and external variables in accordance with the company's position in the IE matrix, namely grow and build strategy. The alternative strategies obtained can be mapped as Fig 2.

Internal Factor / External Factor	Strengths (S)	Weaknesses (W)
Opportunities (O)	S-O Strategies: 1) Maintain credit distribution policies in accordance with the attitudes and character of the community, as well as culture and customs. 2) Utilizing the competencies of the board to be able to develop LPDs so they can compete with other financial institutions.	W-O Strategies: 1) Improve the internal control system so that it does not lag with other financial institutions. 2) Make efforts to increase LPD rentability with transaction cost efficiency by utilizing local culture.
Threats (T)	S-T Strategies: 1) Making credit policies in accordance with government policies. 2) Use management competencies to develop policies or decisions that are able to adjust local economic conditions, such as inflation.	W-T Strategies: 1) Establish an internal control system in accordance with government policies. 2) Minimize risk due to the effects of economic turmoil by seeking increased profitability, one of which is through transaction cost efficiency.

Fig 2. TOWS Matrix Alternative LPD Development Strategy

IV. CONCLUSION

Internal strategic factors related to the LPD transaction cost efficiency strategy include service quality, commitment and competence of the board, and lending policies. While external strategic factors include the development of the number of MSMEs, attitudes and character of the community, as well as competition between banks or other financial institutions. The results showed that several alternative strategies obtained from internal and external variables were in accordance with the company's position in the IE matrix, namely grow and build strategy.

Therefore, for the development of LPD as a credit institution based on indigenous peoples, it must still follow the changing times. In addition, LPD management competencies must always be upgraded and efforts made to strengthen LPD institutions. In addition, the government needs to provide support through regulations and an appropriate economic climate to support the existence of LPDs.

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Analysis of Impact the Bitcoin Development Against Fraud Growth Impersonating Bitcoin Investment

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Abstract—*Industrialization with existing technology causes very fundamental changes in the financial, technological aspects, in addition to economic, social and cultural impacts, technological developments also occur in the digital world where cryptological technology or often called cryptocurrency has created Bitcoin. With the decentralized system Bitcoin was introduced by Satoshi Nakamoto in 2009. Bitcoin became the first cryptocurrency to be introduced in the online market and had an impact worldwide. All processes use the hash cryptographic function with all available schemes. After Bitcoin, many other cryptocurrencies have sprung up with their own superior features. Cryptocurency with a low capitalization market has not been able to survive until now (Kim, 2016). The development of virtual money, including Bitcoin, is thought to have an impact on the development of illegal investments or fraudulent investments in Indonesia. The fertility of digital money-based investments because these investments are offered with huge profits and in a short time it sounds tempting. Not surprisingly, this lure is able to ensnare many people. Even though there have been many victims, there are still some who have been deceived by this investment mode fraud. Cases like this are common and certainly have a negative impact on the development of Bitcoin. The purpose of this study is to determine the effects of the development of Bitcoin technology in Indonesia. The development of Bitcoin in Indonesia is not much different from the development of bitcoin in other countries, where in the last 3 (three) years Bitcoin experienced a surge in prices of nearly 2,400%. Seeing the high volatility of Bitcoin is very risky, but the characteristics of Indonesian people who want everything instantly makes a very large market share to those who are not responsible, so this opportunity has a direct impact on the growth of illegal investments using Bitcoin, from data OJK in the last three years OJK stopped 105 illegal investments during 2018. The number increased from 2017 which amounted to 57 illegal investments and 2016 amounted to 71 illegal investments. For this reason the Government in this case the OJK through the Investment Alert Task Force has always emphasized the importance of the public understanding the investment literacy, especially investment in the field of technology that is vulnerable to abuse so that it harms the community.*

Keywords— *Bitcoin,Cryptocurrency, Fraud Investment, Illegal Invesment*

I. BACKGROUND

In 2018, is the year where globalization can not be stopped into Indonesia, accompanied by increasingly sophisticated technological developments, the world is now entering the era of the industrial revolution 4.0, which emphasizes the patterns of digital economy, artificial intelligence, big data, robotic, etc. etc. or known as the phenomenon of disruptive innovation. Technological developments also occur in the digital world where cryptological technology or often called cryptocurrency has created Bitcoin

With this technology Bitcoin is increasingly being looked at by its users both in Indonesia and in the world some of the advantages of Bitcoin which causes Bitcoin to develop very quickly because Bitcoin is designed to experience deflation, namely reduced Bitcoin production which makes the value of Bitcoin increasingly uphill so that it can be made an investment choice, besides that countries in the world began to look at Bitcoin as an alternative payment. The development of virtual money, including bitcoin, was allegedly affected by the development of illegal investments or fraudulent investments This encourages the Financial Services Authority (OJK) through the Investment Alert Task Force, oversees the growth of investments whose operations have no legality and are characterized by fraud. In 2008 the company closed 40% investment including investment in the virtual currency of Bitcoin, the fertility of digital money-based

investments because these investments were offered with large profits and in a short time did sound tempting. Even though there have been many victims, there are still some who have been deceived by this investment mode fraud. Cases like this are common and certainly have a negative impact on the development of Bitcoin. Unknowing investors will spread information that Bitcoin is a fraud, even though what deceived them was a fake investment company. The development of Bitcoin does not always have a negative impact, many positive opportunities from the development of Bitcoin include an impact in the world of finance, technology, in addition to economic, social and cultural impacts. From the background explanation above, we will analyze the impact of the development of Bitcoin on the growth of fraud under the guise of Bitcoin investment.

II. LITERATURE REVIEW

History of Cryptocurrency David Chaum from the University of California first published the idea of making a cryptographic-based payment method with a product called DigiCash that can maintain the confidentiality of owner's data (Conway, 2014). Six years later, in 1998, Wei Dai published an electronic financial distribution system called B-Money. B-Money is a personal project that leads only to conceptual. In the same year, Nick Szabo then created "Bit Gold". In the Szabo Bit Gold scheme, each user must dedicate computer power in solving the cryptographic equations assigned by the system. Bit Gold is an electronic currency system that users need to solve a problem with a cryptograph solution.

III. RESEARCH RESULT

A. History of Bitcoin

In 2008, a programmer (or maybe a group of programmers) using the name Satoshi Nakamoto published a paper describing digital currencies and the following year launched the Bitcoin network (Metz, 2013). Unlike government currencies, there is no central bank that supports Bitcoin and anyone who has a computer or called the Application-Specific Integrated Circuit (ASIC) Special Integrated Circuit, which is a special machine made for that purpose, can make Bitcoin through a process that called mining. It's relatively fast, cheap and easy to do because in Bitcoin, every participant theoretically has the same strength. There are no banks, therefore there are no bankers, so everyone keeps their own Bitcoin in a virtual account called a wallet. Bitcoin will not have value but Bitcoin can have any price, and volatility is common, Bitcoin can make and lose wealth for many people in the process (Kelion, 2013).

B. Bitcoin Value

The rapid development of Bitcoin can prevent Bitcoin from reaching its true goal as an innovative new form of currency, but it is difficult to accept payments that can lose half their value overnight or may double in the next week, and despite having the potential to become a basic exchange rate at The internet "high volatility, as a result of speculative activity, impedes general acceptance as a means of payment for online trading" (Popper, 2013).

The value of Bitcoin continues to grow because since it was created Bitcoin was designed to only be as many as 21 million worldwide and currently there are as many as 17 million Bitcoin successfully mined. The longer Bitcoin will further reduce the amount of circulation and is predicted to stop in 2140, where every 4 years it will decrease from half the amount. It aims to maintain the value of Bitcoin so that there will not be an over supply of Bitcoin circulating in the community. This is the impact of the price of Bitcoin growing rapidly since 5 years, the last as the graph below that from 2014 to 2019 Bitcoin has grown by as much as 2,400% in the last 5 years, this is the phenomenon of how Bitcoin is still the prima donna in Cryptocurrency.

Fig. 1 2015-2019 Bitcoin Price Development Chart Data obtained by researchers

C. Factors that affect the price of Bitcoin

1) Bitcoin Volume and Distribution **:**This volume greatly affects the movement of Bitcoin, because if many people buy Bitcoin in large quantities, of course the price will rise sharply. Conversely, the value of Bitcoin can plummet if many owners take large amounts of selling.

2) Trader Speculation **:** Believe it or not, the number of Bitcoin users who make it a trading asset is more than those who actually use it as a medium of exchange.

3) Fraud Mode Involving Bitcoin **:** Because of its great potential, many irresponsible parties then make Bitcoin the object of new fraud involving investors. They will persuade potential investors to entrust their Bitcoin with the lure of growing profits periodically. In fact, if the public learns a lot from cases of financial fraud that have cost investors a lot, such a mode should be watched immediately.

D. The development of Bitcoin in Indonesia

The development of Bitcoin in all over the world also occurs in Indonesia, where Bitcoin is growing rapidly and has become a topic of conversation in Indonesia for the past five years and has now become the center of attention for world investors. In Indonesia there is a Bitcoin service company called Indodax (or formerly Bitcoin.co.id) which is the largest Bitcoin company in Indonesia. Indodax serves seller transactions, purchases, and exchanges Bitcoin into rupiah. The company is located in three major cities in Indonesia, namely: Jakarta, Surabaya and Bali. The Indonesian government on the other hand through Bank Indonesia has issued a statement that Bitcoin is not a legal payment tool, so that all risks related to the use and ownership of Bitcoin are borne by the user or owner of Bitcoin and other virtual currencies.

Bloomberg even reported that the number of members of one of the Indonesian Bitcoin exchanges currently reaches almost 1.14 million people and is projected to reach 1.5 million before the end of 2018. The figure is above the number of members of Bitcoin.co.id, a digital currency trading platform (Cryptocurrency) which was established in 2014. Considering such a young age, the achievement of 1.14 million members is fantastic compared to the number of Indonesian capital market investors who have also reached 1.18 investors.

The development of Bitcoin reached its peak especially in 2017 with an astounding increase in value. Just imagine the value had skyrocketed to $ 16,600 per bitcoin on 08/12/2017, or increased by about 67% in a week. And now at the end of August 2019 the value of Bitcoin has fallen to $ 9,620, down 40% to Rp136.6 million per Bitcoin. (Graph 1). Seeing the high volatility of Bitcoin is very risky so people are asked to be careful of Bitcoin and other virtual currencies. All risks related to ownership / use of Bitcoin are borne by the owner / user of Bitcoin and other virtual currencies.

E. Investment scams impersonating Bitcoin

In Indonesia, the development of Bitcoin has also received a response from irresponsible parties, the volatility of Bitcoin is used as a basis for investment practices that tend to lead to fraud to the people of Indonesia. The fertility of digital money-based investments because these investments are offered with huge profits and in a short time it sounds tempting. Not surprisingly, this lure is able to ensnare many people.

In this case the government as a regulator does not remain silent, various measures are given to protect the public from technological crimes using the guise of investment, in this case the government has the OJK (Financial Services Authority). With his duties as the oversight of the Financial Services Authority (OJK), other ministries have agreed to strengthen cooperation in the Investment Alert Task Force to prevent and deal with the rise of illegal investment offers and practices and to function as a means of coordination between Regional Offices / Financial Services Authority Offices and local government agencies / offices related to better protect the community.

In the data submitted by the Investment Alert Task Force (SWI) which can be accessed at https://www.ojk.go.id/waspada-invest/ has stopped 105 illegal investments during 2018. The number increased from 2017 which was 57 illegal investments and 2016 as many as 71 illegal investments. SWI Chairman Tongam Lumban Tobing said, the illegal investment activities were mostly in the form of foreign currency trading, Cryptocurrency (Bitcoin), multilevel marketing (MLM), and money games, such as being the current trend, namely virtual currency or Cryptocurrency including Bitcoin currently has a high prestige. So the chairman of the investment task force is wary of investment, not only that bitcoin is also

often used for bulging investment And in the period of 2016-2018 the investment alert task force has stopped the activities of companies that have indicated bulging investments from OJK data in 2016 illegal investments using Bitcoin / Cryptocurrency of 5%, in 2016 and in 2017 increased by around 9.4% to 14.40% and increased again in 2018 to 26.67%, an increase in the last 3 (three) years shows that an increase in the price of Bitcoin is very influential on an increase in illegal investments using Bitcoin and other Cryptocurrency the year. First, technological advances make it easier for illegal investment actors to offer their activities. Second, public literacy on illegal investment is still inadequate. Third, reports from the public regarding illegal investment continue to increase. Illegal investments were detected thanks to complaints from people who were not yet victims. The complaint was made by telephone 157 or electronic mail to the consumer@ojk.go.id address.
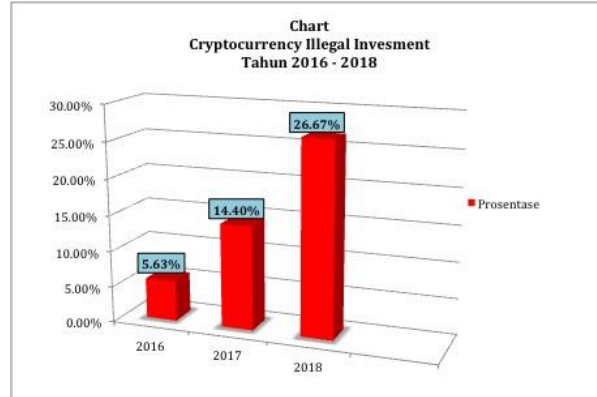
Fig. 2 Chart of Illegal Investment using Bitcoin in 2016 - 2018
Source: Data obtained by researchers

F.   Tips for avoiding fraud under the guise of investment.

Investment with large profits and in a short time does sound tempting. Even though there have been many victims, there are still some who have been deceived by this investment mode fraud. For this reason, Corporate Secretary of PT Reliance Sekuritas Indonesia Erry Hidayat gave seven tips to avoid fraud under the guise of investment.

First, don't get caught up with false promises. he said in the Financial Literacy Reliance Group, Wednesday (3/14/2018). Second, the community must avoid sellers or people who offer investments in a coercive way. Third, beware of sellers who use 'persuasion tips' when offering investments. This is usually done by people who are emotionally close. Fourth, be aware of replication and locking up of funds. Fifth, invest in a clear company. Sixth, you must always pay attention to the permission of the relevant supervisory agency. Finally, remember the principle of investment that is the result must be directly proportional to the risk borne.

IV. CONCLUSION

Technological developments also occur in the digital world where cryptological technology or cryptocurrency has created Bitcoin, which has been developing since 2009, in its development Bitcoin is developing very quickly without the public knowing what is actually Bitcoin, many factors that affect the price of Bitcoin including volume and distribution, trader speculation and a very influential factor is the number of modes of fraud especially in the field of illegal investments that use Bitcoin as a medium of exchange. The third factor occurs because of the enormous potential of Bitcoin, so many irresponsible parties then make Bitcoin as a new object of fraud involving investors.

Cases like this are common and certainly have a negative impact on the development of Bitcoin. Unknowing investors will spread information that Bitcoin Although there are several other factors that can influence the movement of Bitcoin, the three things above can be considered as the main cause. In conclusion, Bitcoin is a currency whose value is very sensitive to global news and is still unstable in responding to the sentiments of traders and users. Therefore, by studying the factors that influence the price of Bitcoin, it is hoped that the public can make it into consideration before buying or selling Bitcoin.

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Detection and Identification of Polymer Migration into Water Induced by Heat Treatment

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Abstract: This study was conducted to determine if the migration of materials from plastic wrap or food and beverage packaging into food or drinks which commonly used in street food due to the influence of heat. This works is aimed provides producers, consumers and government with knowledge about the safety of plastic-based packaging. Collection of plastic packages or packaging samples from food and beverage vendors from several districts in Bali was then reduced in size and mixed with food and beverages, in this case was represented distilled water. Samples are given various heat treatments to induce and accelerate the migration of material from plastic into the food / beverage substituent. Water that was contaminated with plastic material are then separated, and the contamination which migrated was then detected using UV-visible spectroscopy and Gas Chromatography, then identified using FTIR spectroscopy to be analyzed using IGOR software.

Keywords: chromatography, food, migration, polymers, spectroscopy.

I. INTRODUCTION

Polymers are large molecules that have an important role that is easily formed from one form to another, and has properties, structures that are complicated so that it is often used in various activities such as food packaging plastics [1]. Plastic is an example of a polymer that is formed through a polymerization process. Plastic can be found in everyday life, generally used as a means for packaging. There are several types of plastic used as packaging include: PET (polyethylene terephthale), HDPE (high density polyethylene), PVC (polyvinyl chloride), LDPE (low density polyethylene), PP (polypropylene), PS (polystyrena) (Sarker and Rashid) , 2013). Manufacture of plastics requires additives, where additives function to reduce the rigidity of plastics, maintain plastics from damage, strengthen plastics and improve mechanical properties, and increase heat resistance [2].

As a packaging device, plastics must have resistance to heat. heat is an external factor that can cause damage to the plastic [3]. Heating on the plastic can cause the release (migration) of additive components in the plastic into food or drinks that are packaged [4]. At a temperature of 80-100 ° C there is concern that plastic will experience

migration of additive components [5]. In addition to heat, contact surface area, migration speed and type of plastic also affect the migration of plastic packaging. Additives such as Bishpenol A (BPA) and Di- (2-ethylhexcyl) phthalate (Ptalate) are often used to increase the quality of plastics. Plasticizers such as BPA and Ptalate can undergo molecular changes when they are treated with heat, the heating effect can result in BPA and Ptalate being polymerized into food. If migrating into BPA and Ptalate food can cause health problems. Previous studies have shown that exposure to high levels of BPA adversely affects the reproductive organs in men, such as decreasing the number of sperm cells, then can lead to early puberty in women, weight gain, pregnancy complications, giving effect to the prostate organs and malignancy. Ptalate can cause diseases such as diarrhea, vomiting and stomach ulcers [6].

Lack of education and knowledge to food vendors or the community has resulted in various types of plastic used as packaging equipment not having certain specifications and limitations. At the same time the heat from food / drinks stored in the plastic may cause the release of plastic components of the polymer packaging, which migrate into food due to the effects of heating. Additive components released can be detrimental to health, so research is conducted to see whether ordinary plastic, used by food vendors and the public can release additives to food, in this study represented as distilled water.

II. METHOD AND PROCEDURE

The material used in this study consisted of 20 food packaging plastics that were often used by traders and the community and then distilled as the main media. This plastic packaging is taken directly from food vendors in the Denpasar-Jimbaran area. The equipment used in this study is a test tube, centrifuge, autoclave, micro pipette, analytical scales, scissors, plastic funnel, UV-visible spectrophotometer, Gas Chromatography (GC) and Fourier-Transform Infrared (FT-IR) Spectroscopy.

Polymer samples were obtained from plastic packaging vendors and food vendors using plastic packaging. The samples size (plastic) was reduced by cutting into small pieces using custom made punch cutter to increase the surface contact area which higher migration rate was expected, where if migration is high then the possibility of migration detection also increased [6]. Distilled water was chosen since it is one of the main ingredients that is always exist in food or drinks. Distilled water warmed up with a plastic sample of the packaging will only give water and polymer reading without any other possible reading, where 9 mL of distilled water was added for every 1 gram of plastic sample for heat treatment to induced migration.

Polymers samples mixed with distilled water are was heated for 1 hour in 3 different temperature variations, namely 60 ° C, 80 ° C, and 100 ° C for 1 hour. After cooled to room temperature, distilled water contaminated with polymer was separated from the polymer plastic pipette, and then further separated from heavier particles using centrifuge for spectroscopic and chromatographic analysis.

III. RESULTS AND DISCUSSION

The UV-visible spectra of the migration of polymer material shows the migration of polymer material, in all types of plastic packaging (samples) detected. Based on the UV-visible spectrum, 2 patterns were obtained from the entire UV-visible reading. The 2 patterns are related to the type of migrating polymers and heating temperature of each sample. Figure 1 is a result of subtraction between distilled water polluted with polymer, subtracted from water as baseline. Based on the spectrum in Figure 1 it can be concluded that, starting at 60 ° C the UV-visible spectrum has shown an increase in the UV-visible spectrum, further increase at 80 ° C and 100 ° C. Based on the similarity of the spectra, possibly there is only one type of chemical that is detected using a UV-visible spectrophotometer. In addition, Figure 1 also shows the concentration of chemicals released into water were vary according the heating temperature of each sample, where the higher the temperature the higher the concentration of chemicals were released into the water.
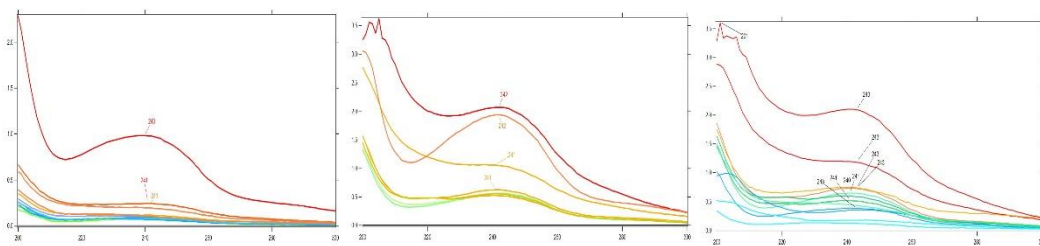
Fig. 1 Pattern 1 of Migrating Polymer at 60 °C (left), 80 °C (center) and 100 °C (right)

Meanwhile the UV-visible spectrum in Figure 2 shows the second pattern, which indicates that there are different chemicals between Figures 1 and 2. The different patterns read indicate that there are at least 2 types of chemicals due to different shapes of the spectrum reading. It is highly possible that the chemicals detected in Figure 1 is different as detected in Figure 2.
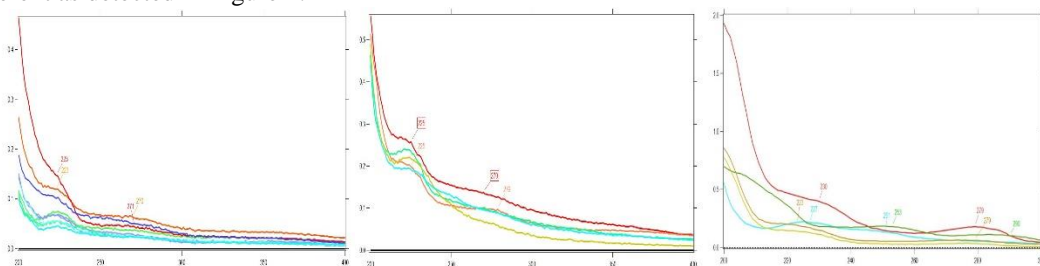
Fig. 2 Pattern 2 of Migrating Polymer at 60 °C (left), 80 °C (center) and 100 °C (right)

The sample chosen for the FT-IR analysis was selected spectrum in Figure 1 since the intensity results shown in Figure 1 is higher than in Figure 2 which indicates the amount of chemicals released is higher. Since there is only 1 peak in Figure 1, it is likely there is only 1 type chemical was released making FT-IR analysis more direct. The selected polymer after heat treatment were dried properly and scanned in FT-IR spectroscopy.
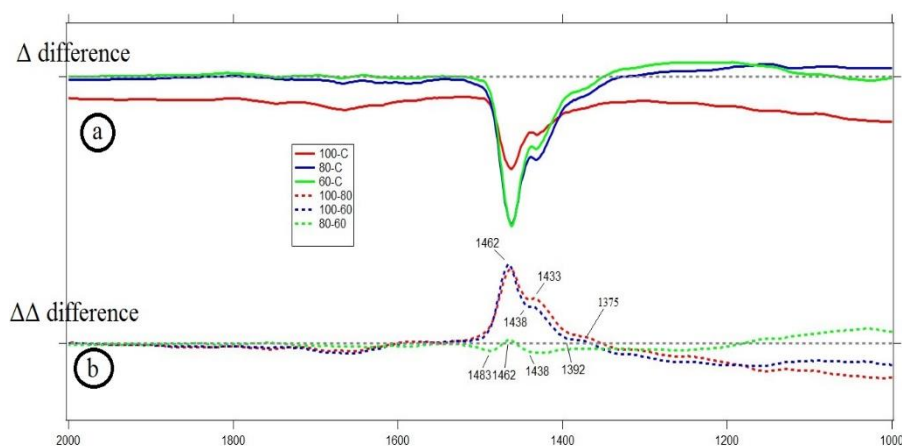
Fig. 3. Difference FTIR Spectra (top) and Double Difference Spectra (bottom).

The spectra in Figure 3 (top) are the result of subtraction from the packaged plastic samples that were heat treated (60, 80, and 100 ° C) *minus* control (plastic packaging samples without heat treatment). The spectral results in Figure 3 between 60 and 80 ° C the results show similar spectra which indicates the polymer material was released similarly slightly, meanwhile the results at 100 ° C show a different spectra which indicated more polymer material is released into water. In Figure 3 (bottom) were double difference spectra [80 °C *minus* 60 °C] shows a small difference, [100 ° C *minus* 80 ° C] shows a greater difference, whereas the result of [100 ° C *minus* 60 ° C]and [100 ° C *minus* 80 ° C] were showing similar spectra. These spectra indicates the possibility of food packaging polymer materials from Figure 1 were began to detach at temperatures 60 ° C. The spectral results shown in the FT-

IR indicates there was probably only 1 type of chemical that is detached from the sample of the packaging plastic which was tested. There are 3 peaks that can be read in Figure 3 (bottom), where peak at 1462 cm^{-1} may from C = C stretch [McFarland/7], peak at 1433 cm^{-1} reads of CH$_2$ compounds (Fan/8), and at the last peak at 1375 cm^{-1} may from C-H stretch (Fan, 2012). Thus from the 3 identified peaks of chemical groups, the possible type of the released plastic polymer material butadienyl (C4H3) (Fan/8).
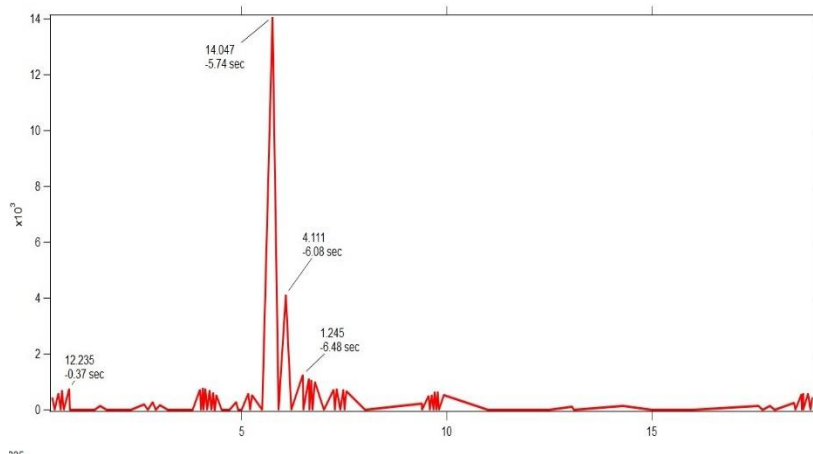
Fig. 3. Fraction Pattern detected using Gas Chromatography.

Samples used in UV Visible Spectrophotometer was then injected into Gas Chromatography (GC) using RTX-Wax as column where oven temperature was increase between 80 °C to 250 °C after sample was loaded. The results of the detection of migrated polymer using GC showed more detection of polymer components were released into water which was unable to be detected using UV Visible Spectrophotometer. There were about 42 fractions of materials were detected in the injected samples, where only the highest percentage of material detected the same as detected in the previous UV-visible spectroscopy reading. Detection were occurred at 0.37 seconds and ended at 18,915 seconds.

IV. CONCLUSION

The results of the shows that out of 20 samples that tested, all plastic were releasing chemical into water upon heating, and the results indicate that component as like Butadienyl was released into water. These indications required further analysis to determine the concentration of the released chemicals and its effect into human health.

V. ACKNOWLEDGMENT

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Extended Spectrum Beta-Lactamase Producing Enterobacteriaceae Colonization Among Intensive Care Unit Patients

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Abstract-
Objective: The prevalence extended spectrum beta-lactamase (ESBL) producing Enterobacteriaceae colonization among Intensive Care Unit (ICU) patients on admission and discharge from ICU

*Methods and Procedures***:** A cohort prospective study involving 70 patients was conducted in Intensive Care Unit Sanglah General Hospital from October 2018 to March 2019. Specimens were obtained from rectal swabs upon admission to and discharged from ICU. Collected data was analyzed using Pearson chi square analysis and adjusted relative risk ratio (RR).

Results: Our study shows, the risk of ESBL colonization associated to respiratory system variable upon admitted to ICU, P value 0.012 (RR 2,828, 95% CI 1,200-6,661), and discharged from ICU, has P value 0.008 (RR 1.987, 95% CI 1.133-3.484),

Conclusion: Patients with respiratory system dysfunction are related to increasing rate of ESBL-producing Enterobacteriaceae colonization in critically ill patients treated in ICU

Clinical Impact: early detection on ESBL Enterobacteriaceae colonization presence to prevent the development of infection and dissemination.
.
Keywords: respiratory system dysfunction, ESBL-producing Enterobacteriaceae colonization, ICU.

I. INTRODUCTION

Extended-spectrum β-lactamases (ESBLs) are bacterial enzymes which is produced to confer resistance to broad range of extended-spectrum β-lactam antibiotics. The ESBLs hydrolyze extended-spectrum cephalosporins. First reports of ESBLs were in the mid-1980s and mostly **Klebsiella pneumoniae** and **Escherichia coli [1]**. In

2013, Centers for Disease Control and Prevention (CDC) reported an increasing resistance which included 26,000 ESBL-producing **Enterobacteriaceae** infections and 1700 deaths in the United States [2], [3]. Colonization of ICU patients with ESBL producing Enterobacteriaceae upon admission has an impact on poorer outcome and increasing mortality. The prevalence of ESBL-producing Enterobacteriaceae found in ICU patients rectal swabs varies throughout the world, 2.25% in United States, 15% in France, 28.2% in South Korea, and 65% in India out of which 56% were ESBL-producing **E. coli** and 43% **Klebsiella** spp [1], [5]. Risk factors for infection with ESBL producing organisms are ICU stay, recent invasive procedures, pressure ulcer, anemia and permanent urinary catheter [5]-[7].

II. METHOD AND PROCEDURE

We conducted a prospective cohort study which was approved by the Medical Ethical Committee of Sanglah General Hospital from October 1st, 2018 until March 31th, 2019. Rectal swabs were collected from 70 patients who fulfilling the inclusion and exclusion criteria and willing to sign the informed consent when patients were admitted and discharged from ICU. Rectal swabs was put in medium amies and delivered to Clinical Microbiology Department Sanglah General Hospital to be inoculated in MacConkey medium. the species were identified and susceptibility was tested using Vitek 2 Compact (bio Me´rieux). Initial bivariate analysis was conducted using χ^2 (Pearson chi square) and considered significant if p value<0.05. Adjusted relative risk ratio (RR) was used to estimate the influence of the variables to ESBL colonization occurrence rate on the patient who were admitted or discharged from ICU. Statistical analysis was performed using IBM SPSS statistic software Version 22.

III. RESULTS

The mean age of the patients was 45.7 ±17.75 years old, and 82.8% were adult (18-64 years old), with length of ICU stay for 6.35 ± 4.01 days. There were 57.1% male patients with 61.4% of total patients were from Sanglah General Hospital inward patients. ESBL colonization increased during ICU stay from 25.7% at admission to 50% when patients were discharged from ICU. The mortality rate was 22.9% (16 patients)

TABLE IV

ANALYSIS OF ESBL COLONIZATION WHEN PATIENTS WERE ADMITTED TO ICU AND DISCHARGED FROM ICU

Variable (n, %)	ESBL on admission				ESBL Colonization When Discharged			
	Positive	Negative	P value	RR 95% CI	Positive	Negative	P value	RR 95% CI
Sex								
Male	9 (22.5%)	31 (77.5%)	.477	(0.750 (0.339-1.658)	22 (55%)	18 (45%)	0.334	1.269 (0.773-2.084)
Female	9 (30%)	21 (70%)			13 (43.3%)	17 (56.7%)		
Age								
Adult	14 (24.6%)	43 (75.4%)	.644	(0.798 (0.314-2.031)	28 (49.1%)	29 (50.9%)	0.759	0.912 (0.517-1.611)
Geriatric	4 (30.8%)	9 (69.2%)			7 (53.8%)	6 (46.2%)		
Central Nervous System Dysfunction								
Present	10 (22.2%)	35 (77.8%)	.370	(0.694 (0.315-1.531)	25 (53.1%)	18 (41.9%)	0.086	1.570 (0.903-2.730)
Absent	8 (32%)	17 (68%)			10 (37.0%)	17 (63%)		
Respiratory System Dysfunction								
Present	12 (41.4%)	17 (58.6%)	.012	(2.828 (1.200-6.661)	25 (64.1%)	14 (35.9%)	0.008	1.987 (1.133-3.484)
Absent	6 (14.6%)	35 (85.4%)			10 (32.3%)	21 (67.7%)		
Cardiovascular System Dysfunction								
Present	9 (26.5%)	25 (73.5%)	.888	(1.059 (0.478-2.348)	17 (54.8%)	14 (45.2%)	0.470	1.188 (0.746-1.893)
Absent	9 (25%)	27 (75%)			18 (46.2%)	21 (53.8%)		
Gastrointestinal System Dysfunction								
Present	7 (38.9%)	11 (61.1%)	.138	(1.838 (0.841-4.016)	10 (52.6%)	9 (47.4%)	0.788	1.074 (0.645-1.788)
Absent	11 (21.2%)	41 (78.8%)			25 (49.0%)	26 (51%)		
Urogenital System Dysfunction								

			P value	RR (95% CI)			P value		RR (95% CI)
Present	5 (31.3%)	11 (68.7%)	.564	(1.298 (0.545-3.091)	9 (52.9%)	8 (47.1%)	.780	0	1.079 (0.638-1.825)
Absent	13 (24.1%)	41 (75.9%)			26 (49.0%)	27 (51%)			
Musculoskeletal System Dysfunction									
Present	3 (16.7%)	15 (83.3%)	.578	(0.308 (0.189-1.767)	9 (69.2%)	4 (30.8%)	.124	0	1.518 (0.958-2.404)
Absent	15 (28.8%)	37 (71.2%)			26 (89.7%)	3 (10.3%)			
Endocrine System Dysfunction									
Present	5 (50%)	5 (50%)	.058	(2.308 (1.053-5.057)	5 (45.5%)	6 (54.5%)	.743	0	0.894 (0.757-1.958)
Absent	13 (21.7%)	47 (78.3%)			30 (50.8%)	29 (49.2%)			
Malignancy									
Present	5 (29.4%)	12 (70.6%)	.689	(1.199 (0.500-2.876)	12 (57.1%)	9 (42.9%)	.434	0	1.217 (0.757-1.958)
Absent	13 (24.5%)	40 (75.5%)			23 (46.9%)	26 (53.1%)			
Immune System Dysfunction									
Present	0 (0%)	5 (100%)	.172	(1.383 (1.190-1.608)	2 (66.7%)	1 (33.3%)	.555	0	1.354 (0.587-3.124)
Absent	18 (27.7%)	47 (72.3%)			33 (49.3%)	34 (50.7%)			
Corticosteroid Usage									
Present	4 (33.3%)	8 (66.7%)	.507	(1.381 (0.505-3.469)	7 (70%)	3 (30%)	.172	0	1.500 (0.921-2.433)
Absent	14 (24.1%)	44 (75.9%)			28 (46.7%)	32 (53.3%)			

Positive ESBL-producing Enterobacteriaceae colonization was found on 18 patients (25.7%) when admitted to ICU. The number was increased to 35 patients (74.3%) upon discharged from ICU with P value 0.003 (RR 1.994, 95% CI 1.225-3.086). The result was in line with study by Harris et al (2004) which found 23 patients (23.7%) from a total of 97 patients became ESBL-producing Enterobacteriaceae carriers during ICUs stay [8]. Young also observed similar results on his study in Singapore and concluded that ICUs stay was the risk factor of ESBL-producing Enterobacteriaceae colonization [9].

Some statistically significant correlations could be observed in our study as the risk factor of ESBL-producing Enterobacteriaceae colonization in ICU patients. Patients with respiratory system dysfunction are also at increasing risk to be carriers with P value 0.008 (RR 1.987, 95% CI 1.133-3.484). An observational multicenter study in France showed similar result with a significant correlation between ESBL-producing Enterobacteriaceae colonization and respiratory system dysfunction (P<0.01), [10].

Some limitations should be underlined. No environmental sample was included in our study that could cause ESBL-producing Enterobacteriaceae colonization by direct contact. The study was limited in ICU and no subsequent observations of morbidity and mortality were done after patients were discharged from ICU.

IV. CONCLUSION

Patients with respiratory system dysfunction are related to increasing rate of ESBL-producing Enterobacteriaceae colonization in critically ill patients treated in ICU

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IMPROVEMENT OF SEAWEED PRODUCTIVITY USING BAGS SYSTEMS IN THE KUTUH COASTAL WATER BALI

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Abstract— Seaweed farming activities no longer exist in the waters of Kutuh Beach because seaweed, especially the type of Eucheuma cotonii, cannot grow well. This condition is caused by the presence of seaweed predators that eat seaweed. The method that can be used to overcome this problem is the use of a bag system, but the bag system requires a longer time in planting seaweed. A development of a bag system is needed that can reduce the time to plant seaweed. The specific purpose of this study was to determine the productivity of the use of the bag system developed by the point method, the ris rope method, and the plot method. Furthermore, the study continued with a feasibility analysis and survey of the interests of members of the seaweed cultivator group. The method used in this research is the Research and Development Method. This research was conducted in July-September 2019 in the waters of Kutuh Beach. The parameters used are the Specific Growth Rate which was analyzed using the ANOVA test with Duncan's advanced test using SPSS software. Based on the results of the study note that the specific growth rate of seaweed in the three methods of installing bags is not significantly different. This shows that the installation of different bags does not affect the growth of seaweed so farmers can choose the method of mounting the bag that is most easily applied.

Keywords— Seaweed, Kutuh, Bag System, SGR, Growth

I. INTRODUCTION

Seaweed culture has an important role in efforts to increase fisheries production to meet food and nutrition needs, expand employment opportunities, increase income and welfare of fishermen and fish farmers and maintain the preservation of aquatic biological resources (Aslan, 1998). Seaweed culture is one of the leading fisheries commodities that are still mostly occupied by coastal communities in Badung Regency. One area that is the center of the development of seaweed culture is in the District of South Kuta, Badung Regency, which is precisely in Kutuh Beach, Kutuh Village.

Kutuh Village has a wide enough sea potential in the development of fisheries activities, especially for seaweed culture which has been able to lift the economy of the people in Kutuh Village. Arthana et al. (2012) stated that the southeastern waters of the island of Bali are suitable for seaweed culture, one of which is the Kutuh Coast waters, Badung. Suwariyati, et al. (2014) added that the types of seaweed cultivated in Kutuh Beach are Eucheuma cottonii and Eucheuma spinosum. Dewi and Saraswati (2016) state that Halymenia sp. can also be cultivated in Kutuh Beach with good growth.

Kutuh Beach which is now known as Pandawa Beach has developed into a tourism area. These developments can affect the development of seaweed culture activities that have existed before, but farmers continue to maintain seaweed farming activities (Suwariyati, et al., 2014). Dewi and Saraswati (2016) add that the community around Kutuh Beach still makes seaweed culture a major occupation even though Kutuh Beach has now developed into a tourism area. However, seaweed cultivators in Kutuh Beach experience some obstacles in seaweed culture activities, namely seaweed cannot grow properly and the quality of dried seaweed is not good. According to Ayu and Ekawaty (2019), the growth of grass that is not optimal in the waters of Kutuh Beach is caused by the number of predators that eat seaweed in the culture area.

One method that can be used to overcome the problem of predators that interfere with seaweed growth is the use of bags in seaweed culture. The bag functions like a poly bag that can be a container for seaweed seeds before it is ready for culture. Syarqawi et al. (2017) stated that the growth of seaweed by using seaweed bags should be applied to help seaweed farmers in Simeulue district. Based on the explanation above, the researchers intend to conduct research to increase the productivity of seaweed using a modified bag method based on how it is installed.

II. METHODS AND PROCEDURES

The method used in this research is the Research and Development Method, which is a research method used to produce certain products, and test the effectiveness of these products. There are three treatments based on the method of installation bags on seaweed culture and each treatment is repeated three times. The first treatment is a bag installed at each of the seaweed planting points, the second treatment is a bag installed on one ris rope containing 10 seaweed planting points and the third treatment is a bag installed on 1 seaweed plot containing 3 ris ropes. The bag in treatment 1 is tubular with a height of 40 cm and a circumference of 95 cm. The bag in treatment 2 is cuboid with height 40 cm, width 40 cm, and length 100 cm. The bag in treatment 3 is cuboid with height 40 cm, width 100 cm, and length 100 cm.

The study was conducted for 6 weeks in July-September 2019 in the Kutuh coastal water. Seaweed cultivation is carried out using off bottom method with the initial weight of seaweed is 100 grams. The parameters observed in this study were SGR by measuring the weight of seaweed once a week. The data was analyzed using the ANOVA test with Duncan's advanced test using SPSS software.

III. RESULTS AND CONCLUSION

The results of this study indicate that the use of different bag methods based on the installation method gives growth results that are not significantly different. This is suspected because each seaweed in the three treatments is protected by a bag and the installation method does not affect the level of seaweed protection from predators. So seaweed in each treatment has the same level of protection from predators. In addition, seaweed in each treatment also gets the same nutrients so that the resulting growth is also relatively the same.

The same growth generated in each treatment can provide opportunities for farmers to choose the most effective installation method according to farmers. This is because the farmers previously objected to using the bag system with the method of installing bags at each planting point of seaweed. Farmers reasoned that the method required more time and extra energy in planting seaweed. Based on interviews with Kutuh Beach farmers, it is known that farmers are more interested in using the bag system with the plot method. This is because according to local farmers that the method is more effective than two other planting methods.

In this study also indicated the feasibility of seaweed cultivation using a bag system. The feasibility of this business is based on the best planting method obtained in this study where the best research method used is the plot method. The plot method to be developed is the 100 cm x 100 cm x 40 cm plot method which contains 3 ris and each ris contains 10 spots of seaweed. The calculation of the feasibility of seaweed farming is based on making 10 seaweed cultivation plots or 300 seaweed planting points. Based on the results of the business feasibility analysis, it is known that the seaweed cultivation business using the bag mapping method is feasible to be continued as a cultivation business.

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Overview of Manganese Superoxide Dismutase (MnSOD) Enzyme Level in Population with Coronary Heart Diseases Risk Factors in Denpasar

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Abstract—Coronary heart disease is the biggest cause of mortality and morbidity in the world Data from the World Health Organization (WHO) in 2012 showed that 17.5 million people worldwide died from cardiovascular disease or 31% of 56.5 million deaths worldwide. Of all deaths due to cardiovascular disease 7.4 million (42.3%) of them were caused by coronary heart disease (CHD) and 6.7 million (38.3%) were caused by stroke. The MnSOD enzymes is an antioxidant enzyme that protect cardiovascular system from damage caused by free radicals. Tissue damage caused by free radicals is mechanism underlying cardiovascular diseases. This research is cross sectional study. Determination of samples was done with consecutive sampling. Sixty elderly people were involved in this study. The research samples was populations that had hypertension and diabetes type II that controlled with anti hypertension and anti diabetic drugs. Measurement of MnSOD level was done used ELISA method. The mean MnSOD enzyme levels in research samples were 1.573. MnSOD level in sample research was very low.

Keywords— Coronary Heart Diseases, MnSOD, Stress Oxidative.

I.   Introduction

Coronary heart disease is the biggest cause of mortality and morbidity in the world. Based on the data from Riskesdas in 2013, the highest prevalence for cardiovascular disease in Indonesia is coronary heart disease. According to the age group, coronary heart disease most often occurs in the age group 65-74 years (3.6%) followed by the age group 75 years and over (3.2%), the 55-64 year age group (2.1%) and age group 35-44 years (1.3%). Data from the World Health Organization (WHO) in 2012 showed that 17.5 million people worldwide died from cardiovascular disease or 31% of 56.5 million deaths worldwide. All of deaths due to cardiovascular disease, 7.4 million (42.3%) of them were caused by coronary heart disease (CHD) and 6.7 million (38.3%) were caused by stroke [1].

Fatal complications caused by coronary heart disease most often occur in middle age to old age. The progression of coronary heart disease is influenced by various risk factors, one of which is the lack of physical activity [2]. Diabetes is generally accompanied by a chronic state of oxidative stress, disequilibrium in the redox balance [3]. The concept that oxygen, which is essential to life, could be causing cell damage and involved in many diseases, was discovered in recent years. Today, many epidemiological and clinical studies strongly suggest the involvement of reactive oxygen species (ROS) in the genesis and evolution of chronicdiseases ,including diabetes and its complications [4]. Reactive oxygen species (ROS) been cited as one of the major causes of atherosclerosis and coronary artery disease whichare possible agents inducing DNA damage. Manganese superoxide dismutase (MnSOD) have evolved to address primary defense against free radical [5]. The aim of the study is to investigate the MnSOD antioxidant enzyme level among a population with coronary heart diseases risk factors in Denpasar

II. Methods and Procedures

This study is a cross-sectional study in which sampling is done by consecutive sampling. The study was conducted in Denpasar Bali. The study was conducted in August 2019. The target population in this study is the population who have risk factors for coronary heart disease in Bali. Affordable population in this study are populations that have risk factors for coronary heart disease in Denpasar City. The study sample came from the study population and after fulfilling the inclusion criteria ie aged 40-55 years, had a history of diabetes, had a history of hypertension. Measurement of MnSOD levels was carried out by the ELISA method carried out in the biomolecular section of Medical Faculty Udayana University.

III. Results

Tabel 1. Characteristics of Research Respondents by Age and Gender

Characteristics	n	%	Mean
Age (year)			
30-40	12	20	
41-50	24	40	47,78
>51	24	40	
Gender			
Male	28	47	
Female	32	53	

Tabel 2. Characteristics of Research Respondents Based on Blood Pressure, Total Cholesterol Levels and Blood Sugar

Characteristics	n	%	Mean
Blood Pressure (mmHg)			
Normal	9	3	
Elevated	10	17	
Hypertension Grade I	18	30	
Hypertension Grade II	21	35	
Hypertension Crisis	2	3	
Total Cholesterol (mg/dL)			
Desirable (<200)	38	63	195,033
Borderline High (200-239)	16	27	
High (>240)	6	10	
Blood Sugar (mg/dL)			
Normal (<200)	57	95	121,817
High ($\geq$200)	3	5	

Tabel 3. Manganese Superoxide Dismutase (MnSOD) Enzyme Levels of Research Respondents

Characteristics	n	%	Mean
MnSOD Levels			
<1	1	2	
1-3	47	78	4,495
3-5	5	8	
>5	7	12	

IV. Discussion

Based on the results of the study, it was found that the majority of study respondents were over 40 years old, as many as 48 people (80%). Diabetes is one of the risk factors for coronary heart disease where type II diabetes mellitus is a metabolic disease associated with the aging process. Central obesity and insulin resistance are factors that initiate the occurrence of metabolic diseases and often occur in the elderly population [6]. There are various risk factors in the prediction model of cardiovascular disease, but age remains a fundamental predictor of cardiovascular risk [7]. Age has an important role in decreasing cardiovascular function, which results in an increased risk of cardiovascular disease (CVD) in older adults [8][9]. The prevalence of CVD has also been shown to increase with age, both men and women, including the prevalence of atherosclerosis, stroke and, myocardial infarction [10]. The American Heart Association (AHA) reports that the incidence of CVD in US males and females is ~ 40% of 40-59 years, ~ 75% of 60-79 years, and ~ 86% in those over the age of 80 [10].

Based on the results of the study also obtained results that the majority of research respondents classified as grade I and II hypertension, namely grade I hypertension as many as 18 people (30%) and grade II hypertension 21 people (35%). This is in line with the results of research by Gutierrez, J et al in 2018 that the prevalence of hypertension in populations with risk factors for coronary heart disease is 11.1% [11]. This revealed that hypertension was widespread and growing, indicating the need for interventions to prevent this disease. In addition, the results of the study shows a significant relationship between hypertension and age in men and women, which is in line with national and world research on various populations with various geographical, environmental, social and financial aspects [12][13]. High blood pressure is one of the most important risk factors for cardiovascular disease (CVD), which is a major cause of death [14][15]. Approximately 54% of strokes and 47% of coronary heart disease, worldwide, are caused by high blood pressure [16].

Based on the study by Wu, CY, et al in 2015 there was a relationship between hypertension and coronary heart disease mortality and the results of this study prove that hypertension can increase mortality among patients with coronary heart disease [17].

The results showed that blood glucose levels when the study respondents were 95% of respondents had blood glucose levels when within normal limits. This is because most of the respondent's blood glucose is drug-controlled. Epidemiological studies show that post prandial glucose levels are independent risk factors that play an important role in the occurrence of coronary heart disease [18].

MnSOD enzyme levels in research respondents showed that most ranged between 1-3 mg / dL, as many as 78% of all study respondents. Oxidative stress in the mitochondria plays an important role in the pathophysiology of coronary heart disease [19]. Oxidative stress comes from excess production of ROS or inadequate antioxidant functions. MnSOD is a mitochondrial enzyme, which works on the metabolism of ROS and participates in cellular defense against oxidative stress. The main antioxidant in mitochondria is MnSOD which converts ROS to oxygen and hydrogen peroxide [20]. Based on research by Yeh, HL than 2018 shows that the MnSOD gene polymorphism is an independent risk factor for susceptibility to cardiovascular diseases in Chinese populations [21].

V. Conclusion

Based on the research that has been carried out, it can be concluded that research respondents have a risk for coronary heart disease, the levels of the MnSOD antioxidant enzyme were relatively low in the research respondents.

The things suggested in this study are to conduct research with a larger number of samples in order to represent the population in Bali and the research also identifies other factors that also affect the levels of the MnSOD enzyme.

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Utilization Of Fly Ash Waste From PLTU Tarahan Lampung For High Quality Concrete With Glass Powder as Filler

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Abstract—This study focuses on the utilization of fly ash waste generated from the remaining coal combustion production at the Tarahan PLTU, South Lampung and the use of glass waste. The focus of this research is to discuss the effect of the use of fly ash and glass waste on the strength and quality of concrete. The purpose of this study is to determine the compressive strength in each variation of the addition of fly ash and glass powder, determine the percentage of fly ash and glass powder in the concrete mixture to produce maximum compressive strength, and find out whether fly ash and glass powder are effectively used together as ingredients concrete mix.

Keywords— Keywords: Compressive Strength, Fly Ash, Glass powder, Waste Material

I. INTRODUCTION

Many attempts were made to get high quality concrete from conventional concrete and also of course at a more economical cost. The use of fly ash waste material is one of the efforts to improve the quality of concrete, reducing the cost of concrete production by reducing the amount of cement used, as well as efforts to reduce environmental pollution caused by waste. Tarahan Power Plant is a power plant that utilizes energy from coal and produces fly ash waste. Fly ash waste is expected to increase concrete compressive strength and reduce pollution

The second waste that is also utilized in this research is glass waste produced by industry and households. The use of glass in concrete is done with the target of increasing the compressive strength of concrete and reducing glass waste that can pollute the environment. Glass is a material which is easy to find and has an economic value, beside that glass also has good resistance to abrasion, weather or chemical attacks, because in the glass there is a high enough silica content. The glass used is a bottle or an unused bulb that is crushed and is expected to be a filler in high quality concrete.

This research is intended to examine the effect of the use of fly ash and glass waste material on the compressive strength of high quality concrete and its positive impact on the environment. Therefore, in this study, the authors used a different percentage of fly ash and glass to compare the compressive strength of concrete samples. The test object used was 18 concrete samples.

II. METHODS AND PROCEDURES

The study was conducted at the Structure Laboratory of the Sumatra Institute of Technology, South Lampung.

This research was conducted in several stages, namely: procurement of materials and equipment, inspection of materials and equipment, planning of concrete mixtures, making concrete, treating concrete (curing), testing concrete and analyzing research results.

The coarse aggregate used in this study is broken stone from Sumber Batu Berkah (SBB), South Lampung. Diameter of aggregate used is not more than 20 mm. Fine aggregate used in the form of sand originating from Mount Sugih, Central Lampung. The Fly Ash used comes from the Tarahan PLTU, South Lampung. Fly ash which is used in research functions as a cement substitution material. Then it is used by replacing cement in different percentages. Fly ash is taken in, 5% weight of cement and 10% weight of cement. The glass powder used comes from broken glass waste in an unused environment and used glass bottles. Glass powder is used as filler by using an additional percentage of the amount of cement and fly ash. The use of glass powder escaped filter no. 50, passed the no. filter. 100, and passed the no. filter. 200.

Tests of material carried out in this study include specific gravity, sludge content, absorption, specific gravity etc. The test results of material are presented in Table I

Table I
Property of Material

No	Material	Property Details	
1	Cement	Grade	PCC Type I
		Specific Gravity	3,14
2	Fine Aggregate	Grading Zone	Zone III
		Specific Gravity	2,52 gr/cm3
		Sludge Content	0,66 %
		Absorption	3,30 %
		Fineness	2,05 %
3	Coarse Aggregate	Specific Gravity	2,52 gr/cm3
		Absorption	2,72 %
		Fineness	7,94 %
4	Fly Ash	Specific Gravity	2,22 gr/cm3

Source: Analysis, 2019

The calculation of the normal mix concrete mix plan uses the standard Public Works Agency (SK SNI T-15-1990-03), from these calculations the material requirements per 1 m3 of 45 Mpa. The design procedure is detailed below, as shown in Table II.

Table II
Composition of Concrete

No	Calculation of Concrete Composition		
1	Water Design of Concrete	210	kg/m^3
2	Weight of Cement	583,33	kg/m^3
3	Weight of Fine Aggregate	1013,13	kg/m^3
4	Weight of Coarse Aggregate	545,53	kg/m^3
	Volume of Concrete	2352	kg/m^3

Source: Analysis, 2019

The research variables on each test as listed in Table III

Table III
Composition of Concrete

No	% Fly Ash	% Glass Powder	Number of Samples
1	0	5	3
2	0	10	3
3	5	5	3
4	5	10	3
5	10	5	3
6	10	10	3

III. RESULT

The most common of all tests on hardened concrete is the compressive strength test. This is partly because it is easy to make, and partly because many through not all, of the desirable characteristics of concrete are qualitatively related to its strength, but mainly because of the intrinsic importance of the compressive strength of concrete in construction.

In all but the least critical applications, care needs to be taken to properly cure concrete, to achieve best strength and hardness. This happens after the concrete has been placed. Cement requires a moist, controlled environment to gain strength and harden fully. The cement paste hardens over time, initially setting and becoming rigid though very weak and gaining in strength in the weeks following.

The compressive strength of a material is that value of uniaxial compressive stress reached when the material fails completely. The compressive strength is usually obtained experimentally by means of a compressive test. The apparatus used for this experiment is the same as that used in a tensile test. However, rather than applying a uniaxial tensile load, a uniaxial compressive load is applied.

The total material needed to make 3 compressive strength test pieces (cylinder h = 30 cm, d = 15 cm) for 28 days testing with fly ash replacement and glass addition. There is a table of variations in the effect of fly ash and glass powder on the compressive strength of concrete in terms of increasing levels of fly ash on cement with glass powder levels

Figure 1. Compressive Test Of Concrete

Table IV
Compressive Test On Cylinders

No	Type of Specimen		Compressive Strength
	% Fly Ash	% Glass Powder	Strength (N/mm2)
1	0	5	42,27
2	0	10	46,80
3	5	5	41,54
4	5	10	42,55
5	10	5	41,61
6	10	10	42,83

IV. CONCLUSION

Based on the results of the materials properties and the experimental investigation on concrete made with fly ash and glass powder, the reason for the variation observed is summarized as followed. The compressive strength of concrete with fly ash and glass powder is more than the conventional concrete.

Both of these wastes (fly ash and glass powder) can be combined with variations of fly ash which substitute the use of cement and the addition of glass powder so that it can be put to good use and used in the manufacture of high quality concrete on the addition of compressive strength of concrete. Fly ash and glass waste should be used so that it is not only disposed of and pollutes the environment.

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Analysis of Lahar Flood Impact on Agricultural Land in Telaga Waja Watershed, Bali, Indonesia

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Abstract—Following the eruption of Agung Volcano in 2017, erosion from material deposits in the recharge area of the river can cause lahar flooding in the downstream areas. Lahar flood which triggered by high rainfall intensity will impact the environmental, one of it is agricultural land especially ricefields. This research is carried out to analyse the impact of Agung Volcano's lahar to rice fields in Telaga Waja Watershed, one of the watershed with high potential of lahar flood. Calculation on the impact of lahar flood to rice fields is calculated using the value of rice productivity. The lahar flood hazard areas are modelled based on 1 million m^3, 5 million m^3 and 10 million m^3 of lahar volume. The impact of lahar flood to rice fields from 1 million m^3 lahar flood scenario shows that total 30,45 ha areas are affected with total productivity reached 194.89 ton and total value of IDR 2,338,680,000.00. 5 million m^3 lahar flood scenario shows total 68.26 ha areas of rice fields are affected by lahar flood with total productivity reached 436.89 ton with total value of IDR 5,242,680,000.00. Meanwhile 10 million m^3 lahar flood scenario analysis shows that total 74.08 ha areas of rice fields are affected by lahar flood with total productivity reached 474.1 ton with total value of IDR 5,689,200,000.00.
Keywords—lahar, impact, agriculture.

I. INTRODUCTION

Indonesia is one of the countries with the most volcanoes. Indonesia has 129 active volcanoes [1]. Volcanoes that are still active and has residential on the surroundings should be aware of the potential for volcanic eruptions. Potential for volcanic eruptions without population preparedness will increase the risk of being affected by eruptions.

One of the volcanoes that experienced an eruption was Agung Volcano in Bali Province at the end of 2017. Agung Volcano is a stratovolcano. The main hazards produced by this type of volcano are explosive eruptions, pyroclastic flows, lahars and slow-moving lava flows. Typically the pyroclastic flows and lahars cause the majority of the damage, with the ash generated by explosions creating the greatest disruption and discomfort to communities [2].

After 53 years of quiescence, Mount Agung start to awoke in August 2017, with intense seismicity, measurable ground deformation, and thermal anomalies in the summit crater. Although the seismic unrest peaked in late September and early October, the volcano did not start erupting until 21 November. The most intense explosive eruptions with accompanying rapid lava efusion occurred between 25 and 29 November. Smaller infrequent explosions and extrusions continue through the present (June 2019). The delay between intense unrest and eruption caused considerable challenges to emergency responders, local and national governmental agencies, and the population of Bali near the volcano, including over 140,000 evacuees [3].

After the latest eruption of Agung Volcano in December 2017, erosion from material deposits off the volcano in the upstream area can cause lahar flooding and high levels of sedimentation in the downstream areas of the river. Lahar flood resulting from the sediment discharges triggered by high rainfall intensity can cause losses and damage to the rice fields. Entering the rainy season, lahar floods hazard is increasing so there's an urgency to estimate the impact by lahar floods, especially on rice fields.

II. METHODOLOGY

A. Research Location

This research was carried out in Telaga Waja Watershed. Geographically, Telaga Waja Watershed is located between 08°16'49,481" - 08°30'29,371" S and 115°23'30.81 "- 115°30 '17,745" E. Administratively, Telaga Waja Watershed is located in Bangli, Karangasem and Klungkung Regencies of Bali Province with an area of 11,864 Ha.

B. Data Collection

Data collection on this research including actual extent of agricultural land especially rice fields, extent of rice fields affected by lahar floods and analysis of impact of lahar to rice fields. Calculation on the impact of lahar flood to rice fields is calculated using the value of rice productivity from Statistical Bureau of Bali Province and Statistical Bureau of Karanasem Regency [4][5]. Table 1 shows the data collection for this research.

TABLE 1.
DATA COLLECTION PROCESS

No.	Data	Collection Process
1	The actual extent of rice fields	Digitation on Quickbird image, 2017
2	Extent of rice fields affected by lava floods	Overlay process with lahar extent model [6]
3	Analysis of impact of lahar to rice fields	Survey and Interviews
4	RBI maps of Bali Province and Quickbird Satellite Image (2017)	Geospatial Information Agency (BIG) of Republic of Indonesia

C. Methodology

Estimation of the extent of rice fields affected by the lahar flood hazard is carried out using satellite image interpretation and digitation. The objects examined in this work are agricultural land especially rice fields along the Telaga Waja River. The image for this research is the high resolution satellite image from Geospatial Information Agency (BIG) assisted by Google Satellite imagery.

The method of analysis of the lahar flood hazard model in the study, focused on the results of the lahar flood model using LAHARZ software. LAHARZ software is a tool to estimate the upcoming lahar events. LAHARZ using DEM (Digital Elevation Model) and several scenarios of lahar volumes as input to create delineations of areas with potential lahar inundation from selected scenarios [6] [7].

The lahar flood hazard areas are modelled based on 1 million m^3, 5 million m^3 and 10 million m^3 of lahar volume [8]. Then, the agricultural land impacted from lahar flood are carried out by overlay of lahar model extent and extent of rice fields. Interview, survey and questionnaire methods were then carried out to determine community's perceptions related to impact of lahar floods to rice fields.

The approach of community perception in the context of this study uses the knowledge and experience of farmers through interviews related to the value of rice field's production. The method of determining the sample of respondents used is purposive sampling, which is addressed to the owners of rice fields.

III. RESULT AND DISCUSSIONS

Based on the modelling using Laharz software and lahar volume scenarios of 1 million m^3 (1st scenario), 5 million m^3 (2nd scenario) and 10 million m^3 (3rd scenario), the area affected by lahar floods is 162.63 Ha for 1st scenario, 376.63 ha for 2nd scenario and 403.23 ha for 3rd scenario [6].

The agricultural rife field impacted from lahar flood from 1 million m^3 lahar flood scenario shows that total 30,45 ha areas are affected. From 5 million m^3 lahar flood scenario shows total 68.26 ha areas of rife field are affected by lahar flood and from 10 million m^3 lahar flood scenario analysis shows that total 74.08 ha areas of rice fields are affected by lahar flood.

Total productivity of rice fields in Karangasem Regency shows that as much as 6.4 ton are produced per ha of area [5]. The calculation with total area affected by lahar flood shows that from 1 million m^3 lahar flood scenario shows that total productivity which affected by lahar flood reached 194.88 ton. From 5 million m^3 lahar flood scenario shows total productivity which affected by lahar flood reached 436.86 ton and from 10 million m^3 lahar flood scenario analysis shows total productivity which affected by lahar flood reached 474.11 ton. Table 2 shows the productivity of rice fields which affected by lahar flood. Fig. 2 shows area of the rice fields that affected by lahar flood.

TABLE 2.
THE PRODUCTIVITY OF RICEFIELDS WHICH AFFECTED BY LAHAR FLOOD

Lahar Scenario	Volume	Affected Rice fields (ha)	Productivity (ton/ ha)	Total Productivity (ton)
I	1 mil. m^3	30.45	6.4	194.88
II	5 mil. m^3	68.26	6.4	436.86
III	10 mil. m^3	74.08	6.4	474.11

Source: Data Analysis
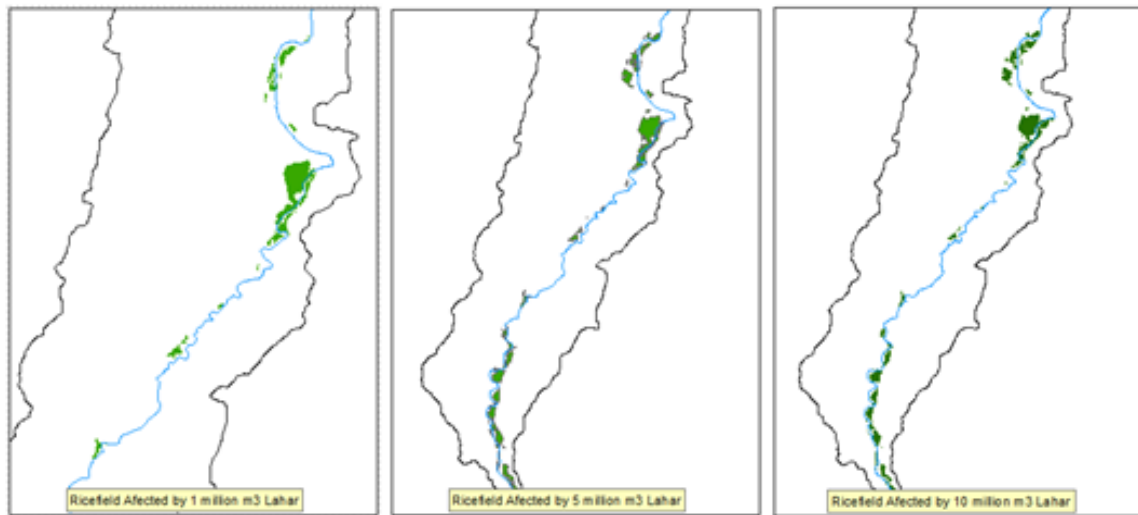
Fig. 3 Area of rice fields that affected by lahar flood, 1 mil. m^3 scenario, 5 mil. m^3 Scenario and 10 mil. m^3 Scenario
Source: Data Analysis

Loss from the lahar flood are calculated based on average rice price on the market and interviews with the farmers. With average rice price per kilogram is IDR 12,000.00, then the loss for onetime harvest from 1 million m^3 lahar flood scenario reach total value of IDR 2.338.680.000,00 (USD 165.418,86). Loss for onetime harvest from 5 million m^3 lahar flood scenario reach value of IDR 5,242,680,000.00 (USD 370,823.77). Meanwhile loss for onetime harvest from 10 million m^3 lahar flood reach total value of IDR 5,689,200,000.00 (USD 402,406.90).

IV. CONCLUSION

The impact of lahar flood to rice fields from 1 million m^3 lahar flood scenario shows that total 30,45 ha areas are affected with total productivity reached 194.89 ton and total value of IDR 2,338,680,000.00. 5 million m^3 lahar

flood scenario shows total 68.26 ha areas of rice fields are affected by lahar flood with total productivity reached 436.89 ton with total value of IDR 5,242,680,000.00. Meanwhile 10 million m^3 lahar flood scenario analysis shows that total 74.08 ha areas of rice fields are affected by lahar flood with total productivity reached 474.1 ton with total value of IDR 5,689,200,000.00.

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Total Cholesterol And Triglycerides Of Weaning Bali Cattle Fed Varying Protein Energy Levels

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Abstract—The purpose of this study was to determine the effect of animal feed of four types of rations with varying protein energy levels (PK 12% and ME 2000 kcal / kg; PK 13% and ME 2100 kcal / kg; PK 14% and ME 2200 kcal / kg; PK 15% and ME 2300 kcal / kg) on cholesterol and triglycerides levels of the weaning Bali cattle blood. This study was carried out by giving a ration formula to 12 weaning Bali cattle. The design used is a Randomized Block Design. The examination of cholesterol and triglycerides total uses an enzymatic colorimetric method. Measurement of cholesterol total using the cholesterol oxidase enzyme. Triglycerides are measured by the release of hydrolysis fatty acids followed by quantification of released glycerol. The results showed that the average cholesterol total of weaning Bali cattle ranged from 93.66 ± 20.60 mg / dl to 146.33 ± 33.71 mg / dl. The average triglyceride total ranges from 5.00 ± 1.00 mg / dl to 11.66 ± 5.13 mg / dl. The value obtained is still in the range of the normal value of cholesterol and triglyceride total in cattle; and there was no significant difference ($P > 0.05$) in all treatments. It was concluded that the four ration formulas used in this study were safe given to weaning Bali cattle. Further research is needed regarding haematology profiles and other blood clinical chemistry with an expanded spectrum and more samples.
Keywords—Bali cattle, cholesterol, triglycerides.

I. INTRODUCTION

Feed is an important aspect in livestock production. The use of feed supplements in animal production has significantly increased in recent years [1]. The nutritional status of individual animals, besides depending on food intake, also depends on the effectiveness of the metabolic process. In order to improve the quality of Bali cattle breeds, Suryani [2] has developed a feed formula for weaning bali cattle. Based on the results of his research, it was reported to produce a good growth of weaning bali cattle, it should be given a ration containing 15% PK and 2300 kcal ME / kg.

The impact of giving the ration still needs to be observed, especially from the aspect of health for the animals that consume it. Serum metabolite concentrations such as cholesterol and triglycerides are commonly used to assess the nutritional status of livestock. Cholesterol is a substance produced by the metabolism of fat that comes from the body and from the food that is eaten. The body, especially the liver, produces the needed cholesterol and then is released into the bloodstream. The liver will produce more cholesterol when many individuals consume foods that contain lots of saturated fat.

The purpose of this study was to determine the impact of feeding with stratified protein energy content in weaning bali cattle. The parameters that became the focus of observation were total cholesterol and triglycerides.

II. METHOD AND PROCEDURE

The study was conducted for three months, using 12 weaning bali cattle, age 9 months, body weight 101.3 kg - 104.3 kg; belongs to the Badung Regency Government located in the Sobangan Animal Husbandry Research Station. Each calf is kept in individual cages. The feed provided consists of forage and concentrate. Concentrate feed is given in the morning, while forage feed is given in a fresh state after being given concentrate feed. This study used a Randomized Block Design with four types of rations as treatments, namely: A = PK 12% and ME 2000 kcal / kg; B = PK13% and ME 2100; C = PK 14% and ME 2200 kcal / kg; D = PK 15% and ME 2300 kcal / kg; with 4 groups of weaning calves as a test. The parameters observed were total cholesterol and triglycerides. Blood samples are taken through the jugular vein, then examined at the Center for Studies of Animal Diseases Laboratory of the Faculty of Veterinary Medicine, Udayana University. Examination of total cholesterol and triglycerides using the enzymatic colorimetric method. Total cholesterol is measured using the enzyme cholesterol oxidase. Triglycerides are measured through the release of fatty acids by hydrolysis followed by quantification of released glycerol. The procedure used follows the instrument instructions (Analyticon® Biotechnologies AG, Germany). The data obtained were then analyzed by analysis of variance.

III. RESULS AND DISCUSSION

The average total cholesterol and triglycerides of weaning bali cattle used in this study are summarized as shown in Table 1. Until now there have been no reports of total cholesterol and triglyceride data of weaning bali cattle. The average value of total cholesterol in this study (Table 1) is within the normal range. According to Smith and Mangkoewidjojo [3], the normal range of bovine cholesterol values is 80-170 mg / 100 ml. Meanwhile according to Meyer and Harvey [4] the normal value of bovine cholesterol ranges from 87 mg / dl to 254 mg / dl.

TABLE 1
TOTAL CHOLESTEROL AND TRIGLYCERIDES OF WEANING BALI CATTLE FEEDED WITH LEVELED PROTEIN ENERGY

Parameter	Feeding Treatment			
	A	B	C	D
Cholesterol (mg/dl)	146,3	124,6	122,0	144,6
Triglycerides (mg/dl)	8,6	11,3	11,6	9,3

A: PK 12%, ME 2000 kcal. B: PK 13%, ME 2100 kcal. C: PK 14%, ME 2200 kcal. D: PK 15%, ME 2300 kcal.

The range of total cholesterol values in weaning bali cattle sera obtained in this study, the lowest was 122.0 mg / dl and the highest was 146.33 mg / dl. This value is lower when compared to the total cholesterol range reported by other researchers namely: 196.3-212 mg / 100 ml [5], 175.9-235 mg / 100 ml [6] or 192.2-229.3 mg / 100 ml [7]. Cornell University Clinical Pathology Laboratory reported normal cholesterol values of cattle ranging between 163-397 mg / dl. A comparable value was observed by Chladek et al. [8]:104.5 to 177.5 mg / 100 ml, or by Guedon et al. [9] namely 101 ± 3 mg / 100 ml.

The range of total triglyceride values in serum of weaning bali cattle obtained in this study, the lowest was 8.6 mg / dl and the highest was 11.6 mg / dl. The value is still in the range of normal total values of triglycerides in cattle in general. Meyer and Harvey [4] reported that the normal range of values for bovine triglycerides ranged from 0-14 mg / dl. Meanwhile, according to Cornell University Clinical Pathology Laboratory report, the normal value of bovine triglycerides is 10-19 mg / dl.

The total value of triglycerides in serum of weaning bali cattle is lower when compared with the total triglycerides in Holstein dairy cows reported by Nozad et al. [10]. The average total triglyceride of dairy cows in general was 27.5 ± 2.80 mg / dl, in dairy cows with high milk production (40 kg per day) was 26.30 ± 1.60 mg / dl. Meanwhile, in dairy cows with low milk production (20 kg per day) is 25.10 ± 1.20 mg / dl. This difference is due to factors of breed, individual and livestock status, specifically related to the physiological status of livestock reproduction [10].

IV. CONCLUSION

Total cholesterol and triglyceride serum of weaning bali cattle in this study were (122.0-146.33) mg / dL for cholesterol and (8.6-11.6) mg / dL for triglycerides. All results obtained are still in the reference range of the normal value of cattle in general. For all parameters observed, there were no statistically significant differences (P> 0.05) between treatments. Thus, it can be concluded that the four formula rations were tried (A = PK 12% and ME 2000

kcal / kg; B = PK13% and ME 2100; C = PK 14% and ME 2200 kcal / kg; D = PK 15% and ME 2300 kcal / kg) does not affect all chemical parameters and blood profiles examined. From the results of this study, feed rations containing 15% PK and 2300 kcal ME / kg can be recommended to be given to weaning bali cattle. In addition, in order to prepare normal range of value data that can be used as a reference for a more comprehensive reference, further research is needed.

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Abstract Document Clustering using Bisecting K-means Algorithm

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Abstract— Today the use of information systems as digital data processing media is very important. Information systems become a medium for processing transactional and daily operational data from a company or institution. Processing these data has an impact on the amount of digital data that owned by a company. Every hour, day, week, month and year the data continues to grow then the data will continue only to accumulate it self and have no meaning (information). Data mining exists as a technique for extracting information implicitly and searching for useful information that was previously unknown. Udayana University (UNUD) is a University that relies heavily on information systems. UNUD has dozens of integrated information systems to carry out its operational activities. This makes UNUD has a large collection of digital data stored on the server. One of the data that continues to grow is research document data that collected at LPPM (is a department that take care of research studies at Udayana University) Management Information System called SIM LPPM. The digital documents resulting from the researcher are very numerous and grow every year but there has never been a process to extract further information about the collection of these documents. One of the first things can do is document clustering. Bisecting K-means Algorithm was chosen as an algorithm for clustering research documents available on SIM LPPM UNUD. Research documents to be clustered are documents in the form of research abstracts. The results of clustering are evaluated with the silhouette coefficient. From these results it was found that the achievement of the highest silhouette coefficient value was achieved when the word proximity feature with a title or keyword was used in the clustering process.

Keywords— Document Clustering, Bisecting K-Means, Silhouette, Data Mining

I. INTRODUCTION

Nowadays data processing method of a company changes to the digital data era. The information system is used as media for processing transactional data and daily operations of companies or institutions. Processing of these data has an impact on the amount of digital data. Every minute, hour, day, week, month and year the data continues to grow more rapidly. A large collection of data will continue to accumulate and only tends to use up space on the storage media. If it is not processed furthermore, the data will only be complementary and have no meaning for the company. This becomes a problem when a company has to deal with a lot of digital data that are owned but without meaning. Data mining is present as one of the techniques used to process and search for meaning from a digital data collection. Its able to extract information implicitly and search for useful information that was previously unknown [1].

Udayana University (UNUD) is one of the universities in Indonesia that uses information systems to process their data. UNUD has dozens of integrated information systems to carry out its operational activities. This makes UNUD has a large collection of digital data. One of data that continues to grow is research document data collected in LPPM (is a department that take care of research studies at Udayana University) Management Information System called SIM LPPM. Research digital documents are very numerous and grow very fast every year but there has never been a further processing to find out what information can be obtained from the collection of the data. One possible way to do this is to cluster those research documents. Clustering is one of the first data mining jobs that can be done. With

the establishment of automated document clustering, it can open up opportunities for other data mining jobs such as the extraction of research data topics, information retrieval and so forth.

There are many simple clustering methods that can be used such as the K-means algorithm that has been used in [2]-[4]. All three studies provide results that K-means gives good results and K-means will improve if it is optimized for example using the Single Linkage Method [4]. Another simple document clustering method is Bisecting K-means Clustering which is a development of K-Means itself. According to the results of a comparison conducted by [5], K-means has accuracy and execution time that is not better than Bisecting K-means algorithm. Based on this fact, this research will use the Bisecting K-means algorithm as a method that used to cluster the documents of existing studies on SIM LPPM UNUD. Research documents to be clustered are abstract research documents that are submitted by prospective researchers through the system. The results of the clusters formed will be evaluated by seeing at the performance of the clustering algorithm based on the value of the Silhouette coefficient [6]. Furthermore, the results of the cluster based on the best Silhouette coefficient will provide a reference about the best form and combination of the number of clusters.

II. METHOD AND PROCEDURE

This section explains about the methods and procedures contained in the research. According to Fig. 1 we can see the research abstract document through the process of text pre-processing first. Furthermore, the terms contained in the document through the term weighting process with *tf-idf*. After going through the process the term vector that has been formed and then processed directly into the Bisecting K-means clustering algorithm. In this process the similarity measure that used is cosine similarity. The clustering results that has been formed are evaluated by the Silhouette coefficient. Cluster results with the best Silhouette coefficient are chosen to get the final clustering result.
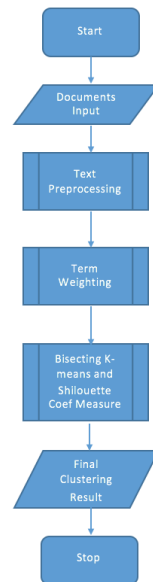
Fig. 1 A Flowchart describe step by step to get final clusters result using Bisecting K-means and Silhouette Coef.

A. Dataset Collection

The dataset that used in this study are data taken from the SIM LPPM UNUD, which amounted to 350 research abstract documents. The average word contained in an abstract document is around 250 words. Dataset is a research abstract consisting of various types of domains of science such as social, economic, engineering, natural sciences, medicine and so on.

B. Text Pre-processing

Words that appear in documents and in queries often have many structural variants. So before retrieve the document, preprocessing techniques are applied to the dataset to reduce data size so that it will increase the effectiveness of information retrieval systems [7]. The preprocessing stage in this study consisted of case folding, tokenizing, and then filtering.

1) *Case Folding*: is a process in which all words that contained in a document are converted into the lower case form. Only words with the letters 'a' to 'z' are accepted. Characters other than letters are omitted and are considered as delimiter.

2) *Tokenizing: is the process of separating rows of words in sentences into phrases, words, symbols and other important elements called tokens.*

3) *Filtering:* is a stage to select important words from tokenizing results, those words that can be used to represent the contents of a document. The filtering process will discard frequently used words such as prepositions and pronouns called stopwords.

C. Term Weighting

Term weighting will be weighted from each word used in the document. The accuracy of the word weighting method will affect the success of an information retrieval system. This research will use a weighting technique that is quite popular, namely Term Frequency-Inverse Document Frequency (tf-idf) according to the study [8].

D. Document Clustering

Clustering is the process of grouping data sets into groups so that objects in one group have many similarities and have many differences with objects in other groups. Clustering is very useful and can find unknown groups in the data. One of the famous clustering algorithm is Bisecting K-Means.

Bisecting k-Means is a combination of two algorithms, k-means and hierarchical clustering. Bisecting k-Means takes the concept by dividing one cluster which is formed in each iteration step by step using k-Means to form the desired k cluster [9].
Following are the steps for the Bisecting K-means algorithm.
1. Select the Cluster to be split
2. Find two sub-clusters using the k-Means algorithm
   (Bisecting step)
3. Repeat step 2, (bisecting step) according to the interaction and split cluster which will give the highest overall similarity value
4. Repeat steps 1,2 and 3 until the number of desired clusters is complete

In the distance calculation process Cosine Similarity is used. Cosine Similarity is a function used to calculate the degree of similarity between two vectors (document by query / document by document) [10].

E. Clustering Evaluation

Clustering evaluation used is the Silhouette coefficient. Silhouette coefficient is used to see the quality and strength of a cluster, how well an object (in this study documents) is placed in a cluster. In this study the Silhouette Coefficient calculation based on research was adopted [6].

III. EXPERIMENTAL RESULT

In this research, several parameter such as the number of clusters were tested to find the best cluster shape. The number of clusters k tested was $2 \leq k \leq 20$. In addition to the number of clusters, the closeness feature between titles, keywords and abstract content was also taken to be an important thing. If a word t is in the title or keyword, the word t frequency is immediately changed according to the weight of the parameter, hereinafter referred to as f. For example the word "technology" is in the abstract content and the word is also in the abstract title, so during the process of weighting the value of $tf_{t,d}$ of the word t, in there document d is multiplied by the value of f. The f value tested in this study moves from $f = 1, f = 10, f = 20$ and $f = 30$. The results of the experiment can be seen in Table I.

In Table I the values of the Silhouette coefficients can be seen from each combination of k and f values. When the value of $f = 1$ for each combination of the number of clusters the maximum value of the Silhouette coefficient produced is 0.0065, when the value of $k = 2$. When the value of $f = 10$ for each combination of the number of clusters the maximum value of the Silhouette coefficient produced is 0.0090, which is when the value $k = 5$. When the value of $f = 20$ for each combination of the number of clusters the maximum value of the Silhouette coefficient produced is 0.0092 when the value of $k = 6$. When the value of $f = 30$ for each combination of the number of clusters the maximum value of the Silhouette coefficient produced is 0.0093 when the value of $k = 13$. So far the highest Silhouette coefficient produced is 0.0093 when $k = 13$ and $f = 30$.

TABLE I

SILHOUETTE COEFFICIENT WHEN $2 \leq K \leq 20$ AND $F = 1, 10, 20$ & 30

k	f	s(i)	k	f	s(i)	k	f	s(i)	k	f	s(i)
2	1	**0.0065**	2	10	0.0064	2	20	0.0061	2	30	0.0048
3	1	0.0032	3	10	0.0038	3	20	0.0067	3	30	0.0071
4	1	0.0054	4	10	0.0062	4	20	0.0073	4	30	0.0054
5	1	0.0032	5	10	**0.0090**	5	20	0.0037	5	30	0.0054
6	1	0.0023	6	10	0.0066	6	20	**0.0092**	6	30	0.0071
7	1	0.0044	7	10	0.0081	7	20	0.0052	7	30	0.0027
8	1	0.0005	8	10	-0.0009	8	20	0.0085	8	30	0.0036
9	1	0.0012	9	10	0.0062	9	20	0.0045	9	30	0.0089
10	1	0.0021	10	10	0.0073	10	20	0.0049	10	30	0.0053
11	1	-0.0017	11	10	0.0013	11	20	0.0067	11	30	0.0060
12	1	0.00001	12	10	0.0026	12	20	0.0060	12	30	0.00002
13	1	-0.0030	13	10	0.0028	13	20	-0.0046	13	30	**0.00093**
14	1	-0.0045	14	10	0.0018	14	20	0.00361	14	30	0.0076
15	1	-0.0056	15	10	0.0053	15	20	0.00195	15	30	0.0058
16	1	-0.0044	16	10	0.0026	16	20	-0.0011	16	30	0.0028
17	1	-0.0018	17	10	-0.0030	17	20	-0.0011	17	30	-0.0011
18	1	-0.0051	18	10	-0.0018	18	20	-0.0083	18	30	0.00607
19	1	-0.0038	19	10	-0.0020	19	20	-0.004	19	30	-0.0028
20	1	-0.0009	20	10	-0.0012	20	20	-0.0128	20	30	0.00323

In simple terms, the *f* value has a significant role in the process of improving the Silhouette coefficient value. When the value of *f* = 1 which means there is no calculation of the frequency multiplication (when a word is in the title or keyword) the Silhouette coefficient value that can be achieved is 0.0065 while when the *f* value is increased starting from 10, 20 and 30 there is a changes in the value of the Silhouette coefficient that are 0.0090, 0.0092 and 0.0093 respectively. The value of *f* gives an effect to the improvement of the silhouette coefficient. The greater value of *f* given, the greater value of Silhouette coefficient obtained.

IV. CONCLUSION

In this research we have discussed the concept of document clustering by using Bisecting K-Means algorithm. In this research, it has been found that the closeness feature of a word with the title and keyword influences the Silhouette coefficient value. The use of these features can increase the value of the Silhouette of a document clustering. The value of the Silhouette which tends towards 1 indicates that this approach can be said has given quite good results.

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The Effect of Production and E-Commerce Factors on the Income of Alpaka Jewelry Craftsmen in Gianyar Regency

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Abstract—Alpaca handicraft is a product of accessories as a substitute for gold and silver jewelry, developing rapidly in Gianyar. This jewelry is very popular with the Balinese people as a complement to traditional clothing, and the price is relatively cheap. The impact of this handicraft business leads to an increase in income, welfare and socio-economy in the order of life of rural communities. The study was conducted in Gianyar, using the census method with a population of 77 business units. The research objective is to analyze the effect of factors of production (capital, labor costs, and materials) on the income of craftsmen, moderated by e-commerce variables. The type of data needed is primary data and collected by distributing questionnaires to respondents. Data were analyzed with Moderating Regression analysis. The results of the analysis found that simultaneously the factors of production and e-commerce had a significant effect on the income of craftsmen. e-commerce has a significant role in moderating the simultaneous influence of factors of production on the income of craftsmen. This means that the regression model can be used to predict alpaca jewelry craftsman income. Partial test shows the influence of venture capital, raw materials and labor is significant on the income of craftsmen. However, the role of e-commerce variables as pure moderation (Pure Moderator) the partial effect of venture capital on income, and as pseudo moderation (Quasi Moderator) the effect of raw materials on income. While the effect of labor costs on craftsman income, the role of e-commerce is only as a potential moderation (Homologiser Moderator). Research recommends that the use of social networks or e-commerce sites need to be utilized in marketing alpaca handicraft products to anticipate industry 4.0.

Keywords— E-commerce, production factors, income

I.   INTRODUCTION

The business of the gold and silver jewelry industry, as a hereditary effort, the Balinese people have developed in accordance with the demands of the times. One of the areas in Bali that is well known in foreign countries as a center for the craft industry is the Gianyar Regency. Entrepreneurs who are members of the handicraft business are generally small and medium scale businesses (UKM). Data from the Bali Provincial Industry and Trade Office in 2017, shows that the number of handicraft business units grew 15.44 percent in the last five years. This handicraft business is unique, because the product manufacturing process is hand made and is based on Balinese customs and culture. Thus, the business potential is unique and difficult to imitate other regions. This condition is also supported by market potential with the issuance of Bali Governor's Decree, No. 79 of 2018, which regulates the Use of Balinese Traditional Clothing, on certain days for each State Civil Apparatus (ASN), employees and school children. Positive impact of the Governor's Decree is bringing up business opportunities in accessories products as a complement to custom clothing, especially for women. Where, the intensity of the use of custom clothing will increase the number of accessories that are increasingly varied. Jewelry made of gold and silver is an exclusive product, and generally requires a fairly high investment of resources because of the high price of materials. The selling price must be set relatively expensive, the volume and intensity of purchases are also relatively rare, this results in the level of craftsman income.

The development of an increasingly rapid production technology environment demands that everyone must be able to adjust, and the handicraft industry is no exception. Such a situation is responded positively by entrepreneurs, through the innovation of accessories made from alpaca products. Alpaca is a substitute for gold

and silver handicrafts that can reduce production costs and selling prices to the lowest purchasing power. The factor of production or organizational resources in producing industrial output is very important. Organizational resources are very important for every industry, especially capital, labor, natural resources or raw materials, manufacturing skills, and the technology used in the production process so that products are ready for sale. The production process of handicraft accessories is generally no problem, but with the accumulation of unsold products, the continuity of production and income of the entrepreneurs are disrupted.

The new phenomenon for the craftsmen today is the use of e-commerce which is predicted to be a new driver of economic growth to develop (Lawrence, 2010). Electronic commerce (e-commerce) is one type of technology implementation to increase product competition in the market. E-commerce plays an important role in this century for trade and economic growth. E-commerce users have the opportunity to use internet technology that can provide great benefits in the increasingly competitive business world competition. E-commerce focuses on digitally activated commercial transactions between organizations and individuals (Khan, 2014). Indonesia has quite promising potential and prospects for e-commerce development. Jewelry craftsmen in Gianyar Regency have anticipated the digital technology. However, it is not clear that to what extent e-commerce has been anticipated and how its ability to drive the growth of sales of jewelry craft products produced. Innovative efforts such as this are efforts to increase people's income, especially in Gianyar Regency. The existence of this jewelry industry also has the potential to reduce unemployment and help the community in increasing household income and improving the local economy. Therefore, this research is interesting to do with the aim; explain the relationship between factors of production and income of alpaca jewelry craftsmen in Gianyar Regency by using e-commerce as a moderator, and explain the effect of factors of production on the income of alpaca jewelry craftsmen in Gianyar Regency

II.   FRAMEWORK FOR CONCEPT AND HYPOTHESES

The production process of gold, silver and alpaca jewelery, in its journey from time to time is still traditional, and rarely adopts technological advances. This is consistent with the theory which states that if the demand for an item is very high, then it should use sophisticated producing technology. The development of the number of jewelry craftsmen in Bali, especially in the Regency of Gianyar, has an impact on increasingly competitive industrial competition. The craftsmen create jewelry accessories ranging from necklaces, bracelets, earrings, bross, rings and other craft jewelry. Because of its artistic design, jewelry crafts in Gianyar Regency are very popular, in addition to having special characteristics, also because the products are handicrafts, as a differentiator from products from other regions and countries. The factors of production of jewelry craft as the main input affect the output and ultimately determine the income of the craftsman. These factors of production are in between; business capital, alpaca raw materials, labor (costs or salaries), and technology used in the production process. The technology applied by craftsmen in the production process so far, some have been using machines and some are producing conventionally. The mastery and use of information technology is also very important if it is associated with market expansion through product promotion in global markets. In the era of globalization, the use and utilization of information technology has entered into various lives, not least among alpaca jewelry craftsmen.

The presence of the internet in the world of jewelry craft business has an enormous influence. The internet and information technology have offered a new form of commerce called e-commerce. Jewelry craft businessmen choose to implement e-commerce in their business activities with the aim of getting ease, speed of transactions, and providing better service guarantees to consumers. The benefits of implementing e-commerce in the jewelry craft business are fatherly entering the vast international market. Digital technology opens up opportunities for businesses to be run without colliding with national borders. Operational costs can be reduced as little as possible and speed up the process and reduce the risk of human error.

The use of e-commerce as a moderating variable is one of the strategies that should be able to support an increase in revenue from the use of organizational resources. This fact indicates that the application of e-commerce technology is one of the important factors to support the successful marketing of jewelry craft products. As a moderating variable, e-commerce can weaken and can also strengthen the relationship between the independent variable and the dependent variable, thereby proposing a conceptual framework of research such as Figure 1.

Figure 1. Research Conceptual Framework
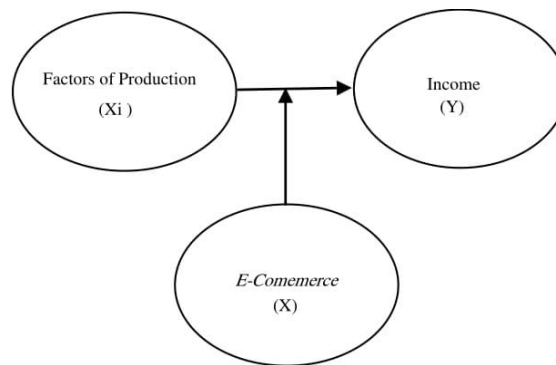
Referring to the research conceptual framework, the following research hypotheses are proposed:

a) It is suspected that business capital has a significant and simultaneous significant effect on income, moderated by e-commerce in alpaca jewelry craftsmen in Gianyar Regency.

b) it is suspected that labor costs have a significant and simultaneous significant effect on income, moderated by e-commerce in alpaca jewelry craftsmen in Gianyar Regency.

c) it is suspected that the raw materials have a significant and simultaneous significant effect on income, moderated by e-commerce in alpaca jewelry craftsmen in Gianyar Regency.

III.   DISCUSSION

The first hypothesis states that it is suspected that venture capital, simultaneously and partially significant effect on income, is moderated by e-commerce in alpaca jewelry craftsmen in Gianyar Regency. Statistical results give an adjusted R-Square value of 0.253, significant at 95 percent confidence level with a probability of a significance level of 0.00 or less than 0.05. This means that 25.30 percent of variation in alpaca craftsman income can be explained by independent variables (venture capital, e-commerce, and moderate-1 variables), while the remaining 74.70 percent is explained by other causes outside the model. This means that increasing the amount of venture capital by moderating the intensity of using e-commerce will be able to increase the revenue of alpaca jewelry craftsmen in Gianyar. Partially, venture capital provides a parameter coefficient of 0.364 and is significant with a probability of a significance level of 0.000 or less than 0.05, E-commerce gives a coefficient of 25443.762 with a significance level of 0.05 equal to 0.05 or insignificant. Moderate variable-1 gives a coefficient value of -0.145 and is significant at a probability of 0.013 less than 0.05. Moderate variable-1 as the interaction between venture capital and e-commerce gives significant results, while e-commerce shows insignificant results. Thus, it can be said that the e-commerce variable is a pure moderation variable (Pure Moderator). Where, e-commerce variables interact with predictor variables without being a predictor variable.

The second hypothesis, which says it is suspected that labor costs have a significant and simultaneous significant effect on income, is moderated by e-commerce in alpaca jewelry craftsmen in Gianyar Regency. The test results give an adjusted R-Square value of 0.844, significant at 95 percent confidence level with a probability of a significance level of 0.00 or less than 0.05. This means that 84.40 percent of the variation in the income of alpaca craftsmen in Gianyar Regency can be explained by labor, e-commerce and moderate-2 costs, while the remaining 15.60 percent is explained by other causes outside the model. This means that increasing the amount of labor costs by moderating the intensity of the use of e-commerce will be able to increase the income of alpaca jewelry craftsmen in Gianyar. Partially, the cost of labor gives a parameter coefficient of 1.142 and is significant with a probability of 0.000 or less than 0.05. E-commerce gives a coefficient of -8818,214 and is not significant with a probability of a significance level of 0.185 or more than 0.05. The moderate-2 variable gives a coefficient value of 0.142 and is insignificant with a probability of a significance level of 0.301 which is more than 0.05. Moderate variable-2 is an interaction between labor costs and e-commerce and is equally insignificant. Thus it can be said that e-commerce is a potential moderation (Homologiser Moderator). That is, the variable has the potential to be a moderating variable and does not interact with predictor variables and does not have a significant relationship with the dependent variable, namely the income of alpaca jewelry craftsmen in Gianyar Regency.

The third hypothesis states that it is suspected that the raw materials have a significant and simultaneous significant effect on income, moderated by e-commerce of alpaca jewelry craftsmen in Gianyar Regency. The analysis shows the adjusted R-Square value of 0.272, significant at 95 percent confidence level with a probability of a significance level of 0.00 or less than 0.05. This means that 27.20 percent of the variation in alpaca craftsman income in Gianyar Regency can be explained by the independent variables namely raw

materials, e-commerce and moderate-3, while the remaining 72.80 percent is explained by other causes outside the model. Partially detected the raw material gives a parameter coefficient of 21640.507 and is significant with a probability of a significance level of 0.000 that is less than 0.05. E-commerce gives a coefficient of 29634,310 and is significant at the probability of a significance level of 0.030 or less than 0.05. The moderate variable-3 gives a coefficient of -8795,006 and is significant at a probability of 0.007 or less than 0.05. Moderate-3 variables are interactions between raw material and e-commerce variables, also showing significant results. Thus it can be said that the e-commerce variable is a pseudo moderation variable (Quasi Moderator). Quasi moderation is a variable that moderates the relationship between the independent variable and the dependent variable which also becomes the independent variable. Interact with predictor variables as well as moderating predictor variables or moderating variables the relationship between raw materials and alpaca jewelry craftsman income in Gian Regency

IV.   CONCLUSION

Simultaneous test results indicate that the factors of production and e-commerce have a significant effect on the income of alpaca jewelry craftsmen in Gianyar Regency. E-commerce is able to play a role as a moderation of the simultaneous relationship between factors of production and craftsman income. Other results found that e-commerce acts as pure moderation (Pure Moderator) the effect of business capital variables on income. That is, the use of e-commerce in business activities as a moderating variable, is able to increase the effect of working capital partially on income. Then, e-commerce acts as pseudo moderation (Quasi Moderator) the effect of raw materials partially on income. That is, e-commerce on this occasion is a variable that moderates the relationship between raw material variables and income variables, which at the same time become independent variables. Meanwhile, e-commerce is only as a potential moderation (Homologiser Moderator) if it is associated with the relationship between labor costs and craftsman income. That is, e-commerce on this occasion has only the potential as a moderating variable relationship between labor costs and income. In this research it is recommended that alpaca jewelry entrepreneurs classified as SME groups should be able to take advantage of the development of e-commerce technology to market their products or other similar forms online. Researchers can further develop similar research by referring to the limitations of this study by including other factors that are felt to have influenced the relationship of the variables in this study, and are expected to be able to add reference variables to be examined in other studies.

V.   IMPLICATIONS

The results of this study provide additional information about how e-commerce's ability to moderate the influence of variable factors of production on the income of alpaca jewelry craftsmen in Gianyar Regency. Empirical evidence in this study, related to the results of statistical data processing in the field shows that e-commerce has a different role as a moderator of the partial effect of capital, raw material and labor costs on the income of alpaca jewelry craftsmen in Gianyar Regency. The results of this study can be taken into consideration for alpaca jewelry craftsmen in making decisions to increase revenue from the sale of handicrafts. The need to use technology to market goods can be a material personal consideration, because the level of need to advance the business in a person is different, this can be seen from the small value of the coefficient of determination in this study which indicates that there are many other factors that influence outside predetermined model.

VI.   LIMITATIONS

The scope of this research is limited to alpaca jewelry craftsmen in Gianyar Regency, so the results of this study cannot be generalized. This research was conducted in a relatively short period of time (one year), while product innovations in accordance with Balinese customs and culture were relentless, thus only with purchasing power and product marketing techniques that could change at any time, as well as the emergence of industry 4.0, making this research important to do again.

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The Effect Of Proactive Cognitive Game Method Toward Knowledge Of Adolescents Reproductive Health

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Abstract-Adolescent have risk for having reproductive health problems due to developmental and relationship factors. The proactive cognitive game is one of the appropriate approaches about reproductive health for elementary school students. This research aimed to identify the effect of proactive cognitive game method toward adolescent knowledge about reproductive health at SDN 21 Dauh Puri. The research employed Pre Experimental Design with One Group Pretest-Posttest Design. The population of this research was all V graders and VI graders of SDN 21 Dauh Puri aged 10-12 years old. The data were analyzed with statistic program (SPSS 22.0 for Windows) with *Wilcoxon Signed Rank Test*. The result showed that proactive cognitive game method significantly ($P<0,05$) increased adolescents knowledge about reproductive health at SDN 21 Dauh Puri

Keywords: proactive cognitive game, reproductive health

I. INTRODUCTION

Adolescence is a period of transition from childhood to adulthood, which includes all developments experienced as preparation for entering adulthood [1]. Adolescence is the most important period in human life. There are several age groups in adolescence: pre-teen (10-12 years old), early adolescence (13-15 years old), middle adolescence (16-19 years old) and late adolescence (20-21 years old) [2]. Pre-adolescence is the crucial age group to be given early reproductive health education. This age group is important because it becomes a bridge between childhood with its freedom and adulthood that demands responsibility [3]. These changes may cause problems that might interfere with subsequent adolescent developments. Reproductive health problems are among these problems faced by adolescents [4].

Adolescent reproductive health is a health condition that involves the system, functions and reproductive processes owned by adolescents [5]. According to the Indonesian Ministry of Health in 2015, adolescents need an adolescent reproductive health service that aims to prevent and protect adolescents from risky sexual behavior that leads to reproductive health problems. Reproductive health problem that still becomes a concern is the high early marriage cases of adolescents in various regions.

According to several studies conducted by the National Family Planning Coordinating Board (BKKBN), reproductive health problems faced by adolescents are increasing, both quantitatively and qualitatively. Various types of sexually transmitted diseases (STDs) are more common in adolescents. Even risky sexual behavior is frequently being carried out by adolescents and it is unfortunate that not a few adolescents undergo abortion, which reaches 28.4% of existing abortion cases [6].

Some other facts also show that around 32.1% of girls and 36.5% of boys aged 15-19 years old began dating when they were not yet 12 years old. If the adolescents do not have adequate life skills, they risk having unhealthy dating behavior. Indications of this case can be seen from the fact

that 0.7% of girls aged 15-19 years old and 4.5% of boys aged 15-19 years old had premarital sexual intercourse. The predominant reasons behind premarital sexual intercourse are: curiosity (57.5% of boys), just happened (38% of girls) and forced by partners (12.6% of girls) [7][8]

The evidence presented above reflects adolescents' low level of knowledge about reproductive health which includes healthy life skills, risks of sexual intercourse, and the ability to reject intercourse that they do not want. For this reason, reproductive health learning methods that are easily understood and suitable for adolescents are required, one of them is the proactive cognitive game method.

II. MATERIALS AND METHODS

This research used the Pre-experimental Design using the One-Group Pretest-Posttest Design. The research was conducted at SDN 21 Dauh Puri on March 2019. The population of this research was all V graders and VI graders of SDN 21 Dauh Puri aged 10-12 years old.

This research used Non-probability Sampling technique. Type of sampling used was consecutive sampling, means all members of the population who meet the requirements were taken and became the research sample [9].

Research procedure started by distributing pretest questionnaire containing 10 objective questions to respondents. The researcher then conducted a proactive cognitive game by asking three topics of problem, one of which was the differences between male and female puberty. The researcher appointed a student as a facilitator. The student who was appointed as the facilitator asked other students to mention the differences discussed in the topic. Students explored the topic thoroughly. After finishing the game, the researcher gave the posttest questionnaire to respondents [10].

Data analysis was conducted quantitatively using a computer statistic program (SPSS 22.0 for Windows using Wilcoxon Signed Rank Test [11].

III.   RESULTS AND DISCUSSION

Pretest

The implementation of proactive cognitive game activity conducted at SDN 21 Dauh Puri went well. There were 92 students who participated in proactive cognitive games (32 boys and 60 girls).

The activity was started by giving pretest to students. Pretest was given to measure students' initial knowledge in understanding adolescent reproduction health, which includes puberty, adolescent behavior towards sex and reproductive health, and introduction to reproductive organs. The pretest contained 10 objective questions. Based on the pretest, students' level of knowledge before the game can be seen in Figure 1.
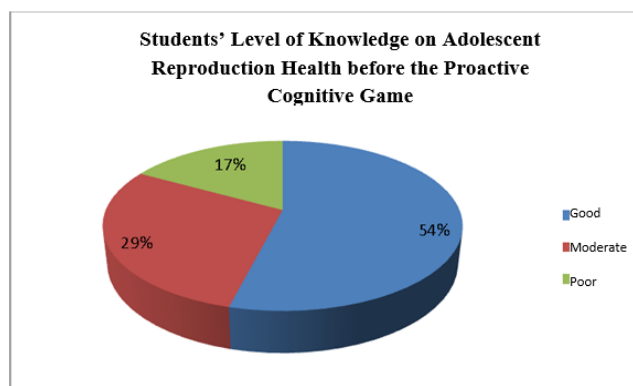
Figure 1 Students' Level of Knowledge on Adolescent Reproduction Health before the Proactive Cognitive Game (n = 92)

In Figure 1, it can be seen that among 92 students, 49 students (54%) have a good knowledge, 27 students (29%) have a moderate knowledge and 16 students (17%) have a poor knowledge.

Regarding the level of knowledge on adolescent reproduction health, there are students who are in the moderate and poor category because they have never received material or counseling about this material before.

Proactive Cognitive Game Activity

In the proactive cognitive game activity, the researcher appointed one of the students who are participating in this activity as a facilitator. In this stage, one of the students was asked to come in front of the class to give a topic on adolescent reproduction health, while the other students discussed and gave their opinions on the topic [10]. In this activity, three topics were given to the students: differences between male and female puberty, differences between male and female reproductive organs as well as positive and negative traits of early dating. Students were enthusiastic during the activity. In the end of the activity, a student was appointed to give a conclusion.

Posttest

The proactive cognitive game activity ended with a posttest. Posttest was given to measure students' knowledge after the proactive cognitive gam. The pretest contained 10 objective questions. Based on the posttest, students' level of knowledge on adolescent reproductive health after the game can be seen in Figure 2.
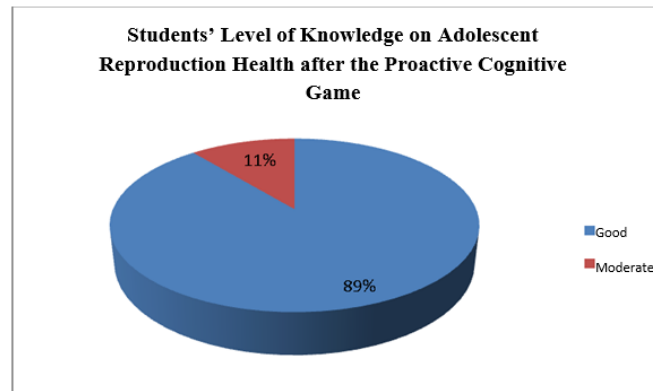
Figure 2. Students' Level of Knowledge on Adolescent Reproduction Health after the Proactive Cognitive Game (n = 92)

In Figure 3, it can be seen that among 92 students, 82 students (89%) have a good knowledge and 10 students (11%) have a moderate knowledge. This shows that the proactive cognitive game method improves students' level of knowledge on adolescent reproduction health. Group discussion method is more effective in increasing knowledge about reproductive health in adolescents compared to the lecture method [11]

The Effect of Proactive Cognitive Game Method Toward Knowledge of Adolescents Reproductive Health At SDN 21 Dauh Puri

The posttest and pretest data was analyzed using the Wilcoxon Signed Rank analysis and a significance value of 0,000 was obtained. This shows that proactive cognitive game on adolescent reproduction health has a significant effect on students' level of knowledge. Students were categorized into three: 60-69 poor category, 70-79 moderate category and 80-100 good category. Among 92 students, there were 82 students in good category and 10 students in moderate category. It means that

the proactive cognitive game on adolescent reproduction health is highly influential on students' level of knowledge regarding the material.

Table 1 Wilcoxon Signed Rank Test on SPSS 22.0 Software for windows

	Posttest - Pretest
Z	-9.468
Asymp.Sg. (2-tailed)	.000

The increase in students' level of knowledge on adolescent reproduction health is influenced by the proactive cognitive game on the material. The implementation of learning method using the proactive cognitive game is designed to improve knowledge on adolescent reproduction health in accordance with adolescents' development ages. Game method may improve students' involvement and creativity in learning process. Research conducted by Mukhtar and Yamin [12] shows that students who learn using game method for two weeks and students who learn from lectures for six months obtain the same results on their cognitive evaluation. In addition, games allow people to relax by making them feel free from problems. Play therapy will pose a challenge to solve the subject matter of the game being played and encourage players and people to participate in the game [13].

Methods for adolescent reproductive health education must be adjusted to the stage of adolescent growth and development [14]. At the age of adolescence, they tends to be curious about something during learning. To accept a conclusion, discussion method is more suitable for them since it is not rigidly convey the material. The learning method aims to make the educational message acceptable and suitable with their development [10].

Proactive cognitive game education method is one way of adolescent reproductive health education approach. The education is carried out with a game and discussion of one case regarding reproductive problems or sexual deviance with cognitive-proactive principles. The cognitive-proactive principles are carried out by inviting adolescents to participate. They have to mention positive and negative features of an adolescent reproductive health problem proactively until they can conclude whether the problem is good or not to be done by adolescents [10].

Reproductive health education through cognitive and proactive methods emphasizes more on how young people are invited to participate or be actively involved (proactive) in expressing their opinions on a topic (cognitive), until they can conclude whether the problem is good or not for an adolescent (Taukhit, 2014). This method is deemed more effective than reproductive health education through the one-way lecture method in classes. Proactive cognitive method in reproductive health education can be done between peers (peer education) or with a facilitator [15]

Peer education is one form of health information provision activities through a peer approach. Peer education is quite effective in increasing reproductive health knowledge because peer education makes their peers feel comfortable [16]. Some research results also show that peer education reduces rates of sexual behavior among adolescents [17]. Peer education changes the risk of deviant sexual behavior and effectively overcomes adolescent problems [16].

IV. CONCLUSION

The proactive cognitive game method improves the level of knowledge on adolescent reproduction health of students in SDN 21 Dauh Puri.

V. ACKNOWLEDGEMENT

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Modelling Microservices Architecture For Integrated Information Systems

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Abstract— In monolithic (conventional) architecture, applications are developed in one large entity. Although easy in initial development, this model poses problems when codebase grows. The result is slower in development and resources cannot be used optimally mainly due to the limited options to scale applications.

Microservices, as the latest technology in software design and development, takes an architectural approach that is built on the concept of modularization, with an emphasis on technical constraints. Each module, called a microservice, is implemented as a small independent system.

This research is aimed to analyse the challenges given in developing microservice, exploring the main features of microservice, and how these features can improve system scalability. Furthermore, a model will be developed that can later be used as a reference in transforming monolithic architecture application to microservices. This model will be applied to existing information system at Udayana University, the Lecturer Information System (SIMDOS). In general, this system has several functions, such as lecturer data management (BKD), user profile, academic portfolio, lecturer workload report and remuneration.

The problem is the difficulty to do horizontal optimization. For example, when the system is running data intensive computing, often causes the system to be inaccessible until the computational process is completed. In addition, SIMDOS is also one of the main applications at Udayana University, where almost all applications request data from SIMDOS. It means that if the SIMDOS is down, many other systems will not be running properly.

Keywords—Monolithic architecture, microservices, container, docker, kubernetes.

I. INTRODUCTION

Microservice architectures are the latest architectural style that developed in recent years. There is no definitive definition of microservice architectures but it can be said that microservice is a collection of several small, autonomous services. Each service has different task that fulfills a single responsibility principle (Kalske et al, 2017). In monolithic architecture, everything is developed in one large entity. This makes initial development easy and quick to understand. However, when the codebase of a system grows, problems begin to emerge in monolithic architecture. The main problem is that larger codebases make development slower, difficult in continuous development and limited options for scaling applications.

Microservices have several advantages over monolithic. Microservice makes constraint, namely its business needs can be seen based on its existing functionality in codebase. This is very important because in large monolithic codebases, it is difficult to determine the location of certain functions. Microservice makes it possible to use different technologies as different services that can be implemented with the latest technology. This allows the adoption of new technologies faster with microservice. Microservice also allows continuous development [1].

Lecturer Information System (SIMDOS) is an application at Udayana University. This application is used by

lecturers and employees at Udayana University. In SIMDOS, there are several functions to perform lecturer data management (BKD), user profile, academic portfolio, lecturer workload report and remuneration. SIMDOS application still uses monolithic architecture. Currently, problems of scaling arise when the system is calculating one particular function with heavy calculation (i.e remuneration). It makes the system temporarily inaccessible until the calculation process is completed. In addition, the SIMDOS application is also central application at Udayana University, where almost all applications request data regarding lecturer to SIMDOS. So that if the SIMDOS is down, it will affect other systems that depend on SIMDOS.

The problems as above, which are related to resource efficiency and computational speed, are a challenge in developing highly complex applications. In this research, the monolithic architecture of SIMDOS is transformed into microservices architecture. With this microservice architecture, the SIMDOS is split into several interrelated services, which are easier to scale, develop, and maintain [2].

II. RELATED WORK

The microservices approach provides additional works for developers because of the increasing complexity of building distributed systems. Other problems that arise are because testing on a distributed system is more complicated. A number of diverse services will require good coordination between development team, which also means increase in complexity. In theory, the microservices approach will lead to increase memory consumption. This is because each service will have its own address space. The biggest problem in microservices is how to divide /split the system into smaller services. The strategy cannot be applied in general, but depends on applications. Solving can be done based on how applications are developed, functioned, interacted with back-end (data sources), or how data is formed (structured).

A. Monolithic Architecture

Monolithic applications tend to bring together all functions required, developed, and used as a single unit. This is the simplest form of architecture and runs quite well as long as it is maintained to have low complexity. Problems arise when application needs to improve its features. Over time, increasing application size and complexity results in decreased development, testing and deployment speeds. Even if you only want to develop simple features that only require different conditions for just a few lines of code, but because of the complex architecture, these lines can be thousands of lines, thus reducing the speed of development.

Scaling up monoliths often results in uneven use of resources. Each part of the application cannot be scaled because all application code runs in the same process on the server. Monoliths work well in the early stages of project but as it grows, it tends to become more complex and difficult to scale. Continuous development and deployment of applications are difficult to achieve for this architecture. They also have barrier in adopting new technology. Because a change in framework or language will affect all layers of business applications, and make it expensive in time and cost.

B. Microservices

The term "Microservices Architecture or Microservices" has emerged over the last few years to describe a specific way in designing software/applications as a set of services that can be used independently [3]. Although there is no precise definition of this architectural style, there are certain general characteristics in business capability, automatic deployment, endpoint intelligence, and decentralized control of language and data. The idea is to divide applications into a set of services that are smaller, interconnected and independent than building a single monolithic application [4].

Each microservice is a small application that has its own hexagonal architecture, which consists of business logic together with various adapters and is developed, tested, and deployed separately from one another. Microservice present a message-based REST or API for communicating with different services [3]. Microservice architecture is often difficult to distinguish from traditional SOA. Even though there are many overlaps, there are also many differences between them. According to Martin Fowler, microservices are a form of SOA, with services orientation being carried out correctly. Microservices can be categorized as a lightweight service version of SOA. SOA is more oriented on the side of IT organizations, while micro services are more related to SAAS-based products (software as a service or software in the form of services). SOA mostly uses XML / WSDL while the microservice architecture adopts the REST API. The main difference between SOA and micro services is that the latter is more independent and

is used independently.

(a) (b)
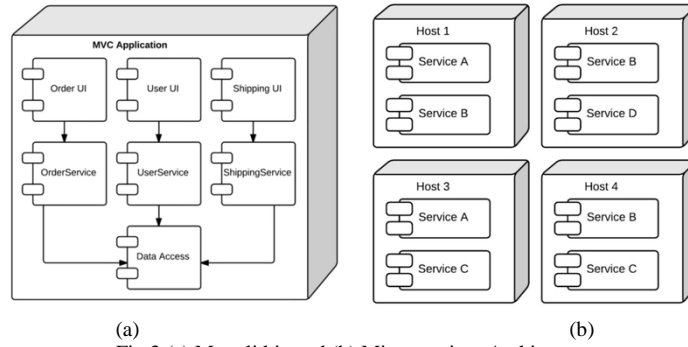
Fig.3 (a) Monolithic and (b) Microservices Architecture

C. Container Orchestration

Container orchestration is carried out using Kubernetes. Kubernetes is an open source system for managing container applications supported by Google, with management, scaling and recovery capabilities. Kubernetes Cluster is a group of computing nodes that act as a unit. It consists of two types of nodes: master and worker node. The Master is a management unit, which is responsible for scheduling, scaling, terminating, and updating applications. The worker node is responsible for running the application. Each worker node has a kubelet [5], which is responsible for communication with the master. In addition, worker nodes require tools to create, run, and delete application containers. The master exposes the API to communicate with the worker node. Kubernetes wrap one or more containers into a higher-level structure called a pod. Containers in the same pod shares the same resources. Containers in the same pod communicate easily with other, as though they were on the same machine while maintaining a degree of isolation from others.

III. DESIGN OF MICROSERVICES FOR SIMDOS

SIMDOSEN application with microservice architecture is designed using Docker as a container-based virtualization platform that is managed by Kubernetes as a container orchestration. Fig. 2 shows the SIMDOSEN topology model in a Kubernetes cluster consisting of 2 components namely master and worker node. The master node functions as a control plane for the cluster that plays role in the scheduling mechanism, exposes the Kubernetes API, stores the cluster data and is responsible for the detection process and for events that occur within the cluster. Meanwhile, the node worker contains services that is useful for running many pods that are managed by the master node.
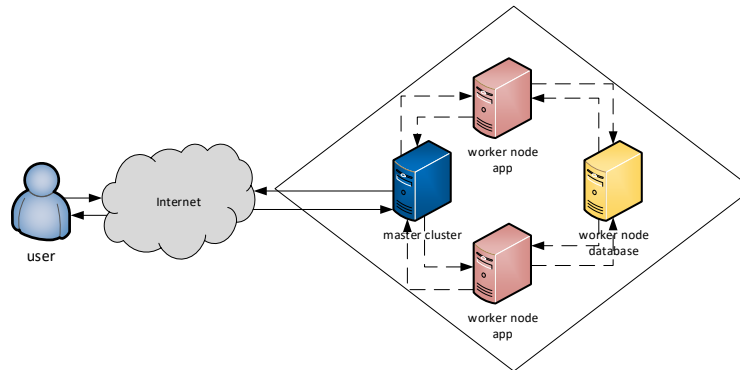
Fig. 2 SIMDOS on Kubernetes Cluster

Users access SIMDOS that has been exposed by the master cluster through the internet network. The master cluster forwards the request to application node worker with the IP cluster and load balancing mechanism. Load balancing is a technique for distributing workloads from 2 or more servers so that traffic runs optimally. Then, the app node worker accesses the data stored on the worker node database.

The SIMDOS development process is carried out using Rancher [6] software as the Kubernetes's management. Rancher functions to manage multiple clusters through the Kubernetes master node that has been integrated with Rancher as shown below. Rancher implements a portable layer of service infrastructure specifically designed to run container applications. Rancher's infrastructure services, which are networking, storage, load balancer, DNS, and security, are run as containers. Rancher supports flexible user authentication plugins and comes with integration of user authentication that was previously created with Active Directory, LDAP, and GIT.

The SIMDOS model with microservice architecture is divided into 6 service groups namely user portfolio, remuneration, BKD, profile,SKP, and authentication, each has a different database. Within the service group, there are smaller and independent service sets but still able to interconnected with each other. Portfolio includes educational background, academic ranks, functionalities and everything related to academic history. Remun services include salary and performances, BKD includes services of Tri Dharma, SKP includes report, scientific works, and data master. Fig. 3 depicts the model.
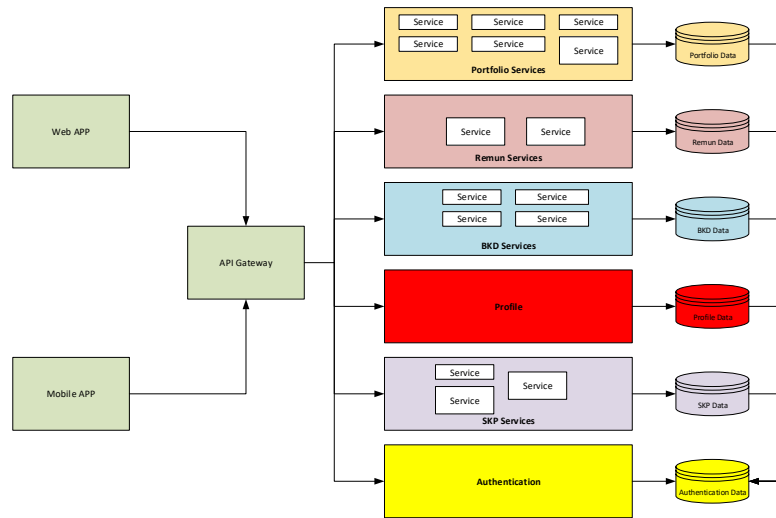
Fig. 3 SIMDOS Microservices Model

IV. CONCLUSIONS

The microservice architecture is able to handle cases of increasing size and complexity of the codebase program. A good separation and definition of modules ensures that complexity is isolated and makes development faster. The microservice architecture makes it easy to develop new features when system complexity is high because each service has a small codebase and modularity is easier to maintain when there are clear module boundaries. The SIMDOS application model with microservice architecture is divided into 6 service groups namely user profile, BKD, SKP, academic profile, authentication and remuneration, each of which has a database according to Figure 3. Within the service group, there are smaller and independent service sets but still able to interconnected with each other.

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The Provision Of Campus Bus Through A Use Of PTVVisum (Case Study: InstitutTeknologi Sumatera)

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Abstract—Transport's accessibility is the ease of moving or moving from a place of origin to a destination. It is implemented in public facilities and infrastructure. Included in academic activities in an university, accessibility is such an important role to facilitate the movement of the academic community. InstitutTeknologi Sumatera (ITERA) is the first state institute of technology in the Sumatera island, which is located in South Lampung district. One of the problems of movement is the unavailability of transportation that serves the area within the campus. The internal movements of academicians have been accommodated by private vehicles, online public transportation, or by foot. This research will examine the needs of campus buses, which are intended to serve the academicians' internal movement in the campus of ITERA. Traffic load modeling in this study uses PTV Visum software. And the number of bus needs will be determined through comparative analysis between, rush hour, number of demands, travel time and bus frequency per one hour.

Keywords—bus, campus, ITERA, PTV Visum

I. BACKGROUND

In academic activities that take place in a campus, accessibility plays an important role in facilitating the movement of the academic community. The movement within a campus is a miniature movement in a small town. That is because the campus is one of the longest active places occupied by higher education stakeholders, which is at least 8 hours of work a day. There are some buildings in campus, such as lecture buildings, laboratory building, student's dormitory, and etc. The movements around that campus area will produce a constant movement that occurs at a certain time simultaneously.

InstitutTeknologi Sumatera (ITERA) is the first state institution on Sumatera, which is located in South Lampung district, which was established on 6 October 2014. Until 2019, ITERA has 3 Departments and 32 Study Programs. According to the Master Plan for the Acceleration of Development of the ITERA year 2017-2027, in the next 5 (five) years or until 2023, there will be 50 Study Programs of Bachelor Degree, 12 Study Programs Study of Master Degree, and 25 Programs Study of Diploma. In 2019, there are 10 buildings in ITERA, 6 from them are used as lecture and practicum activities, and 4 dormitory buildings inhabited by students and some of ITERA staff. By following the human resource needs by year, the development of the ITERA campus will continue to be carried out in accordance with the ITERA Development Master Plan as shown in Figure 1 below.
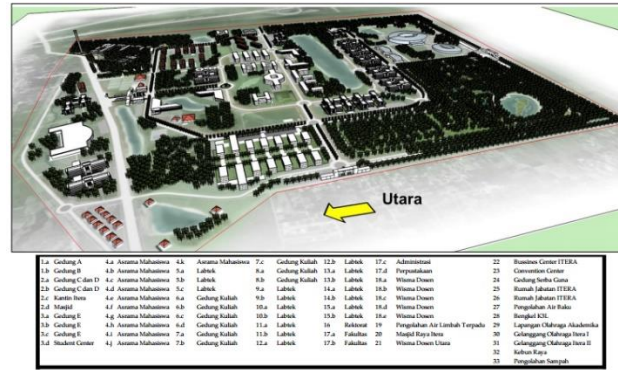
Figure 1.Masterplanof ITERA Development year 2017-2027

Based on the data, it can be concluded that within the next 10 years, there will be additional Human Resources and buildings in ITERA, so that the movement or movement that occurs within the campus will increase. One of the movement problems that will happen is, with a total land area of 275 Ha, there is no public transportation mode to serve the campus area. The movement of academicians on campus is done by using private vehicles, online transportation, and by foot. This study is about transportation model, which is intended as the first step in campus bus planning. It is expected that in the future, campus internal movements can be accommodated through buses that are adjusted to the movement needs of the academic community.

II. METHOD AND PROCEDURE

This study uses PTV VISUM software to modelling the number of internal movement needs of the internal campus area. The first step to modeling is obtaining an Origin Destination Matrix which will be described as a campus bus service route. In 2019, there are some buildings in ITERA that have been used. Therefore in the modeling there are several zoning based on the location of the building.Origin destination matrix is generated through the equation of trip generation and travel attraction. The equation used was taken from previous research.

Generation's formula:
$$Y = -0,0008(x) + 328,19 \tag{1}$$
Explanation:
x: total building area
Source: Safridho, 2017

And for Attraction's formula:
$$Y = 0,0072(x) + 94,790 \tag{2}$$
Explanation:
x: luas total bangunan
Source: Safitri, 2013

In using these equations, it takes the total building area data in ITERA.

Table I. Total building area in ITERA

No	Building	m2
1	A (West Venue)	748
2	B (East Venue)	748
3	LPPM	21132
4	RumahKayu Canteen	1871
5	E	7236
6	Dorm	18424
7	Masjid At-Tanwir	1741
8	GKU	17176

Source: ITERA, 2019

From the equation will produce the Origin Destination Matrix, obtained through the UCGR method. This model has at least one limitation, namely the total movement produced must be equal to the total movement estimated from the trip generation stage. This model is unlimited, in the sense that the model is not required to produce a total equal to the total movement to and from each zone estimated by the trip generation stage. The model can be written as:

$$T_{id} = O_i.D_d.A_i.B_d.f(C_{id}) \tag{3}$$

Source: Tamin, 2000

Traffic loading analysis is carried out using a matrix of origin destination data generated from the movement distribution analysis. Loading of traffic is done by considering several parameters of movement such as: Impedance (resistance level); Road Length; Road Capacity; Speed of movement. In this study the movement distribution analysis was carried out using the PTV Vissum 18 application with the steps below:

1. Zoning
   The zone is the origin and end of the movement of the system developed. All movements originate and head for the observed zone.
2. Node
   Nodes are the meeting points of the road. Nodes are literally crossroads.
3. Connectors
   Connectors are connecting points between zones and nodes.
4. Link Formation
   Link is the road network being reviewed.

PTV Visum's approach is stochastic optimization to do a number of iterations to get the optimum value from the calculations performed. To validate the data from the modeling, the results of the running model will be compared against the traffic survey data. ITERA is a campus area whose traffic volume is not large enough compared to an urban area, so the traffic survey is only conducted at one point that is considered to be sufficient for the campus's internal movement. The location of the traffic survey can be seen as below:

Figure 2. Traffic survey area

Based on Zudhy (2015), in conducting validation use the amountthe volume of traffic flow according to Gustavsson(2007), the best method for comparingsimulation input and output data is byusing the GEH statistical formula. GEH isstands for Geoffrey E. Havers, namely the namefrom the inventor of the formula. GEH ismodified statistical formula from Chi-squaredby combining the differences between valuesrelative and absolute.

$$GEH = \sqrt{\frac{(q_{simulated} - q_{observed})^2}{0,5x(q_{simulated} + q_{observed})}} \tag{4}$$

Explanation:
q: traffic volume (vehicle/hour)
GEH < 5,0 : Accepted
5,0 ≤ GEH ≤ 10,00 Model Error
GEH > 10,00 : Rejected
Source: Irawan, 2015

III. RESULTS AND ANALYSIS

The calculation of Origin Destination Matrix with UCGR Method, can be seen as below:

Table II. Origin Destination Matrix of internal movement in ITERA

Zona	A	B	LPPM	Rumah Kayu	E	Asrama	At Tanwir	GKU
A	0	878	427	270	261	135	84	42
B	878	0	237	150	261	242	150	23
LPPM	274	152	0	878	45	13	8	137
RK	272	272	767	0	261	75	150	136
E	152	152	132	151	0	243	271	42
Asrama	85	85	41	47	146	0	878	4
At Tanwir	15	84	23	47	145	782	0	4
GKU	26	15	74	151	14	4	4	0

Source: Analysis, 2019

From modeling conducted using PTV VISUM software, the result of a traffic loading model that occurs on the internal campus of ITERA can be seen as these figure and table below:

Figure 3. Traffic loading at campus area
Source: Analysis, 2019

Table III. Zoning and traffic at campus area

No	No	From Node	To Node	Type No	TSysSet	Length (km)	Num Lanes	CapPrt	V0PrT (km/h)	VolVehPrT(Ap)
1	1	1	2	1	B,C,W	0,037	1	3400	30	1.286
2	1	2	1	1	B,C,W	0,037	1	3400	30	1.494
3	2	2	3	1	B,C,W	0,341	1	3400	30	726
4	2	3	2	1	B,C,W	0,341	1	3400	30	1.379
5	3	3	4	0	B,C,W	0,051	1	1600	30	2.106
6	3	4	3	0	B,C,W	0,051	1	1600	30	2.456
7	4	4	6	0	B,C,W	0,051	1	1600	30	2.031
8	4	6	4	0	B,C,W	0,051	1	1600	30	2.371
9	5	6	7	0	B,C,W	0,133	1	1600	30	1.640
10	5	7	6	0	B,C,W	0,133	1	1600	30	1.585
11	6	7	8	0	B,C,W	0,138	1	1600	30	1.795
12	6	8	7	0	B,C,W	0,138	1	1600	30	1.934
13	7	4	5	1	B,C,W	0,219	1	3400	30	1.133
14	7	5	4	1	B,C,W	0,219	1	3400	30	1.143
15	8	8	10	0	B,C,W	0,137	1	1600	30	388
16	8	10	8	0	B,C,W	0,137	1	1600	30	288
17	9	9	10	1	B,C,W	0,4	1	3400	30	288
18	9	10	9	1	B,C,W	0,4	1	3400	30	388

Source: Analysis, 2019

The results of the calculation of this movement are carried out using a private vehicle. As for if the mode choice is replaced by using a campus bus, this can cause a decrease in vehicle volume. This is because in one bus fleet, passengers can be transported in mass and rapid like the characteristic of campus bus itself. Based on the Table 3, the maximum value of vehicle is in 3rd zone, from node no 4 to no 3 with 2.436 volume vehicle in one hour.

The survey location is the main intersection on the ITERA campus. From the model results, the maximum value of the vehicles that occurred was 1494 vehicles/hour that occurred from node 2 to node 1. The model results show the network load analysis for one hour. Therefore, the survey is conducted for a minimum of 1 hour by taking the highest volume value ie during peak hours. The following is the result of a survey of vehicles on these roads.

Table IV. ITERA's intersection traffic load

Time (WIB)	Type of Vehicle	Volume
	MC	1528
08.00-09.00	LV	116
	UM	8

Source: Analysis, 2019

From the analysis and survey results, validation will be carried out to determine the accuracy of the model calculations. By using the GEH method, the results of the validation of the two data are follows:

Table V. Data validation

No	q observed	q intersection	GEH	Status
1	1494	1652	3,983	Accepted

Source: Analysis, 2019

From the step of data validation, it can be seen that the results of the analysis of the ITERA campus traffic loading model using PTV VISUM can be accepted. Thus an effective scheduling and bus system can be known to serve the number of movements each day. The analysis and survey results are during peak conditions, this is known from the results of a survey regarding the inter-building transfer schedule conducted by the ITERA academic community such as below.
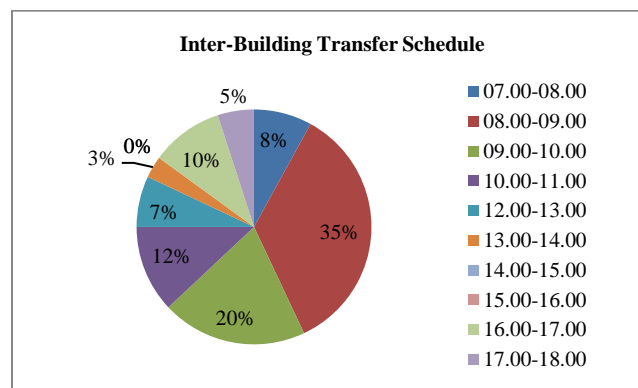
Figure 4. ITERA's academicians movement scheduling
Source: Analysis, 2019

The next step is to determine the number of buses needed to serve the ITERA's internal movement with a comparative analysis. The comparative is done between the traffic load, the travel time to surround the campus in current conditions, and the passenger capacity per bus. The result of the comparative analysis can be seen below:

Table VI. Number of buses

No	Total Demand	Demand Schedule	Bus Capacity	Travel Time (minutes)	Frequency (in 1 hour)	Number of Bus
1		196	70	15	4	1
2		860	70	15	4	3
3		491	70	15	4	2
4		295	70	15	4	1
5	2456	172	70	15	4	1
6		74	70	15	4	0
7		0	70	15	4	0
8		0	70	15	4	0
9		246	70	15	4	1
10		123	70	15	4	0

Source: Analysis, 2019

IV. CONCLUSIONS

From the results of the analysis in this study, it was found that the number of bus needs needed per hour is 2 to 3 buses during rush hour conditions at 08.00-09.00 WIB and 09.00-10.00 WIB. The provision of internal buses in ITERA is known to reduce the number of vehicles who passing by on campus, this is proven by the amount of traffic volume at peak hours of 2456 can be accommodated with the use of 3 buses with 4 times frequency per one hour.

ACKNOWLEDGMENTS

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Characteristics Of Turmeric And Tamarind Leaf Extract Cream In Hydrophile-Lipophile Balance And Perfume Type Variation

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Abstract— The purpose of this study is to determine the effect of Hydrophile-Lipophile Balance (HLB), the perfume type and their interactions on the characteristics of turmeric and tamarind leaf extract cream and to obtain HLB values and type of perfumes that produce turmeric and tamarind leaf extract cream with the best characteristics. The study used a randomized block design (RCBD) factorial pattern of two factors, namely HLB (10,11 and 12) and the type of perfume. Experiments are grouped into 2 so that there are 18 units of experiments. Based on preliminary research, it was obtained 3 types of perfume whose concentration favoured by panellists, with the ranking sequence as follows: jasmine (1.5%), champaca (2%) and rose (2%). The results show HLB, the perfume type and their interaction do not significantly affect adhesion time, pH, separation ratio, viscosity and total phenol. The type of perfume affects the dispersive power, but the HLB and the perfume type have a significant effect on overall acceptance. HLB10 cream on all types of perfumes shows the best cream with characteristics: acceptance value of 5.10-6.10; adhesion time of 14.68-23.50 seconds, dispersive power of 4.91-5.52 cm, pH 6.25-6.38, separation ratio of 0.84-1; viscosity (2.5-2.86) 10,000 cp, and total phenolic of 2.76-2.90 mg GAE/g.

Keywords— HLB, perfume type, cream, turmeric and tamarind leaf

I. INTRODUCTION

Public awareness on harmful chemicals in cosmetics has led to an increase in the demand for natural ingredients cosmetics and the use of safe cosmetic ingredients. Turmeric (*Curcuma domestica* val.) and tamarind leaf (*Tamarindus indica* L.) are natural cosmetic ingredients, both of which have potential as anti-aging ingredients. [1]. Cream is a semi-solid emulsion of either water in oil or oil in water type which is usually used as an emollient (moisturizer) or the use of medication on the skin [2]. *Triethanolamine* (TEA) is an emulsifying agent commonly used in cosmetic creams. Excessive and continuous use of TEA in products can cause irritating reactions and interfere with skin health [3].

The use of safe emulsifiers as a substitute for TEA is a solution to get safe cosmetics. Tween 80 and span 80 are non-ionic surfactants which are non-toxic and non-irritating emulsifiers [4] and have been widely used in the food industry in food systems [5]. The use of tween and span to form oil-in-water (O/W) type of emulsions in the manufacture of ointments and creams generally has an HLB (*hydrophile-lipophile balance*) value of 9-11 so that the cream is easily rinsed and dissolves in water [6]. Cream containing antioxidants will increase the skin's defense against the accumulation of free radicals. Antioxidants are added because it can reduce oxidative damage caused by increased reactive oxygen species (ROS) due to UV radiation [7]. The use of turmeric and tamarind leaf as a source of antioxidants with tween 80 and span 80 as emulsifiers will produce a safe cream.

Turmeric and tamarind leaf extract cream as a result of research [1] uses VCO as a substitute for olive oil, so it has a weakness in scent. The dominant cream is scented with VCO so that the organoleptic value for scent reception is low. Based on this, the addition of perfume is needed to increase the acceptance of the scent. Until now, research on the effect of HLB and scent on cream characteristics has not been conducted, so we need to know: how the HLB value and types of perfume affect cream characteristics, and what is the value of HLB and the type of perfume that produce cream with characteristics that are in accordance with SNI (Indonesian National Standard) and favored by panelists. This research needs to be done so that in the future turmeric and tamarind leaf cream becomes a solution to the increasing demand for cosmetic ingredients with characteristics that meet the standards and preferred by panelists.

II.   MATERIALS AND METHODS

a.   Experimental Designs

This study uses factorial randomized block design with two factors. Factor I: HLB with level 10, 11 and 12, and factor 2: the type of perfume jasmine (1.5%), champaca (2%) and rose (2%)., thus there are 9 combination treatments grouped into 2 groups when making cream, so there are 18 units of experiment.

b.   Making of Turmeric and Tamarind Leaf Extract Cream Emulsion

The cream formula used is shown in Table 1 The oil phase consisting of stearic acid, mineral oil, virgin coconut oil (VCO), Tween 80, Span 80, cetyl alcohol and moisturizer conditioner was heated at 65°C for 15 minutes on water bath until mixed. Aquades and turmeric and tamarind leaf extract were mixed then added little by little to the oil phase mixture while stirring manually for 30 minutes until it was homogeneous, and cream was formed.

Table 1. Cream formulation used based on modification [1]

No	Material	Amount in 100 g		
		E1 (HLB 10)	E2 (HLB 11)	E3 (HLB 12)
1	Stearic Acid	10.9	10.9	10.9
2	VCO	3.64	3.64	3.64
3	Mineral oil	2.27	2.27	2.27
4	Cetyl Alcohol	0.91	0.91	0.91
5	Span 80	2.80	2.34	1.87
6	Tween 80	2.20	2.66	3.13
7	Moisturizer conditioner	10	10	10
8	The type of perfume	according to treatment	according to treatment	according to treatment
9	Turmeric and tamarind leaf extract	0.2	0.2	0.2
10	Water addition up to	100	100	100

III.   RESULTS AND DISCUSSION

1) Adhesiveness

The results of the diversity analysis show that HLB and perfume type and their interactions do not significantly affect (P> 0.05) the adhesiveness of the cream (Table 2). The adhesiveness of the cream range is 6.63 -31.22 seconds. Table 2 shows that the adhesion time of the cream on the 6th week in all HLB treatments is not different. This is due to the addition of the same amount of tween 80 and span 80 non-iconic surfactants; although the ratio is different, but it still produces the same stability. This causes the same adhesion time. The adhesion time until the 6th week still meets the SNI requirements which is more than 4 seconds. The longer the cream emulsion can stick to the skin, the better the absorption of active substances on the skin [14]. The stability of adhesion time is also due to the presence of cetyl alcohol which functions as an emulsifier. The emulsifier works to form a layer around the dispersed droplets thus preventing the separation of the dispersed liquid [15]

Table 2. Average value of adhesion time (seconds) of turmeric and tamarind leaf extract cream on the 6th week

Perfume type	HLB			Average
	10 (E1)	11 (E2)	12 (E3)	
Jasmine (P1)	14.68	9.59	22.84	15.70[a]
Champaca (P2)	23.50	16.22	6.43	15.38[a]
Rose (P3)	23.42	31.22	25.20	26.61[a]
Average	20.53[a]	19.01[a]	18.16[a]	

2) Dispersive Power

The results of diversity analysis show that the HLB treatment has no significant effect, while the perfume type has a significant effect (P <0.05) on the dispersive power of the cream (Table 3). The range of cream dispersion is 4.91-5.66 cm. The HLB treatment is not affected because the HLB value only distinguishes the span and tween surfactant ratios, while the number of additions is the same. Emulsion stability is more influenced by surfactant concentration. Because the concentration is the same, the HLB value does not affect the dispersive power of the cream.

Table 3. Average value of dispersive power (cm) of turmeric and tamarind leaf extract cream on the 6th week

Perfume type	HLB			Average
	10 (E1)	11 (E2)	12 (E3)	
Jasmine (P1)	5.52	5.35	5.58	5.48 [a]
Champaca (P2)	5.13	5.66	5,56	5,.48[a]
Rose (P3)	4.91	5.04	5.14	5.03[b]
Average	5.19[a]	5.35[a]	5..42[a]	

Note: The same letters behind the average value indicate no significant difference at the 5% confidence level

The perfume treatment has an effect on the dispersive power of the cream. It might be due to the difference in the base of the perfume solvent. In general, perfume compositions consist of: ethanol as a solvent, aquadest as a perfume solvent base and active ingredients or perfume core and polyethylene glycol (PEG-40) as a fixative/ binding agent and moisturizer. The three types of perfume used have different amounts of aquadest addition as a solvent base. Based on the value of dispersive power, it shows that the amount of rose perfume added aquadest is smaller than those in jasmine and champaca perfume. The difference in the amount of water in each perfume will affect the dispersive power of cream.

3) Acidity (pH)

The analysis of diversity shows that the HLB treatment, perfume type and their interactions do not significantly influence ($P > 0.05$) the pH of the cream (Table 4). The pH range of the cream is 6.08-6.38. The selection of tween and span non-iconic surfactant emulsifiers has these advantages: safe ingredients, does not irritate the skin and produce a smooth and stable texture [16], and does not affect pH. The difference in the type of perfume does not affect the pH, this is due to the perfume concentration of no more than 2%. The pH of the perfume tends to be neutral and close to the skin's pH so that the treatment of adding perfume does not affect the pH of the cream. A good cream has the same pH value as the normal pH of the skin ranging from pH 4.5 to 6.5 [17]. All research creams meet SNI requirements

Table 4. Average value of turmeric and tamarind leaf extract cream pH on the 6th week

Perfume type	HLB			Average
	10 (E1)	11 (E2)	12 (E3)	
Jasmine (P1)	6.25	6.23	6.08	6.18 [a]
Champaca (P2)	6.25	6.20	6.13	6.19 [a]
Rose (P3)	6.38	6.18	6.13	6.23 [a]
Average	6.29[a]	6.20 [a]	6.11 [a]	

4) Separation Ratio

The results of the diversity analysis show the HLB treatment, the perfume type and the interaction has no significant effect ($P > 0.05$) on the cream separation ratio (Table 5). The cream separation ratio range is 0.53-1. The number of additions of the same tween 80 and span 80 non-iconic surfactants, with different ratios, does not affect the density of the two phases in the emulsion so that it does not affect the separation ratio. This also applies to the type of perfume treatment. The amount of perfume addition which is only a maximum of 2% has no effect on the density of the two phases so that the cream separation ratio is not different.

Table 5. Average value of separation ratio of turmeric and tamarind leaf extract cream on the 6th week

Perfume type	HLB			Average
	10 (E1)	11 (E2)	12 (E3)	
Jasmine (P1)	1.00	0.76	1.00	0.92[a]
Champaca (P2)	1.00	0.76	0.53	0.76[a]
Rose (P3)	0.84	0.81	0.80	0.82[a]
Average	0.95[a]	0.78[a]	0.78[a]	

5) Viscosity

The results of diversity analysis show that HLB treatment, the perfume type and their interactions do not significantly affect ($P > 0.05$) the viscosity of the cream (Table 6). The viscosity range of the cream is 17500-38000 cp. The viscosity of an emulsion is affected by the size of the droplet. The small droplet size will increase the surface area and increase the emulsion resistance to flow which then increases the viscosity [18]. The size of

the droplet is influenced by the time and method of homogenization, this will affect the stability of the emulsion [19]. In this study, the homogenization time and method do not differ that results in the same droplet size, so that the treatment has no effect on the viscosity of the cream. The viscosity of all creams produced meets SNI requirements.

Table 6. Average value of viscosity (x 10,000 cp) of turmeric and tamarind leaf extract cream on the 6th week

Perfume type	HLB			Average
	10 (E1)	11 (E2)	12 (E3)	
Jasmine (P1)	2.50	3.80	2.50	2.93[a]
Champaca (P2)	2.85	2.50	2.00	2.45[a]
Rose (P3)	2.75	1.75	3.25	2.58[a]
Average	2.70[a]	2.68[a]	2.58[a]	

6) Total Phenolic

Based on diversity analysis, it is shown that HLB treatment, perfume type and their interaction have no significant effect (P> 0.05) on total phenolic of the cream (Table 7). The total range of phenolic of the cream is 2.76-2.90 (mg GAE/g). Tween 80 and Span 80 which are sorbitic-ester derivatives, have hydrophilic and lipophilic properties, so they do not affect phenol compounds. The phenol compound is an antioxidant compound and will be oxidized in the presence of light, heat and oxygen. These are also the cause that the HLB regulation does not affect on the total phenolic.

Table 7. Average value of total phenolic (mg GAE/g) of turmeric and tamarind leaf extract cream on the 6th week

Perfume type	HLB			Average
	10 (E1)	11 (E2)	12 (E3)	
Jasmine (P1)	2,90	2,81	2,84	2.85[a]
Champaca (P2)	2,76	2,88	2,79	2.81[a]
Rose (P3)	2,78	2,82	2,81	2.80[a]
Average	2.81[a]	2.84[a]	2.81[a]	

Note: The same letters behind the average value indicate no significant difference at the 5% confidence level

7) Organoleptic Test

Friedman test results show that the HLB treatment and perfume type have significant effect (P <0.05) on the overall acceptance of the cream (Table 8). The acceptance values range from 4.37 - 6.10. The characteristics of the cream in all treatments until the 6th week of storage still meet SNI standards. This shows that tween 80 and span 80 emulsifiers with a concentration of 5% are able to maintain the stability of turmeric and tamarind leaf extract cream emulsion. Based on the organoleptic test, the highest results were obtained from the cream with HLB10 at all storage until the 6th week, with a value of 5.1 to 6.1 (quite like to like).

Table 8: Friedman test result of the cream in HLB and perfume type towards the overall acceptance of the cream

Product	Value	Product	Value	Product	Value
HLB10 Jasmine perfume	6.10 a	HLB 11 Jasmine perfume	4.51 b	HLB 12 Jasmine perfume	4.61 b
HLB10 Champaca perfume	5.57a	HLB 11 Champaca perfume	4.64 b	HLB 12 Champaca perfume	4.57 b
HLB10 Rose perfume	5.10a	HLB 11 Rose perfume	4.47 b	HLB 12 Rose perfume	4.37 b

IV. CONCLUSION

HLB, perfume type and the interaction of the two do not significantly affect adhesion time, pH, separation ratio, viscosity and total phenol. The type of perfume affects the dispersive power, but the HLB and perfume type have a significant effect on overall acceptance. HLB 10 cream on all types of perfumes show the best cream with characteristics: acceptance value of 5.10- 6.10; adhesion time is 14.68-23.50 seconds, dispersive power of 4.91-5.52 cm, pH 6.25-6.38, separation ratio of 0.84-1; viscosity (2.5-2.86) 10,000 cp, and total phenolic of 2.76-2.90.

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EFFECT OF ETHANOL EXTRACTS OF MUSTARD GREEN (*Brassica rapa* L) CAUSEON LOWER MALONDIALDEHYDE (MDA) IN STREPTOSOTOZIN INDUCED DIABETIC RATS WISTAR

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ABSTRACT

Effects of ethanol extract of mustard green (*Brassica rapa* L) on normal and Streptosotozin-induced diabetic rats were investigated in 5 groups of rats (6 rats per group). Test groups were made diabetic with intra-peritoneal injection of streptosotozin and treated with 0.5 mg /kg body weight of mustard green (*Brassica rapa L)* extract, 2,0 mg/kg body weight, and 5,0 mg/kg body weight. Negative group P0(received food standart only), positive control, P1 (induced with streptozotocin and given *glibenclamide* drug*)*; P2, P3, and P4 were treatment groups (induced with streptozotocin and given ethanol extract of mustard green at doses of 0.5, 2.0, and 5.0 mg/KgBw/day respectively). with The separation of ethanol extract of mustard green was carried out by LC-MS/MS. In decrease malondyaldehyde rats, levels were significantly ($p < 0.05$) by 34.68-38.9% on consumption of ethanol extract of mustard green (*Brassica rapa* L).s of diabetic rats. The result suggested restorative (protective) effect of the extract on pancreatic islet cells. can be useful in the treatment of mustard green (*Brassica rapa* L).

Keywords: Mustard green (*Brassica rapa L)*, streptosotozint,malondyaldehyde, hyperglycemic effects

INTRODUCTION

Diabetes mellitus is a primary disorder of carbohydrate metabolism, which generally involves absolute or relative insulin deficiency and/or insulin resistance and ultimately leads to hyperglycemia. There has been increasing demand for the use of natural products with antidiabetic activity. The undesirable side effects of synthetic drugs, easier consumption or availability and the fact that they are not suitable for use during pregnancy, have been some of the factors leading to the strong desire to use hypoglycemic agents of plant origin (Berger, 1985; Jelodar *et al.*, 2007; Yadav *et al.*, 2008).

Some herbs and plant products have been shown to have antihyperglycemic action (Elder, 2004; Srinvasan, 2005; Badole *et al.*, 2006). Plants may act on decrease malodyaldehide blood through different mechanisms. Some of them may have insulin-like substances (Collier *et al.*, 1987; Gray and Flatt, 1999); some may inhibit insulinase activity while others may increase beta cells in pancreas by activating regeneration of these cells (Shan mugasundaram *et al.*, 1990; Abdel *et al.*, 1997).

However, very few of the traditional treatments for diabetes have received scientific scrutiny. The aim of this study was to investigate the hyperglycemic effect of green mustard used in traditional medicine in treatment of diabetes and its possible role on pancreatic tissue.

MATERIALS AND METHODS

Animals
Thirty (30) male Wistar albino rats weighing 180-200g were obtained from the Animal House of the Department of Biochemistry, University of Udayana, Indonesia. The rats were kept in clean and only dry plastic cages, with 12 hrs light-

dark cycle at $25 \pm 2°C$ and 45-55% relative humidity. The animals were fed with pelletized commercial rat feed (Pfizer Livestock Co. Ltd) and tap water ad libitum. The rats were assigned into 5 groups of 6 rats each. .

Sample collection
Samples of green mustard (*Brassica rapa* L) from markets in Denpasar Bali Indonesia. The plant material was authenticated by a taxonomist Ir. Tuah Malen bangun.,M.Si. of the Department of Botany Bedugul Bali'

Preparation of ethanol extract of green mustard

Extract preparation. Extraction of mustard greens: a total of 1000gram of mustard green powder (Brassica rapa L) were extracted by maceration process using 96% ethanol ethanol as solvent until all the mustard green was immersed in the solvent.Soaking was done for ±48 hours repeatedly until a clear filtrate is obtained.The clear filtrate was then run with a thin layer LC-MS/MS plate to confirm complete extraction. The ethanol extract was filtered and seperated from the solvent using a rotary vacuum. Evaporator until a thick extract was produced which from now on will be called as ethanol extract of thick mustard green (Brassica rapa L). The thick ethanol extract was fractionated using water, n-hexane, and ethyyl acetate. The fractionated products were thee evaporated, and dosage from was made for the initial test of the most effective dose to bloog glucose levels in hyperglycemic rats.

Animal treatments
The 6 group of rats were as follows: P0(received food standart only), positive control, P1 (induced with streptozotocin and given *glibenclamide* drug); P2, P3, and P4 were treatment groups (induced with streptozotocin and given ethanol extract of mustard green at doses of 0.5, 2.0, and 5.0 mg/KgBw/day respectively). The dose of streptozotocin used to induce hyperglycemia in all rats was 125 mg/kg BW.
Diabetes was confirmed I week after streptozotocin injection by determining the blood glucose concentration using One Touch Basic Glucometer.

Collection and treatment of samples
After 1 month, the animals were adaptation next intra-peritoneal injection of streptosotozin until 7 day. And than treated with 0.5 mg /kg body weight; 2,0 mg/kg body weight; 5,0 mg/kg body weight of mustard green (*Brassica* under chloroform vapour. Blood samples were obtained by cardiac puncture.

Malondialdehyde (MDA) Levels study
On the last day of experiment, the tail parts of the Wistar Rats were malondialdehyde (MDA). The results of MDA processing was carried out by TBARS method spectromofometry UV-VIS in 532 nm.

STATISTICAL ANALYSIS

All data from the research were analyzed sttistically using the Anova/ Kruskal-Wallis test method whit the SPSS program (Statistical Product and Service Solution). as means ± SD. Student's t-test was used to compare the mean values of test groups and control. Differences in mean values were considered significant at $p < 0.05$.

RESULTS

The effects of ethanol extract of mustard green
The results showed that treatment with 0,50mg/kg body wt streptozososin after 7 days caused significant increases (p < 0.05), The levels of MDA blood diabetic groups before(78.30-82.67mg/dl) were significantly after extrat brassica rapa L (34,68 -38.90 mg/dL)(p < 0.05)

Malobdialdehyde (MDA) levels in Wistar rat
The Damage pacrease especially in lipid peroxid

ation produces the final product is the form of malondialdehyde (MDA) through oxidation by free radical.
Malodialdehyde has been widely used as an indicator of strees oxidativ damage.Significant **p < 0.05**

Decrease of MDA levels of dislipidemia Wistar rat

Mean MDA levels of dislipidemia Wistar rat for preand posttestwere listed on Table 4.7.

Table 1
Decrease of MDA Levels

| Treatment	MDA (μm/L)	
	Pretest	**Postest**
P0(Control)	1.22 ± 0.01	1.22 ± 0.03
P1	1.26 ± 0.01	0.84 ± 0.13
P2	1.25 ± 0.01	0.74 ± 0.16
P3	1.26 ± 0.01	0.61 ± 0.13
P5	1.26 ± 0.01	0.71 ± 0.13
	LSD 5% =0.95	LSD 1% = 1.27

Notes : Mean followed by same letter indicates insignificant different $p > 0.05$. LSD for posttest

Data of mean different profile of MDA levels for various intake Extract ethanol of brassica rapa

DISCUSSION

he P4 groups that received extracts. Furthermore, the percentage reduction in glucose levels is high for all groups treated with extract. The results suggest both hypoglycemic and antihyperglycemic effects of ethanol of mustard green extracts. The findings may indicate the presence of some hypeglycemic agents in the ethanol mustard green, which have been concentrated in the extracts. The hypeglycemic effects of plants may be due to the presence of insulin-like substance in plants (Collier *et al.*, 1987; Gray and Flatt, 1999), stimulation of ß cells to produce more insulin (Chang and Johnson, 1980; Khan *et al.*, 1990).

In this study, the pancreatic ß cells were destroyed with the help of alloxan. Streptozotosin is one of the usual substances used for the induction of diabetes mellitus apart from streptozotocin (Prince and Menon, 2000; Szkudelski, 2001; Ei-Soud *et al.*, 2007). Streptosotozin has a destructive effect on the beta cells of the pancreas (Jelodar *et al.,* 2007). The pancreas is the primary organ involved in sensing the organism's dietary and energetic states via glucose concentration in the blood. In response to elevated blood glucose, insulin is secreted. Histopathological study of diabetic untreated (P0)rats showed degeneration of pancreatic islet cells, which was due to streptosotazin used in this study. This probably gave rise to insulin deficiency. Insulin deficiency (or diabetes mellitus) causes excessive elevation of blood glucose and underutilization leading to hyperglycemia (Standl *et al.*, 2003). The histopathological study of diabetic treated group (P1, P2 and P3) indicated increased volume density of islets and increased percentage of beta cells, in the diabetic rats that received the extracts, which may be a sign of regeneration. Signs of regeneration of ß cells, potentiation of insulin secretion from surviving ß cells of the islets of Langerhans and decrease of blood glucose have been reported following consumption of some plant extracts (Shanmugasundaram *et al.*, 1990; Abdel *et al.*, 1997; Ayber *et al.*, 2001; Suba *et al.*, 2004; Yadav *et al.*, 2008). Extract ethanol mustsrd green have some chemical components that exert regenerative effects on ß cells, stimulate these cells to produce more insulin (pancreatotrophic action) or may have some insulin-like substances.
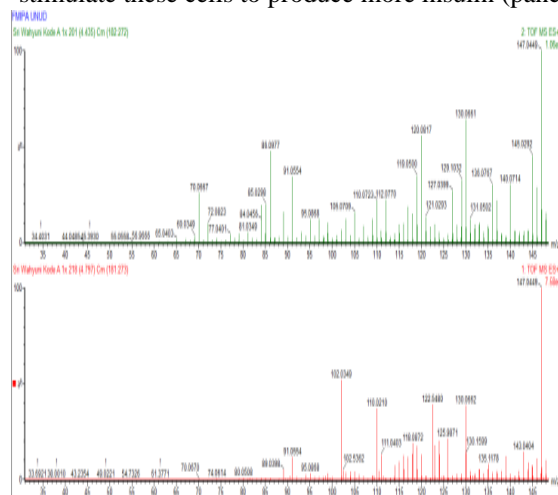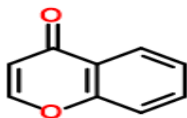
2,4-Pentanediol

A higher dose of the extract has a greater restorative effect on the islet cells of diabetic rats than a lower dose of extract. There was no significant effect of the extract on the pancreas of normal rats.

CONCLUSION

The findings of this study indicate that consumption of effect of ethanol extract of mustard green (Brassica rapa L) significant hypoglycemic effect in diabetic rats. Malondialdehyde studies of the blood of diabetic treated W i s t a r rats show evidence of signs of regeneration of ß cells in groups receiving effect of ethanol extracts of mustard green (Brassica rapa L). These findings support the traditional use of mustard green for controlling hyperglycemia in diabetics, in view of the restorative (protective) effects of the extract on pancreatic islet cells. Further investigation with longer period of higher dose may show clearer features of these findings.

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Cigarette Consumption And Its Effect On Labor Productivity In Denpasar City

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Abstract—Work productivity is a comparison between the results achieved with the overall resources used or the ratio of the amount of production (output) with the resources used. This work productivity measurement has an important role to figure out the work productivity of workers, therefore it can be seen the extent to which productivity can be achieved by workers. The relationship between cigarette consumption and the level of labor productivity in Denpasar is very close considering that Denpasar as a densely populated city area which is a center of tourism and business activities, it is not surprising that the number of workers who smoke is classified as high. This research was conducted with the aim to find out and analyze the effect of cigarette consumption on labor productivity in Denpasar. The variables analyzed use path analysis to determine the direct and indirect effects and the Sobel Test to determine the level of significance of the intervening variable as a mediating variable. The samples were 150 people who were obtained by using non-probability sampling with accidental sampling method. Based on the results of the regression, it can be obtained that the total determination coefficient of 0.976 which has a meaning of 97.6 percent is explained by the model, while the remaining 2.4 percent is explained by other variables outside the model. Variable income, cigarette price and cigarette consumption have a positive and significant effect on labor productivity. The cigarette price variable is a variable that does not have a positive and significant effect on labor productivity in Denpasar.

Keywords— work productivity, cigarette consumption, income, cigarette price

I. INTRODUCTION

Cigarette is one of the food commodities after rice that contributes to Indonesia's poverty. The success of the cigarette business today can be seen from the increasing number of smokers among labors, teenage students and even children. They, smokers actually already know the health hazards caused by smoking. In general, people often serve cigarette with drink or food even used in religious ceremony. Cigarette is believed to be the current lifestyle that is considered a drug to relieve drowsiness and reduce stress on labors. Indonesia is one of the countries with the second largest cigarette consumption in Asia after China. The number of smokers, every year, always increase based on the data from the Central Agency on Statistics (*Badan Pusat Statistik*) (BPS) show that 721 million Indonesian in 1980, to 967 million in 2012. Indonesia itself ranks highest in the prevalence of smoking for men in ASEAN, which is 67.4 percent. The existence of aggressive advertisement and promotion of cigarette will affect the motivation of young people to start smoking. Smoking behavior is still prevalent in society, especially among labors, this is related to the effects of nicotine in tobacco. Over time, a person who has smoked becomes physically and emotionally dependent on nicotine. Physical dependence causes unpleasant withdrawal symptoms when trying to stop. The Tobacco Atlas states that the number of cigarette consumption in the world in 2014 reached 5.8 trillion sticks and is still growing every year. The prevalence of smoking in developed countries has decreased, but vice versa in developing countries. The results of studies in the medical journal, The Lancet, show low smoking cessation rates in most developing countries (BBC Indonesia, 2012). The Tobacco Atlas 2015 data states 66% of men in Indonesia smoke, Russia ranks second with 60% of male smokers over 15 years, then followed by China (53%), the Philippines (48%), Vietnam (47%), Malaysia (44%), India (24%), and Brazil (22%) (Kompas.com, 2016).

In Denpasar, as a densely populated city area which is a center of tourism and bussines, it is not surprising that the number of labors who smoke is classified as high as a survey of the Basic Health Research of the Ministry

of Health of the Republic of Indonesia. In 2018, the number of smokers who worked was quite large, especially those who worked as farmers, fishermen or laborers, namely 44.5 percent. Smokers who do not work are only 6.9 percent. The number of smokers who smoke, every day, is far more than the number of employees who have the biggest number in the smokers who smoke occasionally, which is equal to 7.4 percent. Construction labors are among the labors who have a significant risk factor for smoking and are dependent on nicotine. The smoking style of construction labors causes the productivity to decrease dramatically because smoking time which is done several times reduces the work time that should be able to complete the work. Smoking in the workplace can interfere the health of other labors and is said to be one of the causes of decreased workforce performance. It occurs because job opportunity is lost due to susceptibility to disease and the time spent by labors for smoking makes work less effective and inhibited.

II. LITERATURE REVIEW

a. Work Productivity
Productivity is the ratio between the results achieved (output) with the overall resources (input) used per unit time. This work definition contains method of measurement, although in theory, it can be done, but in practice, it is difficult to implement because the input resources used generally consist of many kinds with different proportions (Hasibuan Malayu S.P, 2012).
Umar Husein (2002) argues that, in general, productivity implies a comparison between the results achieved (output) and the overall resources used (input). Productivity has two dimensions, namely effectiveness which leads to the achievement of maximum performance, namely the achievement of targets related to quality, quantity and time. The second is efficiency related to efforts to compare input with the realization of their use or how the work is carried out. Factors that influence productivity include: education, discipline skills, motivation, attitude and work ethics, nutrition and health, income level, work environment, technology and production facilities.

b. Smoking Behavior
Smoking activity means burning tobacco and tar leave, sucking the smoke produced. Smoking behavior seen from various perspectives is very detrimental to both themselves and others around them. From the health side, the effect of chemicals contained in cigarettes such as nicotine CO (Carbonmonoxide) and tar which can cause blood pressure to increase and heart rate to accelerate.
Smoking is referred to as a habit or addiction, but nowadays smoking is referred to as tobacco dependence. It can be defined as the behavior of permanent use of tobacco, usually more than half a pack of cigarette per day, with the addition of distress caused by the need for tobacco repeatedly. Smoking behavior can also be defined as the subject's activities related to smoking behavior which is measured through smoking intensity, smoking time and function in daily life (Komalasari & Helmi, 2000).

c. Smoker Category
Sitepoe (2000) categorizes smokers based on the number of daily cigarette consumption, namely: (a) light smokers (1-10 cigarettes per day), (b) moderate smokers (11-20 cigarettes per day), and (c) heavy smoker (>20 cigarettes per day). Smokers who consume smaller amounts of cigarettes have a greater tendency to stop smoking (Kwon Myung & Gwan Seo, 2011). Taylor (2009) mentions the term chippers to describe smokers who consume less than 5 cigarettes per day and usually they do not become heavy smokers, therefore they are less likely to experience nicotine dependence. Another term for smokers is social smoker, which is an individual who smokes only in social situation or certain situation, for example when meeting with old friends at an event or party. This social situation act as cue or trigger for smoking (Hahn & Payne, 2003).

III.   RESEARCH METHODS
This research was conducted by using primary data and secondary data. Primary data were data obtained directly from the original source (not through an intermediary). Secondary data were obtained indirectly by researcher through intermediary media (obtained and recorded by other parties). Primary data was implemented to obtain information about labor income, cigarette consumption, and cigarette price. Primary data were obtained by distributing questionnaires to construction labors who worked around Denpasar. Secondary data include data on the number of labors who make smoking activities range of age smokers and types of work

IV. DATA COLLECTION TECHNIQUES

Sampling is a procedure in which only a portion of the population is taken and is used to determine the desired traits and characteristics of a population. While, sampling technique is a way to get a representative sample of a population. Sampling technique include two elements, namely how large the sample size is used and how the sampling process or technique (Nazir, 2009). Data collection techniques are ways that are used to collect data and other information in research on the problem that is the object of research. Research data were collected from various sources related to research, while primary data were obtained from the company where the research was conducted. Secondary data were obtained from books, internet, journals, and others. Data collection techniques used in this study were as follows: library research, field research, interview, direct observation, and questionnaire. The sample, in this study, consisted of construction labors who were working in Denpasar who obtained information related to nicotine dependence. Respondents were given a questionnaire as an illustration of the respondents' smoking experience during a certain period of time. This research variable consists of independent variables, namely: labor income, and the price of cigarettes with mediating variables namely cigarette consumption, while the dependent variable is labor productivity in Denpasar. This study uses path analysis techniques (path analysis), this analysis is used to determine the direct relationship of independent variable to the dependent variable and indirect relationship through intervening variable or mediating variable. The population, in this study, were construction laborers working in Denpasar. The determination of the sample was conducted by using non-probability sampling technique, namely the accidental sampling method, whereby anyone who accidentally meets a researcher can be used as a sample, if it is deemed that the person who happens to be found is suitable as a data source. The population in this study is not known with certainty. Sugiyono (2002) said that a good sample size is 100-200. Considering the unknown population, based on the above guidelines, the sample is determined as many as 150.

V. RESULTS AND DISCUSSION

The analysis technique used to answer the research problem was path analysis. Path analysis was implemented with the aim to identify the causality relationship between research variables. It was implemnted to identify the magnitude of the influence of exogenous, endogenous and intervening variables in combination as well as partially, testing the accuracy of the research data model with the existing theory and deciphering the correlation between variables by looking at the direct effect, indirect effect and total variable effect. The results are shown in Table 1 below.

Table 1
Summary of Path Coefficient and the Significance of Relationship between Variables

Regression	Coef. Reg. Standard	*Standard Error*	t-count	*P.Value*	Results
X1 →Y	0,375	0,117	6,133	0,000	Significant
X1 →M	0,355	0,087	1,388	0,030	Significant
X2 → Y	0,282	0,015	2,195	0,130	Insignificant
X2 → M	0,288	0,059	5,620	0,000	Significant
X2 →Y2	0,255	0,611	2,388	0,025	Significant
M → Y	0,383	0,644	3,783	0.001	Significant

Source: Processed Data, 2018

Based on Table 1, the test results show partially through the t-test (p-value) by comparing t-count with t-table or by looking at the value in the significance column (sig), it can be concluded that there are variables that are not positively and significantly influenced by the path the influence of cigarette price (X2) on the Labor Productivity variable (Y) can be seen from p Value 0.130>0.05 with a standard regression coefficient of 0.282 and an error standard of 0.015. It means that the price of cigarette does not affect the labor productivity of labors in Denpasar, the high or low price of cigarette that is determined will not affect work productivity directly, but the price of cigarette can affect labor productivity indirectly through cigarette consumption. Based on Table 1 about the variable path

diagram, there are direct effects, indirect effects, and the total effect of each variable is presented in the following table.

Tabel. 2
Summary of Coefficient of Direct, Indirect, and Total Between Variables

Variables		M	Y
X1	PL	0,355	0,375
	PTL	-	0,133
	PT	0,355	0,508
X2	PL	0,288	0,282
	PTL	-	0,110
	PT	0,288	0,392
M	PL	-	0,383
	PTL	-	-
	PT	-	0,383

Source: Processed Data, 2018

Intervening testing as a mediating variable can be conducted using the Sobel test. Sobel test is done by testing the strength of the indirect effect of the independent variable (X) to the dependent variable (Y) through the intervening variable (M). The results of the Sobel analysis test show that the z-count of 5.4327 is greater than the z-table of 1.96 with a significance level of 0.05. Therefore, it can be concluded that there is a mediating effect between each of the intervening variables.

VI. CONCLUSION

The study found that there was a significant influence on cigarette consumption as a mediating variable on labor productivity. The government needs to establish and increase public awareness of the effects caused by smoking activity for labor productivity. In addition, company that employ labors need skills training for them to be able to optimally utilize existing work hours in order to obtain better results so as to increase productivity. Although cigarette consumption has an effect on productivity, it has not yet described the difference in productivity between smoker, non-smoker, and labors who have quit smoking so that further study is needed to find out more about the effect of smoking on productivity. A control over cigarette consumption still needed to be in order to maintain health and prevent the negative effects of smoking.

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The Role Of Small And Medium Enterprises In The Creative Economy As A Growing Market In Silver Craf Celuk Sukawati

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ABSTRACT - This study Taking Object Observations in Celuk, SukawatiBianyar Bali with the title role of Small and Medium Enterprises As the Creative Economy In Growing Market craf Silver, research was conducted in order to determine characteristics Medium Enterprises Small, creative economy, and the growth of the market for market success silver craft village Celuk Village, District Sukawati, Gianyar Bali Province. The research approach used in this study is a quantitative approach towards kuanlitatif. The sampling method was random sampling. The independent variable in this study is small and medium enterprises (X1), the creative economy (X2), and the market growth (X3), while the dependent variable is the marketkerjainan silver (Y). The analysis technique used is multiple linear regression analysis, by considering the validity of the test requirements, rehabilitation and data analysis ,. Testing the hypothesis is simultaneously a statistical test (F test) and partial statistical test (t test) and with a significance level α = 5%. Analyzing data using SPSS for Windows version 24. The results showed that: 1.hipotesis representing the characteristics of Small and Medium Enterprises (X1) and the negative effect is not significant to the silver craftsmen market. 2. The hypothesis of creative economy (X2) negativ effect and no significant effect on the silver market. 3. hypothesis Growth Market (X3) as moderation positive and significant impact on the silver market. characteristics of Small and Medium Enterprises (X1), the creative economy (X2), and Growth Market (X3) simultaneously significant effect on the market of silver (Y). Test results of statistical calculations F count has said that positive and significant, while Determination stating the characteristics of Kecik Medium Enterprises, Creative Economic and Market Growth affect the silver market amounted to 49.70%. While the rest of the craft market 50.30% influenced by other variables not examined in this study. The implications of this study can dilajutkan by subsequent research institute While the rest of the craft market 50.30% influenced by other variables not examined in this study. The implications of this study can dilajutkan by subsequent research institute While the rest of the craft market 50.30% influenced by other variables not examined in this study. The implications of this study can dilajutkan by subsequent research institute

Keywords: SMEs, the Creative Economy, Growth Markets, and handicraft markets Perak

I. INTRODUCTION

Entrepreneurship is the process of identifying, developing, and bringing vision into life. The vision can be in the form of innovative ideas, opportunities, better ways of doing things. The end result of this process is the creation of new businesses formed under conditions of risk or uncertainty. Entrepreneurship has historically been known since it was introduced by Richard Castillon in 1755. Some terms of entrepreneurship such as in the Netherlands are known as ondernemer, in Germany it is known as unternehmer. Entrepreneurship education began in the 1950s in several countries such as Europe, America and Canada. Even since the 1970s many universities have taught entrepreneurship or small business management. In the 1980s, nearly 500 schools in the United States provided entrepreneurship education

This paper explains the definition, nature, traits and characteristics and the role of entrepreneurship in the national economy, in Indonesia, recently studied entrepreneurial limited to some particular school or college course. In line with developments and challenges like the economic crisis, the understanding of entrepreneurship both through formal education and training at all levels of society into thriving entrepreneurship. People who perform entrepreneurial activities are called entrepreneurs. The question arises why an has a different way of thinking of the

people in general. They are motivated, calling the soul, perception and emotions that are associated with values, attitudes and behavior as a superior being.

Thought etrepreneurial already established that we can not collect the money without a business plan. The business plan is a work of art in itself, personified documents and express our firm. Every plan, like every sonwflake should be different. Each is a separate piece of art. Each must reflect the individuality entrepretur. Just as we would not imitate the technique romance others, so should we distinguish and we are due to the differences.

The problems faced in the development of the archipelago handicraft are very varied especially the silversmiths in CelukSukawatiGianyar Bali: starting from human resources and the competence of crafters, technology, marketing, capital, including sources of raw materials. It's just that, lack of technology and material resources are considered as the main problems besides Human Resources

To realize the local wisdom that is included in the creative economic subsectors into a creative economic opportunityare promising, then Herein lies the added value. Added value that serves as a conduit value added to a product or the work of making a product or work that is actually already prevalent capable transformed into a product or works worth more - than the work of a kind - how to create a double value of a business or product or result of a work.

RESULTS, DISCUSSION AND SYSTEMS MODEL

Table 3
Correlation Analysis Results

Validation Correlations					
Validation		Kecik Medium Enterprises (X1)	Creative Economy (X2)	Market growth (X3)	Silver Kerajainan market (Y)
Kecik Medium Enterprises (X1)	Pearson Correlation	1	, 260	-, 285	-, 387 *
	Sig. (2-tailed)		, 105	, 074	.014
	N	40	40	40	40
Creative Economy (X2)	Pearson Correlation	, 260	1	-, 180	-, 283
	Sig. (2-tailed)	, 105		, 265	, 077
	N	40	40	40	40
Market growth (X3)	Pearson Correlation	-, 285	-, 180	1	, 695 **
	Sig. (2-tailed)	, 074	, 265		, 000
	N	40	40	40	40
Silver Kerajainan market (Y)	Pearson Correlation	-, 387 *	-, 283	, 695 **	1
	Sig. (2-tailed)	.014	, 077	, 000	
	N	40	40	40	40
*. Correlation is significant at the 0:05 level (2-tailed).					
**. Correlation is significant at the 0:01 level (2-tailed).					

Based Background, Theory basis and framework and the framework of concepts and research metose can dianalysis these data as follows:

To answer the hypothesis of the partial effect of each - each variable according to table 3 as follows:

1. Creative Economy Variable (X2) has a negative effect on the Silver Handicraft Market (Y) of -0.283, meaning that the Creative Economy has a negative effect on the Silver Handicraft Market, so the creative economy should get more attention in the village of CelukSukawatiGianyarBali.
2. Variable Growth Market (X3) positive influence on the market kerajianan Silver (Y) is 0.695 means strong market growth influence the silver craft markets, it is necessary to representing a new market to membua more opportunities in CelukSukawatiGianyar Bali
3. Market Growth Variable (X3) has a positive effect on the Silver Craft Market (Y) is 0.695 which m
4. eans strong market growth affects the Silver handicraft market, so it is necessary to create new markets to create more opportunities in the Village of CelukSukawatiGianyar Bali

Table 4
Anova Analysis Results

ANOVA						
	Model	Sum of Squares	Df	mean Square	F	Sig.
1	Regression	406.421	3	135.474	13.841	, 000b
	residual	352.354	36	9.788		
	Total	758.775	39			
a. Dependent Variable: Y						
b. Predictors: (Constant), Growth Markets (X3), the Creative Economy (X2), Small and Medium Enterprises (X1)						

Based on table 4 above the statistical calculation results show the calculated F value = 13.841> F table (3; 36) = 2.866 and the significance of 0.000 <0.05. Then the regression model can be used to predict the silver craft market.

Table 5
Results Equation Regression Analysis

Coefficientsa						
	Model	Coefficients unstandardized		standardized Coefficients	T	Sig.
		B	Std. Error	beta		
1	(Constant)	13.958	4.901		2.848	, 007
	Small and medium enterprises (X1)	-, 304	, 209	-, 177	-1.457	, 154
	Creative Economy (X2)	-, 128	, 122	-, 125	-1.053	, 299
	Market growth (X3),	, 851	, 163	, 622	5.211	, 000
a. Dependent Variable: Silver Craft Market (Y)						

Based on Table 5 above it can be concluded that the Silver Handicraft Market variable is influenced by three variables used in the study, namely Small and Medium Enterprises (X1), Creative Economy (X2), and Market Growth (X3) so that the following equation is formed: $Y = a + b1 X1 + b2 X2 + b3 X3 = Y = (C) 13,958 - (X1) 0.304 - (X2) 0.128 + (X3) 0.851$

From the multiple regression equation are explained as follows: (Constant) a = 13.958; meaning that if the variable Small Business Medium (X1), the Creative Economy (X2), and Growth Markets (X3) assumed to have no effect at all (= 0) then the silver craft market amounted to 13.985. Variable characteristics of SMEs (X1) has a coefficient of -0.304. - Creative Economic variables (X2) has a coefficient of -0.128. - Variable Growth Market (X3) has a coefficient of 0.851.

Table 6

Coefficientsa						
	Model	Coefficients unstandardized		standardized Coefficients	T	Sig.
		B	Std. Error	beta		
1	(Constant)	13.958	4.901		2.848	, 007
	SMEs (X1)	-, 304	, 209	-, 177	-1.457	, 154
	Creative Economy (X2)	-, 128	, 122	-, 125	-1.053	, 299
	Growth Market (X3)	, 851	, 163	, 622	5.211	, 000
a. Dependent Variable: Silver Craft Market (Y)						

Based on Table 6 it can be seen each independent variable has a significance level of less than 0.05. This means that each of the independent variables significantly influence the dependent variable. The following describes the t-test calculation results in each variable to:

1. Small Business intermediate variables
   T test results on small and medium enterprises generate variable t count equal to -1.457 and significance of 0,154. -1457 t> t table whose value -1.457 with a significance level of 0.154> 0.05, it can be seen that the hypothesis that the characteristics of small and medium enterprises and no significant negative effect on the market of silver craftsmen still need improvement in managing potential craft market in the village CelukSukawatiGianyar Bali

2. Economic variables creative
   T test results on the creative economy variable produces a t count of -1.053 and a significance of 0.299. t count -1,053 <t table with a value of 2,028 with a significance level of 0.299> 0.05, it can be seen that the hypothesis stating that the creative economy has a negative and insignificant effect on the silver handicraft market so that there is a need for creative economic improvement to grow the silver handicraft market in Celuk Village SukawatiGianyar Bali.

3. Variable Growth Market
   The test results on the variable t t Growth Market yield of 5.211 and significance of 0.000. 5.211 t count> t table whose value is 2.028 with a significance level of 0.000 <0.05, it can be seen that the hypothesis that growth is moderating market as positive and significant impact on the silver market can be received CelukSukawatiGianyar Bali

Table 7
Determination Analysis Results

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	, 732a	, 536	, 497	3.129
a. Predictors: (Constant), Growth Markets (X3), the Creative Economy (X2), Small and Medium Enterprises (X1)				

Based on Table 7 it can be seen that the coefficient of determination (adjusted R Square) obtained at 0.497 This shows that the characteristics of Kecik Medium Enterprises, Creative Economic and Market Growth affect the silver market amounted to 49.70%. While the rest of the craft market 50.30% influenced by other variables not examined in this study.

2. DISCUSSION

In the results above discussion regarding the relationship between independent and dependent variables can be explained as follows:

1. Wirausahaan characteristic variable (X1) partially significant effect on business success variable (Y). T test results on small and medium enterprises generate variable t count equal to -1.457 and significance of 0,154. -1457 t> t table whose value -1.457 with a significance level of 0.154> 0.05, it can be seen that the hypothesis that the characteristics of small and medium enterprises and no significant negative effect on the market of silver craftsmen still need improvement in managing potential craft market in the village CelukSukawatiGianyar Bali

2. Creative economic variables
   T test results on the creative economy variable produces a t count of -1.053 and a significance of 0.299. t count -1.053 <t table with a value of 2.028 with a significance level of 0.299> 0.05, it can be seen that the hypothesis stating that the creative economy has a negative and insignificant effect on the silver handicraft market so that there needs to be an improvement in the creative economy to grow the silver handicraft market in Celuk Village SukawatiGianyar Bali.

3. Market Growth Variables

T test results on the Market Growth variable produces a t count of 5.211 and a significance of 0.000. t arithmetic 5,211> t table with a value of 2,028 with a significance level of 0,000 <0.05, it can be seen that the hypothesis that Market Growth as moderation has a positive and significant effect on the silver handicraft market can be accepted in CelukSukawati Village GianyarBaliVariable characteristics of Small and Medium Enterprises (X1), the creative economy (X2), and Growth Markets (X3) simultaneously significant effect on the market of silver (Y). Based on statistical calculation results show the value of F count = 13.841> F table (3; 36) = 2.866 and significance of 0.000 <0.05. Then the regression model to predict the market can digunaka silver in CelukSukawatiGianyar Bali

CONCLUSIONS AND RECOMMENDATIONS
conclusion:

1. There is a lower partial significant influence among small and medium businesses against silver creative market, so the role of small and medium businesses needs to be given a greater role for market representing a creatively about silver
2. There is a significant effect of low between the creative economy to the silver market, so it needs a bigger role on the silver market
3. There is a significant positive influence between moderation on the success of the silver craft market, the role of moderation or the government has an important role in the creative silver market.
4. No significant effect simultaneously between the characteristics of small and medium businesses, the creative economy and moderation of the silver kerjainan market success, all play an active role in economic menumbukan through creative market on silver.

Suggestion:

1. Government should provide ease of finding capital for small and medium businesses to grow the silver market is very low in Celuk village, sub-district Sukawati, Gianyar Bali Provincial Moderation because based on the research variables have the highest coefficient values or influence over the development of the creative market silver
2. The role of government in growing the creative economy based on research, moderating variables have the highest coefficient value, such as providing ease of capital for small businesses to grow the creative economy silver craft market in the village Celuk, District Sukawati, Gianyar Bali Province
3. Small and medium micro business owners in the village Celuk, District Sukawati, Gianyar Bali Province has created a good marketing strategy or right so that the business is able to compete with other businesses, especially in terms of marketing.

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Crematorium Foundation and Its Benefits for The Hindu Community In Bali

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Abstract
In Hinduism, *Ngaben*ceremony is a ceremony for the death of Balinese-Hindu people. *Ngaben*ceremonies carried out by families who are still alive and addressed to the spirits of ancestors or family members who died. The basic principle of implementing *PitraYadnya* is *PitraRnam*, which is an obligation towards parents and ancestors. *Ngaben* ceremony in Bali is very complicated and this problem often arises because it built by religious culture with a high level of rigidity. Balinese-Hindu people trapped by traditions that tend to construct the grandeur of a ritual procession with high cost but ignores the ability of individuals who hold the ceremony. Along with the development of the era towards the modern era, new alternatives and ideas emerged in the *pitrayadnya* ceremony (*Ngaben*), and that alternative is cremation. Cremation that has been widely applied and accepted by the Hindu community in Bali, which is currently developing in several regencies in Bali including in Badung Regency, Klungkung, Singaraja and Denpasar City. There are some problem formulations to be discussed including 1). What is the legal basis for the establishment of a crematorium based on national law? 2). What is the factor from Hindu people use crematorium service in the *pitrayadnya*ceremony (*Ngaben*)?. This type of research used by researchers is empirical legal research that is carried out based on objective facts obtained in the study either the results of interviews with respondents, questionnaire results, or additional information tools obtained from sources. Every establishment of any foundation must refer to positive law. Because as affirmed in article 1 paragraph (3) of the Constitution of the Republic of Indonesia which confirms that the State of Indonesia is Law State which implies that every action of the state and its citizens must be based on law. Besides, the legal basis for the establishment of a Foundation is to refer to Act Number 16 of 2001 about Foundations which is then updated with Act number 28 of 2004 about Amendments to Act Number 16 of 2001 about Foundations. Some factors that influence Hindu people to choose *Ngaben* through cremation services include 1). Economic Factors 2). Energy 3). Time, and 4). Environmental Factors.
Keywords: Crematorium, Ngaben, Hindu People

I. INTRODUCTION

Bali Province legally established on August 14 1958, with the basis of Act Number 64 the year 1958 about the Establishment of Level I Regions in Bali, Nusa Tenggara and East Nusa Tenggara. Similar to other provinces in Indonesia, the Bali Province also has a service village and a customary village as mandated in Act Number 6 the year 2014 about Villages. In general, the Bali Province is one of the provinces where the majority of the population adheres to the Hindu religion both in urban and rural areas.

Religious activities of each village in Bali have different habits that are adjusted to the desa, kala , and patra of each village. Hindu sages may be in the name of freedom of conscience constructing the ways of his worship and adjusting to the village (*desa*) (what kind of place and where), when (*kala*) (when is the right time or right as what), literature (*patra*) (existing literary sources). The formula above can facilitate humans with their consciousness. Consciousness leads humans to have light thoughts without bound. This, in turn, affects every implementation of the ceremony / *yadnya* which is every Balinese people usually carry it out based on five *yadnya*, and then one part of five *yadnya* is *pitrayadnya,* in this case, the subsidiary part of *pitrayadnya* as the focus in this research is *Ngaben*.

In Hinduism, *Ngaben* is a ceremony for the death of Balinese-Hindu people. Ngaben ceremony is carried out by a family who still alive and addressed to the spirits of ancestors or family members who died. Based on the

beliefs of the Hindu community in Bali, children born to both parents have obligations or indebted to their parents, because parents are the ones who take care of them from fetuses until they grow up into an adult and being responsible people.

*Ngaben*ceremony is one of the ceremonies that would be experienced by Hindus people in Bali aside from their status or class, it is because all people who live in this world will be death and the ceremonies of death will always be associated with the *Ngaben* ceremony. The *ngaben* ceremony is based on how it is organized, some variants are adjusted to the situation of the *desa*, *kala*, and *patra* of each village in Bali, they are including :

1. *NgabenNiri* is a ceremony that carried out independently by the family who held the ritual by themselves.
2. *NgabenNgerit* (mass) is the collectively organized of the cremation ceremony. Specifically, there are numbers of families joined together to design and carry out the cremation ceremony together.
3. *NgabenNgiring*, which is someone who participates in a family ceremony, usually the family of the Brahmins or the Knights who is holding a *Ngaben* ceremony for a family member who has been died.

Ngaben ceremony in Bali is very complicated and this problem often arises because it built by religious culture with a high level of rigidity. Balinese-Hindu people trapped by traditions that tend to construct the grandeur of a ritual procession with high cost but ignores the ability of individuals who hold the ceremony.

Along with the development of the modern era, new alternatives and ideas emerged in pitrayadnya ceremony (Ngaben) with cremation as an alternative. Cremation has been applied widely and accepted by the Hindu community in Bali, which is currently developing in several regencies in Bali including in Badung Regency, Klungkung, Singaraja and Denpasar City.

2.1 Research Methods

Research is a planned activity carried out with scientific methods that aim to get new data to prove the truth or untruth of an existing phenomenon. In connection with this study, the type of research used by researchers is empirical legal research based on objective facts obtained in the study either interviewed with respondents, results of questionnaires, or additional information obtained from informants.

Sources of data used in this study are primary data and secondary data. Primary data is data obtained directly from the object of research through observation, interviews from informants and respondents. Secondary data is data obtained through library research by searching books and research results in the form of reports, diaries and so forth.

3.1 Results and Discussion

3.1.2 The legal basis for the establishment of the Crematorium Foundation

Every establishment of any foundation must refer to positive law. Because as affirmed in article 1 paragraph (3) the Constitution of the Republic of Indonesia which confirms that the State of Indonesia is a Law State which implies that every action of the state and its citizens must be based on law. Based on this legal basis, the Foundation which is one of the legal subjects, in its establishment must also be based on applicable law. The foundation as a legal entity has its characteristics that have been separated (independent) from the wealth of its founders, has specific objectives in the social religious fields or is engaged in the humanitarian field. Because of that, the Foundation is not a profitable institution like other business entities and the Foundation does not have a membership like shareholders or company allies. The act governing about the establishment of the Foundation is Act Number 16 of 2001 about Foundations which is later updated with act number 28 of 2004 about Amendments to Act Number 16 of 2001 about Foundations.

According to the origin of its founder, the Foundation can be divided into two types of foundations, The First is a Foundation whose founders and managers are Indonesian people or local citizens with the initial amount of properties originating from separated private assets at least Rp 10,000,000 (ten million rupiahs) and the second is a Foundation established by foreign nationals / citizens but operating in Indonesia with the initial amount of properties originating from separated private assets at least Rp 100,000,000 (one hundred million rupiahs).

In establishing a Foundation there are steps and conditions for founding a foundation that must be carried out by the founders itself, the steps and conditions including:

1. Prepare or formulate the name of the Foundation

Because it must be checked beforehand through a Notary to the Ministry of Law and Human Rights. Ideally, three Foundation names must be prepared. One name is the main and the rest is a backup. The process of checking the name of the Foundation is done manually, therefore it takes a long time, approximately two weeks until one month to ascertain whether the proposed Foundation name can be used.

2. Determine the Foundation's focus area

Whether the Foundation will move in the social, religious or humanitarian fields. The Foundation's vision and mission also need to be formulated. This certainly becomes the basis in carrying out the tasks and functions of the Foundation going forward and making the Foundation's work program.

3. Form the foundation management structure

Foundation Management Structure According to Act No. 28 of 2004 Article (32), consisting of at least one chairman, a secretary, and a treasurer, the appointment shall be carried out by the Trustees. The Board of Directors of the Foundation has a term of office of 5 (five) years and may be reappointed, depending on the decision of the Trustees Meeting.

4. Form a Foundation Supervisor

The Foundation Supervisor appointed by the Trustee, with a term of service of 5 years based on the decision of the Board of Trustees meeting and can be reappointed. If there is a replacement from the Supervisor, the Foundation Management can submit a written notification to the Minister. Besides, the Foundation Supervisor can also be dismissed at any time for certain reasons based on the decision of the Board of Trustees' meeting.

5. Prepare the Articles of Association of the Foundation

The Articles of Association of the Foundation contains the following: the name and location of the Foundation, the aims, and objectives of the foundation and the work programs that support it, the length of time the foundation is established. the initial nominal value of wealth that has been separated from the founder's wealth, how to obtain and use the results of the wealth, the procedures regarding appointments, termination and replacement of the Trustees, Management and Supervisors, rights and obligations of membership of the Trustees , Board Managers and Supervisors of the Foundation, procedures for organizing meetings of Foundation organs, procedures regarding the amendments to the articles of association, procedures for the merger and dissolution of the Foundation and procedures for using liquidated assets and / or channeling the wealth of the Foundation after the liquidation.

6. Following up on the signing of the deed

After the name submitted has obtained approval, the next step of the Foundation Founder must immediately sign the deed issued by the notary. The notary will carry out the endorsement process from the Foundation with a maximum period of 1 (one) month from the issuance of approval by the Ministry of Law and Human Rights. If the process is not immediately followed up, the submission of the name can be said to be null.

7. Prepare administrative requirements

The following conditions include:
a. Foundation name.
b. Photocopy of KTP (Identity Card) of the founder, trustee, management (chairman, secretary, treasurer) and supervisor.
c. Taxpayer Identification Number (NPWP) of the founder, trustee, chairman, secretary, treasurer and supervisor.
d. Company domicile certificate (SKDP) from the Village office or local sub-district office.
e. Taxpayer Identification Number on behalf of the Foundation.
f. If the Foundation is active in the social sector, it must prepare a social service permit.
g. If the Foundation is active in a religious field, it must prepare a permit from the Ministry of Religion.

After the Ministry of Law and Human Rights accepts the submission of the foundation's establishment, then it is endorsed before a notary public. The Deed of Establishment of the Foundation will be signed by the Trustees, Management and Supervisors of the Foundation. After that, the Notary immediately submits the Articles of Association to the Ministry of Law and Human Rights to obtain legality from the Minister or a State Official at

the level of the Minister who has been appointed. Furthermore, the Founder of the Foundation can receive the signed Foundation Approval Letter.

It is important to realize that the Foundation was established not solely for profit but aims to help improve the lives of many people for the common good in the social, religious and humanitarian fields. Likewise, the cremation establishment which was founded based on providing a way out for the people in carrying out cremation ceremonies.

b. General view of cremation cremation

Changes and breakthroughs are always happening both in the fields, law, economics and in the field of religion such as research conducted at this time by researchers namely about cremation ceremony through cremation services. In its development, Bali experienced changes along with the global influence which indirectly, the people were demanded to be able to act more effectively and efficiently in carrying out every demand in the life they lived, including in preparing and holding their religious ceremonies both the ceremony of the dewayadnya, rsiyadnya, manusayadnya, bhutayadnya and pitrayadnya, then the fifth image of the yadnya above referred to as the five yadnya.

If previously the Balinese-Hindu community made their religious ceremonial equipment by themselves, now most Balinese-Hindu people buy it. Especially at this time religious ceremonial equipment can easily be found and purchased in stalls, shops, and traditional markets. Including one of them is the cremation services provided by the MGPSSR (Maha Gotra Pasek, relatives of SaptaRsi) which is widely accepted by the majority of Hindus people in Bali and is proven by the many cremation services utilized by Hindus in Bali.

c. Procedures for the implementation of cremation

The implementation of the cremation ceremony at the Crematorium as researchers at the Santha Yana Crematorium Foundation does not reduce the meaning of cremation in general. The implementation of the cremation ceremony at the crematorium begins with several stages including:

1. Pick up the body at the funeral home or in the hospital, then the body is taken to the Santha Yana crematorium.
2. The body is celebrated and then bathed.
3. Burning the corpse in a place that has been provided after the body has become ashes, the remaining bones are collected and then celebrated.
4. Larung Abu (throwing the corpse's ashes to the river or beach), this procession can be done in the Ayung River alongside the crematorium or can be done in other places following the wishes of the crematorium service users.

3.1.2 Factors that Encourage People to Choose Ngaben Ceremonies at the Crematorium

Ceremonies in the context of the implementation of Hinduism can be classified into five major groups based on the means of its implementation called *PancaYadnya*, including:

a) *Dewa Yadnya* is a holy sacrifice offered sincerely before Hyang WidhiWasa (God);
b) *PitraYadnya* is a holy sacrifice offered sincerely to the ancestors by praising their salvation in the hereafter, caring for their offspring by following all of their demands;
c) *ManusaYadnya* is a holy sacrifice offered sincerely for the sake of the safety of our offspring and the welfare of other human beings;
d) *Rsiyadnya* is a sacred sacrifice offered sincerely for the welfare of the rsi (mahaguru);
e) *ButhaYadnya* is a holy sacrifice offered sincerely to all subordinate creatures.

Ngaben is included in the *PitraYadnya* ceremony which is a sub-part of the five Yadnya, Ngaben ceremony is usually performed on a large scale, this ceremony requires a long time, a lot of labor and also almost with high cost, therefore resulting, the Ngaben ceremony is often performed in the long term period after someone's death. With the use of funds that is not small, most people assume that the *Ngaben* ritual can only be carried out only by wealthy people. However, as time goes by, a new alternative appears to facilitate this, by establishing a crematorium Foundation that receives cremation services. Many Hindus who choose to use these services are caused by several factors:

1. Economic Factors

In general, the Hindus in the implementation of cremation ceremony at the crematorium seen from the category of costs needed, they are not different from conventional cremation, including the means of the ceremony (Banten) and consumption. It's just that, in the implementation of the cremation ceremony at the crematorium, the cost of the ceremony (Banten) is definitely cheaper because there are packages provided by the foundation and the grieving family can calculate the guests who will be invited during the peak of the event and the amount of consumption to be served in the form Snacks and rice are provided by the mourning family. In contrast to conventional cremation, where the costs incurred for ceremonies and consumption cannot be controlled by the mourning family.

2. Energy

In general, time and energy (assistance) in the cremation ceremony through cremation services are also still needed, as was the result of an interview with JeroMangku Alit at the Santha Yana Foundation that the staff (assistance) came from the Santha Yana Dharma Foundation, JeroMangku Alit, and the mourning family. Personnel involved in carrying out the cremation ceremony at the crematorium are called the crew. The crew from the Santha Yana Dharma Foundation numbered 9 people and was divided into pickup crew and implementation crew. Whereas JeroMangku Alit was in charge of the Banten (offerings) crew. All crew members are coordinated by the crew leader from the beginning to the end of the cremation ceremony at the crematorium. The Crew Leader is responsible for the smooth implementation of the cremation ceremony at the crematorium held at the Santha Yana Crematorium and in the area of Maha Gotra PasekSanakSaptaRsi.

3. Time

Besides that, in terms of the time needed to carry out the cremation ceremony at the crematorium, it is relatively short when compared to the conventional cremation ceremony. In the implementation of the cremation ceremony at the crematorium, if the mourning family chooses the complete package (cremation, drifting, donation) then the time needed is approximately seven hours. If the mourning family chooses a thrifty package (mekingsan di geni) then the time required is approximately four hours. So this is very petrified for Hindus who work in the private and public sectors because it does not take a long time for asking a day off.

4. Environmental Factors

The environment is also one of the factors from the residents carrying out cremations, one of the reasons is the village's rule (awig-awig which forbids krama (Residents) from doing their pitrayadnya to bury the body and carry out the abolition).

Conclusions

From the description of the discussion above, it can be concluded that:

1. Every establishment of any foundation must refer to positive law. Because as affirmed in article 1 paragraph (3) the Constitution of the Republic of Indonesia which confirms that the State of Indonesia is a Law State which implies that every action of the state and its citizens must be based on law. in addition, the legal basis for establishing a foundation is to refer to Act Number 16 of 2001 about Foundations which is then updated with Act number 28 of 2004 about Amendments to Law Number 16 of 2001 about Foundations.

2. Some factors that influence Hindu people to choose Ngaben through cremation services including: 1. Economic Factors that In general the Hindus in implementing Ngaben ceremony at the crematorium seen from the cost category are not different from conventional Ngaben, namely Ceremonial Facilities (banten) and consumption. It's just that, in the implementation of the cremation ceremony at the crematorium, the cost of the offerings (Banten) is cheaper because there are packages provided by the foundation 2. Workers, In general, time and energy (assistance) in the cremation ceremony through cremation services are also still needed as the result of an interview with JeroMangku Alit at the Santha Yana Foundation that the staff came from the Santha Yana Dharma Foundation, JeroMangku Alit, and the bereaved family. Personnel involved in carrying out the cremation ceremony at the crematorium are called the crew. The crew from the Santha Yana Dharma Foundation numbered 9 people and was divided into pickup crew and implementation crew. Whereas JeroMangku Alit was in charge of the special crew. All crew members are coordinated by the crew leader from the beginning to the end of the cremation ceremony at the crematorium. The Crew Leader is responsible for the smooth implementation of the cremation ceremony at the crematorium held at the Santha Yana Crematorium

and in the area of Maha Gotra PasekSanakSaptaRsi. 3 Time, Besides that, in terms of the time needed to carry out the cremation ceremony in the crematorium, it is relatively short when compared to the conventional cremation ceremony. In the implementation of the cremation ceremony at the crematorium, if the bereaved family chooses the complete package (cremation, drifting, donation) then the time needed is approximately seven hours. If the bereaved family chooses a thrifty package (passed out in geni) then the time required is approximately four hours. So this is very petrified for Hindus who work in the private and public sectors because it does not take long to take time off. 4. The environmental factor is also one of the factors of the residents carrying out cremation, one of the reasons is the village rules (awig-awig who forbid krama (Residents) to do their pitrayadnya to bury the body and carry out the ngaben ceremony).

4.1.2 Suggestions

From the description above, the researcher gave a number of suggestions including that Hinduism in Bali in addition to preserving customs and culture in Bali as a heritage of ancestors, Balinese Hindu People must accept changes, especially in the field of PitraYadnya Ceremony by not reducing the meaning of ceremonies in general.

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The Influence Of The Marketing Mix On Increasing Sales Of Sallaca Coffee Beans At Agro Abian Salak In Sibetan Village Karangasem

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ABSTRACT

The competency of business   especially in small and medium business is quite high. Sallaca beans coffee is a new product innovation from Agro Abian Salak in Sibetan village in Bali. New product are quite difficult to sell in the market as a lot of competition, such as robusta coffee, arabica coffee who has the best brands in the world . Tight competition occurs among coffee producers in Bali. Coffee native has been worldwide and sallaca coffee from sallaca seeds are new products with innovation is not show improvement in sales. Coffee zal laca seeds is competitive sales in the market. To increase sales of the management using the marketing mix. Analysis quantitative method with interview and data documentations. The results of the study show that the product variables have the effect that positively and significantly to the level of sales of Sallaca coffee beans with t . test of 2, 489 with a significance of 0.015 is smaller than α   (0.05) which means there is an influence that is positive and significant of the product variable on the level of sales of Sallaca coffee beans.

Keywords: Distribution, Price, Product, Promotion, Sales

INTRODUCTION

Small and Medium Enterprises (SME`s) is one of the important sectors  in the economy of Indonesia. SME`s was created a new field work to become a source of income in the regions. In additions SME`s also have a role which is important in the region economic and encourage the growth of the export sector in non-oil and supporting the manufacture and parts spare for large companies . Product is an important element in a marketing programs . Strategy product requires making decisions that coordinated on marketing mix , line of products , brands , packaging and labeling . According to Kotler and Keller (2009: 4), the product are all things that can be offered to the market to satisfy a desire or need , including the goods physically , services , experiences , events , people , places , properties , organizations , information and ideas

Sallaca coffee beans from Agro Abian Salak is a manufacturer of coffee from sallaca bean which is a product of coffee oriented on the local market to consumption . The present that the sallaca coffee beans is still low sales since manufactured in 2017. The study was conducted to determine whether there is influence of marketing mix to increase sales of sallaca Coffee beans at Agro Abian Salak in Sibetan village, Karangasem regency.

Marketing mix is variables that must be understood by the management to be able to achieve its goals . Marketing mix is a set of tools marketing which is known in terms 4P, namely is product , price , place (distribution) and promotion . The Factors of sales that is the quality of products , the uniqueness of the product , the satisfaction of consumers , the competitive Price and the service .

Framework conceptual of thought is the essence of the review literature that is presented in the form of the scheme in the form of linkage theory , and influence between variable one with the other . Framework Conceptual much help in understanding hypotheses were proposed . Framework for thinking that the scheme at the bottom of this can be explained . To determine the effect of the marketing mix an increase in the value of sales of sallaca coffee beans on Agro Abian Salak , can be measured by using analysis regression multiple , analysis of correlation , analysis of determination , F arithmetic and t-test. While the theory which is used as a reference in the research is the theory of management of marketing , basics of marketing , budget companies and theory more relevant to the issues that are discussed .

RESEARCH METHODS

This research uses quantitative research methods . The population was taken from the consumers of Sallaca seeds at Agro Abian Salak in Sibetan Village , Bebandem Subdistrict , Karangasem Regency . Methods of sample that is used the census method . The method of collecting the data to research the data of documentation and primary data interviews in the form of observations in the field .

Sibetan Village, located in Bebandem subdistrict, Karangasem Regency , has enormous potential to be developed into sallaca - based agro tourism centers. The location of Sibetan Village is very strategic, has fertile land with a cool environment, accessibility is easy to reach and close to economic and government centers. Sibetan village distance to the district center is only 2 km, to the capital city district 7 km, to the provincial capital 67 km, and to the airport 78 km . The village is located at an altitude of 500 - 700 meters above sea level, temperatures range from 23 - 29 0C, and rainfall averages 2,000 - 2,500 mm / year .

The population of Sibetan Village based on the village profile in 2014 was 8,725 people . The area of Sibetan Village reaches 1,125 ha, most of it is dry land (912.62 ha) planted with salacca plants, while the rest is used as yards, rice fields and other land. The dominance of land use to sallaca plants (81.12%) than 80% of people's livelihoods depend on commodity barking so long ago Sibetan village famous as production center barked in Bali.

Sallaca Bali harvest period which falls in December - February makes salak production abundant so that the local community develops processed Salacca products into various types, such as wine, dodol, chips, syrup, and sweets. This agrotourism object is visited a lot and get the attention of researchers and students.

RESULTS

Based on Table 1, can be explained that the variable sales of sallaca coffee beans (Y) is influenced by variables that are product (X_1), price (X_2), promotion (X_3), and dis tribusi (X_4), to the level of sales of seeds coffee barked so formed equation regression of multiple as the following :

Y = a + b1 X1 + b2X2 + b3X3 + b4X4
Formulated equation regression linear multiple as follows :

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4$$
$$= 6,312 + 0,303 X_1 + 0,271 X_2 + 0,289 X_3 + 0,293 X_4$$

From equation regression linear above can be explained that the constant of 6 , 312 . If the marketing mix is ignored, it will affect the level of sales of sallaca coffee beans in Agro Abian Salak , Sibetan Village, Karangasem Regency.

The coefficient of regression of $X_1 = 0,303$, coefficient regression $X_2 = 0,271$, the coefficient of the regression $X_3 = 0,289$, the coefficient of the regression $X_4 = 0,293$ each have a value coefficients are positive . The value of the coefficient of positive indicates that the product , price , promotion and d istribusi impact positively on the level of sales of coffee beans , has the sense that if a product , price , promotion and distribution of sallaca coffee beans implemented consistently accentuate its uniqueness , the level of sales of coffee beans bark will experience an increase .

Table 1

Results of Analysis of Multiple Linear Regression Equations
Coefficients [a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	6.315	2,457		2,571	.012		
X1	.303	122	220	2,489	.015	.930	1,075
X2	.271	.088	269	3,068	.003	.949	1,054
X3	.289	.96	267	3.001	.004	.920	1,087
X4	293	. 104	.253	2,804	.006	.894	1,118

a. Dependent Variable: Y

1. Variable product (X1) influence positively significant to the level of sales of bean coffee bark for 0356, it can be known that the hypothesis which states the products affect positively significantly towards to selling Sallaca bean coffee
2. Variable price (X2) influence positively significant to the level of sales of bean coffee bark for 0360, it can be known that the hypothesis which states the price of influence positively significant to the level of sales of sallaca Coffee beans .
3. Variable promotion (X3) influence positively significant to the level of sales of bean coffee bark for 0381 , it can be known that the hypothesis which states the promotion of influence positively significant to the level of sales of sallaca coffee beans .
4. Variable distribution (X4) affect positively significant to the level of sales of bean coffee bark for 0411 , it can be known that the hypothesis which states the distribution of influence positively significant to the level of sales of sallaca coffee beans
5. Variable between products (X_1), price (X_2), promotion (X_3) and distribution (X_4) influence positively significant on the level of sales of bean coffee bark sebasar 0356; 0.360; 0.381 and 0.411 with mean of 1 (one) which means a mix of marketing affects to selling sallaca coffee bean.

CONCLUSION

Based on the results of data analysis that product , price , promotion and distribution has positive and significant effect to increase sale of sallaca coffee beans, in Agro Abian Salak , Sibetan Village , Karangasem regency, Bali province.

SUGESTION

The management of Agro Abian Salak must improved the promotion by increasing the unique taste of the coffee. The price is negotiable to make it more affordable increase the sale by technology digitail , and distribution are smooth right time with the satisfaction of service .
Thank you to Mr I Nyoman Mastra as an informant source and the owner of the business of Agro Abian Salak in Sibetan Village, Karangasem regency, Bali province.

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Pore Size Distribution of Bamboo-Activated Carbon Prepared by Chemical Activation

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Abstract—Activated carbon is a unique material due to its porous structure which is often explained as a pore volume, pore surface area, and pore size distribution (PsD). Optimal PsD of activated carbon is correlated with its maximum capacity of gas adsorption. This research focuses on PsD and adsorption capacity of activated carbon derived from bamboo which is chemically activated using H_3PO_4 at an activation temperature of 400, 550 and 700^OC. Activated carbon was characterized using the isotherm adsorption test at 73,3 K. The results showed that the higher activation temperatures tend to obtain the higher nitrogen adsorption capacity. Activated carbon that activated at 400^OC had the highest adsorption capacity of nitrogen (30.694 cc/g) and produced a balanced pore size distribution between micropores and mesopores. The higher activation temperatures produced pores size activated carbon distributed in more micro size region.

Keywords— Activated carbon, pore size distribution, activation, bamboo

I. INTRODUCTION

Activated carbon is an adsorptive material with high adsorption capacity. It is a solid phase that has an outer and inner surface that interacts with gas or liquid molecules (Keller, 2005). Activated carbon is able to absorb anions, cations, and molecules of organic and inorganic compounds in the form of solutions and gases. It is used as an adsorbent in various fields of life, such as for gas storage [1,2], as desulfurizer of petroleum products [3], water purification [4,5], use as electrode material [6], cathode battery material [7], supercapacitors material [8] and for gas purification and separation [9].

 Activated carbon has a microcrystalline structure with an inter-layer gap between 0.34 and 0.35 nm with an irregular microcrystal orientation known as a turbostratic structure [10]. The microcrystalline structure of activated carbon has an inter-layer gap between 0.34 and 0.35 nm with an irregular microcrystal orientation known as a turbostratic structure [10]. Activated carbon is a non-polar or hydrophobic adsorbent type which can bind more oil or gas compared to water [11]. Activated carbon has a high pore surface area, high pore volume and a pore size distribution that is suitable for a variety of adsorption applications. These characteristics are associated with the high adsorption ability of activated carbon [12]. The pore structure and pore size distribution are highly affected by the raw material chemical composition and the carbonization process parameters [10]. Pores can be clasified into micropores (diameter <2 nm), transitional pores (2 ≤diameter ≤ 50 nm) and macropores (diameter > 50 nm)according to the IUPAC-1985 [13]. A suitable distribution in in micropores and mesopores regions is needed to enable the adsorption amount of larger molecules [14]. Kupgan, 2017 reported that the optimal pore size distribution determines the maximum capacity in gas storage applications [15].

Generally activated carbon is made from coal, agricultural products [16,17] and petroleum residues [18]. Biomass is a source of activated carbon that promises to replace activated carbon sources that come from non-

renewable raw materials such as coal and petroleum residues. In this study, the pore size distribution and nitrogen adsorption capacity of activated carbon from bamboo chemically activated using phosphoric acid with different activation temperatures were evaluated using the adsorption isotherm test.

II. METHODE AND PROCEDURE

Swat bamboo (*Gigantochloa verticillata*) which is used for manufacturing of activated carbon containing lignin (22.99%), cellulose (44.22%), and hemicellulose (14.97%) [19]. Bamboo is cleaned, cut into small pieces, dried under sunlight during 8 days and dried again in an electric furnace at 105°C for 2 hours. Carbonization is undertaken by heating bamboo to a temperature of 750°C for 2.5 hours. The resulting charcoal is made into powder with a 60 mesh. The powder is mixed with H_3PO_4 in a weight ratio of 1:1, homogenized with a magnetic stirrer at 105°C for 2 hours with a rotation of 300 rpm. The mixture is left for 3 hours, and then cleaned with distilled water until it is neutral. Activation is done by heating at temperatures of 400, 550 and 700°C, with N_2 flowing for 1.5 hours and cooled for 12 hours in the kitchen. The activated carbon produced is coded A400-AT, A550-AT, and A700-AT for the activation time of 400, 550 and 700°C respectively. Characterization was carried out using the isotherm adsorption test using the Quantachrome Instruments version 11.0. Adsorption testing is carried out by flowing nitrogen gas into the sample at a constant bath temperature of 73.3 K, and the analysis is carried out for 300.2 minutes.

III. RESULTS AND DISCUSSIONS

The curves of adsorption isotherm of the activated carbons are shown in Figure 1 (A) the relationship between the amount of nitrogen absorbed at different relative pressure levels. The A400-AT curve shows the higher pressure applied causes the higher nitrogen that can be adsorbed. While the A550-AT curve shows an increase in nitrogen adsorbed up to a relative pressure of 0.6, after that the adsorption of nitrogen is relatively constant until the end of the process (p/po=1). While the A700-AT curve shows an increase in nitrogen adsorption up to relative pressure p/po=0.1, and adsorption is then relatively constant until the relative pressure is 0.99. From a relative pressure of 0.99 to 1, a surge in nitrogen uptake occurs. While the maximum of nitrogen adsorption of activated carbon at a relative pressure of 0.99 is presented in Figure 1 (B). It is shown that with chemical activation the lower adsorption was obtained when activated carbon activated at higher temperature. The highest nitrogen adsorption of 30,694 cc/g is achieved by the A400-AT.
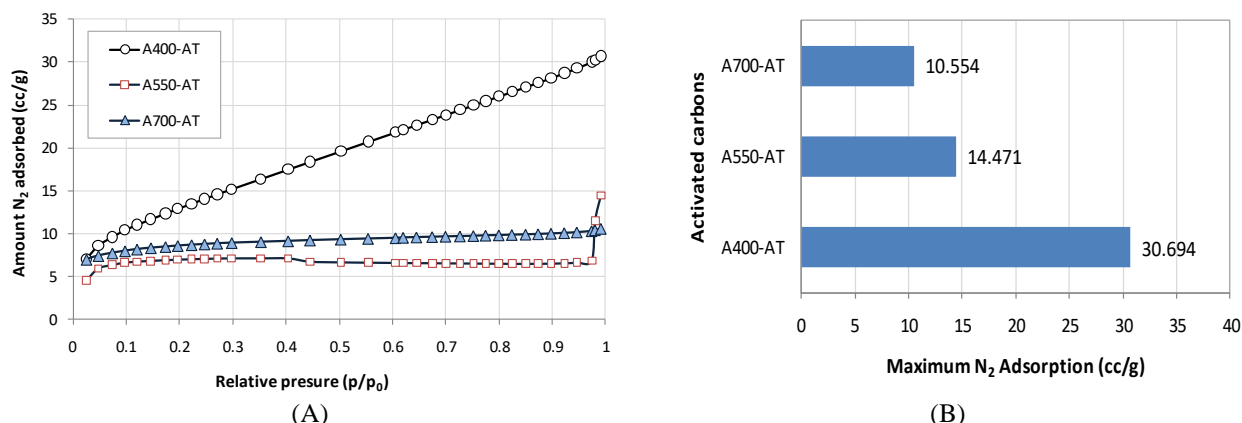

FIGURE 1. (A) ADSORPTION ISOTHERM OF ACTIVATED CARBON PRODUCED (B) NITROGEN ADSORPTION CAPACITIES OF ACTIVATED CARBON PRODUCED

The Pore Size Distribution (PSD) of activated carbon is shown in Figure 2. PSD is one of the properties that influence the adsorption characteristics of the porous material [15,20]. PSD can be divided into two areas, namely the micropore and mesoporous regions. It is also shown that the higher the activation temperature causes the PSD tend to be more distributed to micropore direction. The A400-AT has a distribution in the micropore (less than 2 nm) and the mesoporous region (2 to about 20 nm). Whereas, A-550-AT has a more heterogeneous distribution that

is in the micropore area (less than 0.7 nm) and in the mesopore region of 31-47 nm. The A700-AT has a distribution in the micropore region from 0.4 to 2 nm and in the mesoporous region from 0.2 to 2.5 nm.
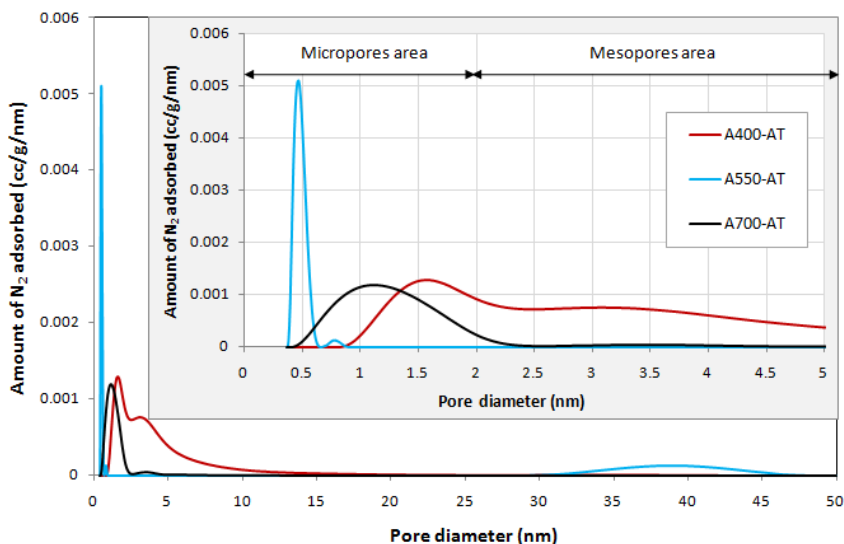

FIGURE 2. PSD OF ACTIVATED CARBON PRODUCED

IV. CONCLUSIONS

Activated carbon derived from bamboo swat is produced by chemical activation using H_3PO_4 with an activation temperature of 400, 550 and 700°C and characterized. The higher the activation temperature the lower the nitrogen can be adsorbed. Activated carbon activated at the lowest temperature (A400-AT) has the highest ability to adsorb nitrogen compared to activated carbon activated at higher temperatures; 550°C (A500-AT) and 700°C (A700-AT). A400-AT has a balanced pore size distribution between micropore and mesoporous causing the highest adsorption of nitrogen. Activated carbon A400-AT has the potential to be used for purification of CO_2 from motor vehicle emissions and also for methane adsorption.

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