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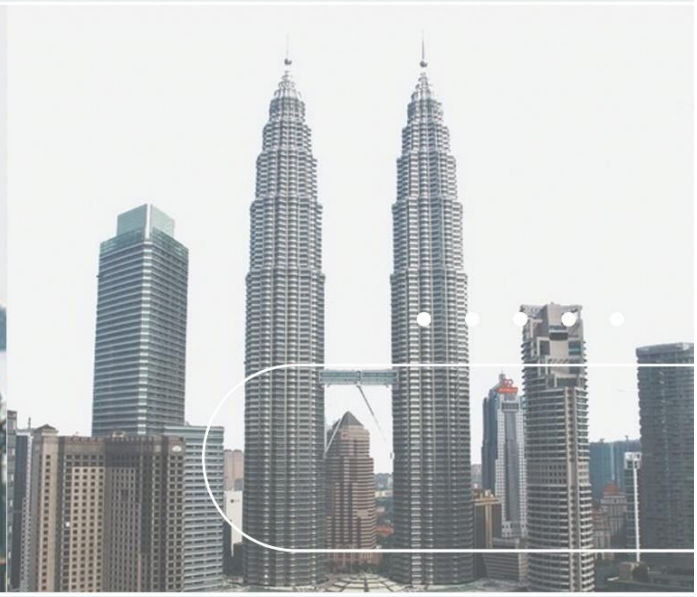
The 4th Bogor International Conference For Applied Science

4TH BICAS 2020



"Facing the World Challenges through Exploring the Beneficial Science and Technology for the Future"

December 2, 2020

Virtual Conference
Djuanda University

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Theme:

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DECEMBER 2nd 2020

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PREFACE

Dear ladies and gentlemen,

In this very precious moment, I would like to convey my warm regards and high appreciation for the eminent speakers, distinguished guests, respected colleagues, and all participants, from the deepest of our heart for having you joining our conference.

In 2020, we have successfully done our responsibility as scholars and researchers through The 4th Bogor International Conference for Applied Sciences (BICAS). Present our research finding virtually worldwide, proofs that knowledge have no boundaries, time, and place border. Even, the pandemic will not stop us to invent, create and publish. We should be more than proud, and this proceeding is dedicated for all participants who have share their remarkable research to the world.

Hereby, we would like to thank to Yayasan Pusat Studi Pengembangan Islam Amaliah Indonesia as well as the highest appreciation to the committee partner in journal publication, Taylor's University and Universiti Kebangsaan Malaysia. Thank you to our loyal partner Universitas Ibn Khaldun that have been collaborating since the first BICAS and BICSS. Finally yet importantly, all remarkable keynote speakers thank you for making the conference full of bright new knowledge. With the deepest of gratitude, we are more than proud to have all partners in the conference.

Through the theme "Facing the World Challenges through Exploring the Beneficial of Science and Technology for the Future", we have more than 40 scholars joined the conference in variety field of study such as Applied Science, Agriculture, Poultry & Husbandry, Fisheries, Bioscience, Engineering & Technology, Computer Science, Food Science, Sciences, Medicine & Applied Health, Pharmacy.

The conferences hope to serve as a forum to exchange ideas and experiences on findings and thoughts presented in empirical and theoretical assessments among Indonesian and overseas academicians and researchers. We deeply say thank a lot to all of you who make this conference happened. Thanks, are also deserved for the committee members and editorial boards for their tirelessly contributions to this conference. Finally, we hope that the pandemic is over and we could meet in person the next Bogor International Conference for Applied Science. Thank You.

Sincerely,

Prof. Ir. Mohamad Ali Fulazzaky, CES, DEA, PhD.

Conference Chair

CONTENTS

Evaluation of chili production on the concentration of banana growth controls

Oktavianus Lumban Tobing[1], Yanyan Mulyaningsih[2]

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ABSTRACT

Red chili plants (Capsicum annum L.) including seasonal crops and fruit vegetables. The production of red chili pepper can be increased, among others, by using the cultivation technique of banana weevil extract which contains growth regulators gibberellin and cytokinins. The types of natural growth regulators found were very different from the results of previous studies, especially their content and how they were used. The research objective was to obtain better chili production with cultivation technology that was applied through site-specific planting, and the results of the research could be used as a source of information by Gapoktan users, local communities, and entrepreneurs both at local and national scales. The method to increase chili production is through the application of growth regulators of banana hump extract in sword stadia. The research method used factorial randomized block design with 2 factors, namely mother liquor consisting of 300 grams of banana weevil powder/liter of methanol (K1); 450 grams of banana weevil powder/liter of methanol (K2), then each volume is concentrated to 150 ml by maceration extraction; The amount of concentration of mother liquor at the time/age of planting chilies, namely T0: not given / age when transplanting, T1: age 1 Weeks After Planting (WAP), T2: age 1.2 WAP, T3: age 1,2,3 WAP, T4: age 1,2,3,4 WAP, T5: age 1, 2,3,4,5 WAP, T6: age 1,2,3,4,5,6 WAP, T7: age 1,2, 3,4,5,6,7 WAP, T8: age 1, 2,3,4,5,6,7,8 WAP. The findings from the study of two mother liquor were two types of natural growth regulators from the banana hump extract of the sword stadia, namely gibberellin, a cytokinin consisting of kinetin and zeatin. Mother solution of 300 grams of banana weevil powder for sword stadia / liter of methanol obtained gibberellins of 4,918 mg / kg, kinetin 1,047 mg / kg, and zeatin 2,032 mg / kg. Mother solution 450 grams of banana hump powder kapok sword stage / liter of methanol obtained 5,184 mg / kg of gibberellin, 1,137 mg / kg of kinetin, and 1,985 mg / kg of zeatin. High-Performance Liquid Chromatography tool is used to analyze the content of growth regulators. Field findings show that the application of natural growth regulators of Kepok banana weevils can significantly increase the production and growth of chilies. The limitation of the research is the limited laboratory facilities because during the research there was an outbreak of Covid 19. The originality of the novelty of the research, namely that there has been no previous research which is the same as this research, because in this study the methodology is very specific, namely the use of two mother liquor natural growth regulators from banana weevils to the sword stadia, and the amount of growth regulators is different in the age range of chili plants.

Keywords: Chili yield; Stock Solution; Total planting age

I. INTRODUCTION

The yield of red chili fluctuates in the field depending on the variety, cultivation technique, and local climatic conditions at the time of planting. The use of seeds from improved varieties has the final impact on high production, therefore in this study, the F1-hybrid chili varieties were used. Selection of the most optimal cultivation technique to increase chili production, environmentally friendly, and easy to obtain and its use is not too difficult, it is felt necessary to find and develop. The cultivation technique that is being developed in this research is the manufacture of the sword stadia kapok banana hump extract. This study aimed to evaluate the production of red chilies after being given banana weevil growth regulators in a limited field.

The study consisted of treatment of 300 g/l and 400 g/l mother liquor, and the time of extracting started from (T0): not given the extract; (T1): giving 7 Weeks After Planting (WAP); (T2): giving 7.14 WAP; (T3): giving 7,14,21 WAP; (T4): giving 7,14,21,28 WAP; (T5): giving 7,14,21,28,35 WAP; (T6): giving 7,14,21,28,35,42 WAP; (T7): giving 7,14,21,28,35,42,49 WAP; (T8): giving 7,14,21,28,35,42,49,56 WAP. Both treatments significantly increased chili production in almost all observed variables including plant growth components, so that it had a great opportunity to be disseminated throughout Indonesia. Increased production and plant growth because the extract found growth regulators gibberellin and cytokinins consisting of kinetin and zeatin based on high-performance liquid chromatography analysis. This study is different from previous findings because previously the use of banana weevil was not known for its variety and standard, also different treatments and not the specific results of vegetable extracts by maceration and high-performance liquid chromatography analysis.

II. LITERATURE REVIEW

The application of growth regulators gibberellin, kinetin, and zeatin in red chili plants to the increase in chili production for a predetermined period. The results of some of the previous findings related to this study can be described based on the author's citation of the following arguments. According to Kurniati et al [1] (2017), the use of various natural growth regulators consisting of shallot tuber extract, bamboo shoot extract, banana hump extract, coconut water has a different effect on candlenut seeds. Sunan from seeds.

According to Aziziy et al [2] (2020), the use of 45% concentration derived from banana weevil germination power, seed height, and number of leaves MOL provides an increase in the variables of plant height, number of leaves, number of productive branches, and fruit weight of chili plants compared to control, but does not affect the use of concentration. 30%. The attack of the fungus Colletotrichum capsici did not occur in chili plants, because during the study the availability of water for the plants was below normal (long dry season) so that there was no spread of pathogenic spores.

The results of the study [3] stated that giving 4 levels of neem leaf fermentation concentration, namely: 1). M0 = 0% (control), 2). M1 = 15% (15 ml neem + 85 ml water), 3). M2 = 30% (30 ml neem + 70 ml water), 4). M3 = 45% (45 ml neem + 55 ml water). The concentration of banana hump fermentation consists of three varieties, namely: Ambon, kapok, and horn with a concentration of 30% (30 ml + 70 ml water). The results showed that the fermentation treatment of the three banana hump varieties affected the variables of stem diameter, number of leaves, crown width, and fruit length, but did not affect the number of fruits, fruit weight, fruit diameter, and fruit weight. chili plant.

[4] argued, the application of gibberellin is 4 levels, namely 0, 100, 200, 300 ppm. Soaking time consists of 3 levels, namely 0, 30, 60 minutes. The yield obtained by gibberellin can affect the total leaves, flowering time, index vigor, plant height, fruit length, and fruit weight per plant. The observed variables of plant height, number of leaves, fruit length, and fruit weight per plant were significantly affected by immersion duration. Soaking the seeds with gibberellin for 30 minutes is the optimum treatment to increase germination, growth, and yield of chilies. [5] stated, the use of gibberellin to induce growth and yield of chili plants. The treatment of gibberellin in the form of no treatment = H0, 150 ppm = H1, 200 ppm = H2, 250 ppm = H3. The results obtained by gibberellin can induce the growth and production of chili plants. Gibberellin 200 ppm is the best treatment. [6] argued, GA3 application time treatment consisted of 3 levels, namely flowering time; when it bears fruit; flowering and fruiting time. The concentration of GA3 consists of 5 levels of 0, 25, 75, 100 ppm. The addition

of GA3 concentration and the giving of flowering and fruiting time did not affect the 5% level. Giving GA3 100 ppm at flowering and fruiting gave greater fruit formation than without treatment. The increase in the number of flowers and fruit length occurred at the time of GA3 giving the initial fruit. The increase in the height of chili plants occurred at the provision of 50, and 100 ppm GA3.

III. METHODOLOGY

The research took place from March to August 2020 in the Gapoktan Repeh Rapih area, Sukamantri Village, Tamansari District, Bogor Regency, West Java.The research method used a factorial randomized block design with 2 treatments, namely: The mother liquor consisted of 300g/l, 400g/l and 0 g/l of sword stadia, sword stadia, and the amount of extract (K0): not given; (K1): give 7 Weeks after planting (WAP); (K2): give 7.14 WAP; (K3): give 7,14,21 WAP; (K4): give 7,14,21,28 WAP; (K5): give 7,14,21,28,35 WAP; (K6): give 7,14,21,28,35,42 WAP; (K7): give 7,14,21,28,35,42,49 WAP; K8: give 7,14,21,28,35,42,49,56 WAP. The plant variables observed were plant height, leaf area, number of branches, number of fruit crops, fruit wet weight, and shoot wet and dry weight. The data collected is the growth and production of red chili plants. The data obtained were processed quantitatively using Microsoft's program, and which observation variables were determined which contributed to the real effect, then they were selected to be included in this research.

IV. RESULTS AND DISCUSSION

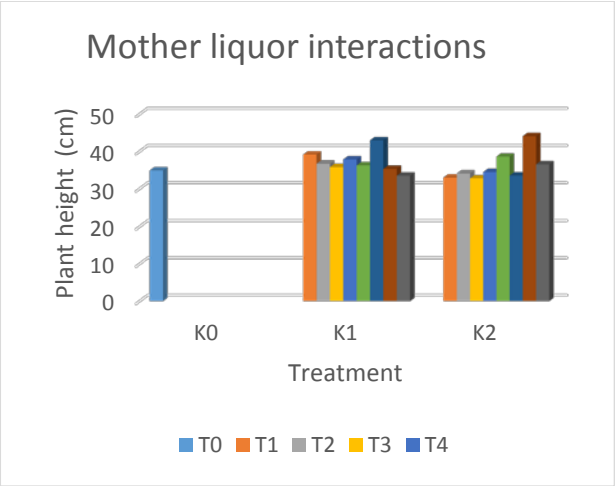


Figure 1. Mother solution and time to height

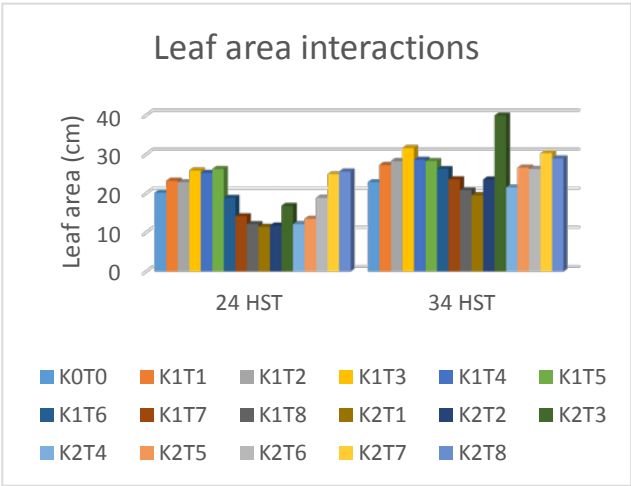
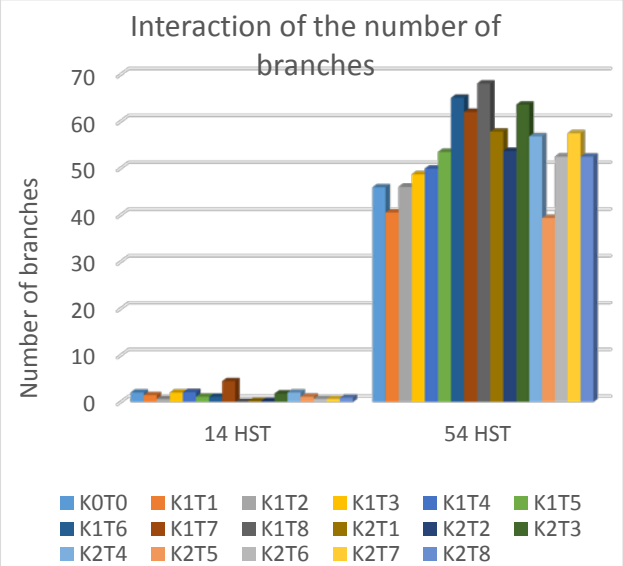


Figure 2. Mother solution and time to leaf area



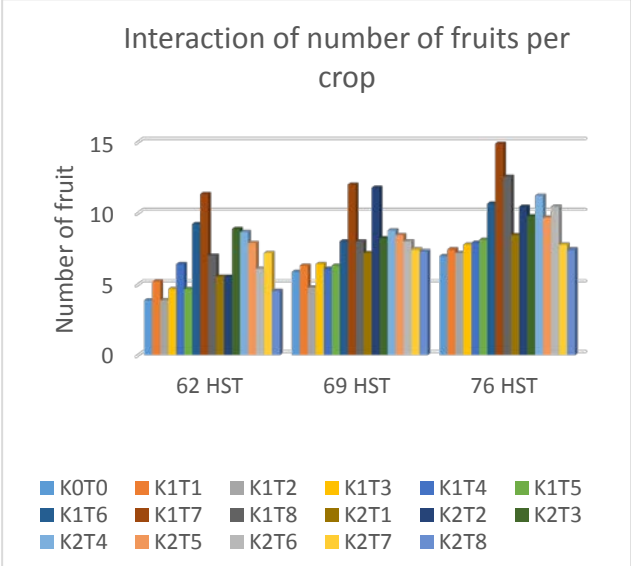
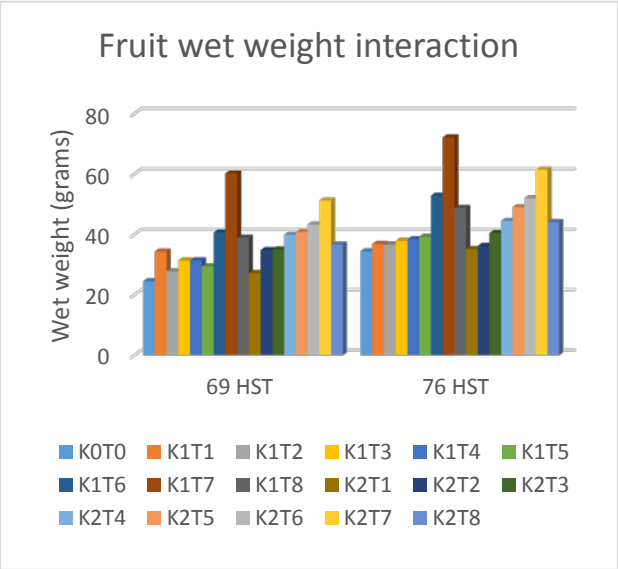


Figure 3. Mother solution and time against the number of branches

Figure 4. Mother liquor and time to the number fruit



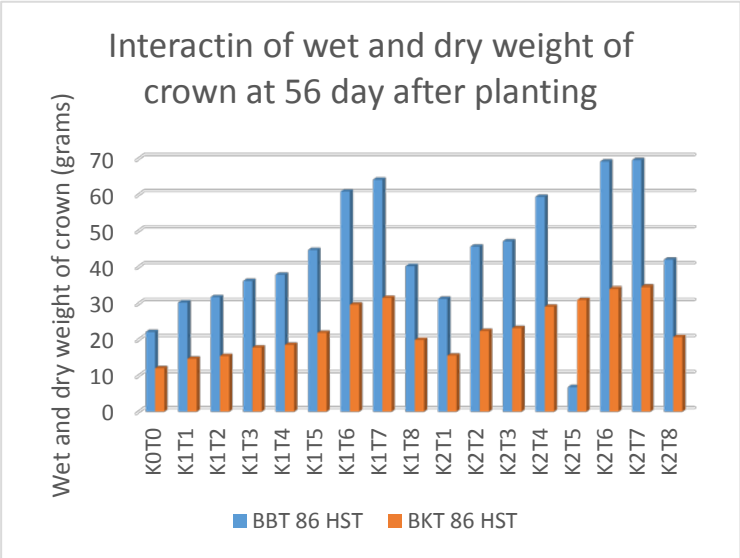


Figure 5. Mother solution and time to wet weight fruit

Figure 6. Mother solution and time to wet and dry weight of the canopy aged 56 days after planting

Based on the results of this study, in Figure 1,2,3,4,5,6, it turns out that the provision of mother liquor and the amount of administration at a certain age gives a real interaction with all components of production and plant growth. The growth regulator substance of gibberellin is 4,918 mg/kg, cytokinins consisting of 1,047 mg/kg of kinetin, and zeatin of 2,032 mg/kg from the main solution of 300 grams of sword stadia banana hump powder per 1 liter of methanol. The growth regulator substance of gibberellin is 5,184 mg/kg, cytokinins consisting of 1,137 mg/kg of kinetin, and zeatin of 1,985 mg/kg from the main solution of 450 grams of sword stadia banana hump powder per 1 liter of methanol. Based on its general use, gibberellin growth regulators accelerate harvest time; increase the number of fruit, increase fruit weight, while on growth the effect is an increase in leaf area, the number of branches (the result of cooperation with cytokinins), and an increase in branch segments. Cytokinins generally act in meristematic use of cells (seen from an increase in the number of branches), increase canopy biomass. Several previous studies related to this research can be described further.

[7] argued, the treatment of using banana weevil weight consisting of 3 levels, namely 100-250 g, 300-450 g, and 500-650 g, and the concentration of gibberellins consisting of 4 levels, namely 0, 150, 300, 450. ppm. The results showed that the split stump had an effect on the 5% level test on the observed variables. Heavier weevils spur faster growth. The use of 500-650 g of banana weevil is the best experiment. Time of emergence of shoots, number of shoots, plant height, number of leaves, number of roots, root length, and weevil weight of plant roots can be stimulated by giving 150 ppm of gibberellin.

[8] The response to growth and crop production is determined by environmental conditions associated with adaptation and acclimation. Adaptation is the adjustment of plant development to temperature exposure and duration of radiation during activities. Climate adaptation is determined by the genetic and physiological factors of the plants used. [9] The unfavorable abiotic stress affects the development of the male reproductive organs of plants. Exposure to high temperatures in chili plants adversely affects male reproductive development, as well as microgametogenesis and microsporogenesis. Determining the planting time of chilies needs to be done so that chili plants avoid environmental stress so that productivity does not occur. According to [10], research on the interaction of environmental factors with genotypes aims to determine the genotypic stability of hybrid chilies in a specific or broad environment. Hybrid chili growers in three test locations in West Java, namely Bandung, West Bandung Regency, and Garut. The results of the study that the middle square value of the genotype was higher than the middle square value of the genotype x environment

interaction, meaning that the genetic effect was more dominant than environmental factors. Variety testing (genotype) affects the level of 5%, which means there is an increase in yields that are not the same between varieties, as well as genotype factors with the interacting environment. The results of MSTATC calculations are H-1 and Cosmos shows a stable genotype. The results were unstable in the Battalion and Meronae genotypes, as well as the H2 and Hot Beauty genotypes. The research concludes that the hybrid chili genotype is stable when planted in the highlands of West Java.

Research [11] argued, the timing of GA3 which consisted of giving GA3 flowering time (W1), giving GA3 fruiting time (W2), and giving flowering and fruiting time (W3) which was the main plot, then giving GA3 was K0: 0 ppm, K1: 25 ppm, K2: 50 ppm, K3: 75 ppm, and K4: 100 ppm which are subplots. GA3 given the time of flowering and fruiting was not significantly different. The percentage of fruit formation was higher than the control treatment that occurred at the provision of GA3 100 ppm at flowering and fruiting time. The increase in the number of flowers and fruit length occurred at the time of the initial GA3 fruiting.[12] stated that the administration of GA3 (HARAXIN) consists of 0 days, 3 days, 5 days, 7 days. The dosage of NPK fertilizer consists of 4 grams / plant (160 kg / ha), 5 grams / plant (200 kg / ha), 6 grams / plant (240 kg / ha). The results obtained by using GA3 had a 5% effect on the observed variables of the number of branches aged 5 mst, number of fruits aged 8 mst, number of fruits aged 9 mst, number of fruits aged 11 mst, number of fruits aged 12 mst, the total number of fruits and total fruit weight. The results of red chilies are better at the interval of every 5 days of application GA3. NPK application has an impact on the level of 5% on the observed variables of total branches aged 4 mst, total branches aged 5, 6, 7, 8 mst, and the greatest yield of chili plants is obtained in 4 g NPK application. 3. The greatest yields of chili plants were obtained once every 5 days of GA3 and 6 grams of NPK per plant.

The formation of mature peanut pods depends on the initial flowering date (IFD = Initial Flowering Date). The mapping of QTL related to IFD was obtained from the results of crosses between the two female elders of Silihong and male elders of Jinonghei 3. The date of the flowering of peanuts is determined by two factors, namely genotype, and environmental factors, and general heritability (h2) is estimated at 86.8%. [13].

The results of the research on hybrid wheat showed an increase in yield of 3.5 to 15% than non-hybrid wheat. The use of hybrid wheat is an alternative in increasing wheat yields in the future. Research through analysis of the most important factors of the arrangement of two rows of hybrid wheat and grain weight (GW) as the parent, LS is the length of the nail, KSN is the increase in the total kernel, and SPN is the total spike of the variable. Variables can be divided into 3 most important factors, namely: factor 1 is the weight factor, factor 2 is the quantity factor 1, and factor 3 is the quantity factor 2 which contributes 37.1; 22.6 and 18.5%. The number of variants of each different agronomic variable, showing that the GW is an indication of the hybrid assessment and the grain weight of the recovery line (RGW used in the guideline [14].

The added stress due to shade is an agronomic trait. The activities of photosynthetic and leaf organ antioxidants were studied in soybean cultivars D16, E93. Shade treatment of soybean seedlings consists of 3 levels, namely: (S0): shade-free, (S1): less shade, (S2): medium shade, and (S3) high shade. The results showed a significant decrease in both cultivars with S3 shade (shade height) on specific leaf area variables, leaf fresh weight, and leaf thickness. Decreases also occur in the photochemical variables of electron transport and maximum quantum yield (Fv / Fm). Shade-free (S0) causes morphological and physiological plasticity to be more adaptable than (S1); (S2); (S3) on the reduction of biomass weight from seed [15].

V. CONCLUSION

Growth regulators from banana weevil in sword stadia contributed greatly to the production and growth of red chilies.

ACKNOWLEDGEMENT

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Market Performance of Indigenous Basil (*Ocimum basilicum L.*) Vegetables in Kadudampit District, Sukabumi Regency

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Abstract

Background - West Java Province is the main producer of vegetables in Indonesia, including Indonesian vegetables. The potential of these indigenous vegetables has not been well exploited, due to the lack of socialization of cultivation techniques and their marketing potential.

Purpose - This study aims to analyze the market performance of indigenous basil vegetables.

Design/methodology/approach - The research was conducted in Sukamaju and Undrus Binangun villages, Kadudampit District, Sukabumi Regency. Data were taken from 42 basil farmers who were taken by simple random sampling method and 29 traders who were taken using snowball sampling. Data were analyzed using descriptive and quantitative statistics using market performance analysis (marketing margin analysis, farmer's share, profit and cost ratios, and marketing efficiency).

Findings - The results showed that there were five marketing channels, the longest channel is from farmers - village collectors - wholesalers - retailers - consumers. Based on the market performance analysis, the largest margin value is obtained from channel V and the lowest margin is obtained from channel II. The largest farmer's share value was obtained from channel I and the lowest farmer's share was obtained by channel V. The highest margin was obtained from channel I for channel II. The profit and cost ratio value of all channels is more than zero ($\pi/C > 0$) and the largest value of profit and cost ratio is obtained by marketing channel V. So that the most efficient marketing channel is channel II. Thus it is suggested that channel II can be used as an alternative marketing decision for farmers. Furthermore, there is an institutional strengthening of farmer groups to strengthen the bargaining position of farmers.

Research limitations - The basil market is still on a local scale, so the marketing analysis is still limited

Originality/value - research on marketing of indegenous vegetables is still limited, in this study a more complete analysis using market performance has been included

Keywords: indigenous, market performance, farmer's share.

I. INTRODUCTION

West Java Province is the main producer of vegetables in Indonesia, including Indonesian vegetables. The potential of these indigenous vegetables has not been well exploited, due to the lack of socialization of cultivation techniques and their marketing potential. Basil is one of the indigenous vegetables whose demand continues to increase in line with the development of Sundanese restaurants that require fresh vegetables. Ambarsari et al (2012) mentioned several indigenous vegetables that have the potential to be developed, including luffa (*Luffa acutangula*), chayote (*Sechium edule*), bitter melon (*Momordica sp.*), purslane (*Portulaca oleracea*), chives (*Allium schoenosprasum*), kenikir (*Cosmos caudatus*), beluntas (*Pluchea indica*), fern leaves (*Arcyteris irregularis*), basil leaves (*Ocimum basilicum L.*), katuk leaves (*Sauropus androgynus*).

II. LITERATURE REVIEW

In West Java, the culture of eating vegetables, especially indigenous vegetables, which are eaten fresh (salad) or cooked is relatively higher compared to other regions. The high interest in eating vegetables is due to their abundant availability in West Java (Prawati, 2011). Sukabumi Regency has potential in developing vegetables in West Java, both commercial and indigenous vegetables. Kadudampit District is a leaf vegetable producer in Sukabumi Regency, West Java Province. The development of indigenous vegetables in farming activities requires costs in the form of input use that will affect farmers' income. Perishable horticultural products will also have an impact on the selling price and income earned by farmers (Agustin *et al.* 2013),

Rahayu (2016) researched indigenous vegetable cultivation in Kadudampit District, the results stated that of the various types of indigenous vegetables that exist, basil is the most consumed and cultivated in Kadudampit District, Sukabumi Regency. The marketing process for basil has various uniqueness, including relatively stable price fluctuations, different ways of selling with vegetables in general because basil is sold in large bindings or commonly called one join, small ties, and retail or what is commonly called “gantil” when it reaches the retailer level. roving or home. From some of this uniqueness, it is important to do basil marketing research. This study aims to analyze the efficiency of marketing by examining market behavior and market performance.

III. METHODOLOGY

This research was conducted in the villages of Sukamaju and Undrus Binangun, Kadudampit District, Sukabumi Regency. The selection of location was chosen purposively because based on previous research investigations, the Sukabumi Regency is one of the producers of indigenous vegetables in West Java, and basil is an indigenous vegetable in Kadudampit District which is widely cultivated in Sukamaju Village and Undrus Binangun Village.

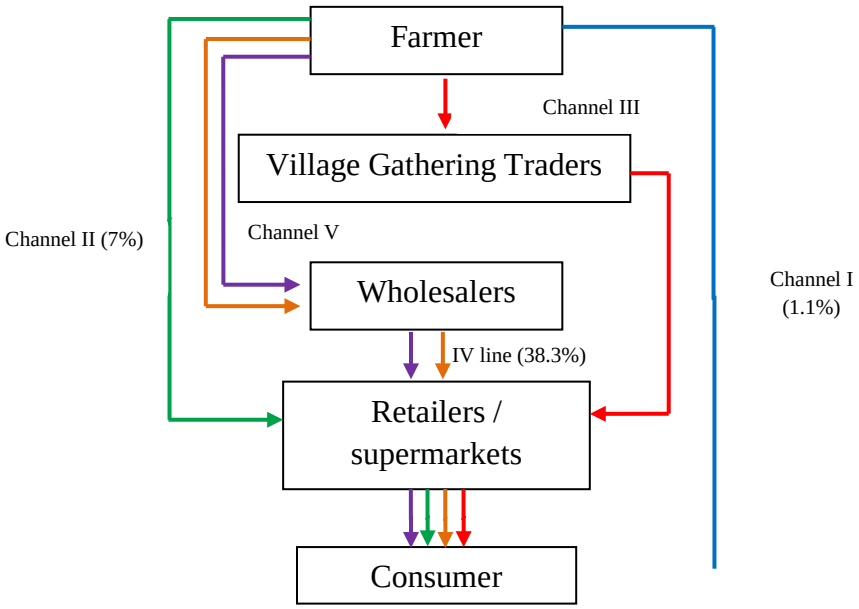
Data were collected from 42 farmers who were taken using a simple random sampling method. Furthermore, marketing data were collected from 6 village collectors, 6 wholesalers, and 17 retailers, which were taken using the snowball sampling method. The data collected are primary data and secondary data. Primary data were collected using interview techniques with a structured questionnaire.

Data analysis used descriptive and quantitative statistical methods. Market performance analysis methods are marketing margin analysis, farmer's share, profit and cost ratios, and marketing efficiency (Dahl and Hammond, 1977).

IV. RESULT AND DISCUSSION

Marketing channel

Figure 1 shows the marketing channel formed from marketing basil in Kadudampit District. There are five channels of marketing basil



Marketing Margin

Table 1 Marketing Margin for Basil Marketing in Kadudampit District

No.	Marketing Agency	Channel I	Channel II	Channel III	Channel IV	Channel V
		Price (Rp/Gab)	Price (Rp / Gab)	Price (Rp / Gab)	Price (Rp / Gab)	Price (Rp / Gab)
1	Farmer					
	Average production costs	2,228.6	-	-	-	-
	Selling price	20,000.0	11,923.5	9,166.7	9,666,7	9,666,7
	Postharvest costs	1,616.7	1,616.7	1,616.7	1,616.7	1,616.7
	Marketing costs	214.3	-	-	-	-
	Advantage	15,940.5	10,306.9	7,550.0	8,050.0	8,050.0
	Margin	17,771.4	-	-	-	-
2	Village Gathering Traders					
	Purchase price	-	-	9,166.7	-	-
	Marketing costs	-	-	480.0	-	-
	Selling price	-	-	13,583.3	-	-
	Advantage	-	-	3,936.7	-	-
	Margin	-	-	4,416.7	-	-
3	Wholesalers					
	Purchase price	-	-	-	9,666,7	9,666,7
	Marketing costs	-	-	-	1,350.0	1,500.0
	Selling price	-	-	-	13,000.0	15,000.0
	Advantage	-	-	-	1,983.3	3,833.3
	Margin	-	-	-	3,333.3	5,333.3
4	Retailer Traders					
	Purchase price	-	11,923.5	13,583.3	13,000.0	-
	Marketing costs	-	687.0	687.0	687.0	-
	Selling price	-	18,073.9	18,073.9	18,073.9	-
	Advantage	-	5,463.4	3,803.6	4,386.9	-
	Margin	-	6,150.4	4,490.6	5,073.9	-
5	Supermarket					
	Purchase price	-	-	-	-	15,000.0
	Marketing costs	-	-	-	-	500.0
	Selling price	-	-	-	-	39,500.0
	Advantage	-	-	-	-	24,000.0
	Margin	-	-	-	-	24,500.0
	Total Margin	17,771.4	6,150.4	8,907.2	8,407.2	29,833.3

Farmer's Share

Table 2 shows the farmer's share value. The value of the farmer's share is inversely proportional to the size of the marketing margin, the higher the marketing margin, the lower the share that will be received by farmers (farmer's share). The largest market share is obtained in channel I followed by channel II and the smallest is in channel V. Based on the farmer share

value, it can be concluded that channel II is the most efficient marketing channel through which farmers market basil because this channel is the channel with the largest farmer's share value.

Table 2. Farmer's Share on Basil Marketing in Kadudampit District

No.	Marketing channel	Prices at farm level (IDR / Gab)	Prices at the consumer level (Rp / Gab)	*Farmer's share*(%)
1	I	20,000.0	20,000.0	100
2	II	11,923.5	18,073.9	66.0
3	III	9,166.7	18,073.9	50.7
4	IV	9,666,7	18,073.9	53.5
5	V	9,666,7	39,500.0	24.5

Profit and Cost Ratio

Table 3 shows the magnitude of the comparison of benefits and costs in each marketing channel for basil in Kadudampit District. From Table 3 it can be seen that the largest marketing costs for basil are in channel IV and channel V is the marketing channel with the largest profit, this is because basil is sold to supermarkets.

Table 3 Ratio of Profits and Costs of Each Marketing Channel of Basil in Kadudampit District, 2017

	Channel I	Channel II	Channel III	Channel IV	Channel V
Profit (Rp / Gab)	15,940.5	15,770.3	15,290.3	14,420.3	35,883.3
Cost (Rp / Gab)	1,831.0	2,303.6	2,783.6	3,653.6	3,616.7
Advantages and Costs	8.71	6.85	5.49	3.95	9.92

Marketing Efficiency

Marketing efficiency can be determined by looking at the value of the marketing margin, the value of the farmer's share, and the ratio of profits and costs (π/C). From Table 4, it can be seen that the marketing margin for basil in Kadudampit District has not been evenly distributed. The most efficient channel is channel II with a margin of IDR 6,150.4, a farmer's share of 66%, and a value of π / C of 6.85.

Table 4. The efficiency of Basil Marketing in Kadudampit District

	Channel I	Channel II	Channel III	Channel IV	Channel V
Marketing Margin	17,771.4	6,150.4	8,907.2	8,407.2	29,833.3
Farmer's share	100	66.0	50.7	53.5	24.5
Profit and Cost Ratio	8.71	6.85	5.49	3.95	9.92

***Share* Basil Marketing Costs**

Institutions involved in marketing basil in Kadudampit Subdistrict market basil to traditional markets around Sukabumi City and District. Marketing costs incurred for marketing basil are not more than 20 percent of the total marketing costs incurred by marketing agencies.

Table 5 Share of Marketing Costs of Kemangi Per Day in Kadudampit District in 2017

Marketing agency	Total marketing costs (Rp)	Basil marketing costs (Rp)	Percentage (%)
Farmer	-	-	-
Village Gathering Traders	63,333.3	12,000	18.9
Wholesalers	323,333.3	54,000	16.7
Retailer Traders	26,470.6	2,647.1	10

V. CONCLUSION

1. Kadudampit has five marketing channels. The shortest marketing channel is farmers - consumers, and the longest is Farmers - Village Collecting Traders (PPD) - Wholesalers - Retailers - Consumers.
2. Based on the market performance analysis, the largest margin value is obtained from channel V and the lowest margin is obtained from channel II. The largest farmer's share value is obtained from channel I and the lowest farmer's share is obtained by channel V. However, channel I cannot be used as a recommendation in marketing basil, this is because there is only one farmer who passes through channel I. The highest margin after channel I is obtained by channel II. The profit and cost ratio value of all channels is more than zero (π / C> 0) and the largest value of profit and cost ratio is obtained by marketing channel V. So that the most efficient marketing channel is channel II.

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Growth, Production, and Quality of Katuk (*Sauropus androgynus* (L.) Merr.) Acccesions on Various Nitrogen Organic Fertilizer

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Abstract

Background – The use of synthetic fertilizers with high doses can cause negative impacts on the environment, including reducing soil fertility, reducing biodiversity, and increasing pest and disease attacks. Reducing the use of synthetic fertilizers can be done by applying an environmentally friendly source of organic nitrogen fertilizer.

Purpose – This study was aimed to study the effect of N-organic fertilizers on growth, production and of katuk (*Sauropus androgynus* (L.) Merr) accessions.

Design/methodology/approach – This study used a factorial completely randomized design (CRD) consisting of two factors. The first factor is katuk accession and the second factor is various types of N sources fertilizer. Katuk accession consists of six levels, namely Kadudampit, Gegerbitung, Dramaga, Cinangneng 1, Cinangneng 2, and Katulampa. The source of N fertilizer consists of four levels, namely urea fertilizer, fermented cow urine, Mexican sunflower compost (MSC), and without N fertilizer. The dose of N fertilizer used is 250 kg N ha^{-1}.

Findings – The results of this study indicated that Katulampa katuk accession plants have the best results on the leaf number and number of buds. Kadudampit accession was superior in plant height and leaf area. Harvest dry weight of plant was applicated by Mexican sunflower compost and cow urine not significantly different from that of urea, although plant with urea fertilizer showed higher plant height, number of leaves, and number of buds. Stem diameter, leaf area, and vitamin C content not different between N fertilizer applications. The leaves nitrate content of plants with urea fertilizer is higher than Mexican sunflower compost fertilizer. Leaves chlorophyll-a content did not different between N fertilizer, but total chlorophyll of urea and fermented cow urine not significantly different.

Research limitations– The limitations of the research is obtaining stable organic fertilizer nutrient content.

Originality/value – Organic fertilizer such as Mexican sunflower compost and fermented cow urine can be used to replace or supplemented with urea fertilizer.

Keywords: *Sauropus androgynus* (L.) Merr.,

I. INTRODUCTION

Katuk (*Sauropus androgynus* (L.) Merr) is a multifunctional plant because the leaves are not only used as vegetables but also as medicinal plants, livestock ration supplements, and food coloring. Cooked katuk leaves retain their green color and tough texture. Traditionally, katuk leaves are used to increase breast milk, so it is widely produced as a biopharma preparation under various trademarks.

Improving the quality of the vegetable leaves can be done by adding nitrogen. According to Patti et al. (2013), nitrogen plays a role in increasing the vegetative growth of plants. One source of nitrogen that is often used by farmers is urea fertilizer. Urea is an inorganic fertilizer that contains 46% nitrogen which can help accelerate plant growth and production (Wahyudi 2010).

The use of synthetic fertilizers with high doses can cause negative impacts on the environment, including reducing soil fertility, reducing biodiversity, and increasing pest attacks. Besides, the negative impact of the use of chemical inputs also extends to components of the food chain such as drinking water, vegetables, fruits, and other contaminated products (Zulkarnain 2014). Thus, to reduce the use of excess chemical fertilizers, the application of organic nitrogen fertilizer sources from cow urine and Mexican sunflower compost (*Tithonia diversifolia*) is an alternative. This study aims to determine the effect of N-organic on growth, production, and quality of katuk (*Sauropus androgynus* (L.) Merr) accessions.

II. LITERATURE REVIEW

Katuk can grow well in areas with an altitude of 500-1300 m above sea level (Susila *et al.* 2012). The optimal rainfall for katuk plants ranges from 200 - 300 mm per year (Wiradimadja 2018). According to Susila *et al*. (2012), to obtain optimum results, this plant requires fertile, loose, well-aerated, and well-drained soil with soil acidity ranging from 5.5 to 6.

Fermented cow urine and Mexican sunflower compost are alternatives to organic nitrogen sources. Cow urine contains 0.52% N, 0.01% P, and 0.56% K (Hadisuwito 2012). Cow urine also contains growth regulators such as auxins, gibberellins, and cytokines (Pangaribuan *et al.* 2017; Ilahi *et al.* 2016). Mexican sunflower is a wild plant that contains a lot of complete macro and micronutrients including N, P, K, Ca, Mg, S, Zn, Fe, Mn, Cu, and B (Reis *et al*. 2016). Lestari (2016) reported that Mexican sunflower contains 3.50 - 4.00% N, 0.35 - 0.38% P, 3.50 - 4.10% K, 0.59 Ca, and 0.27% Mg.

III. METHODOLOGY

This study used a factorial completely randomized design (CRD) consisting of two factors. The first factor is katuk accession and the second factor is various sources of N fertilizer. Katuk accession consists of six levels, namely Kadudampit, Gegerbitung, Dramaga, Cinangneng 1, Cinangneng 2, and Katulampa. The second factor is the source of N fertilizer which consists of four levels, namely urea, fermented cow urine, mexican sunflower compost (MSC), and without N fertilizer. The dose of N fertilizer used was 250 kg N ha^{-1}. In this experiment, 24 treatments were repeated three times, so that there were 72 experimental units.

Data were analyzed using variance (Test F). If the treatment has a significant effect, a further test is carried out with Duncan's Multiple Range Test (DMRT) at the 5% level.

IV. RESULT AND DISCUSSION

The increase in the plant of Kadudampit accession is higher than Gegerbitung and Cinangneng 1, but not significantly different from other accessions. The increase of leaves number and number of buds of Katulampa accession is the highest. The increase was of the total length of buds not different among accessions (Table 1). The plant that was given by urea fertilizer showed a higher increase in plant height, number of leaves, number of buds, and total length of buds than other types of fertilizer (Table 1)

Table 1. Increase in the plant height, number of leaves, number of buds, and the total length of buds of katuk plants at 8 weeks after planting (WAP)

	Increase in the plant height (cm)	Increase in the number of leaves	Increase in the number of buds	Increase in the total length of buds (cm)
Accessions				
Kadudampit	18,61[b]	4,19[a]	10,25[a]	21,79
Gegerbitung	14,68[a]	3,92[a]	7,00[a]	18,74
Dramaga	16,28[ab]	4,06[a]	8,25[a]	23,33
Cinangneng 1	13,88[a]	3,70[a]	12,17[a]	22,86
Cinangneng 2	16,23[ab]	4,51[a]	13,33[a]	26,21
Katulampa	16,83[ab]	8,19[b]	34,83[b]	32,32
Type of fertilizer				
Urea	20,01[c]	6,26[c]	1,92[c]	33,10[b]
Cow urine	16,55[b]	4,94[b]	1,27[b]	27,42[b]
MSC	15,44[b]	4,39[ab]	0,94[ab]	20,01[a]
Without N fertilizer	12,34[a]	3,46[a]	0,64[a]	16,33[a]

Means along the column with the same superscript are not significantly different by DMRT (p=0.05)

The stem diameter of Dramaga and Cinangneng accessions were lower than other accessions. Leaf area of 'Kadudampit' is the highest but harvest fresh and dry weight not significantly different among accessions (Table 2). Harvest dry weight not different among accessions. The harvest fresh weight of plants was given by urea is relatively the same as that fertilized by cow urine, but higher than plants fertilized by Mexican sunflower compost and without N fertilizer (Table 2).

Table 2. Stem diameter, leaf area, harvest fresh weight, harvest dry weight of katuk plants

	Stem diameter (cm)	Leaf area (cm^2)	Harvest fresh weight (g)	Harvest dry weight (g)
Accessions				
Kadudampit	0,28[b]	18,59[b]	13,30	1,73
Gegerbitung	0,26[b]	10,45[a]	12,23	1,61
Dramaga	0,20[a]	13,00[a]	12,46	1,60
Cinangneng 1	0,21[a]	12,37[a]	12,53	1,49
Cinangneng 2	0,25[b]	11,93[a]	14,76	1,90
Katulampa	0,26[b]	10,68[a]	17,25	1,92
Type of fertilizer				
Urea	0,25	12,51	16,61[b]	1,77
Cow urine	0,25	13,36	14,02[ab]	1,75
MSC	0,23	13,47	12,78[a]	1,68
Without N fertilizer	0,23	12,00	11,61[a]	1,63

Means along the column with the same superscript are not significantly different by DMRT (p=0.05)

Nitrate and chlorophyll b content of katuk leaves not different among accessions. Kadudampit katuk has the highest vitamin C content, and Gegerbitung showed the greatest chlorophyll a and chlorophyll total (Table 3). Plant fertilized by urea have more nitrate and chlorophyll total, but not significantly different from that given by cow urine. Vitamin C, chlorophyll-a, and chlorophyll b content not different among types of N fertilizer (Table 3).

Table 3. Content of nitrate, vitamin C, and chlorophyll of katuk leaves

	Nitrate	Vitamin C	Chlorophyll-a	Chlorophyll-b	Chlorophyll total
Accessions					
Kadudampit	2133,33	1557,33[b]	4,04[b]	1,89	5,93[a]
Gegerbitung	2234,58	1349,33[a]	4,80[c]	2,26	7,05[b]
Dramaga	2683,33	1290,67[a]	3,56[ab]	1,60	5,15[a]
Cinangneng 1	2579,17	1240,00[a]	4,08[b]	1,80	5,88[a]
Cinangneng 2	2204,17	1296,00[a]	3,61[ab]	2,42	6,03[ab]
Katulampa	2095,83	1288,00[a]	3,23[a]	1,97	5,20[a]
Type of fertilizer					
Urea	2700[b]	107,70	4,38[b]	2,34	6,72[c]
Cow urine	2261,11[ab]	107,56	4,00[b]	1,95	5,96[bc]
MSC	2052,78[a]	114,22	3,94[b]	1,84	5,78[ab]
Without N fertilizer	2273,06[ab]	116,15	3,22[a]	1,82	5,03[a]

Means along the column with the same superscript are not significantly different by DMRT (p=0.05)

V. CONCLUSION

The results of this research showed that Katulampa katuk accession plants have the highest leaf number and number of buds. .Kadudampit accession superior in plant height and leaf area. Harvest dry weight of plant was applicated by Mexican sunflower compost and cow urine not significantly different from plants treated with urea, although plant with urea fertilizer showed higher plant height, number of leaves, and number of buds. Stem diameter, leaf area, and vitamin C content not different between N fertilizer applications. The leaves nitrate content of plants with urea fertilizer is higher than Mexican sunflower compost fertilizer. Leaves chlorophyll-a content did not different between N fertilizer, also total chlorophyll of urea and fermented cow urine not significantly different.

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Exploring Consumers' Acceptance of E-Marketplace Using TAM And Flow Theory at Pusat Pembelanjaan Mentaya Kotawaringin Timur

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Abstract

Background – One business models of E-commerce which well-developed is E-Marketplace. The internal competition of E-Marketplace remains tough yet some achieve its successful compared to the others. The parameter of successful E-Marketplace can be seen by the numbers of acceptance by the costumers. Hence, this research on E-marketplace acceptance is significant to be done. This research takes a case study in one of the Indonesian markets, named the 'Pusat Perbelanjaan Mentaya' (PPM) regarding the use of the E-marketplace.

Purpose – This research aims to find out the adoption of e-marketplace acceptance. Our research model based on Technology Acceptance Model (TAM) which is modified by adding shopping enjoyment variable(Flow Theory).

Design/methodology/approach – This research applies quantitative research method; spreading questionaries and surveys. The data obtained were 240 from the PPM consumers who use E-marketplace application. Then the data would be used to examine the relationship between the variables of the proposed model.

Findings – The results of this study show that the perception of the use of E-Marketplace application effects the perceived benefits. This due to the ease of operating the E-marketplace service affects users, moreover, sales and purchase transactions become more effective and efficient. In essence, the ease perceived also has an influence of the users' attitude. This shows that E-marketplace service users feel that using these services increases effectiveness and benefits; they will not refuse to use E-marketplace services. The results in this study that the variable attitude towards use of Behavioral Intention is not accepted, because the attitude in using E-marketplace services does not determine user behavior in the future.

Research limitations – This research is limited to the adoption of information technology acceptance using TAM. In the future, it is hoped that there will be a combination of other technology acceptance models such as UTAUT and TPB.

Originality/value – The novelty of this research is on the lack of sources which deeply dig on the details of some factors of acceptance of information technology use in Sampit city.

Keywords: Technology Acceptance Model, Technology Acceptance Theory, Shopping enjoyment, E-marketplace

I. INTRODUCTION

The necessity to pursue the satisfaction in purchasing and selling has of ways. This is done in order to get the mutual satisfaction in the transaction. Shopping that is currently in demand is online shopping as it can be done anytime and anywhere.

For instance, e-commerce business models, that can be done anytime and anywhere, just like e-marketplace. E-marketplace is an internet-based online media which conducts business activities and transactions between buyers and seller (Putra et al., 2017). Good online communication will increase trust

between sellers and consumers (Bao et al., 2016). One of the variables that can influence users to intend to use the E-market place is perceived usefulness (Setiyadi et al., 2019). E-market place needs to offer the same concept as traditional markets. This eases the sellers to meet their customers. The simplicity offered by the E-marketplace makes it faster known, many even describe the E-marketplace as a Department Store.

The expansion of the E-marketplace has almost dominated various parts of the world. The results of the Sharing Vision survey in 2018 stated that 92% of online consumers shop through the marketplace and 50% use social media. The number of internet users in Indonesia reached 88 million until almost the end of 2014, while the total population of Indonesia was around 253 million, hence, it is estimated that internet users reached 34.9% (Fachriyan & Wijaya, 2018). With the increasing number of internet users in Indonesia, it certainly benefits E-Marketplace owners in Indonesia such as Bukalapak and Tokopedia as well as other E-Marketplace holders. Seeing the increasing number of internet users in Indonesia, the opportunity to become an E-Marketplace holder is very possible and profitable. Even since the inception of the E-marketplace, it has provided opportunities for new entrepreneurs to start or expand their business (Wiradinata, 2017).

The high interest of E-Marketplace users in Indonesia makes Indonesian scientists want to know the extent of the role of the Indonesian people in accepting the development of online transactions. In fact, many studies mention that research on e-commerce in the world is currently an interesting topic to research (Farki & Baihaqi, 2016). Topics related to E-Marketplace as carried out by (Suryanto, 2018), (Pandy, 2018), (C. Y. Lai et al., 2017), (Chong et al., 2018), (Fedorko et al., 2018), (Fayad & Paper, 2015), and (Al-Gahtani, 2011).

Sampit has a very fast economic development. Economic progress is supported by the easy entry and exit of various products, both through seaports and airports. In addition to these conveniences, in Sampit City there is a Shopping Center called Pusat Perbelanjaan Mentaya (PPM), often visited by people and visitors from outside the city to conduct business transactions. Progress in various fields is currently being matched by the development of information technology that can make it easier for everyone, such as in online transactions. Online meetings require a high level of trust because the seller and the buyer do not meet in person.

Based on the problems described above, it is necessary to know the level of public trust in online transactions. This can help develop an online transaction system in addition to the features required by customers. This research is intended to recommend the development of an E-Marketplace application in Sampit city. By conducting research on the community in Sampit and its surroundings regarding the level of trust in conducting online transactions. So that the development of applications can later meet the needs of sellers and buyers on the side.

II. LITERATURE REVIEW

A. Information Technology

Information technology defined as the use of electronic devices, especially computers to input, process, and distribute the information (Rerung, 2018). Information technology is growing rapidly in various countries. Countries tend to follow a clear pattern of specialization along development paths, by moving towards more complex and valuable technologies (Petralia et al., 2017).

B. Electronic Marketplace

The use of technology by converting traditional businesses to digital at MSMEs in Indonesia is a very essential contribution to gross domestic product (Ramadhanti & Slamet, 2020). The biggest challenge in using an e-marketplace is insufficient funding. In essence, organizations that are unable to handle change management, and several other things (Lestyowati J, 2018).

C. TAM (Technology Acceptance Model)

A method that has a high contribution in evaluating the adoption of Information Technology is Technology Acceptance Model (Gunawan & Lynawati, 2018). TAM was first introduced as a theoretical extension of the Theory of Reasoned Action (TRA). TRA is a domain model that defined a person's behavior is determined by intention to perform behavior, and the intention is formed by subjective norms and attitudes toward behavior (F. D. Davis et al., 1989). TAM adapted from TRA proposes two assumptions, perceived usefulness and perceived ease of use as the main driver for technology acceptance. Perceived usefulness is defined as the extent to which a person believes that using a system will improve

his job performance, and perceived ease of use is defined as the extent to which a person believes that using a system will be free from physical and mental efforts(F. D. Davis et al., 1989).

D. Shopping Enjoyment

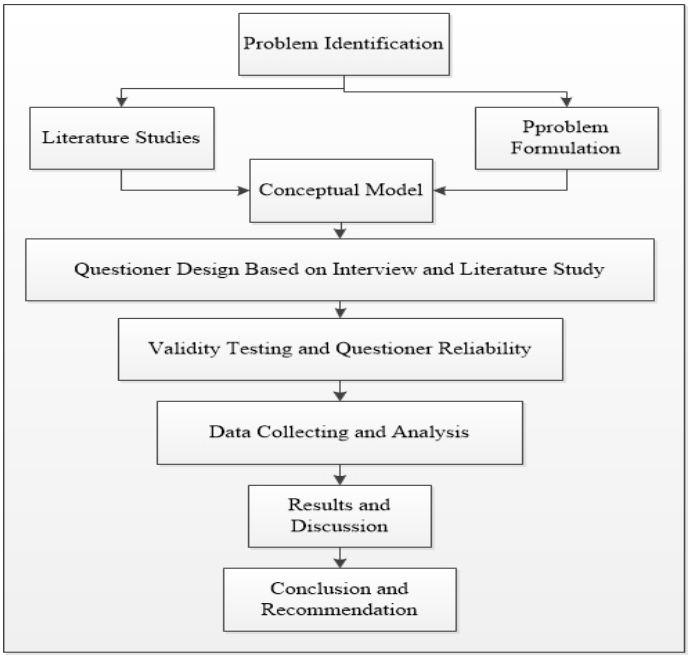
One of the dimensions of flow theory is enjoyment, a holistic sensation that a person feels when they do something with all entanglement illustrate as a flow (M. S. Davis & Csikszentmihalyi, 1977). Flow is generally used to evaluate the behavior of hedonistic technology users (Fan et al., 2012).

E. SEM (Structural Equation Modeling)

SEM (Structural Equation Modeling) is a statistical analysis tool that combines factor analysis and regression (Santoso, 2018). SEM is able to solve multiple models in a research. SEM has the characteristics of an analysis technique to confirm rather than to explain. The point is that a researcher is more likely to use SEM to determine whether a particular model is valid or not than to use it to find a particular model suitable or not.

III. METHODOLOGY

The phases of the research carried out are problem identification, literature study, formulating problems obtained in the identification process, designing models, compiling questionnaires based on interviews and literature studies, testing the validity and reliability of questionnaires, data collection and model validation, analysis of results, conclusions and suggestion.



Picture 1. Flowchart of research

A. Problem Identification

Problem identification were made in order to get a number of problems that will be sought for solutions later; identification of a problem will describe the problem in the title of the study.

B. Literature Studies

Literature studies are carried out by reviewing books, and reports related to problems to be solved. From the literature studies conducted, the technology adoption acceptance model introduced by (F. D. Davis, 1989) is the Technology Acceptance Model (TAM). Technology Acceptance Model (TAM) is an adaptation of Theory of Reasoned Action (Ajzen, I., & Fishbein, 1980) which is specially made for the acceptance model of the use of information technology.

C. Conceptual Model

The model used in this research is TAM and flow theory, there are six variables in this model; perceived ease of use, perceived usefulness, attitude toward using, behavioral intentions. Intention, actual usage and shopping enjoyment.

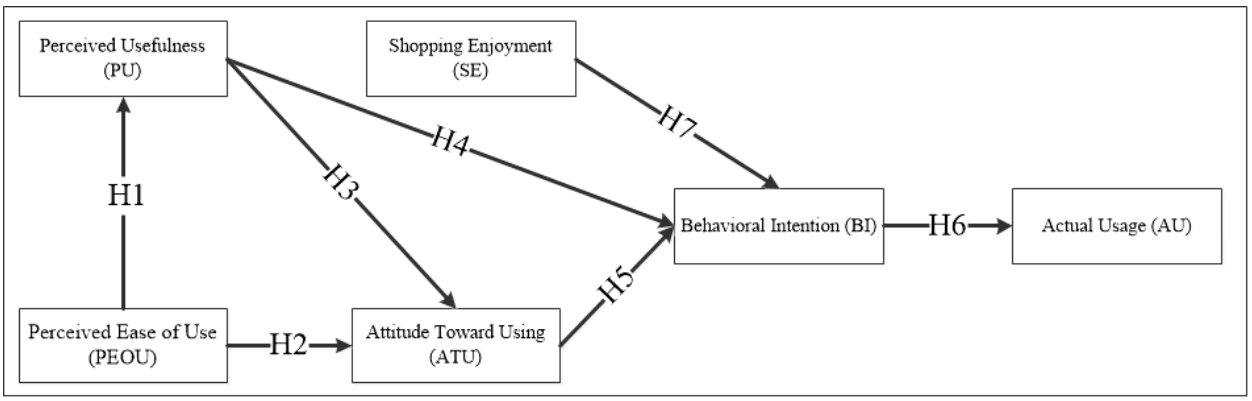


Figure 2. Conceptual Model

The conceptual model in Figure 2 above, it is known that the hypothesis is as follows:

H1 - Perceived Ease of Use (PEOU) is related positively to the Perceived Usefulness (PU).

H2 - Perceived Ease of Use (PEOU) is related positively to the Attitude Toward Using (ATU).

H3 - Perceived Usefulness (PU) is related positively to the Attitude Toward Using (ATU).

H4 - Perceived Usefulness (PU) is related positively to the Behavioral Intention (BI)

H5 - Attitude Toward Using (ATU) is related positively to the Behavioral Intention (BI).

H6 - Behavioral Intention (BI) is related positively to the Actual Usage (AU)

H7 – Shopping Enjoyment(SE) is related positively to the Behavioral Intention(BI)

IV. RESULT AND DISCUSSION

A. General description of the characteristics of the respondent

Respondents in this study are general consumers who have made transactions at the Pusat Perbelanjaan Mentaya (PPM), which is one of the markets in Indonesia. The number of respondents obtained in this study was 240, after sorting there were 224 respondent data that were suitable for analysis. Respondent data to be analyzed is obtained from various characteristics, for example gender, age, occupation, city, ever used e-marketplace, e-marketplace used, how many times a month use e-marketplace, how many hours a month visit e-marketplace, and how often to visit e-marketplace.

The prescription data obtained in the study were 48% female and 52% male. The data collected also shows the age of respondents 10-24 years 44%, age between 25-34 years 47%, ages between 35-44 years 7%, and ages between 45-55 years 2%. Moreover, if it is viewed from work or status, it is obtained that 31% of students, 33% of workers, 9% of housewives, 10% are self-employed, and 17% answered others. Respondent data obtained came from several cities; Samuda, Kota Besi, Parenggean, and Sampit (Kec. Baamang and Mentawa Baru / Ketapang).

In essence to obtaining information about the demographics of the respondents, this research also receieves the information about respondents' experiences in using the E-Marketplace. Based on the data obtained by 240, it is known that 224 respondents have used the e-marketplace. It also obtained the data on the types of e-marketplace used by respondents; 110 respondents used Shopee, 16 respondents used shopee, 10 respondents used Lazada, 5 respondents used Bukalapak, and 18 respondents used other types of e-marketplace. Other respondents have used various types of e-marketplaces.

The research results also obtain information related to the frequency with which someone uses e-marketplace services. It is known that the majority of respondents visit the e-marketplace every few months, namely as many as 61 respondents. It can be concluded that the majority of respondents visit e-marketplaces to shop or look for products / services only when they are in need. Then obtained information about the length of time the respondents visited the e-marketplace on average less than one hour. As seen from how often respondents visit the e-marketplace, it is known that 86 respondents use the e-marketplace normally.

B. Processing of Survey Results

The result of data collection, shows that Perceived Ease of Use and Perceived Usefulness has the most positive responses., it has mean value of 4.18. Attitude Toward Using variable has the smallest response. A description of the mean value of each variable can be seen in Table 2.

Table 2 Mean Variable

No	Variable Code	Variable Name	Mean
1	PEOU	Perceived Ease Of Use	4,18
2	PU	Perceived Usefulness	4,18
3	ATU	Attitude Toward Using	3,1
4	BI	Behavioral Intention	3,77
5	AU	Actual Usage	3,48
6	SE	Shopping Enjoyment	3,79

C. Measuring Model Assessment

To quantify the model, assessing the connection among indicators and latent variables by evaluating reliability and validity. Reliability was evaluated by composite reliability and Cronbach alpha. While validity were analyzed in two components, that is convergent validity and discriminant validity.

Table 3 loading score and cross-loading

	PEOU	PU	ATU	BI	AU	SE	Type (As Defined)	SE	P Value
PEOU.1	(0.799)	-0.094	-0.067	0.340	0.113	-0.428	Reflective	0.058	<0.001
PEOU.2	(0.806)	0.056	-0.118	-0.651	0.138	0.462	Reflective	0.058	<0.001
PEOU.3	(0.823)	-0.104	0.124	0.078	-0.188	0.039	Reflective	0.058	<0.001
PEOU.4	(0.824)	0.129	0.020	0.010	0.021	0.052	Reflective	0.058	<0.001
PEOU.5	(0.833)	-0.058	0.049	-0.170	0.062	0.211	Reflective	0.057	<0.001
PEOU.6	(0.840)	0.069	-0.013	0.384	-0.140	-0.335	Reflective	0.057	<0.001
PU.1	0.179	(0.751)	-0.067	-0.758	-0.082	0.597	Reflective	0.058	<0.001
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
SE.3	0.037	-0.042	-0.052	0.144	-0.034	(0.905)	Reflective	0.057	<0.001
SE.4	-0.032	0.172	0.067	0.188	-0.080	(0.904)	Reflective	0.057	<0.001

In table 3, it is known that the p value is significant, which is less than 0.05 and of all loading indicator values there is a loading indicator value that is less than 0.60. In the other cases, according to Sholihin, the requirements for loading values above 0.60 are often not fulfilled, especially in the case of newly developed questionnaires, therefore, the loading indicator value still needs to be maintained. According to Hair indicator with loading below 0.60 it should be removed from the model. However, the decision to remove indicators with loading values below 0.60 should first analyze the impact. This indicator can be removed if it can increase AVE and composite reliability above the limit. From the above statement, it is considered to maintain the indicator with a loading value below 0.60 because the AVE results and the composite reliability indicator with a loading value of 0.60 meet the acceptable threshold.

Table 4 Coefficient Latent Variable

	PEOU	PU	ATU	BI	AU	SE
R-Squared		0.582	0.263	0.987	0.436	
Adj. R-squared		0.580	0.256	0.986	0.434	
Composite reliab	0.925	0.928	0.007	0.928	0.872	0.930
Cronbach's alpa	0.903	0.906	0.525	0.902	0.780	0.900
Avg. Var. Extrac.	0.674	0.682	0.493	0.720	0.695	0.770
Full Collin. VIF	2.504	3.231	1.368	32.453	1.969	31.553

In table 4, the analysis results provide information that the AVE value has met requirements above 0.50, as well as the composite reliability value and Cronbach alpha. There is other way to analyze discriminant validity; by looking at the results of the calculation of the latent variable correlations.

Table 5 Correlation between variables (AVE value)

	Correlations Among I.vs. with sq. rts. of AVEs						P values for correlations					
	PEOU	PU	ATU	BI	AU	SE	PEOU	PU	ATU	BI	AU	SE
PEOU	(0.821)	0.759	-0.438	0.585	0.567	0.587	1.000	<0.001	<0.001	<0.001	<0.001	<0.001
PU	0.759	(0.826)	-0.481	0.677	0.625	0.675	<0.001	1.000	<0.001	<0.001	<0.001	<0.001
ATU	-0.438	-0.481	(0.702)	-0.330	-0.292	-0.359	<0.001	<0.001	1.000	<0.001	<0.001	<0.001

BI	0.585	0.677	-0.330	(0.849)	0.639	0.983	<0.001	<0.001	<0.001	1.000	<0.001	<0.001
AU	0.567	0.625	-0.292	0.639	(0.834)	0.619	<0.001	<0.001	<0.001	<0.001	1.000	<0.001
SE	0.587	0.675	-0.359	0.983	0.619	(0.877)	<0.001	<0.001	<0.001	<0.001	<0.001	1.000

Table 5 shows that The AVE value between latent variables in the non-diagonal column is lower than the AVE value in the diagonal column.. The statement above shows that the discriminant validity is fulfilled. In conclusion, it shows that the results of the measurement model have good validity and reliability values.

Model fit and quality indices

Average path coefficient (APC)=0.429, P<0.001
Average R-squared (ARS)=0.567, P<0.001
Average adjusted R-squared (AARS)=0.564, P<0.001
Average block VIF (AVIF)=1.914, acceptable if <= 5, ideally <= 3.3
Average full collinearity VIF (AFVIF)=12.180, acceptable if <= 5, ideally <= 3.3
Tenenhaus GoF (GoF)=0.617, small >= 0.1, medium >= 0.25, large >= 0.36
Sympson's paradox ratio (SPR)=1.000, acceptable if >= 0.7, ideally = 1
R-squared contribution ratio (RSCR)=1.000, acceptable if >= 0.9, ideally = 1
Statistical suppression ratio (SSR)=1.000, acceptable if >= 0.7
Nonlinear bivariate causality direction ratio (NLBCDR)=1.000, acceptable if >= 0.7

Figure 3 Model Fit Index

Figure 3 shows the result of fit model index and quality indices test. The data test produces a significant value because it can be seen that the p value on APC, ARS and AARS is less than 0.0001 and the AVIF value has a value of less than 5.

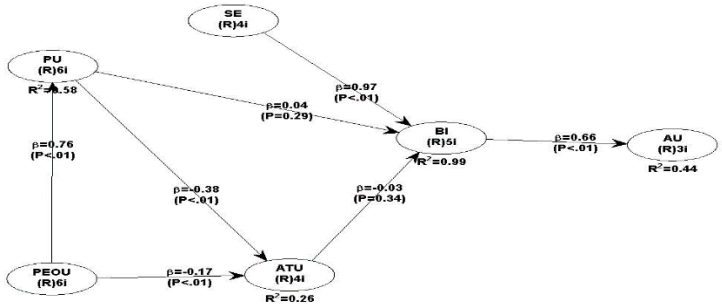


Figure 4 The SEM-PLS structural model test results

Figure 4 shows result that relationship between ATU and BI is not significant, because the p value of each of these variables is more than 0,05. The complete model evaluation results can be seen in table 6 below.

Table 6 Model Test Results and Effect Size Relationship between Latent Variables

Relationship beetwen Latent Variables	Model Test Results			Effect Size	
	Path coefficient	P Value	Significant to 95%	Effect Size	Information
PEOU PU	0,763	<0,001	Significant	0.582	Large
PEOU ATU	-0,165	<0,001	Significant	0.073	Weak
PU ATU	-0,381	<0,001	Significant	0.190	Medium
PU BI	0,037	<0,001	Significant	0.026	Weak
ATU BI	-0,027	0,41	Not significant	0.009	Very weak
BI AU	0,66	<0,001	Significant	0.436	Large
SE BI	0,968	<0,001	Significant	0.952	Large

The SEM-PLS test results with WarpPLS also produce the Effect Size value. Effect Size is calculated from the absolute value of the individual contribution of each latent predictor variable to the R-squared value of the latent criterion variable (Cohen, 1988). According to Kock and Hair in their research cited by (Sholihin & Ratmono, 2013) effect size can be grouped into three categories; weak (0.02), medium (0.15), and large (0.35). The effect size value below 0.02 indicates that the influence of the latent predictor variable is very weak from a practical point of view even though it has a significant P value. Table 6 above summarizes the effect size of the latent predictor variables on the latent criterion variable.

[H1] - Perceived Ease (PEOU) is related positively to the Perceived Usefulness (PU). The results of the Model Test in table 6 present the relationship between the PEOU variable and the PU variable, which has a path coefficient value of 0.763 and a p value <0.001. These results indicate that the two variables have a significant relationship. Hence, hypothesis 1 in this study is accepted. In testing the structural model it

also shows that the relationship between the predictor variables for the perceived ease of using the e-marketplace and the criterion variable for the perceived benefits of e-marketplace has an effect size of 0.582, this value indicates that the perceived ease of using a large e-marketplace variable from a practical point of view has a P value significant.

[H2] - Perceived Ease (PEOU) is related positively to the attitude toward using (ATU). In Table 6, the Model Test Results presents the relationship between the PEOU variable and the ATU variable, which has a path coefficient value of -0.165 and p value <0.001. These results indicate that the two variables have a significant relationship. Thus Hypothesis 2 in this study is accepted. In testing the structural model it also shows that the relationship between the perceived ease of using e-marketplace predictor variables with the criterion variable of the attitude of using e-marketplace has an effect size of 0.073, this value shows that the perceived ease of using e-marketplace variable is weak on a practical point of view and has a P value significant.

[H3] - Perceived Usefulness (PU) is related positively to the attitude toward using (ATU). In Table 6, the Model Test Results presents the relationship between the PU variable and the ATU variable, which has a path coefficient value of -0.38 and a p value <0.001. These results indicate that the two variables have a significant relationship. Thus Hypothesis 3 in this study is accepted. In testing the structural model it also illustrates that the relationship between the predictor variables for perceived benefits using e-marketplace and the criterion variable for the attitude of using e-marketplace has an effect size of 0.190, this value shows that the perceived benefit variable using e-marketplace is medium on a practical point of view and has a P value. significant.

[H4] - Perceived Usefulness (PU) is related positively to the behavioral intention (BI). In Table 6, the Model Test Results presents the relationship between the PU variable and the BI variable, which has a path coefficient value of 0.037 and a p value <0.001. This result shows that the two variables have a significant relationship. Thus Hypothesis 4 in this study is accepted. In testing the structural model it also shows that the relationship between the predictor variables for perceived benefits using the e-marketplace and the behavioral intention criterion variable has an effect size of 0.026, this value shows that the perceived benefit variable using the e-marketplace is weak in practical terms and has a significant P value.

[H5] - Attitude toward using (ATU) is related positively to the Behavioral intention (BI). In table 6, the Model Test Results presents the relationship between ATU and BI variables, having a path coefficient value of -0.027 and a p value of 0.41. This result shows that the two variables have an insignificant relationship. Thus, hypothesis 5 in this study is not accepted. Then the structural model test shows the relationship between the ATU variable and the BI variable has an effect size of 0.009. This value indicates that the variable relationship is not significant

[H6] – Behavioral Intention (BI) is related positively to the Actual Usage (AU). The Model Test Results presents the relationship between the BI variable and the AU variable, which has a path coefficient value of 0.66 and a p value <0.001. This result shows that the two variables have a significant relationship. Moreover, hypothesis 6 in this study is accepted. In testing the structural model, it also shows that the relationship between the BI predictor variable and the AU criterion variable has an effect size of 0.952, this value shows that the BI variable is large from a practical point of view and has a significant P value.

[H7] – Shopping Enjoyment (SE) is related positively to the Behavioral Intention (BI). The Model Test Results presents the relationship between the SE variable, has a path coefficient value of 0,968 and a p value <0.001. The result shows that the two variables have a significant relationship. Moreover, hypothesis 7 in this study is accepted.

D. Findings

Tabel 7 Summary of the results of proving the hypothesis

Variable Relationship	Note
Perceived Ease of Use(PEOU) is related positively to the Perceived Usefulness(PU).	Accepted
Perceived Ease of Use(PEOU) is related positively to the Attitude Toward Using(ATU).	Accepted
Perceived Usefulness(PU) is related positively to the Attitude Toward Using(ATU).	Accepted
Perceived Usefulness(PU) is related positively to the Behavioral Intention(BI)	Accepted
Attitude Toward Using(ATU) is related positively to the Behavioral Intention (BI).	Not Accepted
Behavioral Intention(BI) is related positively to the Actual Usage(AU)	Accepted
Shopping Enjoyment(SE) is related positively to the Behavioral Intention(BI)	Accepted

Hypothesis 1 is known that there is an effect of perceived ease of use (PEOU) on perceived usefulness (PU), this is due to the fact that the ease of operating e-marketplace services affects the results obtained from these uses. Ease of operating e-marketplace services affects users so that sales and purchase transactions using e-marketplace services become more effective, faster. This result is in line with research (Lu et al., 2009), (Pavlou, 2003) which states that convenience perceived ease of use (PEOU) has a very significant effect on perceived usefulness (PU).

Hypothesis 2 is proven that perceived ease of use (PEOU) has an influence on attitude toward using (ATU). The results of this study indicate that e-marketplace service users feel that using e-marketplace services will increase the effectiveness and efficiency of the transactions they make, such as sales transactions, purchases, search for products or services according to what they want. Therefore, when users feel that using e-marketplace services is useful, comfortable, and provides convenience, they do not refuse to use e-marketplace services. The results of this study support previous research conducted by (Adams et al., 1992), (Igbaria et al., 1997), and (Burton-Jones & Hubona, 2005) suggest that perceived ease of use has an influence on attitude toward using. In addition, this imperis study is in line with other research conducted by (Venkatesh & Davis, 2000), (Bruner & Kumar, 2005), and (Kulviwat et al., 2007) and also suggests that there is a positive influence on perceived ease of use (PEOU) on attitude toward using (ATU).

In hypothesis 3 testing, it can be seen that the perceived usefulness (PU) that have a positive effect on attitude toward using (ATU) are accepted, this shows that when users of e-marketplace services feel that the use of these services increases the effectiveness and efficiency of their business transactions, they will have an accepting attitude in using the e-marketplace service. Consumers in Pusat Perbelanjaan Mentaya feel convenient and happy when using e-marketplace services because it is easier for them to make purchases, sales and find and promote their services or products. Others, if consumers feel that e-marketplace services are not useful, then consumers will not like or reject e-marketplace services to help with their business transactions. The results of this study support previous research by (Kurnia & Chien, 2003), (Pavlou, 2003), and (Lu et al., 2009).

The test results of Hypothesis 4 from the results of data processing, it is known that the path coefficient value in table 6 above is 0.68 and p value <0.001, these results indicate that both the perceived usefulness variable (PU) and the behavioral intention variable (BI) have a relationship. significant. The majority of respondents stated that e-marketplace services that provide benefits when used will encourage respondents to continue using e-marketplace services in the future. The results of this study also support previous research by (Lu et al., 2009), (Lou et al., 2005), and (Setiawan, 2015) which states that perceived usefulness (PU) have a significant effect on behavioral intention (BI).

On hypothesis 5 test results, the variable attitude toward using (ATU) affects the variable behavioral intention (BI) the results are declared not accepted. This is because the attitude in using e-marketplace services does not determine user behavior in the future. If the user's attitude towards e-marketplace services tends to be negative, then users will certainly not use the e-marketplace service in the future and look for other alternatives to replace existing e-marketplace services. This is in line with research (Widyapraba et al., 2016) which states that attitudes in the use of technology have no influence on user behavior in using this technology in the future. This is in stark contrast to research (F. D. Davis, 1989), (F. D. Davis et al., 1989), and (Rodrigues Pinho & Soares, 2011) which states that attitude to use affects the intention to use.

Hypothesis 6 The SEM-PLS calculation results on the inner model or structural model, the relationship between behavioral intention (BI) e-marketplace services and actual usage (AU) of e-marketplace services has an effect size of 0.436, this value shows that the behavioral intention variable is very high. large on a practical point of view and has a significant P-value. The conclusion is that the results of this test are accepted, this is supported by research (Lu et al., 2009).

On Hypothesis 7 test results, the variable shopping enjoyment(SE) affects the variable behavioral intention(BI) the result declared accepted.

V. CONCLUSION

This research measures the adoption of e-marketplace acceptance using the Technology Acceptance Model. The object of research is carried out in one of the markets in Indonesia called the Pusat Perbelanjaan Mentaya. The survey results illustrate that the most positive responses are found in the Perceived Ease of Use and Perceived Usefulness variables, both of which have an average value of 4.18. Based on the analysis, it is known that the relationship between the variables PEOU and PU, PEOU and

ATU, PU and ATU, PU and BI, BI and AU, SE and BI has a significant effect. Meanwhile, the attitude toward using (ATU) variable has no significant effect on the Behavioral Intention (BI) variable. The Model Test results on the ATU and BI variables resulted in a path coefficient value of -0.01 and a p value of 0.41. The relationship between these two variables means that the attitude in using e-marketplace services does not determine future behavior. In the future, it is hoped that there will be a combination of other technology acceptance models such as UTAUT and TPB to measure the acceptance of information technology adoption, especially E-marketplace technology.

ACKNOWLEDGEMENT

We can complete the research on the perception of e-marketplace acceptance; hence we would like to thank all those who supported the implementation of this research. The research was carried out well according to the predetermined methodology. Hopefully the results of this research can add scientific repertoire in the field of information technology. In essence, it is hoped the results of this research can be useful for the progress of Indonesia, especially advances in technology in Sampit.

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Development of Probability Density Function for Data Analysis of Variance Equality Testing

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Abstract

Background – In pre-processing in the field of computer science, it is necessary to analyze the data by testing of variance equality. So there needs to be a critical point that is developed exactly from the probability density function based on the data to be processed.

Purpose – This test needs to be done to see how between one data group affects another data group.

Design/methodology/approach – This research uses an exact derivation of the Mathematical formula by considering the independent or dependent between the variances themselves.

Findings – By developing the formula for the probability density function itself, then we get two conditions in which there are independent and dependent variances. That way the critical point for these two conditions is easily obtained, and variance testing and analysis can be done for various existing cases.

Research limitations – Initial data must be normally distributed, or taken in large numbers and random.

Originality/value – This development is based on deriving a mathematical formula that is exactly different from previous research based on simulations.

Keywords: Probability Density Function, Data Analysis, Variance Equality Testing, Exact Derivation, Critical Points

I. INTRODUCTION

The purpose of this research is to develop an exact formula for the probability density function and the critical point for testing and analysis of variance equality for both independent and dependent variances. Previous research only used existing applications or simulations regardless of whether the variances were independent or not (Muhamad Nursalman et al., 2018) (Akbar Hidayatuloh et al., 2018). But this research develops it exactly following its critical point.

II. LITERATURE REVIEW

Several previous researches (Bland, 1981)(David, 1969)(Grubbs, 1969) have developed a critical point for testing variance equality as a stage of further pre-processing of data, but this development is carried out through simulation so that the results are still inaccurate because too many approaches are taken.

Therefore, this research develops an exact formula so that the results will be better than before.

III. METHODOLOGY

The method used in this study is clearly different from previous research which was developed through simulation. But this research was developed by deriving the exact mathematical formula. So that the critical point is generated from the exact formula. This provides a more accurate measurement.

For data samples taken a large number and randomly to meet the requirements are normally distributed.

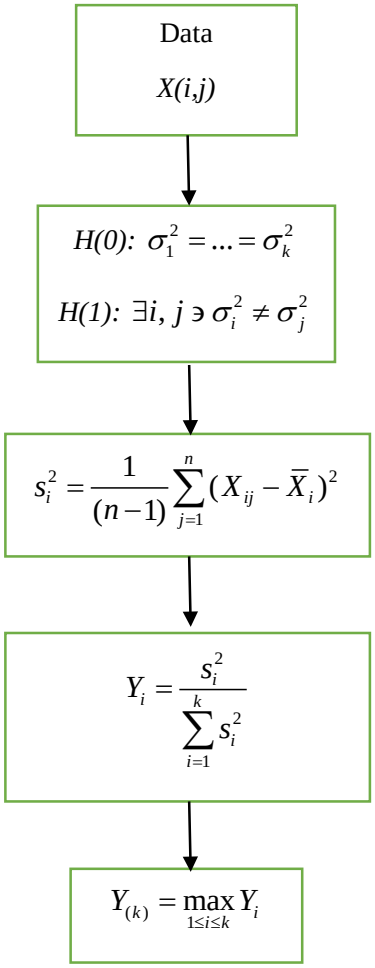

Figure 1. The Testing Statistic

The testing statistic is $Y_{(k)}$.

IV. RESULT AND DISCUSSION

4.1 Exact Distribution of Y_i

The distribution of

$$(n-1)s_i^2 / \sigma^2 \qquad (1)$$

is chi-square with degree of freedom is *n*-1.

Then, the distribution of

$$\sum_{l=1,l\neq i}^{k} \frac{(n-1)s_i^2}{\sigma^2} \tag{2}$$

is chi-square with degree of freedom (k-1)(n-1) and it is independent with (1).
Therefore, $Y_{(k)}$ can be written as

$$Y_{(k)} = \max_{1\le i\le k} Y_i = \max_{1\le i\le k} \frac{s_i^2}{\sum_{i=1}^{k} s_i^2} = \max_{1\le i\le k} \frac{s_i^2}{s_i^2 + \sum_{l=1,l\neq i}^{k} s_i^2} \tag{3}$$

Then, the distribution of Y_i is

$$Y_i = \frac{s_i^2}{s_i^2 + \sum_{l=1,l\neq i}^{k} s_i^2} \sim Beta((n-1)/2,(k-1)(n-1)/2) \tag{4}$$

4.2 Independence of Y_i

Following are the simulation steps for investigating the independence of Y_i random variables.

1. Let take any of n. In this case n = 20
2. Decide the number of laboratorium/grup, k = 2, …, 45
3. Generate random data X from standard normal distribution with size $n \times k$, then calculate

$$Y_i = \frac{s_i^2}{s_i^2 + \sum_{l=1,l\neq i}^{k} s_i^2}, \text{ where } s_i^2 = \frac{1}{(n-1)} \sum_{j=1}^{n} (X_{ij} - \bar{X}_i)^2$$

4. Repeat the steps of above, 1-3, for 1000 trying.
5. Then calculate the correlation coefficient of $r(Y_i,Y_j)$.

Based on the steps above, for k = 10, $r(Y_i,Y_j)$ = -0,111068133.

4.3 The Critical Point of $Y_{(k)}$ for The Big k

If k is big enough, then $Y_1, \ldots, Y_k$ can be considered independent. If the probability densitiy function (pdf) is f, then the pdf of largest ordered statistic, $Y_{(k)}$, is

$$\begin{aligned} f_k(y_{(k)}) &= k[F(y_{(k)})]^{k-1} f(y_{(k)}), 0 < (y_{(k)}) < 1, \\ &= 0, \text{ others,} \end{aligned} \tag{5}$$

where

$$F(y_{(k)}) = \int_0^{y_{(k)}} f(a)da, 0 < (y_{(k)}) < 1 \tag{6}$$

is the distribution function.

Based on this pdf can be find the critical point from $Y_{(k)}$. For significant level α, then

$$\Pr(\text{accept } H_0 | \ H_0 \text{ is right}) = 1 - \alpha \tag{7}$$

Then

$$\Pr(Y_{(k)} < c_0) = 1 - \alpha \tag{8}$$

Or

$$\int_0^{c_0} f_k(y_{(k)}) dy_{(k)} = 1 - \alpha \tag{9}$$

Then

$$c_0(\alpha, k, n) = F^{-1}(\sqrt[k]{1-\alpha}) \tag{10}$$

This, $c_{0,}$ is critical point from $Y_{(k)}$ where Y_1, …, Y_k is independent.

4.3 The Critical Point of $Y_{(k)}$ for case Y_1, …, Y_k is Dependent

For significant level α , then the critical point c is

$$1 - \alpha = \Pr(Y_{(k)} < c_0) = 1 - k(1 - \Pr(Y_i < c_0)) \tag{11}$$

Then

$$\alpha \le k(1 - \Pr(Y_i < c_0)) \tag{12}$$

Or

$$\Pr(Y_i < c_0) \le 1 - \alpha / k \tag{13}$$

Therefore

$$c = F^{-1}(1 - \alpha / k) \tag{14}$$

From the above description, it is evident that the pdf can be derived exactly, so it is easy to get the critical point. So that with this critical point, the variance equality testing process can be carried out very easily.

V. CONCLUSION

The development of the exact pdf formula can be derived mathematically well. With this pdf formula, the critical point is easily generated. Because the development is done mathematically, the results are better than the simulation results. This is due to the absence of many approaches. So that the measurement will be more accurate.

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The Concept of Feminism Architecture in Houses to Reduce Postpartum Depression Symptoms

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Abstract

Mothers who have just given birth, there has been a drastic change in hormone levels. The hormones estrogen and progesterone in the body will decrease. This can cause chemical changes in the brain and trigger mood swings. If the mother is not cared properly, this can get worse and there is even a desire to hurt herself and the baby, this is called Postpartum Depression. Because of this, a suitable architectural concept was sought to help reduce the symptoms of postpartum depression, namely the architectural concept of feminism. The purpose of the research, is to find concept of feminism architecture that can help mothers reduce their symptoms of Postpartum Depression. Literature review and statistic descriptive analysis is needed in this reseach to find how feminism architecture can help mothers to reduce their symptoms of postpartum depression. For descriptive statistical analysis, a cartesian diagram of the mean and standard deviation was used to see the distribution of the indicator variables, so it could be found about the most approved indicators that helped mothers reduce the symptoms of postpartum depression.

The results of this research found that the room that mothers often use should has a wide opening, the room that the mothers often use should have been near the bathroom, the mothers had to have a private garden in the house, the mothers should has a separate private room with the baby, the room that mothers often use should has walls that are not plain and has a feminine taste on it. the room that mothers often use should has a feminine paint color, the room that mothers often use should has a high ceiling or high position of roof, and lastly, the rooms that mothers often use should has feminine floor colors. The limitations of this reseach is about to find how feminism architecture help mothers to reduce postpartum depression symptoms by Cartesian dagram which is trying to know the distribution of indicators of variables. This research is still a basic simple research; there are still many possibilities for further research that can be done, for example, how those variables can help mothers in detail.

Keywords: feminism architecture, mothers, postpartum depression

I. INTRODUCTION

Architecture is related to humans and also closely related to their various ways of life. Different styles and ways of human life can create different architectures. But there is also the possibility that architecture itself can change human life and style. There is a concept in architecture that focus on the gender of the users. Although according to Coleman (1996) the word feminism is very rarely used in architecture, because the word “feminime” has a negative connotation, and seems like “man-haters”. But sometimes this word is needed to be a concept in architecture to help a particular gender or for this matter is a woman. Because as previously explained, architecture can change the way and lifestyle of its users.

Women have a nature to give birth to babies. What is very rarely known by the public is that nothing will happen after a woman gives birth, but this is not true, there are unusual symptoms caused by changes in the hormones estrogen and progesterone which decrease drastically, and it is not uncommon for this to happen, and these are rarely diagnosed, so the condition will progressed badly and there was a feeling of hurting herself and the baby, this kind of condition called postpartum depression (Stewart, 2003).

Postpartum depression should be treated, or else, this condition will get worse and it is called puerperal psychosis, or a condition which a mother experiences a hormone disorder that is more severe than postpartum depression, because in this condition a mother will even kill her child and kill herself practically (Robertson, 2008).

Such conditions as previously mentioned are often experienced by women who have just given birth, therefore, an architectural concept that can change the way of life of women who have symptoms of postpartum depression is needed. Feminism architecture is an architecture that produces an architectural design in a form of space that makes the design look moresoft and elegant. Basically, feminist architecture is here to overcome social inequality of a design. Feminism demands division of space in architecture that takes into account one's space requirements of women (Silaban and Punuh, 2011). That is enough reason to research about feminism architecture to help woman to decrease the postpartum depression symptoms.

II. LITERATURE REVIEW

Data from large population-based studies suggest that postpartum depression is the most common and it is complications in childbirth, this condition occurs in 10-15% of women after giving birth to a baby (O'Hara & Swain, 1996). This condition usually starts within the first six weeks postpartum and most cases require health treatment from professional. Over a long period of time, people with postpartum depression have to keep caring for babies with pretty bad mental conditions. Usually a mother will care for her baby in a place to live, not in a hospital. This means the most of her life after giving birth is at a place of residence, whether it be a landed house, apartment, flat, or even a room that they consider as their place of residence. Signs and symptoms of postpartum depression include a depressed mood, anhedonia, and low energy. It is not uncommon for them to even attempt suicide (Nonacs & Cohen, 1998).

A home with care will help the mothers to reduce their symtoms of potpartum depression. Architecture is the most related thing in houses to be fixed to cure their symptoms of postpartum depression. Gender architecture has architectural principles that adapt to the gender of its inhabitants. According to this case, the gender is a woman. It means feminism architecture is a suitable concept for this case.

Cronin (2018) said that feminism architecture is an art and science that studies about designing an object that adopts the geometry behind the feminine nature. Where usually in designing an object is more likely to be adopted by men, these problems make women demand equality by doing some feminism movement (Puspita and Mahendra, 2017). Meanwhile, Silaban & Punuh (2011) said that feminism itself has a meaning in the field of architecture, namely apart from the adoption of women's characteristics has a deeper meaning, namely freedom and equality to express building ideas and designs.

According to Silaban & Punuh (2011) the concept of applying feminism architecture to buildings can be seen based on the shape of the building which characterizes a woman, such as being elegant, dynamic, and aesthetically pleasing. Then from its zoning, feminism architecture demands a clear division of space in architecture between public and private spaces, such as a special kitchen and a private garden. This situation is to meet the basic needs of self-identity, comfort and a feeling of security. The building's facade looks calm and elegant in accordance with the taste of feminism. Colors of the interior or even exterior should be has characteristic of feminism itself. Different colors will bring different meaning to the houses. And lastly feminism architecture must adapt to the form of the building and the function and use of the building to be designed. Usually feminism architecture has a strong and sturdy structure that is shaped in such a way as to make it look feminine, elegant and not rigid.

III. METHODOLOGY

The methodology in this research is statistical descriptive analysis by Cartesian diagram using mean as an X and standard deviation as a Y. About fifty five respondents are needed in this research. The sample of population in this research is mothers that have postpartum depression symptoms in Indonesia. e- Questionnaire with likert questions are used to get answers to be analysed. There are twelve questions that they had answer by likert system from variable indicators.

IV. RESULT AND DISCUSSION

The indicators to find the answers of this research are:

1. There are corners in the room that is usually occupied by mothers.
2. There is a wide opening in the room that is usually occupied by mothers.
3. There is a bathroom close to the room that is usually occupied by mothers.
4. There is an empty private space in the house
5. There is sunlight in the room that is usually occupied by mothers.
6. Mothers have a private garden in the house
7. The mothers have a separate private room by the baby
8. The walls in the room that are usually occupied by mothers are not plain and have feminine motifs.
9. The wall in the room that mother used to live in have a calm and feminine color.
10. The room that is usually occupied by mothers have high ceilings and roofs.
11. The room that mother used to live in has a feminine floor color
12. The room that used to be occupied by mother has furnitures with feminine colors.

After the electronic questionnaire was distributed, fifty-five answers were returned which were analyzed statistically descriptively using a Cartesian diagram. X is the mean and Y is the standard deviation in order to find the spread of the indicator.

The 4th quadrant or the quadrant that has the highest mean and standard deviation levels is the distributions of the indicators that most mothers agree on these indicators that actually help reduce symptoms of postpartum depression.

The answers were found, they are Q2, Q3, Q6, Q7, Q8, Q9, Q10 and Q11. They are:

Q2: There is a wide opening in the room that is usually occupied by mothers.

Q3: There is a bathroom close to the room that is usually occupied by mothers.

Q6: Mothers have a private garden in the house

Q7: The mothers have a separate private room by the baby

Q8: The walls in the room that are usually occupied by mothers are not plain and have feminine motifs.

Q9: The wall in the room that mother used to live in have a calm and feminine color.

Q10: The room that is usually occupied by mothers have high ceilings and roofs.

Q11: The room that mother used to live in has a feminine floor color

V. CONCLUSION

The concept of feminism architecture that help woman to reduce potpartum depression sympyoms are the room that mothers often use should has a wide opening, the room that the mothers often use should have been near the bathroom, the mothers had to have a private garden in the house, the mothers should has a separate private room with the baby, the room that mothers often use should has walls that are not plain and has a feminine taste on it. the room that mothers often use should has a feminine paint color, the room that mothers often use should has a high ceiling or high position of roof, and lastly, the rooms that mothers often use should has feminine floor colors.

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Physical Environment Criteria that Affects Tuberculosis Prevalence in Rural Settlement

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Abstract

As of 2016, Indonesia ranked 9th on the list of WHO's Global TB incidence rates with 391 cases per 100,000 population and 2nd on Annual TB incidence list with 1.020.000 cases. Settlements have an important role as a risk factor for the spread of diseases, especially Tuberculosis (TB). The majority of TB cases in Indonesia are found in densely populated areas and rural settlements. There have been many previous studies that raised the problem of the relationship between physical factors at home and the prevalence of TB in Indonesia yet it's dominated by the health science perspective. There is so little research has been found in the architectural science scope that comprehensively identifies physical quality of the house as the risk factors for TB in rural settlements. This study determined the house physical factors that have direct and indirect correlation with TB prevalence. The existing data had been measured and assessed by each variables' standard calculation. Correlation analysis had been conducted to see the relationship between the physical quality of the house and its surrounding as a physical environmental factor (Occupancy Density, Ventilation, Lighting, Temperature, Humidity, Materials, and the Other Surrounding Distractions) with the respondents' TB status that were divided to 3 categories (1) The duration as the confirmed TB patient; 2) the percentage of the positive case in a house; and 3) the category of the TB severity) as the indicator of occupants' health quality. Later, the regression analysis were necessary to proved which variables could be more preponderant. Based on the results of the correlation and regression analysis, the Windows-to-wall ratio (WWR) variable has a direct influence on the prevalence of TB. Likewise, the variable area per-person is proved to have a direct relationship with the TB prevalence variable which is stated in the determinant group of the percentage of TB patients in 1 house. The study area in this research were 50 homes of TB patients in several villages in Kebumen Regency, a district that has had a fairly high TB prevalence rate. The focus of the measurement and assessment were limited to the building and the site. This research could expand the contributions that integrate health phenomena with architectural scientific fields.

Keywords: Tuberculosis, Rural Setlement, Physical Environment, Regression Analysis, Correlation Analysis

I. INTRODUCTION

The latest World Health Organisation (WHO)'s Tuberculosis report in 2019 explained that the 30 high Tuberculosis (TB) burden countries accounted for 87% of new cases. Eight countries account for two thirds of the total, with India leading the count, followed by Indonesia, China, the Philippines, Pakistan, Nigeria, Bangladesh and South Africa. As of 2016, Indonesia ranked 9th on the list of WHO's Global TB incidence rates with 391 cases per 100,000 population and 2nd on Annual TB incidence list with 1.020.000 cases (Kemenkes, 2017). The Indonesian government has a target to eliminate all TB cases by 2030 with 6 national programs, such as Strengthening Leadership in the District level Management, Improving access to the quality TB services, Control of Risk Factors, Enhancing TB Partnership through the Coordination Forum, Engaging Community in TB Control, and Health System Strengthening. Several prior researches indicate that one of the biggest TB's risk factors are the house environment (Satwikasari, 2018).

House environment is one of the main parameters that have a big influence in the process of spreading TB. Several aspects of the physical condition of the building and site in the neighborhood can integrate with the quality of human's life in a built environment. This study will measure and analyse the physical

factors of the house in rural area that direct and indirectly affects the occupants' health, which is in this case, the main health parameter is the TB's positive case in Kebumen Regency, Indonesia.

The majority of TB cases in Indonesia are found in densely populated areas and rural settlements. The characteristics of settlements, especially rural areas, are a determinant of the incidence of TB (Suharyo, 2013). There have been many previous studies that raised the problem of the relationship between physical factors at home and the prevalence of TB in Indonesia yet it's dominated by the health science perspective. There is so little research has been found in the architectural science scope that comprehensively identifies physical quality of the house as the risk factors for TB in rural settlements. The study area in this research is the home of TB patients in several villages in Kebumen Regency, a district that has had a fairly high TB prevalence rate (Mam, 2020).

II. LITERATURE REVIEW

In the logic disease outbreaks that was put forward by the theory of epidemiology (Gordon, 1916) the interrelationship between the agent (the source of the disease), the host (where the disease grows and develops), and the environment are the main influencing factors. If the environmental quality does not meet the standard, the agent, in this case is the TB bacteria, can reproduce faster and have the potential to infect humans who live within. On the other hand, if the human's immune quality is not stable enough coupled with the unhealthy surrounding environmental conditions, it can trigger infection of biological agents such as TB bacteria in the house. It can be assumed that one of the steps to prevent and reduce the incidence of TB is to improve the quality of the aspects formed in the living environment (micro) to the residential environment (macro).

To improve the micro environment, we have to focus on the microclimate quality of the house. Some aspects that affect microclimate conditions in a residential environment are temperature, humidity, sky conditions, solar radiation, rainfall, wind movement, and local weather conditions (Koenigsberger, 1975). The Indonesian Public Works Agency (PU) also stated in the General Guidelines for Simple Healthy Homes (WILAYAH, 2002) that a house's health and comfort quality are influenced by three aspects, which are lighting, ventilation, also air temperature and air humidity. According to the Regulation of the Minister of Public Works (WILAYAH, 2002) to be able to find out the ratio of building area to land area owned can be assessed by looking at the Building Covered Ratio (BCR). Meanwhile, to ensure the occupant's TB status, a clear classification is needed to identify the severity. The severity of TB disease and the healing status of TB patients can be viewed from checking X-rays and checking sputum (laboratory tests) after a 6-month intensive treatment period (Sardjanti, 2015).

III. METHODOLOGY

The determination of these indicators and variables is based on the results of previous studies regarding the influence of physical environmental factors as a risk factor for TB disease. Later, the determination of primary data indicators is divided into the physical factors (every aspects related to the house and its site) and the non-physical factors (every aspects that can indicate the emergence of TB). The variables which are described from the two main factors will become the main instruments of this research which form the basis of the questionnaire sheet. Determination of indicators and variables of two main factors used in this study is based on parameters that have been widely studied in previous studies.

There are 7 physical environment factors that will be measured and analysed in this research are Occupancy Density, Ventilation, Lighting, Temperature, Humidity, Materials, and the Other Surrounding Distractions. Those factos will have several variables that will be measured in the existing house. In order to be able to do the correlation and regression analysis, there are several adjustments to the data types that will be collected. As the dependent variables, it will be divided as 3 categories, those are 1) The duration as the confirmed TB patient; 2) the percentage of the positive case in a house; and 3) the category of the TB severity.

The research object is Kebumen Regency which is declared as one of the districts with a high TB prevalence rate in Indonesia. Of the 26 sub-districts, 3 sub-districts were selected which had the highest prevalence rates and had differences in the topography of rural settlements (mountains, urban villages, and coastal villages), namely Alian sub-district (19 respondents), Kebumen sub-district (41 respondents),

and Buluspesantren sub-district (16 respondents), it made 50 respondents in total. In this study, the case population was grouped based on the medical records of BP4 Kebumen patients who had not yet been declared cured in April 2014 and were devoted to only 3 districts that were the object of the study.

IV. RESULT AND DISCUSSION

The following points are the resume of the distribution data from the 50 samples of TB patients' houses:

1. More than 90% of the houses were located < 1 km from the rural environment such as rice fields and yards
2. Most of the houses were located < 8 m with the sewage treatment area and animal pens.
3. The majority of the houses were located more than 1 km away from the public transportation facilities and activities, industrial centers, and construction activities.
4. On average, TB patients in the Kebumen district had an average land area at least 60 m^2 and the area per-person a minimum of 10 m^2.
5. The mean value of Building Covered Ratio (BCR) in the all research areas were high (60% -100%).
6. 64% of the houses' living room had low ventilation (under 10%). Likewise, 96% of the houses had a percentage value below 10% for the ratio calculation of the ventilation's total area houses' total area.
7. 72% of the daylight factor value in the living room / family room were below 2%.
8. 82% of the houses had sky factor percentage value below 2% or in other words it is still below the SNI standard.
9. The entire houses had a Windows-to-wall ratio (WWR) value below 40%.
10. 98% of their houses had brick walls and 70% had tiled floors and plaster of cement. There is only 1 respondent who had a house with woven bamboo walls and 1 respondent whose floor was still dirt.
11. 74% of the respondents' houses had high indoor temperature ($\geq 30^0$ C).
12. 98% of the houses had a high humidity level or more than 60%.

After being analysed with correlative methods there are several findings related to each physical environment parameters such as:

1. The percentage analysis of the correlation between WWR and TB prevalence had an r value of -0.33, which means that this variable has a low correlation and the opposite is true. This condition explained that the greater the WWR value, which means that if the dimensions of the light exposure are wider, the TB prevalence rate will decrease.
2. The per-person area variable showed a fairly strong correlation with an r value of more than 0.4 but has an opposite relationship with the the percentage of the positive case in a house. These results indicate that the lower the per-person area, which means that if the occupants in a house are too densed, the percentage of TB sufferers in that dwelling will be potentially increased.

Based on the results of the regression analysis, the Windows-to-wall ratio (WWR) variable had a direct influence on the prevalence of TB. The results of this analysis indicate that the low percentage of WWR can result in a high potential for the spread of TB in the home environment. Likewise, the variable area per-person is proved to have a direct relationship with the TB prevalence variable which is stated in the determinant group of the percentage of TB patients in 1 house. The high percentage of TB sufferers is caused by the ratio of the area of the house to the number of occupants who do not meet the standards.

V. CONCLUSION

According to the analysis result, there are some physical environmental factors criteria that have to be considered in rural settlements planning. The location of the dwelling should be at least 1 km away from paddy fields and yards. Proximity Animal cages and trash cans are placed at a minimum distance of 8 m from the house building to reduce the potential for air pollution from animal manure and cages and garbage waste. At least the percentage of the ratio of the area of the opening to the area of each room is attempted to achieve a minimum value of 10%, so that the quality of openings in all parts of the house can also meet these standards. The materials used must be waterproof, have no potential to store dust or become a habitat for disease pathogens, and the most important thing is to always keep them clean. In order to improve the WWR, a house ha

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In Silico Study of Butterfly Pea Flower Water Extract (*Clitoria ternatea* L.) as Inhibitor of NADPH Oxidase Enzyme

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Abstract

Background – NADPH Oxidase (NOX) is an enzyme that can produce Reactive Oxygen Species (ROS) in various tissues. Excess amount of ROS can cause cell damage. Therefore, an inhibitor is needed that can inhibit the action of NOX. One of the natural ingredients that has the potential to act as an inhibitor is a chemical compound from the water extract of butterfly pea flower (*Clitoria ternatea* L.).

Purpose – The aim of this study was to predict the potential of active compounds of butterfly pea flowers with in silico methode based on the bond affinity parameters (ΔG_{bind}) and the interaction of amino acids on the formed hydrogen bonds.

Design/methodology/approach – The ligands used were the test ligands which were active compounds of butterfly pea flower water extract (pentanal and 1-butanol, 3-methyl-, acetate) and innate ligands namely GTP and than NOX as receptors. The binding of ligands and receptors was carried out in silico by computational methods using Autock Vina software.

Findings – The results showed that all tethered ligands met Lipinski's rule . The value of ΔG_{bind} for GTP ligand -7.3 kcal / mol, -3.6 kcal / mol for pentanal ligand and 1-butanol, 3-methyl, acetate -4.3 kcal / mol. This value indicates that the test ligand had the ability to bind to NOX. There was hydrogen bonds in the *1-butanol, 3-methyl- , acetate* and GTP ligands with the same binding residue, namely THR^{35}. Thus, it is predicted that the test ligand can act as a NOX inhibitor with a weaker inhibition level than the GTP ligand.

Research limitations This research is an early stage research in predicting the potential of active compounds from butterfly pea flowers. Further research is needed to use other free radical-producing sources in the body

Originality/value – There are no studies that use computational methods to predict the potential of water extract of buterfly pea flower as NOX inhibitors.

Keywords: butterfly pea flower, inhibitor, in silico, NADPH oxidase, ROS

I. INTRODUCTION

NADPH Oxidase (NOX) is an enzyme that can be found in various tissues in the body . NOX has seven components that play an important role in producing superoxide ions, one of which is the $p67^{phox}$ component (Lapouge *et al* ., 2000). Panday *et al.,* (2015) stated that NOX will be active if it is stimulated by viral and bacterial infections. The superoxide produced by NOX plays a role in killing foreign bacteria that enter the body . However, if there are in excess, superoxide can generate hydrogen peroxide that can further react to form reactive oxygen species (ROS). ROS in the body with normal amounts have cellular functions, would be but if present in high concentrations can affect to the imbalance of endogenous antioxidants that lead to cellular damage. NOX activity in producing ROS can be inhibited by secondary metabolites One source of natural ingredients that has potential is telang flowers.

The butterfly pea flower is a flowering plant of the genus *Clitoria* , has purple flowers and produces green peas. Butterfly pea flowers are wild plants and are currently used for ornamental and medicinal

plants . The results of the phytochemical test of the ethanol extract of butterfly pea flowers contain flavonoids, tannins, saponins and terpenoids (Cahyaningsih *et al* ., 2019) . The production of ROS produced by NOX can be inhibited by flavonoid compounds where the inhibitory effect depends on the structure of the flavonoids (Ciz *et al* ., 2012). The potential of butterfly pea flower extract in inhibiting the formation of ROS was studied in silico.

The in silico method is an approach using software to predict the binding between ligands and receptors. Ligand molecules, which are active compounds, are attached to the mooring site of a static protein with or without including molecules cofactors and / or H_2O (Motiejunas & Wade, 2006). Based on this explanation, it is necessary to carry out computational research to determine the potential of chemical compounds in the butterfly pea flower extract against the inhibition of the NADPH oxidase enzyme.

II. LITERATURE REVIEW

Butterfly pea flowers have compound leaves, single flower shaped like a butterfly with a length of about 3 , 5 -4 cm, indigo blue colored with white or yellowish color in the middle and the fruit of a green colored legumes (Dalimartha, 2008). Butterfly pea flowers can act as antioxidants because they contain anthocyanin compounds. Anthocyanin is a type of flavonoid found in butterfly pea flowers as a bluish purple color (Hariana, 2011). According to Morris (2009), the type of anthocyanin in butterfly pea flowers is delpinidin 3-o-glycoside. Research on butterfly pea flower extract as an antioxidant had been carried out by previous researchers. Andriani and Murtisiwi (2020) obtained an IC_{50} value of the ethanol extract of telang flowers of 41,36 µg/mL using the DPPH method and included in the very active antioxidant category. Antioxidants are needed to reduce free radicals. In humans, free radicals can be generated from the results of oxidative metabolism, one of which is through the enzymatic reaction of NADPH oxidase. The ability of an active compound can be predicted to reduce free radicals through computational methods using the in silico technique (molecular docking) . This method mimics the interaction of ligand molecules, which are active compounds with proteins as the target of in vitro tests (Motiejunas & Wade, 2006).

III. METHODOLOGY

The 2D ligand structure which is the active compound in the water of telang flower extract, was obtained from the results of research by Neda *et al.,* (2013) with the * .sdf format and the receptor structure in the form of NADPH Oxidase (NOX) with the code 1E96 downloaded from the Protein Data Bank. The NOX receptor structure was prepared by removing H_2O molecules and non-standard residues using the Biovia Discovery Studio Visualizer 2020 and stored in * pdb format. The receptors that had been prepared was optimized using Autodock Tools 1.5.6 software including the addition of hydrogen atoms and grid box arrangement and saved in *pdbqt format.

Structure preparation is also carried out on ligands in the form of active compounds of butterfly pea flowers and comparison ligands, namely ligands that are already attached to the NOX receptor. These ligands was 2D structures obtained from the site https://pubchem.ncbi.nlm.nih.gov . The obtained structure was converted into a 3D structure with the help of Marvin Sketch 20.11 software and saved in *pdb format. Then performed the optimization using AutoDock Tools 1.5.6 by increasing the gaisteiger load and setting the number of active torsion. Optimization results were saved in *pdbqt format and filtered according to Lipinski rules online.

The optimized ligands and receptors were then carried out by the molecular docking process using AutoDock Vina software. File ligands and receptors files with the format *pdbqt were copied to Vina folder and Vina configuration typed in notepad was then saved with the name 'cofig_rigid.ixt'. The Vina program was operated via the Commond Prompt.

IV. RESULT AND DISCUSSION

Before the molecular docking process is carried out, the ligands and receptors need to be optimized. The receptor used was the NOX enzyme protein with GTP as the innate ligand . The optimization carried out

for NOX was by removing non-standard residues and adding hydrogen atoms. According to Droe (2005), the added hydrogen atom aims to adjust to the docking atmosphere. Meanwhile, the test ligands were optimized by applying a gaisteiger charge and setting the active torsions.

4.1. Lipinski's rule on ligands

The ligands that will be attached to the receptor must comply with Lipinski's rules with five predefined parameters. This rule can be used as a guideline to determine the hydrophobic / hydrophilic properties of ligands / chemical compounds when they enter the cell membrane (Syahputra *et al* ., 2014). All test ligands which were chemical compounds from the water extract of butterfly pea flowers had met the Lipinski rules (Table 1). This showed that the ligand can interact with NOX.

Table 1. Lipinski Rules on Test and Validation Ligands

Ligand	*Lipinski's rule*				
	A	B	C	D	E
Ligan GTP (validation)	507	-4,737250	0	18	82,351898
Pentanal	86	1,375500	0	1	25,588993
1-butanol, 3-methyl-,acetat	130	1,595600	0	2	36,087990

Information:
A : Relative atomic mass <500 Da
B : Log P <5
C : Bond donors H <5
D : Bond Acceptor <10
E : Molar refractifity 40 – 130

4.2. Bond Affinity (ΔG) and RMSD Value

The results of the in silico study with molecular docking obtained bond affinity values (ΔG_{bind}) and Root Mean Square Deviation (RMSD). The more negative ΔG_{bind} value indicates the level of stability of the strong bond.

Table 2. The Value of ΔG_{bind} and RMSD

Ligand	Bond Affinity (ΔG) (kcal/mol)	RMSD (Å)
GTP ligand (validation)	-7,3	3,111
Pentanal	-3,6	13,296
1-butanol, 3-methyl-,acetat	-4,3	8,873

Based on Table 2, the GTP ligand had a more negative ΔG_{bind} value than the test ligand. This showed that the binding of the GTP ligand to the receptor had a better level of stability. The RMSD value of the test ligands was greater than that of the GTP ligand, but all of them had values > 2,5 Å. An RMSD value > 2,5 Å indicates that there were a far shift of the molecule. This shift can be caused by failure in scoring or it can also be caused by the program not being able to carry out the process at several bond positions (Baber *et al*., 2009).

4.3. Hydrogen Bonding and Amino Acid interactions

Observation of amino acid residue interactions aims to identify the interactions that occur between ligands and receptors. GTP ligands and test ligands 1-butanol, 3-methyl- , acetate had the same amino acid residue in the hydrogen bond, namely the THR^{35} residue. Meanwhile, pentanal compounds was found to have no hydrogen bonds. According to Jefrey & Mart (1997), hydrogen bonding occurs when an atom gives a proton to a more electronegative atom such as oxygen in –OH (SER, THR, TYR, Carbohydrates).

V. CONCLUSION

Based on the results of the analysis that had been carried out , the test ligands consisting of pen tanal and 1-butanol, 3-methyl-, acetate compounds respectively had ΔG_{bind} values of -3.6 kcal/mol and -4.3 kcal/mol which indicates the two compounds can bind to NOX. There was 1 type of the same amino acid residue in the hydrogen bond of 1-butanol, 3-methyl- , acetate and GTP ligands,

namely THR[35]. Therefore, the test ligand was predicted to be a NOX enzyme inhibitor with a lower stability level than the GTP ligand .

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LOOP-MEDIATED ISOTHERMAL AMPLIFICATION IN HALAL INDUSTRY: CURRENT STATE AND FUTURE TRENDS

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Abstract

Background – Detecting pork and its derivatives have become a major challenge for the halal industry. Loop-mediated isothermal amplification (LAMP) shows promising future for species analysis as it employs the strong point of Polymerase Chain Analysis: sensitivity, specificity, and relatively fast time. It also overcome major barrier for industry that want to fight species adulteration: the high cost of obtaining a Polymerase Chain Analysis machine. Unfortunately, there is no paper that comprehensively review the improvement of the LAMP testing for porcine. There is no overview for researcher that want to enter the field or industry that want to employ the method.

Purpose – The purpose of the paper was to provide overview of our current experience working in the field and the result of the other research group. We try to predict future trends. By understanding the landscape, other researcher will have ease understanding and quickly fill the gap. Industry will also have a guideline when considering implementing LAMP for raw material testing.

Design/methodology/approach – We perform systematic review using database of PubMed and Google Scholar on November 2020. We used keyword such as "LAMP", "DNA", "porcine", and "pork". After having the article, we perform selection based on criteria of inclusion: using English, published within the last 10 years, and wet laboratory-based research. Exclusion criteria include systematic review, research protocol is not available, full text were not available, and double publication. After undergo selection, there are fifteen articles (and the author's unpublished data) that were chosen and compiled with our own research to be reviewed related to its validity, significancy, and ease of implementation in halal testing.

Findings – Result shows the shortest LAMP amplification time were achieved within 5 minutes coupled with indirect luminol-based electrochemiluminescence detection system, which detect 0.1 pg porcine DNA/µL (pure meat) and 0.0001% (W/W) pork spiked in chicken matrices. For conventional approach, LAMP could directly detect 1,2 x 10^{-12}ng/µL and 0.5% (W/W) of pork spiked in beef matrices with SYBR visualization within 25 minutes. The future trends will be increasingly focus on making LAMP reagent mix stable in room temperature, improving visual detection, creating extraction-free LAMP, and shorten the amplification time.

Research limitations– There may be publication that is not covered PubMed and Google Scholar but available in other citation index excluded by this research.

Originality/value – The paper review the progress of LAMP-based research and potential areas of development.

Keywords: DNA, LAMP, porcine, pork, systematic review

I. INTRODUCTION

Porcine DNA analysis is critical tools in ensuring halal supply chain from farm to fork. There have been case of fraud where trace of porcine DNA were found in halal products, such as meat pies and pasties supplied to jails in the UK (Crosslay, 2013). Real-time polymerase chain reaction (qPCR) is a strong analytical tools with great sensitivity and specificity to detect porcine DNA. The problem is in the high price of the qPCR machine and relatively long analytical time. Loop-mediated isothermal amplification (LAMP) shows promising potential in having the advantages of qPCR analysis and offering simple heat incubator machine with simple (sometimes real-time) visualization. The paper will provide a review of

the progress in the LAMP testing for porcine DNA and the future potential. By understanding the development, end-users and researcher will have a clear picture on which approach is viable and where are the room for improvement.

II. METHODOLOGY

We perform systematic review using database of PubMed and Google Scholar on November 2020. We used keyword such as "LAMP", "DNA", "porcine", and "pork". After having the article, we perform selection based on criteria of inclusion: using English, published within the last 10 years, and wet laboratory-based research. Exclusion criteria include research protocol is not available/unclear, full text were not available, and double publication. After undergo selection, there is 15 article that were chosen and compiled with our own research to be reviewed related to its validity, significancy, and ease of implementation in halal testing. We also assess the loophole and potential area of improvement

III. RESULT AND DISCUSSION

A. Summary of findings

Table 1. Summary of systematic review

No.	Reference	Gene Target	Amplification and Detection	Limit of Detection*
1	Ahmed et al., 2010	12S rRNA	• 63^{o}C in 60 minutes • LAMP-based Sensor	2.033 x10^{-5} ng/µL
2	Cho et al., 2014	COXII	• 64.6^{o}C in 30 minutes • Direct visualization (Evagreen)	• 2.63x10^{-5} ng/µL (raw pork) • 2.59 x10^{-5} ng/µL (cooked pork)
3	Yang et al., 2014	Cyt-B	• 63^{o}C in 45 minutes • Gel electrophoresis	4x10^{-2} ng/µL 0.01%
4	Kanchanaphum et al., 2014	D-loop	• 63^{o}C in 45 minutes • 80^{o}C in 5 minutes • Gel electrophoresis • $CuSO_4$ (ring formation)	Not reported
5	Ran et al., 2015	DN1	• 63^{o}C in 45 minutes • 80^{o}C in 5 minutes. • Direct visualization (SYBR)	• 2.00x10^{-8} ng/µL • 0.01%
6	Lee et al., 2016	D-loop	• 65 ^{o}C in 30 minutes • Fluorometer	• 4x10^{-4} ng/reaction • 0.1%
7	Roy et al., 2016a	Not reported	• 63^{o}C in 20-60 minutes • Gel electrophoresis • Spot in the filter paper (contain magnetic beads)	1x10^{-5} ng/µL
8	Roy et al., 2016b	Cyt-B	• 65^{o}C in 30 minutes • Luminophore dyes	1x10^{-6} ng/µL
9	Roy et al., 2017	Cyt-B	• 65^{o}C in 30 minutes • Gel electrophoresis • Luco cristal violets paper	1x10^{-6} ng/µL
10	Abdullahi et al., 2017	tRNA lysine ATPase subunit 8	• 63^{o}C for 25 minutes • Gel electrophoresis • Direct visualization (SYBR)	• 1,2x10^{-12} ng/µL • 0.5%
11	Rungruang et al., 2017	Cyt-B	• 57-63 ^{o}C for 30-90 minutes • Gel electrophoresis	1x10^{-4} ng/µL
12	Hutami et al., 2018	Cyt-B	• 95 ^{o}C for 2 minutes • 65^{o}C for 45 minutes	Not reported

			• 80°C for 5 minutes • Gel electrophoresis	
13	Azam et al., 2018	Not reported	• 65°C for 5 minutes • Gel electrophoresis • ECL-based detection using luminol	• ≥ $1.0x10^{-7}$ ng/µL • 0.001%
14	Kai et al., 2019	Cyt-B	• 57°C for 60 minutes • Direct visualization (4-(2-pyridylazo)-resorcinol sodium salt)	$1x10^{-5}$ ng/µL
15	Grish et al., 2020	D-loop	• 95 °C for 5 minutes • 65°C for 60 minutes • 80°C for 2 minutes • Fluorometer (SYBR green)	• 0.5 ng/µL • 0.1%

*) Note: The percentage shows the amount of pork in a certain matrices such as, but not limited to, beef and chicken

B. Shortest amplification and most sensitive
   Our review shows that shortest amplification could be achieved by indirect LAMP method in 5 minutes, coupled with luminol-based electrochemiluminescence detection system. It can detect 1.0 x 10^{-7} pg porcine DNA/µL (pure meat) and 0.0001% (W/W) pork spiked in chicken matrices (Azam, Roy, Lim, & Ahmed, 2018). Unfortunately, the recent reviews shows luminol-based electrochemiluminescence detection for DNA is not commercially available (Fang, Li, Yan, Guo, & Yifeng, 2017). The testing price of such tools is also unclear.
C. For the "conventional" approach, LAMP could directly detect 1.2 x 10^{-12} ng porcine DNA/µL and 0.5% (W/W) of pork spiked in beef with the aid of SYBR visualization within 25 minutes (Abdullahi et al., 2017). This is the shortest amplification and most sensitive method.
D. Visualization
   The visualization of LAMP product were reported can be done by using several methods. There were LAMP-based sensor, direct visualization, gel electrophoresis, spot in the filter paper that contained magnetic beads, luminophore dyes, direct visualization by using the SYBR green, ECL-based detection using luminol, direct visualization by using the 4-(2-pyridylazo)-resorcinol sodium salt, and direct visualization by using the fluorometer (SYBR green).
E. Future potential: most focused on better sensitivity and easier visualization
   1) Mix stable in room temperature
   2) Improving visual detection
   3) Creating extraction-free LAMP
   4) Shorten the amplification time
      Most only adapt the standard 30-60 minutes amplification times

IV. CONCLUSION

The study shows that $1.0x10^{-7}$ ng/µL and 0.0001% of porcine could be detected in 5 minutes when LAMP is coupled with luminol-based electrochemiluminescence detection. The conventional LAMP approach could detect 1,2 x 10^{-12}ng/µL and 0.5% (W/W) in 25 minutes using SYBR visualization. The use of salt (such as $CuSO_4$) is the cheapest and most practical direct visualization approach, followed by SYBR. Unfortunately, the author research experience shows how difficult to replicate the outcome of other publication on this approach. Research could thrive by making mix stable in room temperature, improving visual detection, creating extraction-free LAMP, shorten amplification time. The limitation of this studies lies in the possible omission of relevant publication that is only available in other citation index.

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The fungal solid-sate fermentation (FSSF) strategy in modified bitter cassava flour (mocaf) production

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Abstract

Background - Bitter cassava tubers has high HCN and low protein content that is dangerous to human who consumed it because it can caused konzo disease. The HCN level can be reduced and the protein content can be increased by fermentation process and make the cassava to be a product called modified cassava flour (mocaf). One of the fermentation technique that possible and efficient to be used is solid-state fermentation (SSF).

Purpose – To reduce HCN level and to increase protein content of bitter cassava in the form of mocaf by fungal solid-state fermentation process.

Design/methodology/approach – Three kinds of fungal are used as a three different treatment of fermentation in SSF process of mocaf production. The three fungi that was used are *Rhizopus oryzae, Aspergillus oryzae,* and consortium of both of them. Each 10^7 CFU/ml fungi was inoculated to sliced, blanched, mashed and squeezed bitter cassava in a sterile glass bowl. And then they fermented aerobically in 30^{o}C for 120 hours. The fermented cassava were dried in tray dryer at 55^{o}C until it has 13% water content and milled for 10 second to become modified cassava flour (mocaf). Each treatment of mocaf with different fungi were measured in residual HCN level and protein content to get one best treatment with highest reduce of HCN and increase of protein. The selected mocaf were measured in water, ash content and also yield and Passed 100 mesh sieve value.

Findings – The three kinds of fungal (*Rhizopus oryzae, Aspergillus oryzae,* and consortium of both of them) can reduce HCN level until below 10 ppm and also they can increase protein content until 3,31% on modified bitter cassava flour. The consortium of *Rhizopus oryzae* and *Aspergillus oryzae* was the best treatment compared to others. Mocaf with consortium of *Rhizopus oryzae* and *Aspergillus oryzae* has 6,64% water, 0,03% ash, 39,32% yield, and 99,33% passed 100 mesh sieve. Those parameters are in accordance with the quality requirements in SNI 7622:2011.

Research limitations–The modified bitter cassava flour should be measured in other parameter as quality requirements in SNI 7622:2011 and also trying to aplicate as raw material in any product to substitute wheat flour.

Originality/value – Mocaf was made with solid-state fermentation process by *Aspergillus oryzae, Rhizopus oryzae,* and consortium both of the fungi has never been studied before.

Keywords: mocaf, SSF, *Aspergillus oryzae, Rhizopus oryzae*

I. INTRODUCTION

Cassava (*Manihot esculenta* Crantz) is the fourth major food crop in the tropical region of Africa, Latin America, and Asia after rice, wheat and maize (Nambisan, 2011). At least five hundred million people consume it as staple food because it contains 80% to 90% carbohydrate (dry weight basis) which is an important compound of energy source in human diets (Julie *et al.*, 2008). Cassava grown in more than 90 countries and it has become a preferred crop because it requires low input of labor, cash, and time, and also produce moderate yields in marginal lands, and tolerant to disease and pests (Julie *et al.*, 2008; Nambisan, 2011). It makes cassava become a readily available source of food and a valuable food security crop. But in the other hand, cassava contain a toxic substance that interfere with digestion and uptake nutrients (Julie *et al.*, 2009). There is cyanide which is a metabolite from hydrolysis of

cyanoglucoside (linamarin and lotaustralin) by linamarase enzyme. This compound causes bitter taste on cassava tuber which varies in every varieties of cassava that led classified it into two cultivars of cassava, one of them is bitter cassava (Cardoso *et al.,* 1999).

Bitter cassava cultivars have a cyanide level exceeding the Food and Agricultural Organization/ World Health Organization (1991) recommendation of 10 mg/ kg (dry weight basis) and also have low protein content that can cause serious problem. Nambisan (2011) classified the cassava cultivars based on the cyanide level as low (< 50 µg/g), medium (50 - 100 µg/g), and high (> 100 µg/g). Consumption of 50 to 100 mg cyanide has been associated with acute poisoning and has been reported to be lethal to adults (Julie, 2008). Long-term consumption of small amount of cyanide can cause severe health problems such as tropical neuropathy (Julie *et al.,* 2009) and konzo (spastic paraparesis) which is prevalent in only cassava consuming populations, and associated with high cyanogen intake due to the consumption of improperly processed bitter cassava, deficiency of sulphur and low protein intake (Nambisan, 2011). Fermentation is one of efficient process in reduce cyanide level and also increase the protein content in cassava (Julie *et al.,* 2008).

One of fermentation product of cassava is modified cassava flour (mocaf). In mocaf production, cassava are peeled, cut into pieces, soaked/submerged fermented in water with lactic acid bacteria, dried, and then milled into cassava flour. Mocaf has similar characteristic with wheat flour (white, soft, and cassava odorless) that makes mocaf possible to be substitute for wheat flour. Mocaf fermentation process is mostly using submerged technique which makes the whole process of mocaf producing are time consuming because of the drying process takes longer. Another fermentation technique that possible to be used in mocaf production is solid-state fermentation (SSF).

Solid-state fermentation (SSF) is a fermentation process occurs in the absence of free water in growth microbes media because it used the solid compound as a substrate. SSF of cassava product is presently in Canada using *Aspergillus fumigatus* (Oboh and Elusiyan, 2007), in Burundi and Nigeria where *Rhizopus oryzae* (Oboh G and Elusiyan, 2007) was used in enriching cassava product with proteins. Oboh and Elusiyan (2007) reported that SSF of the cassava mash using *Rhizopus oryzae* and *Saccharomyces cerevisiae* caused significant increase in protein and fat content and decrease of anti-nutrient (tannin, cyanide, and phytate) content.

Therefore, this study will carry out the production of mocaf using the solid-state fermentation technique by *Rhizopus oryzae* and *Aspergillus oryzae* fungi which have the ability to produce L-lactic (Phrueksawan *et al.,* 2012; Vrese *et al.,* 2015) and act as proteolytic fungi (Carrol *et al.,* 2017). Thus, this research is expected to reduce levels of HCN/cyanide content in the bitter cassava optimally while increasing the protein content of cassava.

II. LITERATURE REVIEW

Bitter cassava is a variety which able to produce high yields (Balitkabi, 2011). Thus, it is widely cultivated in Indonesian (Mosamandiri, 2015). Bitter cassava tubers contain > 50 mg HCN / kg (Ginting, 2013). The high HCN content in bitter cassava comes from high natural anti-nutrition compounds, namely cyanogenic glycosides in the form of linamarin (93%) and lotaustralin (7%) (Andama and Oloya, 2017).

Hydrogen cyanide (HCN) is a toxic coumpound by inhibits the respiration of all cells of aerobic organisms. Hydrogen cyanide toxicity is acute and chronic for humans who consume bitter cassava for a long time. Intoxication due to consuming bitter cassava can cause tropical neuropathy, Konzo (paralysis of the legs), goiter, and cretinism. Symptoms that caused by cyanide poisoning are vomiting, stomach pain, nausea, diarrhea, dizziness, headaches, and can even cause death. Cyanide poisoning is associated with consumption of untreated bitter cassava and death occurs at lethal doses of HCN of 0.5 - 3.5 mg / kg body weight (Andama and Oloya, 2017). The levels of hydrogen cyanide (HCN) contained in cassava tubers can be reduced by a combination of some process including drying, soaking, frying, grating, and fermenting through degradation of toxic components by oxidation, reduction or hydrolysis (Omolola *et al.*, 2017).

One of the common fermentation techniques that can reduce HCN content is solid-state fermentation (SSF). SSF is a method that uses a solid substrate with low water content. This method is suitable for the fungi group as an agent of fermentation. The advantages of SSF include more cost-effectiveness, lower water and energy consumption, reduced wastewater treatment costs, high productivity levels, simple techniques, and less foam (Aranda *et al.,* 2006 in Indriani *et al.,* 2015). In Andama's research (2017) revealed that the SSF method in cassava was more effective in reducing HCN compared to other

fermentation methods (SmF), as well as in Iyayi and Losel's (2001) study, the SSF method with *Aspergillus niger* and *Saccharomyces cerevisiae* increased protein content of cassava.

III. METHODOLOGY

Fungi strain. The *Rhizopus oryzae* and *Aspregillus oryzae* strain were used as the agent of fermentation. All the fungi cultivated in Potato Dextrose Agar slant and incubated for 72 hours in 30^{o}C. The fungi were suspended with 6 ml sterile distilled water. The 1 ml fungi suspension were used as starter in cassava fermentation and the other 1 ml of them were diluted for 6 times and cultivated to Potato Dextrose Agar plate and incubated for 72 hours in 30 ^{o}C for enumeration the colonies (CFU/ml). The 10^{7} CFU/ml fungi suspention were cultivated to the fermentation media.

Fermentation media. Bitter cassava than has been used as a substrate was 8 months old Jimbul cultivar from Indonesia. It has 79.924 ppm hydrogen cyanide and 1,71% protein content with 15-26 cm length and 3.5-4 cm diameter. The cassava was been sorted, peeled, washed, sliced 0,1 cm thick, blanched for 5 sec in 65 ^{o}C sterile water, and then cooled immediately by dipping in cold sterile water at 11^{o}C for 3 minutes to stop the heating process. Furthermore, the cassava tubers are crushed using a sterile food processor for 3 minutes and squeezed using a sterile cloth to be stored in a sterile glass bowl for the fermentation process.

Solid-state fermentation. Fermentation is carried out by adding 1% suspension of *Rhizopus oryzae* / *Aspergillus oryzae* / consortium both of them to the cassava which has been prepared before. The solid-state fermentation process is carried out aerobically by covering the bowl with a hollow sterile cloth and incubating at 30^{o}C for 120 hours. The fermented cassava is then made to be mocaf by drying it using a tray dryer at 55^{o}C until it has 13% moisture content and milled in a dry blender for 10 minutes. The obtained mocaf is then analyzed both physically and chemically according to the Indonesian National Standard for mocaf.

Mocaf Analysis. The obtained mocaf was tested for water, ash, and protein content based on AOAC2003. In addition, the remaining HCN levels contained on it were tested using the Indonesian National Standard (SNI 6989.77: 2011) method and the yield value of mocaf obtained was also measured based on Adelina *et al.,* (2017). The level of fineness of mocaf is calculated using SNI 7622: 2011 method.

IV. RESULT AND DISCUSSION

In this study, a modification of bitter cassava with high levels of HCN was carried out into mocaf by performing solid-state fermentation using *Rhizopus oryzae, Aspergillus oryzae* and a consortium both of them. The fermentation process and the data of HCN also the protein content of mocaf that have been produced can be seen in Figure 1 and Table 1 below.

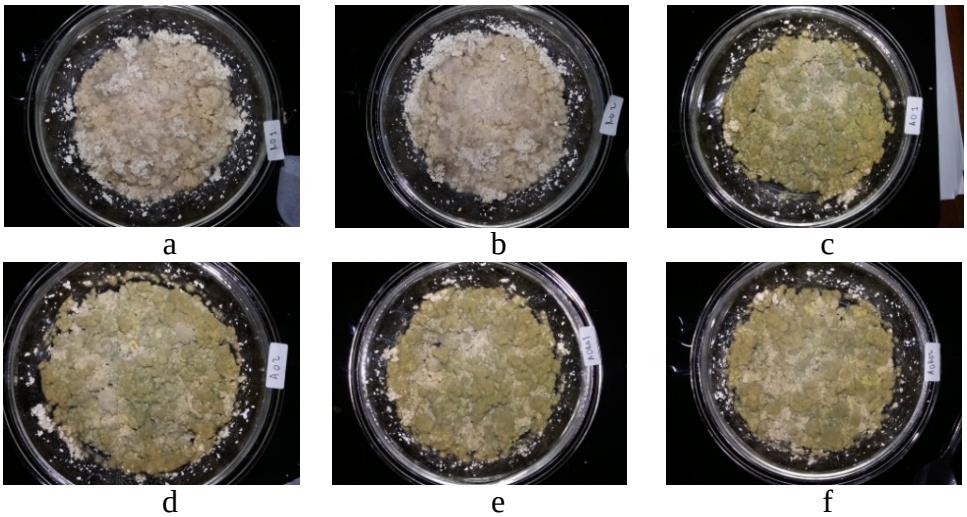


Figure 1. Fermentation process of Jimbul cultivar cassava by: a-b. *Rhizopus oryzae,* c-d. *Aspergillus oryzae,* e-f. Consortium of *Rhizopus oryzae* and *Aspergillus oryzae*

Table 1. HCN and protein level of bitter cassava after SSF processing

The fungi	HCN singkong (ppm)	Protein of mocaf (%)
Rhizopus oryzae	0,26[a]	3,18[a]
Aspergillus oryzae	0,52[a]	2,74[a]
Concortium of *Rhizopus oryzae* and *Aspergillus oryzae*	0,23[a]	3,31[a]

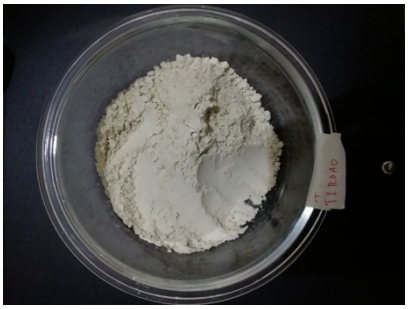
Note: Numbers in the same column followed by the same letter superscript show no significant difference (Duncan analysis at $\alpha = 0.05$).

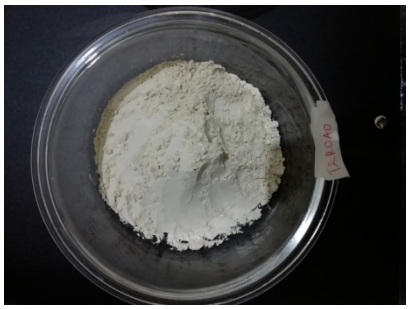
The fermentation of Jimbul bitter cassava using the SSF method by *Rhizopus oryzae*, *Aspergillus oryzae* and the consortium both of them resulted in a decrease of HCN level to < 10ppm and also increase in protein content of cassava (Table 1). The cassava HCN level (< 10 ppm) after fermentation is the safe limit for mocaf HCN content based on FAO / WHO, 1991 and SNI 7622-2011. The decrease in HCN is thought to be due to the ability of the fungi to produce enzymes that can reduce the pH of the fermentation medium so as to create optimum conditions for linamarase enzyme to accumulating the HCN level in medium. The accumulated HCN are evaporated during the fermentation process at room temperature (min 28^{o}C), (Montagnac *et al.,* 2009; CAC / RCP, 2013). While the increase of protein in mocaf that have been produced is thought to be due to the increasing growth of fungi in the fermentation process. The fungi can produce several extracellular enzyme as proteins and accumulated in the cassava media. In addition, it maybe because a number of fungi that grow in cassava / fermentation medium are counted as cell biomass in the form of single cell protein (Oboh and Elusiyan, 2007).

The SSF process using a consortium of fungi produces the lowest HCN levels and the highest protein content in mocaf. Therefore, the consortium of *Rhizopus oryzae* and *Aspergillus oryzae* in mocaf production is taken to be a selected microbes in mocaf production. The mocaf that have been produced can be seen in Figure 2. Mocaf that has been produced then carried out measurements of chemical and physical properties. The result of chemical and physical data can be seen in Table 2. Based on the data, mocaf produced in accordance with the SNI 7622: 2011 quality requirements in terms of moisture, ash content, and passed 100 mesh sieve. In addition, the yield value of mocaf is quite high and greater than mocaf made from non-bitter cassava cultivar using *Aspergillus niger* in the study of Adelina *et al.,* (2017) which has a yield rate of 34.62%. This higher yield of bitter cassava mocaf is due to the fact that generally bitter cassava is classified as a superior variety so that it can produce high yield values (Balitkabi, 2011).

Tabel 2. Chemical and physical characteristic of selected mocaf

No	Analisis Produk Terpilih	Mocaf Konsorsium Kapang	SNI 7622:2011
1	Chemical characteristic		
1.1	**Water (%)**	6,64±0,38	max. 13%
1.2	**Ash (%)**	0,03±0,01	max. 1,5%
2	Physical characteristic		
2.1	**Yield (%)**	39,32±0,39	-
2.2	**Passed 100 mesh sieve (%)**	99,33±0,43	min. 90%





a b

Figure 2a-b. Selected mocaf which fermented by consortium of *Rhizopus oryzae* and *Aspergillus oryzae*

V. CONCLUSION

Fungal solid-state fermentation was successful in reducing HCN levels and increasing protein levels in bitter cassava which was made into modified cassava flour (mocaf). The three types of fungi used (Rhizopus oryzae, Aspergillus oryzae, and the consortium of the two fungi) reduce HCN levels to below 10 ppm in accordance with SNI and FAO / WHO requirements. Meanwhile, the protein content of cassava increased to 3.18%, 2.74%, and 3.31% of the three types of mold. The lowest levels of HCN and the highest protein mocaf were produced from the SSF process using a consortium of both fungi, so it was taken as the best fermentation process in making mocaf. Mocaf produced using selected fermentation techniques has chemical and physical characteristics in accordance with the quality requirements of mocaf in SNI 7622: 2011.

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CHARACTERISTICS OF NATURAL LIQUID HAND SOAP WITH NEEM SEED (*Azadirachta indica*) OIL

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Abstract

The recent outbreak of COVID-19 is declared as a global public health emergency of international concern by the World Health Organization (WHO). The recent COVID-19 pandemic has resulted in increased hand hygiene and hand cleansing awareness. To prevent virus transmission, the Centers for Disease Control and Prevention recommends frequent hand washing with soap and water.This study was conducted to formulate a liquid hand soap with neem oil as an antibacterial component. The physico-chemical properties was evaluated to determine the quality of the liquid soap. Three different concentrations of neem oil 5; 10 and 15%, were formulated as liquid soap using coconut oil, castor oil and neem oil as its soap bases. The natural liquid soap was made by saponification reaction between oils and potassium hydroxide. The soap was evaluated for its pH value, specific gravity, foam stability, insoluble in alcohol content and free fatty acid. The results showed that the characteristic of the liquid soap was transparent liquid soap with yellowish colored and had distinctive smell of neem oil. The pH values of the different formulated liquid hand soaps are within the accepted pH range of 4 - 10. The specific gravity was 1,087 g/ml. The foam stability range were 44,7%, respectively. The insoluble in alcohol content 0.5. The free fatty acid content 2.5. This study needs to carry out further test such as antibacterial properties. This study was conducted to formulate a liquid hand soap with neem oil as local commodity.

Keyword : natural, neem oil, liquid soap

I. INTRODUCTION

The recent COVID-19 pandemic has resulted in worldwide hand hygiene and hand cleansing awareness. COVID-19, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is an enveloped, unsegmented, positive-sense RNA virus (Y.R Guo et al,2020). According to the Ministry of Health, the virus is currently believed to spread via direct contact, indirect contact, and droplet contact. To prevent virus transmission, the Ministry of Health recommends frequent hand washing with soap and water for 20 seconds.

Hand hygiene is essential for reducing COVID-19 transmission. There are a variety of hand hygiene products available. Soaps are made of lye and natural fats. The term *soap* is used to refer to any cleanser (Draelos, 2018). Soap is created when a fat interacts with an alkali, resulting in a fatty acid salt with cleansing properties. Soap removes dirt and inactivates viruses by disrupting the lipid membrane and intracellular lipids. There is evidence to support soap as a more effective method of hand hygiene than hand sanitizer. Hand washing with soap and water has the added benefit of physically washing away debris and pathogens with running water (Levin and Miller, 2011)

Natural liquid hand soap is a promising alternative for synthetic chemicals used in the soap. Neem oil, extracted from the seed of neem plant (*Azadirachta indica*) is reported to contain natural organic antimicrobial agents, largely used in the Indian sub-continent in traditional/folk medicine. Upadhyay et al. (2010) reported neem oil to be highly bactericidal. Neem oil has been used in the treatment of

inflammation, pain and swelling that occur inarthritis (Subapriya et al., 2005). In Indonesia,neem trees could be found in central Java, East Java, Bali and West Nusa Tenggara (Indiati, 2008). The purpose of this study is to formulate natural liquid hand soap with neem oil. The characterization of soap was studied.

II. LITERATUR REVIEW

There are some kinds of natural substances, including plant essential oil, and plant extract, which possesses
an antibacterial activity Neem oil is rich in essential fatty acids (EFAs), triglycerides, vitamin E and calcium. Because ofits EFAs and vitamin E, neem oil penetrates deep within the skin to heal the minute cracksbrought on by severe dryness. Fatty acids present in the neem kernel oil are oleic acid (52.8%),linoleic acid (2.1%), palmitic acid (12.6%) and stearic acid (21.4%) and other lower fatty acids (2.3%) (Sadekar, 1998).

Neem oil has been used in the manufacture of natural cosmetics, soap, toothpaste, hair and skin care products, emulsions, liquors, ointments and medicinal cosmetics (Chatterjee,1994). However neem oil can be produced mechanically (hot or cold press) or chemically (solvent extraction) from dried neem seeds. The best quality neem oil with a majority of phytoconstituents intact is obtained through cold press. In cold press the oil is lighter in colour and has a milder odour (Ramakrishna, et al, 1993)

Soaps are prepared by the process of saponification reaction. Sodium and potassium salts are used for the production of soaps. Soaps are widely used incleaning and washing of skin. The washing property of soaps are due to the presence of fatty acid that can be obtained from plants and animal source having both saturated and unsaturated fatty acid chain such as oleic acid, lauric acid, myristic acid, palmitic acid and stearic acid (Ainie, 1996). Liquid soap is now widely produced because of its practical use and better appearance (Anggraini et al., 2012).

III. METHODOLOGY

Soap Preparation

For the formulation of liquid hand soap, the hot process method was used in the study. Coconut oil, castor oil and neem oil (5;10 and 15%) was heated in a beaker at 100°C. The temperature was checked using a thermometer. Sodium lactate and sucrose were mixed with oils. KOH and glycerin was weighed and water was prepared. The KOH was mixed with distilled water and glycerin. Stirred using a stirring rod to dissolve the KOH. The mixture served as the lye-water solution. Once the lye-water was completely mixed until it became clear, the lye-water solution was then slowly added to the heated oils. The lye-water solution were poured into the heated oils in a beaker. The solution was heated at a maintained temperature of 100°C for 30 - 40 minutes. After which, the solution was continuously stirred using a stick blender. This served as the soap paste. The soap paste was then mixed to distilled water and citric acid.

Soap characteristics Several soap characteristics such as pH, foam stability, density, insoluble in alcohol and free fatty acid were analyzed for the prepared soaps These soap characteristics were assessed according to the SNI 2588 : 2017 standard guidelines.

Test of pH

A volume of 1 ml on each of the Treatments wasdissolved in a 100 ml distilled water. The pH of the soap solution was verified using a calibrated pH-meter

Density test

Density test used pycnometer. Empty piknometer was weighed. The piknometer was filled fully with aquadestand the temperature was lowered to 20 °C, if volume decreased, aquadestis added through the

capillary. The temperature was raised to 25 °C and weighed. Experiments on the sample liquid were the same as aquadest

Foam stability test

Foam stability test done by taking one mL sampling and inserting it into test tube which had been given scale, and then 5 mL of distilled water was added. The reaction tube was shaken strongly to form a foam and then the height of the foam formed was measured. The height of the formed foam was measured at 10 minutes.

Insoluble in alcohol

Soap sample were dissolved in 50 ml hot ethanol and quantitatively transferred in a pre weighed filter paper. The residue was dried in the oven at 105˚C for 30 minutes, cooled and weighed again then reading taken.

Free Fatty Acid

Free fatty acid value is define as a number of miligrams of caustic potash required to neutralized the oraganic acid present in 1 g of the sample. This value gives an insight into the free fatty acid present ini the soap.

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IV. RESULT ANF DISCUSSION

The characteristic of the soap were divided into several criteria, namely pH, density, foam stability, insoluble in alcohol content and free fattyacid, of the soap. The data of soap prepared l that were formulated were tabulated in Table 1

Table 1. The characteristics of the formulated liquid hand soap

No	Characteristics	N1	N2	N3	SNI 2588 : 2017
1	pH	8.6	8.6	8.6	4 - 10
2	Insoluble in alcohol	0.3	0.5	0.7	0.5
3	Free fatty acid	2.2	2.7	2.5	1
4	density	1.087	1.087	1.086	-
5	Foam stability	33.3	52.6	48.2	-

The physico-chemical properties of soap actually determine its quality. According to SNI (2588 : 2017), the range of pH for liquid hand soap is within 4-10. In the evaluation of physico-chemical parameters as shown in Table 1, all the formulated liquid hand soaps fall within the accepted limit pH range. pHliquid soap tends to be alkaline due to the presence of KOH components as the base material used to produce saponification reactions with fat or oil or synthetic detergentshaving pH values above neutral pH (Irmayanti, et al, 2014). The human skin has an acidic pH of 5.4 to 5.9, which is an important factor in the protection against microorganism where in alkaline substances such as soaps neutralize the body's protective mantle that acts as barrier against bacteria (Onyango *et al.,* 2014). Furthermore, highly alkaline pH could damage the acid mantle and as well as the disruption of the lipid lamellae of the epidermis, that could possibly result to skin dryness due to higher trans-epidermal water loss allowing the access of potential irritants and allergens (Mendes *et al.,* 2015). pH value of liquid hand soap soap is safe for the skin.

The density of liquid soap is influenced by the type and concentration of raw materials that was added. The higher the value of molecular weight of the raw material added, the higher the density. Density is the ratio of liquid soap mass tothe water mass at the same volume and temperature. Density test is to determine theeffect of ingredients use in liquid soap formulations (Irmayanti, et al, 2014). Density of liquid soap formulation is 1.086, 1.086 and 1.087

g/mL. The value of density is influenced by its constituent material and its physical properties.

Soap formulation results show the value of foam stability with a range of 33.3 – 52.6%. One factor that affecting foam stability is the type of fatty acid in soap formulations. Coconut oil composed of saturated fatty acid (lauric acid, meristic acid) is known of its high purgative action with very fluffy and unstable lather. The neem seed oil contains oleic acid which can produce a stable and soft foam, palmitic acid and stearic acid which has the stabilizing properties of the foam. In general, good and stable foam is one of the key attributes for effective cleansing action by soaps.

From the values obtained in the analysis, liquid hand soap with 15% neem oil had the highest level of insoluble in alcohol of 0.7 followed by liquid hand soap with 10% neem oil which had 0.5, then liquid soap with 5% neem oil. Insoluble in alcohol is a parameter that is used to determine the purity of soap. It is the measure of non-soap ingredients known as builders or fillers such as sodium silicate, sodium phosphate, sodium carbonate and minor constituents such as bleachers, whitening agents and fluorescing agents in the finished product. The soap with high insoluble in alcohol values suggests that it contained high level of impurities which may be attributed to the level of impurities of alkali used for producing the soap.

Free fatty acid of saop is parameter that quantifies the amount of unreacted fatty acid available in the soap structure. The free fatty acid in this study report higher than SNI. High FFA value denote the availability of considerable fatty acid concentration, which eventually break down upon the soap exposure to light, heat, and water causing rancidity (Abdulkadir and Jimoh, 2014).

V. CONCLUSION

This study shows that neem seed oil could be used as natural ingredient producing liquid hand soaps. It is a product innovation of a natural soap produced from neem oil that is free from chemicals, such as sodium sulfate (SLS), artificial colourant, and artificial fragrance. However, further research should be improve the quality of the soap. The pH values of the different formulated liquid hand soaps are within the accepted pH range of 4 - 10. The specific gravity was 1,087 g/ml. The foam stability range were 44,7%, respectively. The insoluble in alcohol content 0.5. The free fatty acid content 2.5. This study needs to carry out further test such as antibacterial properties.

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Physical Transport of Polycyclic Aromatic Hydrocarbons Emission in Urban Air

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Abstract

Polycyclic aromatic hydrocarbons (PAHs) in air ambient contribute considerably to the health risk of air pollution. The physical transport aspects of the air environmental process have received considerable attention, however not much is known about the transport PAHs themselves. This paper is primarily concerned with the physical transport PAHs in urban air. Measurement PAHs in urban air Jakarta showed that high concentration at bottom side dominated at low wind direction. Stable atmospheric conditions are not favorable in physical transport PAHs pollutants in urban air Jakarta due to buoyancy force in the opposite direction of the force resulting in the lifting of the air mass to a certain height go down, PAHs expected lifting together with the surrounding air mass move to bottom with a high concentration and receptors might receive high PAHs exposure. Thus, it is important to understand physical transport of PAHs in urban air so that exposure of PAHs air pollution can be efficiently spatial controlled.

Keywords: *PAHs, physical transport, air pollution, urban air, spatial*

I. INTRODUCTION

Polycyclic aromatic hydrocarbons (PAHs) are ubiquitous in the atmosphere and well-known to be carcinogenic and mutagenic (Moller et al., 1982; IARC, 1984). They are products of incomplete combustion and pyrolysis of fossil fuels and other organic materials from natural and anthropogenic sources (Jones et al., 1989). (Conceptual frameworks and coherent stories) Combustion is the primary source of long-range atmospheric transport of PAHs into the surrounding environment [8]. PAHs tend to decrease in concentration further from the initial point source [1]. The movement of pollutants in the atmosphere is caused by physical transport, dispersion, and precipitation. Physical transport is a movement caused by the average flow of wind while dispersion is a movements that take place less than the time used for the transport average. Depositon of pollutants was another movement causes downward in the atmosphere.

The concentration of PAHs pollutants associated with moving vehicles is determined by several factors: the emission rate of pollutants from the vehicle, mixing induced by vehicle motion, wind speed and direction relative to the axis of the roadside, intensity of ambient atmospheric turbulence, reactions to or from other chemical species, and rate of removal to the ground surface (deposition).

Due to the complexity of such processes, the assessment of physical transport requires experiments in well-defined PAHs concentration, emission rates, windspeed and turbulence produced by the interaction of the local wind with complex structures such as buildings and roadside barriers. Wind can carry pollutants far from their sources, so that emissions in one region cause environmental impacts far away. Long-range transport complicates efforts to control air pollution because it can be hard to distinguish effects caused by local versus distant sources and to determine who should bear the costs of reducing emissions. Weather plays a role in most of these components, generally causing higher emission rates at lower temperatures (Chang and Norbeck 1983b), diluting pollutants at higher wind speeds, mixing pollutants vertically during unstable thermal conditions, and influencing the rates of homogeneous and

heterogeneous chemical reactions and the rate at which pollutants are scavenged from the atmosphere by moisture or dry deposited.

During the past decade, the complexities of transport of airborne pollutants associated with vehicular emissions have been studied with elaborate field and modeling experiments. Jakarta was selected as the field of this study, where traffic air pollution and its health effects have long been a serious problem due to the heavy traffic and the chronic state of traffic congestion. (Dinas Perhubungan Dalam Angka, 2013). Previous studies on roadside measurements reported ambient air concentration of the sum of 15 PAHs in Jakarta was detected 74 ng/m^3 two times higher than in Serpong 34 ng/m^3 with similar distribution pattern of PAHs in those two locations. Ratio calculation of individual PAHs indicated that PAHs pollution in ambient air majority produced from combustion process (Retnaningsih et al., 2014). However, there is limited knowledge on PAHs spreading in urban air environment, research to date has focused only on physical transport at two site roadside in Jakarta.

In an effort to find out dissemination of sector concentration of pollutants transport, it would require more analysis about the level of PAHs pollutant emissions. One method used in determining deployment concentration of pollutants is through physical transport in the distribution of PAHs pollutants that enter to the atmosphere. The dynamics factor that influences are the transport of substances by air and the transport of mass through molecular diffusion and turbulence.

II. LITERATURE REVIEW

A number of PAHs are semivolatile (vapour pressures at 298K in the range 10−6–10−2 Pa) and, hence, partition between the gas and particulate phases of the atmospheric aerosol, influenced by temperature, particulatephase chemical composition and particle size (Keyte et al., 2013) PAHs range from naphthalene (two aromatic rings) which under ambient conditions exists almost entirely as vapour through to compounds with six or more aromatic rings which partition almost entirely into the particulate phase. The majority of compounds, and especially those with three or four rings, are considered as semi-volatile and such compounds partition between the vapour and particle phases in the atmosphere.

PAHs concentrations in urban air generally show seasonal and temporal pattern, variations in PAHs concentration are seen during individual days, reflecting, for instance, changing traffic flows and meteorological conditions. The apparent magnitude of the contribution from exhaust emissions will be significantly influenced by the PAHs loading from mobile sources, by the relative abundance of gasoline and diesel fuelled vehicles, plus the influence of such factors as wind speed and direction, air temperature and humidity. The concentrations of individual PAHs will be influenced by the extent and source of the pollution, and the susceptibility of particular PAHs to chemical and photochemical degradation. This will again show seasonal variation, influenced by ambient temperature and the intensity of sunlight. Much of the PAHs detected in air is associated with particulate matter, though the lower molecular weight PAHs are sufficiently volatile to be present in the vapour phase. The proportion of PAHs in the vapour and particulate phases will be significantly influenced by the ambient temperature, and hence again show seasonal variation. In addition, this distribution may not reflect the distribution of the emissions sources. Recent work on the gas and particle partitioning of PAH in ambient aerosols has been presented by Liang (1996) and mathematical modelling approaches described by Jang (1997) and Bowman (1997).

PAHs pollutant concentrations of traffic congestion segments are derived from atmospheric movement patterns or physical transport in the distribution of PAHs pollutants that enter to the atmosphere. The dynamics factor that influences are the transport of substances by air and the transport of mass through molecular diffusion and turbulence as equation below:

$$\frac{\partial C}{\partial t} + U\frac{\partial C}{\partial x} + V\frac{\partial C}{\partial y} + W\frac{\partial C}{\partial z} - K_x\frac{\partial^2 C}{\partial x^2} - K_y\frac{\partial^2 C}{\partial y^2} - K_z\frac{\partial^2 C}{\partial z^2} = 0 \quad \text{.....(1)}$$

Where U, V and W respectively are wind directions in the x, y and z directions while Kx, Ky and Kz are difusion and turbulance in x,y and z axis. These equilibrium conditions of transport dynamics in fact are difficult to get, so that in simplifying the following assumptions are required: opposite wind direction was neglected, advective in x direction is more dominant than turbulent diffusion and pollutants concentration will remain all the time at steady state condition.

Reformulation equation 1 as stated below,

$$U\frac{\partial C}{\partial x} + - K_y\frac{\partial^2 C}{\partial y^2} - K_z\frac{\partial^2 C}{\partial z^2} = 0 \quad \text{.....(2)}$$

The solution of equation (2) uses the variable separation and similarity method, Laplace transformation and Wronskian method. A solution is obtained for a finite length line source of pollutants,

$$\bar{c}(x,z) = \frac{K}{\left(2\pi^{1/2}\right)}(G_2 - G_1) \quad \text{…….....…..……..(3)}$$

Whereas,

$$K = \frac{Q}{\bar{u}\sigma_z}\left\{\exp\left[-\frac{(z-H)^2}{2\sigma_z}\right]\right\} + \left\{\exp\left[-\frac{(z-H)^2}{2\sigma_z}\right]\right\} \quad \text{…….....……..(4)}$$

$$(G_2 - G_1) = \int_{H1}^{H2}\frac{K}{\left(2\pi^{1/2}\right)}\, exp\left(\frac{B^2}{2}\right) dB \quad \text{…….....……..(5)}$$

Q	:	rate of polluants emission sources (g/s or g/s/m)
$\bar{u}$	:	The wind speed at the position x (m/s)
σ_z	:	Parameter dispersion or standard deviation concentration distribution at the position z (m)
z	:	The position of the z direction in Cartesian coordinates (m)
H	:	Effective height of emission sources (in this research is 0)
B	:	The ratio of the length of roads to dispersion parameter at the position y

III. METHODOLOGY

3.1. Sampling site

The sampling location was selected to represent the Jakarta metropolitan. The selection was representative of the city, including the meteorological conditions of the area, and other considerations, e.g., minimize obstructions between source and sampler, maximize unrestricted flow, and consider the reasonable separation distance between roadway and the sampler probe inlet. The sampling site was located at S-UA1, S-UA2, S-UA3 (figure 1) and U-UA1, U-UA2, U-UA3 (figure 2), away from areas subject to point source emissions. Possible traffic pollution is expected since most of the sampling site are around traffic congested, buffer zone Jakarta entry, public transport access, bottle neck, intersection and traffic light. The sampling point of receptor is about 500 and 1000 meters from to the wind direction as point source. The sampler inlet was on the roof top of a building for the ease of access, power supply, and security reasons. S-UA1 (S: 06° 13'26,51 and E:106°51'5,23") is one of the main roads in the south of Jakarta, this road segment close to shopping centers, access roads to the central business area of Jakarta and there is a train station around this road. Congestion on this sampling point almost occurs for all day time. The surrounding of the sampling station S-UA2 and S-UA3 consisted of a mixture of urban, commercial and traffic areas.

Figure 1. sampling site South of Jakarta

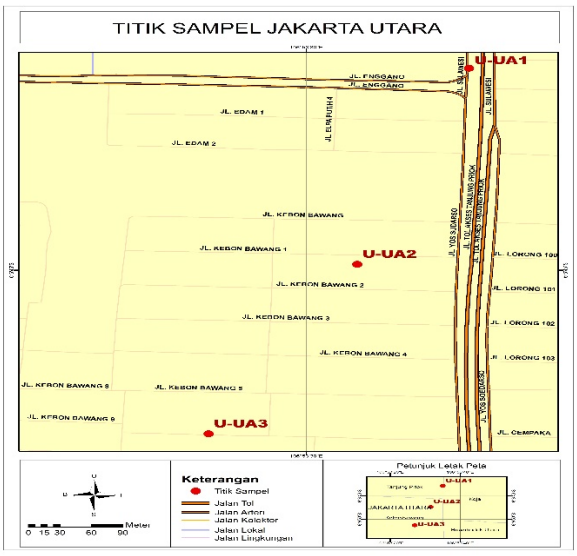


Figure 2. Sampling site Nord of Jakarta

U-UA1 (S: 06° 06'35,64" and E:106°53'35,02") point source of segment road in nord of Jakarta. Main road north of Jakarta which is an access road leading to the Jakarta container transportation area. Congestion on the road almost occurs since morning until noon, especially on the schedule of transporting container. Heavy duty truck and motorcycle dominated of vehicle density in this area.

3.2. Sampler

Gas and particulate phase air samples were taken on sequential days from January to February, 2016. The high volume sampler was equipped with one glass fibre filter (GFF) and one polyurethane foam (PUF) plug in series. Particle size was classified in the particulate phase using high volume filter sampling and low volume impactor sampling

3.3. Sample extraction

For PAHs analysis all samples were extracted with dichloromethane in an automatic extractor. Surrogate recovery standards (naphthalene, phenanthrene, perylene) were spiked on each PUF and GFF prior to extraction. The volume was reduced after extraction under a gentle nitrogen stream at ambient temperature, and fractionation achieved on a silica gel column. The extract was fractionated on a silica column (5 g of silica 0.063–0.200 mm, activated for 12 h at 150 _C). The first fraction (10mL n-hexane) containing aliphatic hydrocarbons was discarded. The second fraction (20mL dichloromethane) containing PAHs was collected and then reduced by stream of nitrogen in a concentrator unit and transferred into an insert in a vial. Terphenyl was used as syringe standard; final volume was 200 µL.

3.4. Analysis

Analyte separation, detection, and identification were performed by gas chromatography mass spectrometry (GC-MS) on an Agilent 7890A gas chromatograph equipped with an Agilent DB EUPAH Column (20 m x 0.18 mm x 0.14 µm film thickness) and 5975C mass selective detector.

The oven temperature was ramped from 40°C (3 min) to 310 °C (10 min) at a rate of 40°C/min. Persistent organic pollutant (including PAHs) concentrations in filter extracts were determined by GC-MS in the selected ion monitoring (SIM) mode using electron impact (EI). The target analyte list was comprised of 83 compounds including PAHs, pesticides, isotopic surrogates, and pesticide degradation products. Target analyte loss was corrected by surrogate recovery using target analyte-to-surrogate response ratios in calibration curves. The mean recovery over the entire analytical method for all surrogates in all samples was more than 60%.

3.5. PAHs Dispersion Model

Finite Length Line Source (FLLS) methods used in the study dispersion model. Volume sampling procedure traffic is done using handy camera which automatically records traffic volume observation

area. The calculation of the volume of traffic (traffic volume) was done by count the number and type of vehicles recorded in the image sampling.

The geographic coordinates that have been obtained from the next road segment converted to UTM coordinates for obtaining long road segment and total length in units of meters along the wind direction. The length of this segment further used as input in the modeling of FLLS.

Geographic coordinates of receptors that are around the road determined using GPS. Determined the orientation of the receptor lies against street. Geographic coordinates subsequently converted to UTM coordinates to get a unit of length in meters. the receptor determined distance the segment of road. Distance receptor on the road nearest segment used as input in determination of conditions atmospheric stability.

The calculation of the concentration of pollutant particles PAHs by using Finite Length Line Source required several stages processing. Illustrations can be created to describe this model on the road segment to a receptor. One road segment is defined as one straight road to meet with other road segments that form a corner, between roads and issue rate of emissions constant along the road segment Distance to receptors on the road calculated perpendicular to the road, then used to determine dispersion parameters based on the conditions of local atmosphere stability. Road length were taken into account in this model. The benchmark in calculating the length of the street is the location receptor. Wind direction and speed helped taken into account in the application of this model. Wind speed and direction are calculated upright perpendicular to each road segment. Furthermore, the application equality of parameters has been determined using the equation 1,2 and 3 (Cooper et al, 1994).

IV. RESULT AND DISCUSSION

The sampling area plays an important role in the amount of particulate phase and PAHs gas concentrations in ambient air. In the same season, the particulate phase and PAHs gas concentrations in the traffic-congested areas were clearly higher than the community areas.

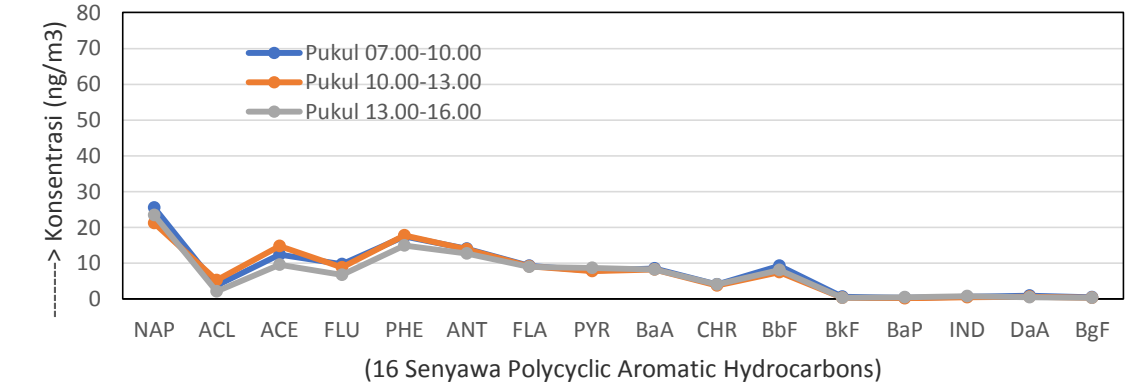


Figure 3. Roadside South of Jakarta PAHs profile

In general, the volatility of PAHs depends on their molecular mass, while higher molecular weight PAHs were associated with particle phase due to their lower vapor pressure. PAHs containing 3 and 4 rings are semi-volatile and are more likely to be in the gas phase rather than in the particle phase. Therefore, NAP (MW=128), ACY (MW=152), ACE (MW=154), and FLU (MW=166) would not much found in particulate phase samples.

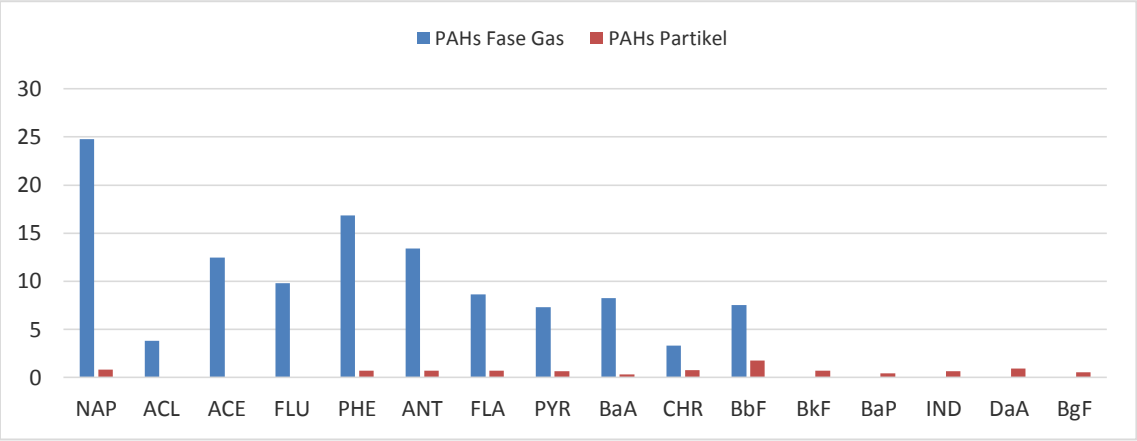
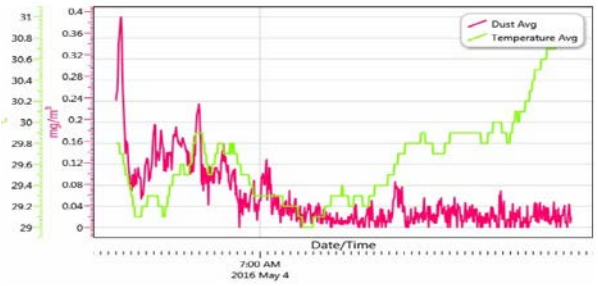
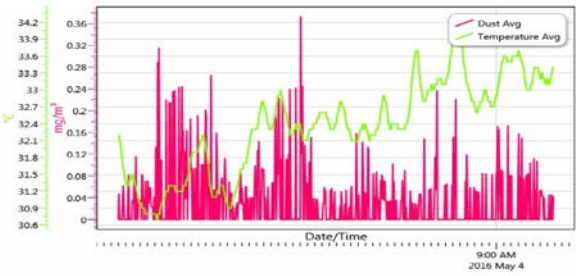


Figure 4. Roadsie South of Jakarta PAHs speciation

During the transport process, the photochemical reaction and the shift of PAHs from particle phase to gas phase or blending of lower PAHs composition particle phase would reduce the particle-bound PAHs composition.

The ambient temperature influences the composition of PAHs pollutants around the research area, figure 5 showed an effect of temperature to the content of particles measuring 10 microns in the roadside area of South Jakarta.





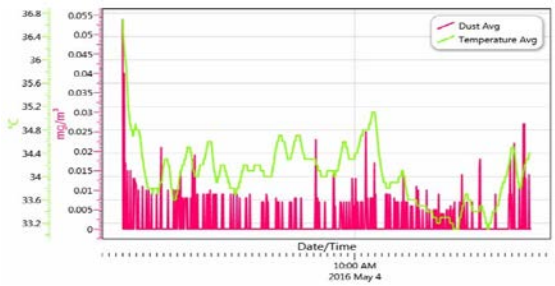


Figure 5a, 5b and 5c showed that highest concentration of dust average at minimum temperature and maximum humidity caused by low temperatures of pollutant compounds which adsorbed on particles and increasing dust concentration, while in minimum humidity it caused amount of water vapor to be carried

away by dust particles. This method of influencing temperature can be used for the initial study of the abundance of PAHs in air particles, in this case the compounds of PAHs with four to six rings tend to be adsorbed on dust particles at low temperatures and high humidity.

Atmospheric stability one of meteorological factor that influence of pollution caused by organic PAHs. Atmospheric conditions are very influential on the transport process of pollutants both vertically and horizontally. The turbulence process of pollutants in the air around of the study area is the adsorption and absorption of substances into the atmosphere caused by turbulence. Pasquill stability class refers to wind speed and solar radiation conditions, during the observation period in 2016 the average atmospheric stability was obtained between South Jakarta, Central Jakarta and North Jakarta with a percentage of 75% stability class B, 23% stability class C and the remaining 2% stability class A and B. Stability class B is influenced by wind speeds of 2 to 3 m/sec and moderate solar radiation which is less than 350 W/m^2.

Table 1.

Mei 2016	Waktu Pengujian	Kondisi Metrologis				Polisiklik Aromatik Hidrokarbon ng/m^3									
		Kecepatan angin (m/detik)	Arah angin	Intensitas Sinar Matahari	Kestabilan Atmosfer	PHE	ANT	FLA	PYR	BAA	CHR	BBF	BAP	IND	DAA
2	07.00-08.00	2,2	Selatan ke Utara	Sedang	B	16,31	14,11	11.02	13,11	<1	2,32	<1	<1	<1	<1
	08.00-09.00														
	09.00-10.00														
	10.00-11.00	2	Selatan ke Utara	Sedang	B	15,65	12,74	10,41	12,93	<1	2,81	<1	<1	<1	<1
	11.00-12.00														
	12.00-13.00														
	13.00-14.00	2,2	Selatan ke Utara	Sedang	B	16,12	15,32	9,26	13,41	<1	2,93	<1	<1	<1	<1
	14.00-15.00														
	15.00-16.00														

Mei 2016	Waktu Pengujian	Kondisi Metrologis				Polisiklik Aromatik Hidrokarbon ng/m^3									
		Kecepatan Angin (m/detik)	Arah Angin	Intensitas Sinar Matahari	Kestabilan Atmosfer	PHE	ANT	FLA	PYR	BAA	CHR	BBF	BAP	IND	DAA
2	07.00-08.00	2,2	Timur ke Barat	Sedang	B	16,11	13,00	13,26	16,90	<1	3,72	<1	<1	<1	<1
	08.00-09.00														
	09.00-10.00														
	10.00-11.00	2,4	Timur ke Barat	Kuat	B	15,82	13,30	14,16	15,92	<1	3,19	<1	<1	<1	<1
	11.00-12.00														
	12.00-13.00														
	13.00-14.00	3,1	Timur ke Barat	Sedang	B	16,32	13,18	13,83	16,71	<1	3,75	<1	<1	<1	<1
	14.00-15.00														
	15.00-16.00														

Table 1 and 2 showed the morning atmospheric stability at 07:00-16:00 at South Jakarta is generally dominated by class B stability. This is caused by moderate radiation heating with an average wind speed of 2,2 m/seconds up to 3.1 m/sec. Air mass tends to move down because the temperature of the air mass is lower than the temperature of the atmosphere, so the pollutant levels of PAHs have two and three benzene rings per unit volume of air will be high. Phenatrene and pyrene in the stability class B atmosphere have significant abundance and decrease in concentration at increased wind speeds. Both of these compounds show a shift in the sampling point region with constant solar radiation conditions.

Increasing initial emission of pollutants causes increase the maximum concentration of PAHs pollutants but the area of receptor point of maximum concentration is fixed while profiles of the distribution of pollutants with the same emissions showed that decreasing wind speed affected decreasing the maximum concentration with more distant position of the area of maximum concentration of the source. For the desired atmospheric conditions so that pollution to the environment can be minimized

namely the unstable atmospheric state, because the farther the distance from the source the lower the concentration.

V. CONCLUSION

Higher PAHs concentration were mainly caused by local émission source. The lower PAHs concentration were observed were likely due to easier dispersion of air pollutants, wash out effect, and to lesser content and photo degradation. The sampling area plays an important role in the amount of PM10 and PAH concentrations in ambient air. In the same season, the PM10 and PAH concentrations in the traffic-congested areas were clearly higher than the community areas. Currently this research still continue to get model of particle associated PAHs by FLLS. Resulted model may contribute to mitigate air pollution in Jakarta.

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Flushing Diet Supplementation Affects Apparent Nutrient Digestibility of Postweaning Pasundan Calves under Extensive Grazing

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Abstract

Background - The transition period from preweaning to post-weaning is a very important period for livestock because during that period there was a change in the type of feed from consuming milk during the pre-weaning period to 100% solid feed since entering the post-weaning period.

Purpose – This study aimed to study the effect of flushing rations on the digestibility of post-wean calves which are extensively grazed.

Design/methodology/approach – The study used a completely randomized factorial design with two factors (gender and diet treatment) and five replicates. The total number of calves used in this study was 30 (15 male and 15 female preweaning Pasundan calves). The dietary treatments were 1) calves were grazed without supplementing flushing diet, 2) calves were grazed and fed a flushing diet without urea-impregnated zeolite (flushing-1), 3) calves were grazed and fed a flushing diets with urea-impregnated zeolite inclusion (flushing-2). The parameters measured are digestibility of dry matter, crude protein, crude fiber, and ether extract. The collected data were analyzed by a general linear model univariate analysis

Findings – Supplementation of flushing diets increased ($P<0.05$) dry matter digestibility (68.77 ± 2.29% in grazing calves vs. 79.70 ± 2.29% in flushing-1 calves or 78.92 ± 2.29% in flushing-2 calves) and crude protein digestibility (71.91 ± 2.96% in grazing calves vs. 89.34 ± 2.96% in flushing-1 calves or 89.58 ± 2.96% in flushing-2 calves; $P<0.05$) but not for ether extract digestibility (77.38 ± 2.98% in grazing calves vs. 83.25 ± 2.98% in flushing-1 calves or 83.44 ± 2.98% in flushing-2 calves) and crude fiber digestibility (63.03 ± 7.07% in grazing calves vs. 61.47 ± 7.07% in flushing-1 calves or 65.16 ± 7.07% in flushing-2 calves).

Research limitations– The research limitation was the lack of tool to collect feces efficiently. This was because the use of nylon bags was often released due to being disturbed by other cows during grazing.

Originality/value – The novelty of the research was that feeding flushing ration at postweaning period of Pasundan calves under extensive grazing improved dry matter and crude protein digestibility.

Keywords: postweaning, Pasundan calves, nutrient digestibility.

I. INTRODUCTION

The low quality forage in the tropics (Agus and Widi, 2018) may impact on lower dry matter digestibility. The native grass obtained from the pasture in the coastal areas of West Java contained a lower crude protein content (9.74%). Meanwhile, it was required at least 11% crude protein to support an optimal microbial growth (Pathak, 2008). Thus, supplementation of concentrate is needed to fulfil the nutrient requirement and to improve its apparent nutrient digestibility of postweaning calves grazed extensively. The study wishes to reveal the effect of the flushing diet on the apparent nutrient digestibility of the postweaning calves under extensive grazing.

II. LITERATURE REVIEW

In a cow-calf rearing system that relies on pasture as the main source of feed, post-weaning calves rely heavily on forage or fibrous feed available in pasture to meet their nutritional needs. Meanwhile, the fibrous feed had lower fiber digestibility due to its lignin encrusted the fiber (Labussiere et al., 2009; Maskaľová and Vajda, 2015). Some efforts to improve nutrient digestibility and meet the nutrient needs

of post-weaning cows that are extensively grazed can be done by providing concentrate supplements. Supplementing total solid diets consisted of 92% concentrate and 8% hay increased digestibility of organic matter, crude protein, and fat (de Assis Lage et al. 2019), The digestibility of low-quality forage was also improved by reducing the particle size of the feed (Ghassemi Nejad et al., 2012). Thus, feeding flushing diet consisted of the small particle size concenrate might improved nutrient digestibility and fulfil nutrient requirements in postweaning calves under extensive grazing.

III. METHODOLOGY

The study used 30 (15 male and 15 female postweaning Pasundan calves of 7 months old. The study used a completely randomized factorial design with two factors (gender and diet treatments) and five replicates. All calves were allocated to the following treatments: 1) calves are grazed without feeding flushing diet, 2) calves are grazed and fed a flushing diet without urea-impregnated zeolite (flushing-1), 3) calves are grazed and fed a flushing diet with urea impregnated zeolite inclusion (flushing-2). The flushing diets were formulated based on the previous study (Kardaya et al., 2018). Apparent nutrient digestibility was determined by internal (lignin) indicator and calculated based on the formula as follows (Zewdie 2019):

Digestion coefficient of nutrient = 100 - 100 x (% Indicator in feed x % Nutrient in feces) x (% Indicator in feces x % Nutrient in feed) $^{-1}$.

All digestibility variables were analyzed by General Linear Model Univariate Multivariate (IBM SPSS Statistics 24, 2018). The treatments and genders were determined as fixed factors. All data main effects were analyzed by the least significant difference (LSD). The results were significant if $P \leq 0.05$.

IV. RESULT AND DISCUSSION

Diet treatment affected (P < 0.05) apparent dry matter digestibility (DMD). Grazing calves showed lower DMD than flushing-1 calves or flushing-2 calves (Table 1). The flushing-1 calves and flushing-2 calves showed similar DMD. Diet treatment affected (P < 0.05) crude protein digestibility (CPD). Grazing calves showed lower CPD (P < 0.05) than flushing-1 calves or flushing-2 calves. Either flushing-1 calves or flushing-2 calves showed similar CPD. Either ether extract digestibility (EED) or crude fiber digestibility (CFD) was not affected significantly by diet treatment (Table 1).

Table 1. Effect of flushing diets on nutrient digestibility (mean ± se) of postweaning Pasundan calves under extensive grazing

Variables	Grazing	Flushing-1	Flushig-2	P
DMD	68.770±2.286[a]	79.697±2.286[b]	78.915±2.286[b]	.007
CPD	71.905±2.963[a]	89.337±2.963[b]	89.578±2.963[b]	.001
EED	77.382±2.975	83.253±2.975	83.442±2.975	.293
CFD	63.025±7.074	61.468±7.074	65.162±7.074	.934

DMD = dry matter digestibility, CPD = crude protein digestibility, EED = ether extract digestibility, CFD = crude fiber digestibility. P = significant level. Different superscript within similar row, significant difference (P<0.05).

Greater DMD in flushing-1 and flushing-2 calves reflected a higher degradability of nutrients in both flushing diets. DMD in flushing calves was in the range of the DMD (78.9 – 89.2%) reported by previous study (Casper et al. 2017, Chapman et al. 2017, de Assis Lage et al. 2019). Crude protein digestibility (CPD) in the recent study was within the range of CPD (68.1 – 1.8%) reported by previous study (Ghassemi Nejad et al. 2012; Casper et al. 2017; Chapman et al. 2017; de Assis Lage et al. 2019).

V. CONCLUSION

Flushing diet improved dry matter digestibility and crude protein digestibility of postweaning Pasundan calves under extensive grazing but not for ether extract digestibility or crude fiber digestibility.

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ANALYSIS HANDLING METHOD OF SPECIFIC HOUSEHOLD WASTE ON SELF-QUARANTINE PATIENTS IN THE PATIENTS CONFIRMED OF COVID-19 CASE IN THE AREA WORKING OF THE CANGKUANG PUBLIC HEALTH CENTER

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Abstract

Background. According to Law no. 18 of 2008 that specific waste is waste that contains hazardous and toxic materials. Waste containing hazardous and toxic materials should be handle specifically to make the specific waste doesn't impact human healths. as of March 25, 2020, Indonesia has reported 790 cases of COVID-19 from 24 provinces. Patients with mild symptoms are allowed to do self-quarantine at home and obviously, they will produce for specific waste that needs special handling.
Purpose. This is to find out how far the Specific Waste Management is in Self-Quarantine COVID-19 Patients in the Work Area of the Cangkuang Community Health Center.
Design. Used is descriptive qualitative study case design. Respondents in the study consisted of COVID-19 Confirmed Patients (8 people), Close Contact Families (4 people), Health Service Staff (1 person) and TPS C Person in Charge (1 person). Data collection was carried out through interviews and observations.
Findings. at the specific waste sorting stage there are 37.5% do not meet the requirements, the container stage 50% do not meet the requirements, the stage, 100% do not meet the requirements, the transportation stage 100% does not meet the requirements, the final management stage 100% does not meet the requirements and specific waste handling in total by COVID-19 confirmed patients who are 100% self-quarantine do not meet the requirements.
Research limitations. specific Waste Management is in Self-Quarantine COVID-19 Patients in the Work Area of
Originality. Management is in Self-Quarantine COVID-19 Patients in the Work Area of the Cangkuang Community Health Center

Keyword: Waste Management, Specific Waste, COVID-19

I. INTRODUCTION

Waste is a subject matter that many people discuss, as we all know the amount of waste in Indonesia has increased every year, this is because the population in Indonesia is increasing every year and the need for population is increasing which results in the growing waste population. this causes an imbalance (Winda*et al*, 2018).

According to Government Regulation No. 81/2012 concerning Management of Household Waste and Waste Similar to Household Waste, household waste is waste that comes from daily activities in the household which does not include feces and specific waste. Household-like waste is household waste originating from commercial areas, industrial areas, special areas, social facilities, public facilities, and / or other facilities. Piles of garbage that disturb the health and beauty of the environment are a type of pollution that can be classified as environmental degradation. which is social in nature (Hasibuan, 2016). Some of the rubbish is easy to decompose and does not, some even take a long time of up to 100 years for the garbage to be destroyed. That is what causes waste to continue to accumulate and can be detrimental (Winda, 2018).

The level of Indonesian waste production per capita reached 0.6 kg / person / day for urban areas and 0.3 kg / person / day for rural areas in 2005. Along with economic growth, waste production per capita will continue to increase so that in 2030 it will reach 1.2 kg / person / day for urban areas and 0.55 kg / person / day for rural areas (Bappenas, 2010). The World Bank states that the amount of solid waste that is produced by Indonesia nationally reaches 151,921 tons per day. This means that every Indonesian citizen throws out 0.85 kg of waste per day on average (Prihatin, 2020).

In general, the waste produced is divided into three types, namely organic waste, inorganic waste, and finally B3 waste. Organic waste can be categorized as waste that can rot and decompose, so organic waste should not cause environmental problems if managed properly. Meanwhile, inorganic waste is difficult to decompose because this waste includes plastic, paper, rubber, glass and other materials that do not decompose naturally. However, this type of waste can be recycled and reused so that inorganic waste needs special treatment by sorting it from the start and separating it from other waste. Furthermore, there is B3 waste or hazardous and toxic materials which include chemicals, broken glass, used medical objects such as syringes, batteries and other dangerous objects. This type of waste should also be given special treatment, especially when sorting to avoid the dangers of these materials (Katadata, 2019).

In December 2019, there was an outbreak of a disease caused by the coronavirus or commonly known as COVID-19 (Coronavirus disease 2019), COVID-19 was first detected in Wuhan City, Hubei Province, China and was declared a pandemic by the World Health Organization (WHO) on March 11, 2020. As of April 23, 2020, more than 2,000,000 cases of COVID-19 have been reported in more than 210 countries and territories resulting in more than 195,755 people died and more than 781,109 people recovered. Coronavirus is thought to be spread through respiratory droplets produced during coughing. These splashes can also result from sneezing and normal breathing. In addition, the coronavirus can be spread through direct contact such as shaking hands (Wikipedia). Indonesia first reported 2 cases of COVID-19 on March 2, 2020. As of March 25, 2020, Indonesia has reported 790 confirmed cases of COVID-19 from 24 Provinces (4th Revision of the Guidelines for the Prevention and Control of COVID-19). The first COVID-19 case appeared in the Cangkuang Puskesmas Work Area, namely on March 28, 2020, as many as 1 case (Cangkuang Puskesmas Surveillance Data).

COVID-19 patients who have mild symptoms can self-isolate at home, while patients with moderate symptoms can be isolated in an emergency hospital, and if the patient has severe symptoms, isolation is carried out at a referral hospital. If the patient is self-isolating at home, then there are health protocols that need to be applied such as always wearing a mask and disposing of used masks in the designated place, if you are sick or have symptoms then stay at home, use telemedicine facilities or health social media, use a separate room from family members and maintain a distance of 1 meter from family members, determine daily temperature checks, adopt clean and healthy living habits, consume nutritious food, maintain cleanliness and home health with disinfectant fluids and immediately contact health service facilities if the illness continues (P2PTM Ministry of Health RI , 2020).

As long as the COVID-19 patient performs independent isolation, surely the patient will produce waste so that the waste becomes infectious and can be categorized as specific waste. According to Law No. 18 of 2008 concerning Waste Management, that specific waste is waste containing hazardous and toxic materials. Waste containing hazardous and toxic materials must be treated specifically because this waste can have an impact on humans. The waste generated from COVID-19 confirmation patients can be infectious, so that the waste can become a medium for the transmission of the corona virus because it can cause the entry of sick agents to people exposed to the garbage. The purpose of this study is to find out how far the handling of specific household waste in COVID-19 confirmation patients in the Cangkuang Community Health Center Work Area is compared to the applicable standard standards for handling COVID-19 special waste.

II. LITERATURE REVIEW

2019-nCoV is a new type of beta-CoV, belonging to the subgenus Sarbecovirus. After this new virus was identified and its entire genome sequenced, extensive thawing was carried out in the GenBank sequence database, which was found to be mostly associated with two bat strains of CoV (bat-SL-CoVZC45 and bat-SL-CoVZXC21), with 96.2% homology with those of the CoV bat. first. Significantly, 2019-nCoV shares only 79.5% of the genetic sequence with SARS-CoV and approximately 50% with Mers-CoV. Therefore, it is assumed that like SARS-CoV and MERS-CoV, the origin of this virus is bat CoV. So far it has been impossible to determine which animal is the reservoir host. In addition, human-to-human transmission has been confirmed by the presence of cases between family members and health workers (Rodriguez, 2020).

Coronavrius Disease 2019 (COVID-19) is an infectious disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). SARS-CoV-2 is a coronavirus that is known to cause diseases that can cause severe symptoms such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). Common signs and symptoms of COVID-19 infection include acute respiratory symptoms such as fever, cough and shortness of breath. The average incubation period is 5-6 days with the longest incubation period of 14 days. Severe cases of VOVID-19 can lead to pneumonia, acute respiratory syndrome, kidney failure and even death.

Current epidemiological and virological studies prove that COVID-19 is primarily transmitted from a symptomatic person to another person who is in close proximity via droplets. Droplets are water-filled particles with a diameter of> 5-10µm. Droplet transmission occurs when a person is in close proximity (within 1 meter) with someone who has respiratory symptoms such as coughing or sneezing so that the droplets are at risk of hitting the mucosa (mouth and nose) or the conjunctiva (eyes). Transmission can also occur through objects and surfaces contaminated with droplets around infected people. Therefore, transmission of the COVID-19 virus can occur through direct contact with an infected person and indirect contact with surfaces or objects used on an infected person (for example, a stethoscope or thermometer).
In the context of COVID-19, airborne transmission may be possible in special circumstances where aerosol-producing supportive procedures or treatments such as endotracheal intubation, bronchoscopy, open suction, administration of medication, nebulization, manual ventilation before intubation, changing the patient to a prone position, disconnecting the ventilator , non-invasive positive pressure ventilation, tracheostomy and cardiopulmonary resuscitation. Further research is still needed regarding airborne transmission (Guideline P2 COVID-19 5th revision).

Independent isolation or home care is carried out for people with mild symptoms and without comorbid conditions such as lung, heart, kidney and immunocompromised conditions. This action can be performed on a patient under surveillance, a person under surveillance and symptomatic close contact while keeping an eye on the possibility of worsening. Some of the reasons for patients being treated at home are inpatient care not available or unsafe. These considerations must take into account the patient's clinical condition and environmental safety. Location consideration can be done at home, public facilities, or transportation means by taking into account local conditions and situations. Informed consent needs to be made as per the attached form for patients who perform home care.
It is important to ensure that the environment in which the monitoring is conducted is conducive to meeting the physical, mental and medical needs of the person. Ideally, one or more public facilities that can be used for monitoring should be identified and evaluated as an element of preparedness to face COVID-19. The evaluation should be carried out by an official or public health officer. During the monitoring process, patients must always be proactive in communicating with health workers. Health care workers who carry out monitoring use PPE, at least in the form of surgical masks and disposable rubber gloves (contact with the patient's body fluids if necessary).

According to Law No. 8 of 2008 concerning Waste Management, waste is the remains of human daily activities and / or natural processes in solid form. Meanwhile, based on Government Regulation No. 81/2012 concerning Management of Household Waste and Waste Similar to Household Waste, household waste is waste originating from daily activities in the household which does not include feces and specific waste. The classification of types of waste can be based on its chemical composition, biodegradability, flammability, hazard and characteristics. Based on the classification of chemical composition, waste is divided into organic waste and inorganic waste (Noor, 2013 in Sudrajat, 2018).

According to Law No. 18 of 2008 concerning Waste Management, the types of waste consist of: 1) household waste is waste originating from daily activities in the household, excluding feces and specific waste, 2 types of household waste. constitutes waste originating from commercial areas, industrial areas, special areas, social facilities, public facilities, and / or other facilities, 3) specific waste is waste containing hazardous and toxic materials, containing hazardous and toxic waste, waste arising from disasters, debris from building demolitions, technology that cannot be processed, and / or waste that occurs periodically.
According to Government Regulation No.27 of 2020 concerning Specific Waste Management, specific waste can come from: households, commercial areas, industrial areas, special areas, residential areas, social facilities, public facilities, and other facilities. B3 waste treatment is the process of reducing and /

or eliminating its hazardous and / or toxic nature. In its implementation, B3 waste treatment can be carried out thermally or non-thermally

The research design used a qualitative approach to the type of case study in the Cangkuang Community Health Center. The research was conducted by interviewing via cell phone to reduce the risk of direct contact, while the observation was carried out via cell phone with the respondent sending photos that match the object under study. The instruments of this study were the interview form, internal documents, observation sheets, cellphones, and cameras. Respondents of this study were 8 COVID-19 confirmation patients who were independently isolated, close contact families who live in one house: 4 people, Environmental Health Section of the Bandung Regency Health Office: 1 person, TPS C: 1 person in charge. Data analysis in this study uses thematic analysis with the aim of identifying each object that is used as a research which will then be analyzed by the researcher, namely Reduction Data, Display Data, and Conclusion Drawing / Verification.).

III. METHODOLOGY

The research design used a qualitative approach to the type of case study in the Cangkuang Community Health Center. The research was conducted by interviewing via cell phone to reduce the risk of direct contact, while the observation was carried out via cell phone with the respondent sending photos that match the object under study. The instruments of this study were the interview form, internal documents, observation sheets, cellphones, and cameras. Respondents of this study were 8 COVID-19 confirmation patients who were independently isolated, close contact families who live in one house: 4 people, Environmental Health Section of the Bandung Regency Health Office: 1 person, TPS C: 1 person in charge. Data analysis in this study uses thematic analysis with the aim of identifying each object that is used as a research which will then be analyzed by the researcher, namely Reduction Data, Display Data, and Conclusion Drawing / Verification.).

IV. RESULT AND DISCUSSION

A. Result

1. Specific types of waste generated during independent isolation

Table 1
Specific types of waste generated during independent isolation

No	Respondents P	Type of waste generated
1	Respondent J	Tissues, disposable mask, food wrappers, and *handsanitizer* bottles
2	Respondent D	Tissues, disposable mask, food wrappers, and *handsanitizer* bottles
3	Respondent C	Tissues, disposable mask, food wrappers, and *handsanitizer* bottles
4	Respondent A	Tissues, disposable mask, food wrappers, and *handsanitizer* bottles
5	Respondent L	Tissues
6	Respondent T	Tissues and food wrappers
7	Respondent O	Tissues and food wrappers
8	Respondent E	Tissues and food wrappers

From the results of interviews with Respondent P, the types of waste generated during independent isolation have similarities, namely tissue, food wrappers, disposable masks and handsanitizer bottles.

2. Specific waste sorting method

Table 2
Specific waste shorting method of self isolated Covid-19

No.	Respondents P	Shorting	
		Yes	No
1	Respondent J	√	
2	Respondent D	√	
3	Respondent C	√	
4	Respondent A	√	
5	Respondent L	√	
6	Respondent T		√
7	Respondent O		√
8	Respondent F		√

Based on the results of the interview at the sorting stage, it was found that 37.5% did not meet the requirements because there were 3 Respondents P who did not separate between specific waste and household waste so that the waste was mixed. Respondent P did not yet know if specific waste had to be sorted and differentiated from other household waste because specific waste was waste directly contaminated by COVID-19 confirmation patients who were feared to be a medium for transmitting COVID-19.

3. Specific waste storage method

Table 3
Specific waste storage method of self isolated Covid-19

No	Respondents P	The ares special container available		Containers are labeled/coded		The containers is always closed	
		Yes	No	Yes	No	Yes	Now
1	Respondent J	√		√		√	
2	Respondent D	√		√		√	
3	Respondent C	√		√		√	
4	Respondent A	√		√		√	
5	Respondent L	√			√	√	
6	Respondent T		√		√		√
7	Respondent O		√		√		√
8	Respondent F		√		√		√

Interview result:
"The waste generated during independent isolation is put into a special trash can that was bought by the wife (Respondent K), which has a lid, and I cover the bin with black plastic to make it easier to collect the trash when it's full. I labeled the black plastic with paper with the words "hazardous waste", and I disinfected the trash I threw away. " (Respondent J, COVID-19 confirmation patient who is self-isolating)

“I bought a special trash can for my husband (Respondent L) which he used during self-isolation. I cover the trash with black plastic and always keep it closed. I tell my husband (Respondent L) every time I throw out rubbish that has been in direct contact to always spray disinfectant first. And when the trash can is full, then I will wrap the black plastic and spray it again with disinfectant to avoid spreading the virus. " (Respondent S (Close Contact of Respondent L)

"I don't really understand about this garbage, I just throw away the trash in my room which is then combined with other garbage." (Respondent T, self-isolating COVID-19 confirmation patient)

“The garbage produced by my sister (Respondent F) during independent isolation is thrown into the same trash can as other dry trash. I don't know about the waste produced by COVID-

19 confirmation patients that must be disposed of in a special place. "(Respondent N (Close Contact of Respondent F))

4. Specific waste collection methods

Table 4
Specific waste collection methods of self isolated Covid-19

No.	Respondents P	Specific wasted is transforted to the TPS using a licensed vehicle		Specific wasted is disposed of in a special TPS for specific wasted	
		Yes	No	Yes	Now
1	Respondent J		√		√
2	Respondent D		√		√
3	Respondent C		√		√
4	Respondent A		√		√
5	Respondent L		√		√
6	Respondent T		√		√
7	Respondent O		√		√
8	Respondent F		√		√

Referring to table 4., it was found that 100% of the results did not meet the requirements because all Respondents P did not dispose of specific waste at the special B3 TPS from COVID-19 patients who were independently isolated and even transported did not use a vehicle that already had a B3 permit. The results of the interview with Respondent P showed that the specific waste generated during independent isolation was disposed of to a public TPS, but there was also specific waste generated during independent isolation by Respondent P, which was processed by fire. The results of interviews with Respondent K as a close contact family who live in the same house with a COVID-19 confirmation patient are as follows:

This interview was conducted with Respondent R as a close contact family of COVID-19 confirmation patients who were independently isolated, namely Respondents J, D, C, and A.
"The waste that is produced is divided into two, for dry and wet household waste I usually hang it in front of the house which is then transported by the cleaning service, while the hazardous garbage from my husband and children, usually burnt alone on the 3rd floor of our house because I am worried that if the garbage is dumped into TPS it could become a medium for the transmission of the corona virus. "

This interview was conducted with Respondent S as a family of close contact with COVID-19 confirmation patients who are independently isolated, namely Respondent L.
"When the specific waste produced by my husband was full in the trash, I immediately wrapped the specific waste using black plastic and then sprayed disinfectant which I then threw myself at TPS C. I do this activity every 2 days by using a bicycle. motorcycle. I do not mix specific waste with dry household waste because I am afraid that it will spread to other people, so I throw it myself into TPS C for dry household waste and store it in front of the house where it is then transported by the cleaning staff.

This interview was conducted on Respondent U as a close contact family of COVID-19 confirmation patients, namely Respondent T and Respondent O.
“Our house was locked by local residents which caused us to go nowhere, not even throwing garbage out of our house so that the garbage from our house was piled up in front of the house and it was all mixed up, it's been almost 3 weeks we can't leave the house and the plan was when it was done. There was a swab from my wife and child which stated that they were cured, so I would throw this garbage to TPS C. Usually there are cleaners who carry garbage

from our house but because the news of my wife and child has spread so that the cleaning staff is reluctant to take the trash from our house. "

This interview was conducted with Respondent N as a close contact family of a COVID-19 confirmation patient, namely Respondent F.
“Garbage from our homes is usually transported by cleaners, sometimes once a day, every other day or even once every three days. The waste is then disposed of to TPS C. "

5. Specific garbage transport method

Interviews were conducted with the person in charge of TPS C to review the extent of activities at TPS C in handling waste because officers working at TPS C did not know the type of waste disposed of at TPS C.
"As the person in charge at TPS C, I do not know what kind of waste is thrown here, but the officers here, after transporting the garbage from the residents, then sort it again to separate the trash that can still be sold. From the PD Cleaning, there is no information regarding the handling of specific waste from COVID-19 confirmation patients. The waste that is dumped here will then be taken to the Sarimukti TPA by using a garbage truck. "

Interviews were not conducted only to the person in charge of TPS C, but interviews were also carried out to the Bandung Regency Health Office, especially the Environmental Health Section, as for the results of the interview as follows:

"So far, the dropbox / depot to dispose of specific waste from COVID-19 confirmation patients is only at the Manggahang BLK, but if the dropbox / depot to dispose of specific waste from COVID-19 confirmation patients in each sub-district has not been available until now."

6. Specific wasted final processing

The specific waste that is disposed of to TPS C and has been sorted out by the officers working at TPS C, then the specific waste at TPS C will be transported again to TPA Sarimukti. Based on the results of interviews with the person in charge at TPS C, the waste will be transported to TPA Sarimukti twice a day, namely at 05.00 a.m and 11.00 p.m. Garbage that has arrived at the Sarimukti TPA will also be sorted out by the officers there.

7. Specific waste management

Based on the results of interviews regarding the handling of specific waste in self-isolating COVID-19 confirmation patients, the following results were obtained:

Table 5
Specific waste management methods of self isolated Covid-19

No.	Question	Criteria		% Not Qualify
		Qualify	Not Qualify	
1	Doing waste stroing	5	3	37.5
2	Garbage is disenfected	5	3	37.5
3	The are containers availabale	5	3	37.5
4	Special labels are available	4	4	50
5	Closed containers	5	3	37.5
6	Specific waste are disenfected	7	1	12.5

7	Garbage is transported to the TPS provided by the relevant regional goverment	0	8	100
8	Transported of waste is carried out by transported who already have a permit	0	8	100
9	Garbage is transported to the TPA	4	4	50

Referring to Table 5, the results show that the specific waste handling methods carried out by COVID-19 confirmation patients who are independently isolated in the work area of the Cangkuang Community Health Center who do not meet the requirements in the sorting stage are 37.5%, disinfected waste is 37.5%, special containers are available for 37.5 %, special labels are available at 50%, closed containers at 37.5%, specific waste containers are disinfected by 12.5%, 100% of waste is transported to the TPS provided by the relevant local government, transportation of waste by transporters who already have a license of 100% and garbage transported to the TPA by 50%.

8. Discussion

The types of waste produced vary, but the most common ones are tissue, disposable masks and food wrappers. Respondent P often uses tissue because tissue is the simplest and easiest wiping object because it can be found in many minimarkets and has a lot of content so it is often used once and then throw away.

WHO has advised the public to wear masks for both sick and healthy people. Respondent P who did self-isolation often produced used mask waste, but there were some Respondents P who produced disposable trash and there were also some Respondents who used masks that could be reused. WHO also recommends the use of single-use masks to be more careful in disposing them so they are not reused, whereas for masks that can be reused, only 1 mask is allowed for 1 person and if the mask is dirty or wet, it must be replaced by washing it carefully. to avoid contamination to other items. The Minister of Health of the Republic of Indonesia suggested that if someone uses a reusable mask, that person must have a spare mask.

Respondent P also produces a lot of specific waste in the form of food wrappers, this is because with an application that can make it easier to order delivery food so that some Respondents P choose to order food using the application, and there are also some close contact families who provide Respondent P such as snacks, drinks and vitamins that are still wrapped in their packaging which then the packaging becomes specific waste.

Separating specific waste for self-isolating COVID-19 confirmation patients must be separated between specific waste and household waste. 5 Respondent P, who was independently isolated, had separated specific waste from household waste to prevent transmission of COVID-19, so that different trash bins were provided between specific and household waste. the specific waste that is discarded has also been sprayed using a disinfectant first. The other 3 Respondents P did not sort specific waste so that it was still mixed between specific waste and household waste. This is because Respondent P does not yet know how to handle specific waste, it is feared that the specific waste can contaminate household waste, so it is necessary to separate the specific waste from household waste first.

Respondent P used 1 plastic bag to dispose of specific waste which was then disposed of at the TPS. The other 2 Respondents P, when closing the plastic bag, waited for the specific waste to be full first. According to Scheinberg (2020) explaining the stages in the containment of specific waste from self-isolating COVID-19 confirmation patients, as follows: 1) all specific waste produced by COVID-19 confirmation patients must be

combined in 1 disposable plastic bag1, 2) ethics ¾ the plastic bag is full, so the plastic bag is closed and leaves a little air if possible, 3) the plastic bag must be put in the second plastic bag. 4) This second plastic antong should not be too full to make it easier to close and should not be damaged; In closing this second plastic bag, hands should not be pressed to get enough space for specific waste inside, 5) squeeze the disinfectant liquid on the outside of the bag, 6) someone must wash their hands before and after doing the container, 7) the second plastic tube can put in a closed temporary storage area.

All P Respondents who were independently isolated in the work area of the Cangkuang Community Health Center, 4 respondents did not meet the requirements in the specific waste container method because there was still specific waste mixed with household waste, the container was not given a special label or code and the container was open. Labeling / coding on plastic bags in order to make it easier for cleaners or trash transporters to find out what type of waste is being thrown by consumers, so that officers will be more careful in transporting it to TPS, and to prevent transmission of COVID-19 due to COVID-19 can last several hours on inanimate objects.

The collection of specific waste from COVID-19 confirmation patients who are independently isolated in the work area of the Cangkuang Community Health Center is different, some are transported by motorbike to TPS C and some are transported by garbage collectors. 4 Respondent P did not collect garbage, but they processed specific waste by themselves by burning it on the top floor of their house. 4 Another respondent P, transports specific waste to the same TPS, namely TPS C. This TPS C is a public TPS that receives waste from 52 RWs in the Cangkuang Kulon and Cibaduyut areas.

Of the 4 Respondents P who were transported to TPS C, there was Respondent L who was a COVID-19 confirmation patient who was independently isolated, for his specific waste was transported by himself on a motorbike by a close contact family who lives in the same house with him, this specific waste from Respondent L was transported one day Two times to TPS C. This is because the transportation of specific waste from Respondent L's house to TPS C can be scattered on the streets and may cause the transmission of COVID-19.

Other respondent P whose waste was transported to TPS C were Respondent T and Respondent O who were self-isolating COVID-19 confirmation patients, the specific waste produced from this house has been almost 3 weeks starting from the first independent isolation there has not been garbage transportation. This is because there are problems among local residents who are anxious because one of their residents is affected by COVID-19, with the citizens' mindset about COVID-19 so they do not care to lock the houses of Respondent T and Respondent O from outside, so that one of Respondent T's family You can't go anywhere, usually the garbage from Respondent T's house is often transported but after receiving this news, the garbage collector is reluctant to pick up trash from Respondent T's family house. Specific waste from Respondent T's house piles up and mixes with household waste. . According to the Asian Development Bank (2020) in Amalia (2020) states that infectious waste or specific waste in households must be transported as soon as possible.

Another respondent P who transports garbage to TPS C is Respondent F who is a COVID-19 confirmation patient who is self-isolating, but for Respondent F, the waste generated from his house is transported by garbage transport officers every two days or even once every three days. The specific waste produced by Respondent F was not disinfected first so it was feared that it could infect the garbage transporters.

Specific waste that has been disposed of by a COVID-19 confirmation patient who is self-isolated to TPS C, will then be sorted again by the officers at TPS C and the garbage at TPS C will be transported to TPA Sarimukti every day by using a garbage truck every 05.00 morning and 11.00 am. Many of the officers working at TPS C still do not wear PPE such as gloves, masks and boots. The person in charge of TPS C does not know where the waste that

is disposed of comes from because it is feared that specific waste originating from COVID-19 confirmation patients who are independently isolated could be mixed with other waste while at TPS C.

According to Government Regulation No. 27 of 2020 concerning Specific Waste Management, it is clear that specific waste transportation refers to the statutory regulations regarding B3 waste. In accordance with Government Regulation No. 101/2014 concerning Management of Hazardous and Toxic Waste, it is explained that in the transportation of B3 or specific waste, it must have a permit issued by the Minister of Environment and Forestry.

Anne Dewiana Rulianti as Secretary of the Bogor City Environment Agency said that the flow of infectious waste handling from COVID-19 confirmed patients who are self-isolated can be done with specific waste originating from households being transported to auxiliary Puskesmas which is then handled by the main Puskesmas and last transported by the Environmental Service officer to be handed over to a third party managing the B3 waste.

The results of the analysis based on an interview with the person in charge of TPS C, stated that the garbage disposed of at TPS C will be transported using a garbage truck to TPA Sarimukti. TPA Sarimukti serves as a collection of waste from 4 areas, namely Bandung City, Bandung Regency, West Bandung Regency and Cimahi City. TPA Sarimukti has a sanitary landfill principle, namely garbage is stacked and compacted and then leveled by heavy equipment then piled back by the ground. According to Amalia (2020) specific waste can be disposed of to the TPA with waste processing procedures at the TPA like handling household waste in general but the TPA must based on the minimum controlled landfill standard, while TPA Sarimukti uses the principle of sanitary landfill where this principle is more advanced than controlled landfill so that specific waste from COVID-19 confirmation patients can be processed like household waste in Sarimukti TPA, as long as the waste is left idle for 72 hours and transported directly using a garbage truck.

The handling of specific waste by COVID-19 confirmation patients who are independently isolated in the work area of the Cangkuang Community Health Center has not fully met the requirements because there are still several things that do not meet the requirements when compared to the applicable regulations, namely the Circular Letter of the MENLHK No. SE2 / MENLHK / PSLB3 / PLB.3 / 3/2020 and Government Regulation No. 27 of 2020 concerning Specific Waste Management. There are still many COVID-19 confirmation patients who are self-isolating who do not know about specific waste handling so it is necessary to conduct education or outreach by related agencies such as the Puskesmas. Specific waste produced by COVID-19 confirmation patients who are independently isolated can be entrusted to the Puskesmas because the Puskesmas already has an MoU with licensed B3 transportation and processing services, so that specific waste produced by COVID-19 confirmation patients who are independently isolated does not mixed with other household waste that is feared could become a medium for transmission of COVID-19.

V. CONCLUSION

The specific types of waste produced by COVID-19 confirmation patients who are self-isolated, namely tissue, disposable masks, food wrappers and handsanitizer bottles, 37.5% of waste sorting methods do not meet the requirements, 50% specific waste container methods do not meet the requirements, garbage collection 100% specific does not meet the requirements, 100% specific waste transportation does not meet the requirements, specific waste final processing does not meet the requirements, and 100% specific waste handling does not meet the requirements when compared to the Circular Letter of MENLHK No. SE2 / MENLHK / PSLB3 / PLB.3 / 3/2020 and Government Regulation No. 27 of 2020 concerning Specific Waste Management.

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PRODUCT ATTRIBUTES DETERMINE THE PREFERENCE OF HERBAL MEDICINE CONSUMERS

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Abstract

The emergence of a wide variety of herbal medicinal products requires marketers to better understand consumer behavior. The various brands offered make consumers tend to have certain preferences before making a purchase decision. This study aims to determine the attributes of herbal medicinal products that determine the level of consumer preference in the purchasing process and the closeness of the attributes to consumer preferences. The method used is interviews with consumers which are then processed with conjoint analysis to determine the attributes that are most important to consumers in making a purchase. The research concludes that the most important attributes in purchasing herbal medicine in order from the most important are the properties, price, expiration time and packaging. There is a close relationship between the combination of attributes studied and consumer preferences for herbal medicine. This study is limited to four attributes and does not use ranking ratings on the stimulus or combination of attributes, consumer behavior. The uniqueness of this study is to analyze the attributes simultaneously.

Keywords: Herbal medicine product attributes, consumer preferences, conjoin analysis, level of importance

PRELIMINARY

1.1. Background

Medicinal plants are a type of plant that is proven as a natural ingredient in the pharmaceutical industry. This commodity has the potential to be developed as a source of raw materials for herbal and modern medicine. The use of medicinal plants is not only in primary form but also in secondary form / simplicia and extracts. The development of this medicinal plant processing industry has an impact on increasing demand for raw materials. The rate of demand for medicinal plant raw materials is increasing with the trend of public interest in consuming herbal medicines, the high cost of modern chemical drugs and a lifestyle that leads to back to nature. The increase in the rate of consumption of natural ingredients medicine is shown in the production of the Natural Material Extract Industry (IEBA) and Standardized Herbal Medicine (OHT).

The increasingly diverse production of herbal medicines has consequences for the rivalry between producers. Herbal medicine manufacturers are required to be more responsive in understanding the behavior patterns of their consumers. Manufacturers seek to identify the

character of consumers in the product purchasing process. Consumers have alternative choices in making decisions about the type of herbal medicine to buy. The number of herbal medicine brands on the market makes consumers have many alternative choices according to the preferences they want. Consumers tend to analyze the information provided by the manufacturer before determining their choice in making drug purchase decisions. Consumer preferences are indicated by the product attributes.

1.2. Research purposes

1. To know the attributes that determine the selection of purchasing decisions.
2. This is to determine the closeness of the relationship between the combination of attributes and consumer preferences

2.LITERATURE REVIEW

2.1. Product attribute

Attributes are properties or characteristics of a product. In general, attributes function in determining evaluative criteria in the consumer decision-making process. Marketers are very interested in consumer knowledge about product attributes because they can influence consumers in making purchasing decisions. Attributes are divided into three aspects, namely product quality, design and product characteristics (Kotler, P., 2005) ,. Product quality is the product's capabilities related to its functionality. Product characteristics are used to distinguish differences from competing products, while product design shows a characteristic product appearance that triggers consumer attention.The results of research on the product attributes of oyster mushrooms, namely packaging, quality, price, and brand have a significant effect on purchase decisions except for brand attributes (Sudrajad, AB and DRAndriani, 2015)

2.2. Consumer Preferences

Consumer Preferences states that consumer attitudes towards a choice of product brands that are formed have gone through the evaluation stages of alternative types of brands (Kotler, P and KLKeller, .2009). The drug preference study concluded that the preference for modern medicine was 65.4% and herbal medicine was 34.6%. The factors that most influence the choice of modern medicine are economic and psychological factors, while the choice of herbal medicine is due to social, psychological and economic factors (Yudhianto, 2017).

3. RESEARCH METHODS

3.1. Location and Time of Research

3.2.The research was conducted at CV Toga Nusantara, Bekasi City and at the Sringganis Garden Processing Industry located in Bogor City. Determination of the location is done purposively with the consideration that the two companies are herbal medicine industries that sell their products directly to end consumers. Data collection was carried out from February to September 2020.

3.2. Research Respondents and Data Collection Methods

Determination of respondents is carried out *purposive sampling*, based on the criteria, namely: the final consumer who buys herbal medicine. The number of respondents interviewed was 60 consumers consisting of herbal medicine consumers from the two companies, with 30 respondents each.

Respondents were collected using the Accidental Sampling method. Respondents are herbal medicine consumers who happen to meet researchers who are actively making purchases at sales outlet locations.

3.3. Data analysis method

The analysis method is quantitative and descriptive analysis. In the quantitative analysis carried out using conjoint analysis Conjoin analysis is processed using*software* SPSS 17 *for windows*. The most detailed conjoint method in evaluating the level of preference of consumers related to levels and attributes so that respondents can be more specific in determining attributes and levels of choice.

IV. RESULTS AND DISCUSSION

Consumer Preference for Product Attributes

The attributes analyzed were packaging, price, expiration date and efficacy. The results of the analysis show the most important attributes in purchasing herbal medicines as seen in Table 1.

Table 1 Conjoint Analysis of the Relative Importance Value of the Herbal Medicine Attributes

No.	Attribute	Value of Interest
1	Efficacy	70,769
2	Price	16,668
3	Expired date	5,748
4	Packaging	6,816
	amount	100

Table 1 shows that the most important attribute is efficacy with an importance value of 70,769, this shows that consumers of herbal medicines are very concerned about the efficacy of herbal medicines. The second attribute is price with an importance value of 16,668, the next attribute is expiration date with a value of 5,748, the last order is packaging, this attribute is not considered by consumers when buying herbal medicine compared to other attributes.

Herbal medicinal properties

Efficacy is the most important attribute in a product herbal medicine. The level of attributes on the efficacy of herbal medicine or utility value can be seen in Figure 1.

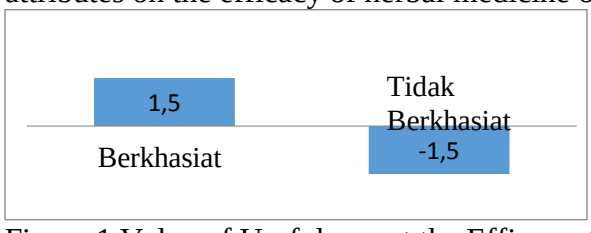

Figure 1 Value of Usefulness at the Efficacy Attribute Level of herbal medicine

Figure 1 shows that consumers really like herbal medicines which have efficacy with a value of 1.5 compared to herbal medicines that are not efficacious, this shows that the attributes of herbal medicines that are efficacious can be used as consumer preferences and are liked by consumers while non-efficacious herbal medicines have a negative value, namely -1.5 This

shows that consumers really don't like herbal medicines that have no properties and consumers really consider the properties in purchasing herbal medicines

Price

The price attribute has two level is an affordable and expensive price. At the attribute level, the expensive price has a useful value of -0.354, this shows that expensive herbal medicinal products are not liked by consumers and consumers prefer affordable herbal medicines with a useful value of -0.354. the utility value of this attribute in Figure 2

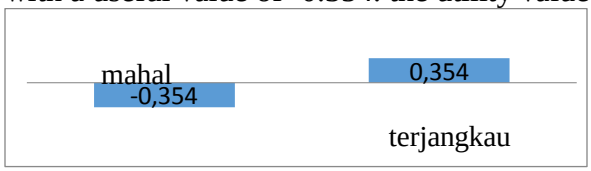

Figure 2 Value Usefulness Against Price

Expiry Time

Preferred expiration timehas a long-lasting expiration time of 0.087 while the non-durable is -0.087. This shows that consumers do not like herbal medicines that have expiration time than those that do not last long (Figure 3).

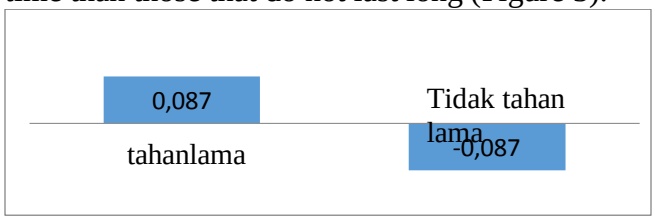

Figure 3 Value of Use Against Expiry Time

Packaging

The level of packaging attribute has 2 attribute levels, namely unattractive and attractive packaging, consumers prefer attractive packaging with a value of 0.042 than unattractive packaging of -0.042. This shows that the packaging made by consumers prefers as consumers' preference for herbal medicine, can be seen in Figure 4.

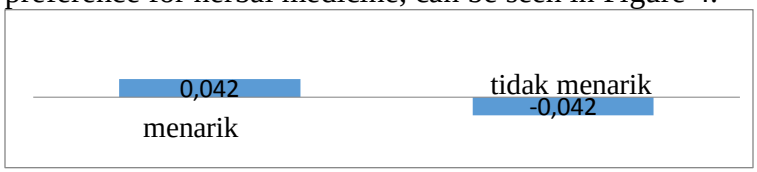

Figure 4 Value of Use of Packaging

Correlation test

The accuracy of the conjoint analysis of the combination of attributes with the results of consumer preferences is measured by correlation test. The results of the correlation test can be seen in Table 2.

Table 2 Results of the Correlation Test for the Combination of Attributes with Consumer Preferences

	Value	Sig.
Pearson's R	0.991	0.000

Kendall's	0.982	0.000

Table 2 shows the Pearson's R correlation value of 0.991, with a significant value of 0.000, this indicates a close relationship between the combination of attributes and consumer preferences because the significant value of Pearson's R is smaller than the significant attribute level used, namely 0.05. The test results show that conjoin can be used as a consumer preference for herbal medicine which can be used as a reference in developing a marketing mix for herbal medicinal products. This is in line with researchFerrinadewi, E (2005) concluded that 3 attribute factors that are considered by consumers in making cosmetic purchasing decisions, namely quality factors, risk factors and brand factors.

V. CONCLUSION

The study concluded that the most important attributes in purchasing herbal medicine from the most important were efficacy, price, expiration time and packaging. There is a close relationship between the combination of attributes studied and consumer preferences for herbal medicine.

RECOGNITION

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THE PERFORMANCE OF THE SAFETY SUPPLY CHAIN (Curcuma Domestica Val.) AS A HERBAL MEDICINE

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ABSTRACT

Turmeric (Curcuma domestica Val) is a medicinal plant that is widely used as an ingredient in natural herbal medicine. The increasing need for natural herbal medicine has a great opportunity to develop turmeric medicinal plants, as well as the processing industry on a large enough scale. With the increase in turmeric plants, it is necessary to support a good supply chain management system. This study aims to analyze supply chain performance and supply chain channel efficiency of turmeric at CV. Herbattaubah city of Bogor. The research location was conducted at CV. Herbattaubah Bogor City with the number of respondents taken as many as 31 turmeric farmers, 3 village gathering traders, and 1 large trader. The analysis used in this research is descriptive and quantitative analysis. The results showed: The performance of the supply chain of turmeric as a raw material for natural medicine in CV. Herbattaubah, consists of a flow of information in the form of information about prices, availability of turmeric and turmeric orders from CV. Herbattaubah to turmeric supplier, product flow in the form of saffron delivery to CV. Herbattaubah from farmers in Banyumas, financial flow in the form of payment of turmeric from CV.Herbattaubah to suppliers. The most efficient marketing supply chain channels for turmeric are channels (3) and (4), with a margin value of Rp. 0, and the largest farmer's share of 100%. financial flow in the form of turmeric payments from CV.Herbattaubah to the suppliers. The most efficient marketing supply chain channels for turmeric are channels (3) and (4), with a margin value of IDR 0, and the largest farmer's share of 100%. financial flow in the form of turmeric payments from CV.Herbattaubah to the suppliers. The most efficient marketing supply chain channels for turmeric are channels (3) and (4), with a margin value of Rp. 0, and the largest farmer's share of 100%.

Key words: medicinal plants, turmeric, supply chain

1. INTRODUCTION

Indonesia has good potential and prospects for the development of medicinal plants. Indonesia has 30,000 types of plants and about 940 species of which are known to have medicinal properties and 180 species have been used in traditional medicinal herbs by the Indonesian traditional medicine industry (Susi, 2005). Turmeric is a medicinal plant that has been seriously cultivated in Indonesia.

Turmeric (Curcuma domestica Val) is a medicinal plant that is widely used as an ingredient in natural herbal medicine. According to BPS (2018), turmeric is one of the biopharmaceutical plants in the rhizome group which has increased from 2017 to 2018 with a production value of 331,796,475 kg and a growth of 58%.

The increasing consumption of natural medicines is indicated by the existence of the Traditional Medicine Industry (IOT) and the Natural Material Extract Industry (IEBA). The increasing need for natural herbal medicines has a big opportunity to develop turmeric medicinal plants, as well as the processing industry on a fairly large scale. With the increase in turmeric plants, it is necessary to support a good supply chain management system. The use of supply chain management is to determine the relationship between information flows, product flows, and financial flows from farmers to end consumers (Assauri, 2011).

The increasing demand for herbal medicines, especially in Indonesia, is a promising business opportunity in developing the processing industry, so that many herbal medicine manufacturers have sprung up. The higher demand for herbal products has the potential to bring benefits to farmers.

CV. Herbattaubah is one of the Traditional Medicine Industry (IOT) and Natural Material Extract Industry (IEBA) in Bogor City which is still preserving and producing various medicinal plants for public health. CV. Herbattaubah produces various products with the main raw material, namely medicinal plants.

The problem that arises is how to manage a supply chain that involves farmers so that profits are on their side. This study aims to analyze supply chain performance and supply chain channel efficiency of turmeric at CV. Herbattaubah city of Bogor.

2. LITERATURE REVIEW

Supply Chain Performance

Supply chain management is the management of a flow of material and information as supporting facilities between the supply chain, such as with suppliers, vendors, manufacturing plants, assembly plants, warehouse facilities. warehousing), distribution centers (distribution centers), and retailers (retailers) (Masudin (2017) .In the supply chain concept, suppliers are one of the most important parts of the supply chain and affect the survival of a factory (Musyaffak et al., 2013).).

Measuring supply chain performance is necessary so that evaluation and improvement can be carried out so that its performance is expected to improve. Performance measurement is a process for quantifying the efficiency and effectiveness of an action (Tangen, 2004).

A good supply chain performance assessment between suppliers, companies and customers can be measured by one of the supply chain management performance measurement models, namely the Supply Chain Operations Reference (SCOR) model, which is a model designed by the Supply-Chain

Council (SCC) (Bolstorff & Rosenbaum). , 2003).

To create an effective and efficient performance management, a measurement system that is capable of evaluating the performance of the supply chain holistically is required. The work measurement system is needed to: 1) Supervise and control; 2) Communicate organizational goals to functions in the supply chain; 3) Knowing the position of an organization against competitors and the objectives to be achieved; 4) Determine the direction of improvement to create competitive advantage (Pujawan, 2010).

Marketing Efficiency

Agribusiness marketing can be declared efficient (relative efficiency) if there are indicators such as (1) creating or increasing high value added to agribusiness products, (2) generating profits for each marketing agency (company) involved in accordance with the value of the sacrifices (costs incurred), (3) the marketing margins (costs and profits) that occur are relative to business functions or activities that increase final consumer satisfaction, and (4) give the farmer's share the share) which will relatively stimulate farmers to produce at the farm level (Asmarantaka, 2012).

Marketing margin

Marketing margin is used to determine the level of marketing efficiency from farmers to end consumers. Each supply chain actor performs a different marketing function. This makes a difference in the selling price of each supply chain actor. The more marketing agencies involved, the higher the price difference or the greater the marketing margin between producers and end consumers.

Farmer'Share

*Farmer's share*is also one of the quantitative measuring tools to assess marketing efficiency in addition to marketing margins. Farmer's share is influenced by: processing rate, transportation costs, product durability or shelf life, and the quantity of the product (Kohls and Uhl 2002).

3. RESEARCH METHOD

Location and Time of Research

The research was conducted at CV. Herbattaubah Bogor City. The location selection was made deliberately (*purposive*).Data collection was carried out from March to October 2020.

Research Respondents

Respondents were taken using the snowball sampling method. The number of respondents was 3 village collectors, 1 wholesaler, and 31 turmeric farmers.

Method of collecting data

This study uses primary data and secondary data. Primary data were obtained through direct interview techniques with turmeric farmers and turmeric marketing agencies. Direct interview technique using a questionnaire. Secondary data were obtained from the Central Bureau of Statistics, Directorate General of Horticulture, Ministry of Agriculture, previous research and other library materials.

Method of Analysis

The data analysis method used is descriptive and quantitative analysis. Descriptive analysis is used to identify the characteristics of farmers, marketing institutions and marketing channels. Quantitative analysis is used to analyze marketing efficiency including marketing margin and farmer's share

4. RESULTS AND DISCUSSION

4.1. Performance Turmeric Supply Chain

The performance of the supply chain of turmeric as raw material for making herbal medicine in CV. The herbs can be identified from the turmeric marketing channel patterns. There are three patterns of turmeric marketing channels, namely: Marketing channels (1) farmers - village collectors - wholesalers - CV. Herbattaubah Marketing channels (2) farmer - trader - CV. Herbattaubah Marketing Channel (3) plasma farmers - CV. Herbattaubah (Picture 1)

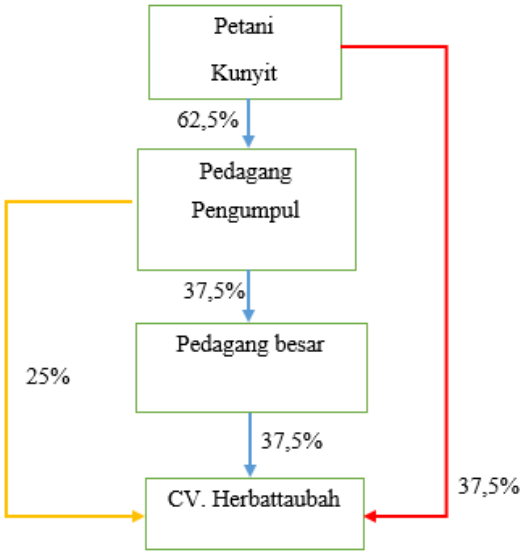

Figure 1. Turmeric Marketing Channels at CV. Herbattaubah, 2020

From the marketing channel pattern of turmeric, it can be analyzed the supply chain activity of turmeric as raw material for the manufacture of herbal medicine at CV. Herabattaubah. Turmeric supply chain activities consist of information flow, goods flow, and financial flow (Figure 2).

the flow of finance. Figure 2 shows the distribution pattern of the turmeric supply chain at CV. Herbattaubah.

Figure 2 Supply Chain Distribution Pattern Turmeric at CV. Herbattaubah, 2020

Information :

Information Flow :

Flow of Goods :

Financial Flow :

Information Flow

Information flow is a flow that moves from two directions, namely from upstream to downstream and downstream to upstream. The information flow that runs between turmeric marketing agencies includes information about prices, information on the types of turmeric seeds, the amount, the amount of turmeric available, and the status of taking and sending turmeric.

Flow of Goods

The flow of goods on the marketing channel (1), namely the collector traders purchase dried turmeric to farmers with an average purchase volume of 1,400 / kg per purchase, then sold to wholesalers with an average volume of 278.6 kg / day, then sold to CV. Herbatta change with an average volume of one time purchase then 214.3 kg /

day. In the marketing channel (2), namely, the collector traders buy dried turmeric from the farmers with an average volume of 550 kg / one purchase and then sell it directly to CV. Herbattaubah. In the marketing channel (3) farmers sell turmeric directly to CV. Herbattaubah in wet form with an average volume of 1000 / kg and selling dried turmeric with an average volume of 500 kg.

Financial Flow

The financial flow in the marketing channel(1), collecting traders buy turmeric from farmers at an average price of Rp. 9,000 / kg and sells to wholesalers at an average price of Rp. 14,000 / kg, then wholesalers sell to CV. Herbattaubah with an average price of Rp. 17,000 / kg. The financial flow in the marketing channel (2) the collector traders buy dried kunyi to the farmers at an average price of Rp. 9,500 / kg and sold directly to CV. Herbattaubah with an average price of Rp. 16,000 / kg. In the marketing channel (3) are plasma farmers who sell turmeric directly to CV. Herbattaubah in wet and dry form, the average selling price of wet turmeric is Rp. 6,000 / kg while the average selling price of dried turmeric is Rp. 12,000 / kg.

4.2 Turmeric Supply Chain Efficiency

The efficiency of the supply chain of turmeric was analyzed by using the marketing efficiency approach of turmeric using marketing margin analysis and farmer's share.

Marketing Margins

Margin analysis on each marketing channel has a difference, a margin on marketing (1) the average selling price at farmer level is Rp. 9,000 / kg with a total margin of Rp. 8,000 / kg. The margin in the marketing channel (2) the selling price at the farmer level is Rp. 9500 / kg with a total margin of Rp. 6,500 / kg. The marketing channel margin (3) is divided into two, namely the margin for wet turmeric with an average selling price of Rp. 12,000 / kg so that the total margin obtained is Rp. 0 / kg, while the margin for dry turmeric is 6,000 / kg average selling price, so that the total margin obtained is Rp. 0 / kg. The calculation of the marketing margin analysis can be seen in Table 6.

Table 6 Marketing Margin of Turmeric at CV. Herbattaubah Year 2020

No.	Marketing Agency	Channel			
		I	II	III Dry	III Wet
1	Farmer				
	Average Production Costs	4207.73	4207.73	4207.73	4207.73
	Selling price	9,000	9,500	12,000	6,000
	Drying Fee	240	233	233.33	-
	Marketing Costs	128	175.38	73.62	36.92
	Advantage	4,425	4,884	7,485	1,755
	Margin	9000	4616.11	4514.68	4244.65
2	Gathering Traders				
	Purchase price	9,000	9,500		
	Marketing Costs	395.50	395.50		
	Selling price	14,000	16,000		
	Advantage	4604.50	6,104.50		
	Margin				
3	Wholesalers				
	Purchase price	14,000			
	Marketing Costs	578.00			
	Selling price	17,000			
	Advantage	2,422			
	Margin	3,000			
4	CV. Herbattaubah				
	Purchase price	17,000	16,000	12,000	6,000
	Total Margin	**8,000**	**6,500**	**0**	**0**

Source: Primary data processed, 2020

Table 7. Farmer'Share analysis in CV. Herbattaubah Year 2020

No.	Marketing Institution	Prices at Farmers Level (Rp / Kg)	Prices at the consumer level (Rp / Kg)	*Farmer Share* (100%)
1	I	9,000	17,000	53
2	II	9,500	16,000	60
3	III	12,000	12,000	100
4	III	6,000	6,000	100

Source: Primary data processed, 2020

Farmer's Share Analysis

Calculation *farmer's share*done by dividing the selling price at the farm level with the selling price at the end consumer level. Efficient marketing can be seen from the largest share received by farmers. Based on the results of the calculations in Table 7 above, marketing channel III has the largest farmer share, which is 100% because this marketing channel is relatively shorter than other marketing channels. Analysis of the farmer's share calculation can be seen in Table 7.

Profit and Cost Ratio Analysis

The ratio of profit and cost can be calculated by comparing the amount of profit received and the marketing costs on the marketing channel. Efficient marketing channels can be seen from the distribution of the largest profit to cost ratio.

Based on the results of the profit and cost ratio analysis in Table 8, it can be seen that the profit-to-cost ratio in channel 1 has the largest value, namely 1.3, while the lowest ratio value, namely channel 3, has a ratio value of 0. Based on these analysts, it can be seen that efficient marketing channels from the farmer's side and in terms of traders or marketers by looking at the profits received and the lowest margin.

5. CONCLUSIONS AND SUGGESTIONS

5.1. Conclusion

1. The performance of the supply chain of turmeric as a raw material for natural medicine in CV. Herbattaubah, consists of a flow of information in the form of information about prices, availability of turmeric and turmeric orders from CV. Herbattaubah to turmeric supplier, product flow in the form of saffron delivery to CV. Herbattaubah from farmers in Banyumas, financial flow in the form of turmeric payments from CV.Herbattaubah to suppliers.
2. The most efficient marketing supply chain channels for turmeric are channels (3) and (4), with a margin value of Rp. 0, and the largest farmer's share of 100%.

5.2. Suggestion

Companies need to make raw material inventory management so that the company can anticipate shortages and delays in raw materials.

Table 8 Analysis of the Ratio of Profits to the Cost of Turmeric at CV. Herbattaubah, 2020

Marketing channel	Marketing Profits (Rp / product scale per batch)	Production Cost (Rp / production scale per batch)	Ratio of Benefit to Cost
1	7,026.5	5,181.5	1.35
2	6,104.5	4,603.3	1.32
3	0	0	0

Source: Primary data diola, 2020

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The Implementation Of Occupational Health And Safety For Pregnant Workers In Various Workplaces

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Abstract

Background - Pregnant workers have more health risks for health problems than other workers. There are different potential hazards in different workplaces. Occupational Health and Safety Programs need to be implemented for pregnant workers in order to avoid work related diseases in various workplaces.

Purpose – This study aims to determine the the implementation of occupational health and safety for pregnant workers in various workplaces.

Design/methodology/approach – This study uses a qualitative method by conducting FGD (Focus Group Discussion) with pregnant women workers from various workplaces and in-depth interviews with occupational health and safety experts.

Findings – Occupational health and safety programs have been implemented for pregnant workers such as the right to maternity leave, working hours arrangements, health insurance, and special protection for pregnant workers. However, there are some workplaces that still do not provide special protection for working pregnant women. Every workplace should pay more attention to the health and safety of pregnant workers as an effort to prevent occupational accidents and work related diseases.

Research limitations– This study uses a qualitative method. Future studies can more describe the health and safety of pregnant workers by using quantitative methods.

Originality/value – This study presents informants from many different workplaces, so that this study obtains in-depth information about the health and safety of pregnant workers from various sources.

Keywords: health, safety, pregnant, workers.

I. INTRODUCTION

Occupational Health and Safety is a must for companies to protect workers from health and safety risks, as well as increasing company productivity. If the health and safety of workers are well maintained, the morbidity, absenteeism, disability and work accidents can be minimized, so that healthy and productive workers will be realized. Company profits are also influenced by worker productivity, which is closely related to occupational health and safety.

Law of Republic Indonesia Number 1 of 1970 concerning Work Safety as the legal basis for implemention of safety work in Indonesia and Law of Republic Indonesia Number 36 of 2009 concerning Health states that all workplaces are required to implement health efforts both in the formal and informal sectors. Article 5 of the Law Number 13 of 2013 also explains that every worker has equal opportunity without discrimination to get a job, including women workers.

The current equality of working opportunities has increased the interest of female workers to actively participate in working. This provides an opportunity for women workers to develop their personal abilities through various types of work. Women workers have received special attention in the world of work. This is due to the complex problems faced by the female workforce itself, both in relation to

developing their personal potential and in relation to family and community life at the same time (Hakim, 2011).

In Indonesia, female workers are protected by the Major Labour Laws of Indonesia. The protection includes the right to menstruation leave, maternity and childbirth leave, the right to breastfeed or pump breastmilk, the right to take leave when miscarriage, prohibition of layoffs due to marriage, pregnancy and childbirth and special rights during certain working hours.

Pregnant women workers have more risks than mothers in general to be exposed to various pregnancy problems (Agustina, 2019). Female workers will be exposed to reproductive hazard which can potentially cause pregnancy disorders and complications in female workers. 78% of female workers have experienced reproductive health problems from mild to severe, 75% are exposed to noise and 78% work in rooms with hot temperatures. Risk factors from noise and hot temperature in work environment have the potential to cause various health problems both to the mother and to the fetus that the mother is carrying (Agustina, 2019).

The work environment can create various health problems for female workers. Risk factors in the work environment vary widely from physical, biological, chemical, psychological, physiological, ergonomic and other according to the workplace. Unorganized company environment, working too long time without rest, poor supervision of work environment, well-executed procedures, various hazards in the work environment can result in health problems for female workers. Every female worker, especially pregnant women, has different bodily powers, although in general the company should have carried out regular medical examinations.

Several studies have shown health problems due to the work environment in pregnant women workers. Work can affect the health of birth in women such as miscarriage, premature birth, reduced opportunities for breastfeeding, and so on. Disturbances in pregnancy, childbirth, breastfeeding and parenting will affect maternal health and child development (Darwin and Wijaya, 1994).

Health problems in female workers can range from mild to severe. These disorders have long-term impacts such as premature babies, miscarriage, breast milk is not smooth and others. The results of research by Agustina (2019) state that female workers who experience pregnancy disorders that the rights that must be obtained by female workers according to the Major Labour Laws of Indonesia have not been fully granted by the company.

Research by Darwin and Wijaya (1994) concluded that working women have a risk of experiencing reproductive health problems. Health problems can be influenced by the work environment. A noisy work environment can directly cause health problems for female workers. According to research by Martiana, et al (2018) exposure to noise that exceeds the Threshold Value (TLV) continuously can cause infertility, premature birth and miscarriage. Indirectly, noise in the workplace can cause hearing loss in babies. The Swedish Work Environmental Authority recommends that pregnant women should be protected from exposure to noise in excess of 80dB.

The International Labor Organization which aims to improve social protection and address various problems related to the world of work has given full attention to pregnant women workers by issuing the

Convention on the Protection of Pregnant Women. This Convention applies to women employed in industrial and non-industrial activities. Occupational health and safety is important for pregnant women workers to be protected from the risk of interruption in pregnancy. For this reason, it is necessary to know the extent of the application of occupational health and safety in various industries.

Based on the background and problems described above, the objectives to be achieved from this study is analyzing the implementation of occupational health and safety in pregnant women workers in various workplaces.

II. LITERATURE REVIEW

Occupational Health and Safety (OHS) is one of the health and safety efforts in the work environment which aims to improve the quality of life and increase worker productivity. Thus, this will have an impact on company profits.

Work safety has been regulated in Law No.1 of 1970 concerning work safety in article 3 paragraph (1) and article 9 paragraph (3), with the laws and regulations stipulated work safety requirements to prevent and reduce accidents, prevent, reduce and extinguish fires, prevent and reduce explosive hazards, provide opportunities or a way to escape during a fire or other dangerous incident, provide assistance to accidents, provide personal protective equipment for workers, prevent and control the occurrence of diseases work both physically and psychologically, poisoning, infection and transmission, maintaining cleanliness, health and order, obtaining harmony between labor, work tools, working environment and work processes, and adjusting and perfecting security in jobs where the danger of accidents is getting higher.

Meanwhile, occupational health has been regulated in Health Law no. 23 of 1992 Part 6 concerning Occupational Health, Article 23 which written that occupational health is organized to achieve optimal work productivity, occupational health includes protection of occupational health, prevention of occupational diseases, and occupational health requirements, and every workplace is obliged to provide occupational health.

Occupational Health and Safety has also been stated in Article 86 paragraph 2 number 31 of Law Number 13 of 2003 which confirms that every worker / labourer has the right to obtain protection for occupational health and safety in order to protect the safety of workers / laborers in order to achieve optimal work productivity, measures for occupational health and safety shall be carried out.

Mangkunegara (2013), also states that work safety shows a safe or secure condition from suffering, damage or loss in the workplace. Safety risks are aspects of the work environment that can cause fire, fear of electricity, cuts, bruises, sprains, fractures, loss of organs, vision, hearing, all of which are often related to company equipment or the physical environment and include tasks. work that requires maintenance and training.

According to Mangkunegara (2013), occupational health indicates a condition that is free from physical, mental, emotional, or pain disorders caused by the work environment. Health risks are factors in

the work environment that work over a defined period of time that can help with emotional stress or physical distress.

According to the International Labor Organization (ILO), Occupational Health and safety is an effort to maintain and increase the highest degree of physical, mental and social welfare for workers in all positions, prevention of health deviation among workers caused by working conditions, protection of workers in work from risks due to factors that are detrimental to health, placement and maintenance of workers in a work environment adapted to physiological and psychological capabilities; and summarized as a job adaptation of humans and every human being to his position.

According to Mangkunegara (2013) that the goals and benefits of occupational health and safety are so that every employee gets a good health and safety guarantee physically, socially, and psychologically, in order to avoid health problems caused by the environment or working conditions, and every employee feel safe and protected at work. The goals and benefits of occupational health and safety cannot be realized and the benefits are felt, if only rely on the role of the workforce but also the role of the leadership.

The ILO as the International Labor Organization which aims to improve social protection and address various problems related to the world of work has given full attention to pregnant women workers by issuing the Convention on the Protection of Pregnant Women. Protection of the Health of Women Workers during Pregnancy i.e. Night work and overtime work should be prohibited for pregnant women and women caring for children and their working hours should be planned in such a way as to ensure adequate rest periods. This is also regulated in the Major Labour Laws of Indonesia. Employment of a woman in a job that is detrimental to her health or the health of her child, as determined by the authorities, must be prohibited during pregnancy and until at least three months after giving birth and longer if the woman is caring for her child. Women who are employed in jobs determined to be harmful to health by the authorities, have the right, without loss of wages, to be transferred to a type of work that is not dangerous to their health. The right should also be granted for reasons of pregnancy in individual cases for women who submit medical statements stating that a change in the nature of their work is necessary for the health of her and the health of her child.

III. METHODOLOGY

This research uses qualitative methods by conducting in-depth interviews and FGD (Focus Group Discussion), which is to obtain more information about the impelentation of occupational health and safety to pregnant women workers in various workplaces, and to obtain information about the OHS program in the workplace, working hours of pregnant women, working conditions in various industries, and the aspirations of these pregnant workers towards the implementation of OHS in the workplaces.

The selection of informants is done by following the principles of adequacy and suitability. The principle of adecuacy means that the data obtained from the informants are expected to describe the

phenomena related to the research topic, while the principle of suitability means that the informants are selected based on their relationship with the research topic. The informants in this study were pregnant women workers from various workplaces such as hospitals, food industry, mining industry, cigarette industry, educational institutions, construction sector, and government institutions, also the occupational and safety experts as key informants.

Data collection was carried out by researchers by collecting primary data and secondary data. Primary data obtained based on the results of in-depth interviews (in-depth interviews), namely information and information obtained orally from informants through meetings and conversations as well as Focus Group Discussions (focus group discussions) where a group of people discuss according to the direction of the researcher as a moderator or facilitator. Secondary data were obtained from reports relating to the problems studied. To assist during the data collection process, the researcher used an in-depth interview guide that contained a list of questions related to the topic to be studied. In accordance with the characteristics of qualitative research, the research instrument is the researcher himself. In the implementation of FGDs and in-depth interviews, researchers used FGD guidelines and in-depth interviews accompanied by questions related to the material to be presented.

Efforts to maintain the validity used in the study are data triangulation methods, which are checking data from various sources in various ways and at various times (Sugiyono, 2010). In this case the researchers used source triangulation and method triangulation. Source triangulation was carried out by looking for data from various interrelated sources, and researchers conducted exploration to check the credibility of various sources (Satori, et al, 2010). Method triangulation using more than one method, namely in-depth interviews and focus group discussions (FGD).

IV. RESULT AND DISCUSSION

The main informants in this study were 8 pregnant women workers from 8 different workplaces who were selected based on predetermined criteria. The characteristics of worker informants consist of age, education, length of work, and type of industry / workplace.

Table 1. The Characteristics of Main Informant

No.	Informant Code	Age (Year)	Education	Length of work (Year)	Workplace
1.	I.A1	26	D3	3	correctional institution
2.	I.A2	25	S1	2	hospitals
3.	I.A3	27	S1	2	food industry
4.	I.A4	25	S1	4	mining industry
5.	I.A5	28	S1	4	cigarette industry
6.	I.A6	25	S2	2	educational institutions
7.	I.A7	27	S1	4	construction sector
8.	I.A8	30	S1	6	government institutions

Based on table 1 shows that the main informant consists of 8 people. There were 3 informants aged 25 years, 2 people aged 27 years and the rest 26, 28, and 30 years. The last education is D3 with 1 person, the latest education is S1 with 6 people and S2 is only 1 person. The informants have worked 2 to 6 years in their respective workplaces. Informants come from various workplaces such as correctional institution, hospitals, food industry, mining industry, cigarette industry, educational institutions, construction sector, and government institutions.

In addition to the informants above, there are key informants in this study, namely OHS experts who have experience working in the Health Safety Environment (HSE) department. Based on table 2 shows that the key informants in this study consisted of 2 people. Key informants were 27 years and 28 years old. The two key informants have S1 education and have worked as safety officer for 2 years and 5 years.

Table 2. The Characteristics of Key Informant

No.	Informant Code	Age (Year)	Education	Length of work (Year)	Workplace
1.	I.B1	27	S1	2	HSE department
2.	I.B2	28	S1	5	HSE department

The Occupational Health and safety (OHS) program is a system designed to ensure the good safety of all personnel in the workplace so that they do not suffer injuries or cause disease in the workplace by complying with the laws and regulations on occupational health and safety, which are reflected in change in attitude towards safety in the workplace (Rijuna Dewi, 2006). Based on the results of interviews with the main informant, it was found that almost all workplaces have implemented several occupational health and safety programs. The programs implemented include preparedness programs for emergency or natural disasters, self-evacuation training, OHS training for some workers, OHS inhouse trainning, fire simulation, training for using light fire extinguisher, installation of OHS signs, OHS bulletin, medical checkup, hazard communication, and electrical safety. This is in accordance with what was stated by the main informant as follows: *"Yes, OHS Trainning (Inhouse OHS training, fire simulation, light fire extinguisher usage training etc.), Installation of OHS signs, OHS Bulletin, and medical check up"* (I.A1). This was also said by the key informants as follows: *"In various companies usually have implemented various occupational health and safety programs such as hazard control and handling of hazards in the workplace"* (I.B1).

Based on the research of Yuliandi and Ahman (2019), the implementation of Occupational Health and safety is carried out by providing the need for Personal Protective Equipment (PPE) according to standards, training and socialization regarding work procedures, emergency response procedures, first aid in accidents, and increasing workers' insights regarding work hazards and risks faced.

According to Rizky Argama (2006), the Occupational Health and safety (OHS) program is a program system designed for workers and employers as an effort to prevent (preventive) the occurrence of occupational accidents and diseases due to work relations in the work environment by identifying potential things. cause accidents and occupational diseases due to work relations, and anticipatory action when such things occur. The potential for hazards in the workplace varies depending on the work

environment. An informant who works in the construction sector stated that the uneven road conditions around the workplace is one of the dangerous risks for pregnant women. For workers in the food industry, the source of danger is physical hazards, namely hot rooms and chemical hazards from evaporating liquids in the Quality Control laboratory, as well as dust from flour & seasoning. According to workers, the company has provided protection from these dangers, such as early detection of disease and availability of personal protective equipment and means of evacuation in case of physical danger. this is as said by the informant: *"yes, there is protection in that condition. availability of early detection and personal protective equipment as well as means of evacuation in case of physical danger. "* (I.A1).

Based on the results of interviews with key informants, there are various potential hazards in the workplace that pose a risk to pregnant women, such as chemical hazards from chemicals in the workplace, physical hazards such as noise, vibration, high temperatures, psychological hazards such as stress, and potential hazards. biology for pregnant women who work in hospitals. *"Potential hazards in the workplace can range from chemical, physical, biological, to psychological hazards"* (I.B2). In some workplaces there are chemicals used in the production process which, if continuously exposed to pregnant workers, will have an impact on the health of the fetus. The chemicals already in a mother's body can be passed on to her developing baby during pregnancy. Many chemicals toxic can enter a pregnant woman's body, such as lead and mercury. These chemicals can be transferred to the growing fetus through the placenta and eventually harm the fetus (The Hesperian Foundation, 2010).

Several companies have provided special protection for pregnant women from these potential dangers and get protection in doing their work. *"So far this is enough, pregnant women get work protection"* (I.A7). Every workplace should implement various OHS programs to protect its workers from various potential dangers, including for pregnant women. *"Yes, every company is obliged to protect pregnant women with the OHS program for pregnant women at work"* (I.B1).

The OHS program for pregnant women that is implemented in the workplace includes a leave program for pregnant women, shifting work shifts, counseling on the health of pregnant women, and data collection on the health of pregnant women every month. This is in accordance with what the informant said *" shifts for pregnant women, counseling on the health of pregnant women, as well as data collection on the health of pregnant women every month."* (I.A2). However, there are some working mothers who do not know about the OHS program specifically for pregnant women in their workplace.

Some companies arrange maternity leave schedules for their employees in such a way, but there are also those that allow employees to set their own leave schedules so that employees can be free and focused during the recovery period and make the best use of their time for their babies. The physical condition and hormonal changes of a woman during pregnancy and her struggles in childbirth, of course, also affect their performance.

Article 82 (1) of the Major Labour Laws No.13 of 2003 states "Workers / women workers have the right to get a break for 1.5 (one and a half) months before the time to give birth to a child and 1.5 (one and a half) months after giving birth according to the calculation of the obstetrician or midwife." All informants in this study stated that each workplace regulates the time off for pregnant women. the applied

leave time is 3 months on average for each workplace. However, there was 1 informant who said that at his workplace, pregnant and giving birth mothers were allowed to take 6 months of leave but were not given 3 months of wages. *"Maximum of 6 months. 3 months with salary, the remaining 3 months without salary)"* (I.A5). In America, the average duration of leave taken during the twelve month period after delivery is 72.51 days or 2 to 3 months (Dagher et al, 2013). Maternity leave is very important because it also affects the mental health of workers. the results of a study by Dagher et al (2013) showed that new mothers who took time off from work less than six months after giving birth appeared to have an increased risk of postpartum depression symptoms. Research findings indicate the importance of leave as a protective factor for women's mental and physical health.

Article 76 (2) of the Major Labour Laws No.13 of 2003 states "Entrepreneurs are prohibited from employing pregnant women who could be dangerous to their womb and themselves". Companies or business owners are obliged to guarantee protection for female workers who are pregnant because women who are pregnant are more vulnerable than other workers. Protection provided such as not giving out-of-town assignments that require using air transportation in the first trimester of pregnancy, or avoiding heavy work for factory workers. The results of this study indicate that some workplaces do not employ pregnant women to locations that endanger the health of the mothers, as conveyed by the informants that for the first trimester of pregnancy, superiors do not give out-of-town tasks that have to use air and land transportation. For the next semester, the boss asked in advance whether it was possible if assigned out of town. The informants also said that the company where they work has registered all of its employees with the Health Insurance, which covers costs for health services for antenatal care and childbirth. In this study there were also informants who said that they were still working in locations that were not safe for pregnant women, namely construction workers who did require these workers to continue working through potholes. This was conveyed by the main informant as follows: *"there is no difference between pregnant and non-pregnant workers, the road to the work location is a road with potholes and is a risk for pregnant women"* (I.A7).

The Minister of Manpower Regulation No. Permen 03 / Men / 1989 regulates the prohibition of layoffs for female workers on the grounds of marriage, pregnancy, or childbirth. The same thing is also stated in the ILO convention No. 183 of 2000 article 8, “Upon returning to the workplace, companies are prohibited from discriminating against female workers who have just returned after maternity leave. They have the right to re-occupy their position and receive a salary equal to the salary they received before maternity leave. " All informants in this study stated that after the female workers at the company finished maternity leave, they would return to work and occupy their original positions.

Article 76 of the Major Labour Laws No.13 of 2003 states, “Companies are prohibited from employing pregnant women workers between 23.00 and 07.00 hours. In addition, the company is obliged to provide shuttle transportation for female employees, pregnant or not, who have shifts to and from between 23.00 and 05.00." One of the informants mentioned that at his workplace there is a night shift. There is no shuttle service for the workers, but workers who work during the night get additional consumption of milk. *"Yes, there is no transportation service, but shift workers get additional milk".*

(I.A3). Providing additional intake for female workers is also a program that can maintain the health of female workers. Women's nutrition has a positive influence because healthy women can fulfill various roles to have healthy children and maintain the health of their family members (Priyadarshini, 2016).

V. CONCLUSION

Occupational health and safety programs have been implemented for pregnant workers such as the right to maternity leave, working hours arrangements, health insurance, and special protection for pregnant workers. However, there are some workplaces that still do not provide special protection for working pregnant women. Every workplace should pay more attention to the health and safety of pregnant workers as an effort to prevent occupational accidents and diseases.

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Pengaruh Media Pendidikan Seks Terhadap Perubahan Pengetahuan dan sikap Remaja Usia 12-15 Tahun dalam Berperilaku Seksual Di Kecamatan Cianjur Kabupaten Cianjur Tahun 2020

*(*The Effect of Sex Education Media on Changes in Knowledge and the attitude of adolescents aged 12-15 years in sexual behavior In Cianjur District, Cianjur Regency in 2020*)*

Ai Ana Rodiana, M.Keb, Novi Widiastuti, M.Kes

ABSTRAK

Masa remaja merupakan satu periode dalam kehidupan manusia yang batasan usia maupun peranannya seringkali tidak terlalu jelas. Pubertas yang dahulu dianggap sebagai tanda awal remaja ternyata tidak lagi valid sebagai patokan atau batasan untuk kategori remaja, sebab usia pubertas yang dahulu terjadi pada akhir usia belasan (15-18 tahun) kini terjadi pada awal belasan bahkan dalam usia 11 tahun. pengetahuan remaja terhadap ciri-ciri akil baligh laki-laki masih terpaku pada perubahan fisik. Persentase remaja yang mengetahui mimpi basah sebagai ciri akil baligh rendah, yaitu untuk remaja perempuan sebesar 13,8 persen dan 26,8 persen untuk laki-laki. Pendidikan seksual merupakan bagian yang penting untuk mempersiapkan remaja dalam menghadapi perubahan pola prilaku seksual remaja agar dapat terhindar dari penyakit menular, kejadian HIV/AIDS, kehamilan yang tidak diinginkan, kekerasan atas dasar gender, serta ketidak setaraan gender yang akan menimbulkan resiko yang serius untuk perkembangan kehidupan remaja.

Penelitian Quasi experimental berupa pemberian media pendidikan seks dengan media *booklet* tentang pendidikan seks pada remaja usia 12-15 tahun di Kecamatan Cianjur Kabupaten Cianjur. Desain penelitian menggunakan *pretest-posttest design with control group.* Populasi remaja yang berusia 12 - 15 tahun, sampel dalam penelitian perkelompok masing-masing 96 orang, total sampel 192 orang. variabel pengetahuan menggunakan pertanyaan dengan alternative jawaban benar salah, variabel sikap menggunakan pernyataan dengan skala likert (1-4). Untuk mengetahui pengaruh pemberian media pendidikan seks (booklet) terhadap pengetahuan dan sikap remaja menggunakan uji wilcoxon. Kemudian untuk mengetahui perbedaan pengetahuan dan sikap remaja yang tidak diberikan media pendidikan seks menggunakan Uji Mann Whitney.

terdapat perbedaan pengetahuan yang bermakna antara sebelum dan sesudah penyuluhan dengan media *booklet* Nilai sig (*2-tailed*) adalah 0.000 < *p value* (0,05), terdapat perbedaan sikap yang bermakna antara sebelum dan sesudah penyuluhan dengan media *booklet* Nilai sig (*2-tailed*) adalah 0.000 < *p value* (0,05), terdapat perbedaan rerata skor tingkat pengetahuan responden menggunakan media *booklet* dengan tanpa intervensi nilai sig. (*2-tailed*) 0.000 (p< 0.05). terdapat perbedaan rerata skor tingkat sikap responden menggunakan media *booklet* dengan tanpa intervensi *2-tailed*) 0.006 (p< 0.05).

diharapkan Sebagai bahan informasi dasar yang berguna dalam peningkatan mutu pelayanan kesehatan khususnya bidan dengan memanfaatkan hasil penelitian ini dijadikan salah satu intervensi yang efektif untuk menambah pengetahuan remaja dalam berperilaku seksual.

Kata Kunci : media pendidikan seks, pengetahuan remaja, sikap remaja

The Effect of Sex Education Media on Changes in Knowledge and the attitude of adolescents aged 12-15 years in sexual behavior In Cianjur District, Cianjur Regency in 2020

Ai Ana Rodiana, M.Keb, Novi Widiastuti, M.Kes

ABSTRAC

Adolescence is a period in human life whose age and role boundaries are often unclear. Puberty, which was previously considered a sign of early adolescence, is no longer valid as a benchmark or limitation for the category of adolescence, because the age of puberty that previously occurred in the late teens (15-18 years) now occurs in the early teens even at the age of 11 years. Adolescent knowledge of the characteristics of male adolescence is still fixated on physical changes. The percentage of adolescents who know wet dreams as a characteristic of adolescence is low, namely 13.8 percent for girls and 26.8 percent for boys. Sexual education is an important part of preparing adolescents to face changes in adolescent sexual behavior patterns in order to avoid infectious diseases, HIV / AIDS incidents, unwanted pregnancies, violence on the basis of gender, and gender inequalities that will pose serious risks to development. teenage life.

Quasi experimental research in the form of providing sex education media with booklet media about sex education to adolescents aged 12-15 years in Cianjur District, Cianjur Regency. The research design used a pretest-posttest design with control group. The population of adolescents aged 12-15 years, the sample in each group study was 96 people, the total sample was 192 people. knowledge variables use questions with alternative answers to true or false, attitude variables use statements with a Likert scale (1-4). To determine the effect of providing sex education media (booklets) on adolescent knowledge and attitudes using the Wilcoxon test. Then to find out the differences in knowledge and attitudes of adolescents who were not given sex education media using the Mann Whitney test.

There is a significant difference in knowledge between before and after counseling with booklet media) is 0.000 <p value (0.05), there is a difference in the mean score of the respondent's level of knowledge using booklet media without the intervention of the sig value. (2-tailed) 0.000 (p <0.05). There is a difference in the mean score of the attitude level of respondents using booklet media without 2-tailed intervention) 0.006 (p <0.05).

It is hoped that as basic information that is useful in improving the quality of health services, especially midwives, by utilizing the results of this study, it is used as an effective intervention to increase adolescent knowledge in sexual behavior.

Keywords: sex education media, adolescent knowledge, adolescent attitudes

PENGENALAN

Masa remaja merupakan satu periode dalam kehidupan manusia yang batasan usia maupun peranannya seringkali tidak terlalu jelas. Pubertas yang dahulu dianggap sebagai tanda awal remaja ternyata tidak lagi valid sebagai patokan atau batasan untuk kategori remaja, sebab usia pubertas yang dahulu terjadi pada akhir usia belasan (15-18 tahun) kini terjadi pada awal belasan bahkan dalam usia 11 tahun.(Arum, 2005)

Pengetahuan remaja terhadap reproduksi manusia masih rendah. Hasil Survei Kesehatan Reproduksi Remaja Indonesia (SKRRI) tahun 2002-2003 menunjukkan bahwa pengetahuan remaja terhadap ciri-ciri akil baligh laki-laki masih terpaku pada perubahan fisik. Persentase remaja yang mengetahui mimpi basah sebagai ciri akil baligh rendah, yaitu untuk remaja perempuan sebesar 13,8 persen dan 26,8 persen untuk laki-laki. Ciri akil baligh pada perempuan yang menonjol adalah menstruasi. Persentase remaja yang menyebutkan menstruasi sebagai ciri akil baligh perempuan yaitu 69,9 persen untuk remaja perempuan dan untuk remaja laki-laki sebesar 36,5 persen. Selain itu, pengetahuan remaja terhadap masa subur masih sangat rendah, yaitu remaja laki-laki sekitar 10 persen yang menjawab secara tepat, sedangkan remaja perempuan sekitar 15 persen (BKKBN,2005).

Pendidikan seksual merupakan bagian yang penting untuk mempersiapkan remaja dalam menghadapi perubahan pola prilaku seksual remaja agar dapat terhindar dari penyakit menular, kejadian HIV/AIDS, kehamilan yang tidak diinginkan, kekerasan atas dasar gender, serta ketidak setaraan gender yang akan menimbulkan resiko yang serius untuk perkembangan kehidupan remaja. masih banyak anak remaja yang belum mendapatkan pendidikan sekual, padahal pendidikan seksual remaja ini sangat penting agar remaja mempunyai kendali dan memuat keputusuan dalam kehiduan seksualnya berdasarkan informasi tentang seksual dan hubungan secara bebas dan bertanggung jawab.

Terdapat tiga masalah yang besar dikalangan remaja, yaitu masalah yang berkaitan dengan seksualitas, Narkotika, Psikotropika dan Zat Adiktif Lainnya (NAPZA), dan *Acquired Immunodeficiency Syndrome atau Acquired Immune Deficiency Syndrome* (AIDS). Hasil penelitian tentang peranan pengetahuan kesehatan reproduksi terhadap perilaku seksual remaja awal yang dilakukan oleh HAfid Mahesa Romulo didapatkan hasil bahwa tingkat pengetahuan kesehatan reproduksi berpengaruh terhadap perilaku seksual remaja awal yang berarti bahwa semakin tinggi pengetahuan kesehatan reproduksi maka akan semakin rendah perilaku yang dilakukan. (KPA. *Fakta tentang HIV/AIDS*. Diakses dari www.aidsindonesia.or.id.)

Tidak tersedianya informasi yang akurat dan benar tentang kesehatan reproduksi memaksa remaja untuk berusaha mencari akses dan melakukan eksplorasi sendiri. Media internet, televisi, majalah dan bentuk media lainnya seringkali dijadikan sumber oleh para remaja untuk memenuhi tuntutan keingintahuan tentang seksual. Di samping itu orangtua dan keluarga yang bertanggungjawab memberikan informasi tentang kesehatan reproduksi bagi remaja belum berperan (Devy dkk., 2001). Hal tersebut akan menimbulkan sikap dan perilaku yang berisiko, bila remaja mendapatkan informasi tentang kesehatan reproduksi yang tidak tepat (Kespro, 2003).

SOROTAN KARYA

Comment [U1]: Sorotan karya

Pendidikan secara umum adalah segala upaya yang direncanakan untuk mempengaruhi orang lain baik individu, kelompok, atau masyarakat sehingga mereka melakukan apa yang diharapkan oleh pelaku pendidikan. Dari batasan ini tersirat unsur unsur pendidikan yakni ; input adalah sasaran pendidikan (individu, kelompok, masyarakat) dan pendidik (pelaku pendidikan), proses (upaya yang direncanakan untuk mempengaruhi orang lain), output (melakukan apa yang diharapkan atau perilaku) (Notoatmodjo, 2005).

Pendidikan kesehatan adalah aplikasi atau penerapan pendidikan di dalam bidang kesehatan.Secara operasional pendidikan kesehatan adalah untuk memberikan dan atau meningkatkan pengetahuan, sikap, dan praktek baik individu, kelompok atau masyarakat dalam memelihara dan meningkatkan kesehatan mereka sendiri (Notoatmodjo, 2005)

Pendidikan seks adalah upaya pengajaran, penyadaran dan penerangan tentang masalah-masalah seksual kepada remaja, sejak ia mengenal masalah-masalah yang berkenaan dengan naluri seks dan perkawinan. Sehingga ketika remaja telah tumbuh menjadi pemuda dan memahami urusan-urusan kehidupan, ia telah mengetahui apa yang diharamkan dan apa yang dihalalkan. Lebih jauh, bahkan mampu menerapkan tingkah laku Islami sebagai akhlak dan kebiasaan hidup, serta tidak diperbudak syahwat dan tenggelam dalam gaya hidup hedonis. (Ulwan, 1999)

Pengetahuan adalah hasil dari tahu dan terjadi setelah orang melakukan penginderaan terhadap objek tertentu. (Notoatmodjo, 2012). Pengetahuan merupakan rasa keingintahuan manusia terhadap sesuatu dan hasrat untuk meningkatkan harkat hidup sehinga kehidupan menjadi lebih baik dan nyaman yang berkembang sebagi upaya untuk memenuhi kebutuhan. Pengetahuan hanya sekedar menjawab pertanyaan *what*, misalnya apa alam, apa manusia, apa air, dan lainnya. (Ariani, 2014)

a. Tingkatan pengetahuan

Menurut Notoatmodjo (2010), Ada 6 tingkat pengetahuan yang dicapai dalam domain kognitif yaitu :

1) Tahu (*know*)

   Tahu diartikan hanya sebagai recall (memanggil) memori yang telah ada sebelumnya setelah mengamati sesuatu. Oleh sebab itu tahu ini merupakan tingkat pengetahuan yang paling rendah. Kata kerja untuk mengukur bahwa orang tahu tentang apa yang dipelajari antara lain: menyebutkan, menguraikan, mendefinisikan, menyatakan, dan sebagainya.

2) Memahami (*comprehension*)

   Memahami suatu objek bukan sekedar tahu terhadap objek tersebut, tidak hanya sekedar dapat menyebutkan, tapi orang tersebut harus dapat menginterpretasikan secara benar tentang objek yang diketahui tersebut.

3) Aplikasi (*application*)

   Aplikasi diartikan apabila seseorang yang telah memahami objek yang dimaksud dapat menggunakan atau mengaplikasikan prinsip yang telah diketahui tersebut pada situasi yang lain.

4) Analisis (*analysis*)

   Analisis adalah suatu kemampuan untuk menjabarkan dan memisahkan dan mencari hubungan antara komponen-komponen yang terdapat dalam suatu masalah atau objek yang diketahui. Indikasi bahwa pengetahuan seseorang telah sampai pada tingkat analisis adalah apabila orang tersebut telah dapat membedakan, atau mengelompokan, membuat diagram (bagan) terhadap pengetahuan atas objek tersebut.

5) Sintesis (*synthesis*)

Sintesis menunjukan kepada suatu kemampuan seseorang untuk merangkum atau meletakan dalam suatu hubungan yang logis dari komponen-komponen pengetahuan yang dimiliki. Dengan kata lain sintesis adalah suatu kemampuan untuk menyusun formulsi baru dari formulasi-formulasi yang telah ada.

6) Evaluasi (*evaluation*)

Evaluasi ini berkaitan dengan kemampuan seseorang untuk melanjutkan justifikasi atau penilaian terhadap sutau objek tertentu. Penilaian ini dengan sendirinya didasarkan ada suatu kriteria yang ditentukan sendiri.

Sikap dapat diposisikan sebagai hasil evaluasi terhadap obyek sikap yang diekspresikan ke dalam prosesproses kognitif, afektif (emosi) dan perilaku. Dari definisi-definisi di atas menunjukkan bahwa secara garis besar sikap terdiri dari komponen kognitif (ide yang umumnya berkaitan dengan pembicaraan dan dipelajari), perilaku (cenderung mempengaruhi respon sesuai dan tidak sesuai) dan emosi (menyebabkan respon-respon yang konsisten). (Wawan dan Dewi M, 2010)

Komponen Sikap Menurut Notoatmodjo (2010) sikap terdiri dari 3 komponen yang saling menunjang yaitu:

1) Komponen kognitif Merupakan representasi apa yang dipercayai oleh individu pemilik sikap, komponen kognitif berisi kepercayaan stereotipe yang dimiliki individu mengenai sesuatu dapat disamakan penanganan (opini) terutama apabila menyangkut masalah isu atau yang kontroversial.
2) Komponen afektif Merupakan perasaan yang menyangkut aspek emosional. Aspek emosional inilah yang biasanya berakar paling dalam sebagai komponen sikap dan merupakan aspek yang paling bertahan terhadap pengaruh-pengaruh yang mungkin adalah mengubah sikap seseorang komponen afektif disamakan dengan perasaan yang dimiliki seseorang terhadap sesuatu.
3) Komponen konatif Merupakan aspek kecenderungan berperilaku tertentu sesuai sikap yang dimiliki oleh seseorang. Aspek ini berisi tendensi atau kecenderungan untuk bertindak atau bereaksi terhadap sesuatu dengan cara-cara tertentu.

Menurut Sarwono (2003), perilaku seksual adalah segala tingkah laku yang didorong oleh hasrat seksual baik yang dilakukan sendiri, dengan lawan jenismaupun sesama jenis tanpa adanya ikatan pernikahan menurut agama.Menurut Mu'tadin(2002), perilaku seksual yang sehat dan adaptif dilakukan ditempat pribadi dalam ikatan yang sah menurut hukum, sedangkan perilaku seksualpranikahmerupakan perilaku seksual yang dilakukan tanpa melalui prosespernikahan yang resmi menurut hukum maupun menurut agama dan kepercayaan masing-masing.

Perilaku seksual ialah perilaku yang melibatkan sentuhan fisik anggota badan antara pria dan wanita yang telah mencapai pada tahap hubungan intim,yang biasanya dilakukan oleh pasangan suami istri. Sedangkan perilaku seks pranikah merupakan perilaku seks yang dilakukan tanpa melalui proses pernikahan yang resmi menurut hukum maupun menurut agama dan kepercayaan masing-masing individu.

KAEDAH KAJIAN

Penelitian ini bersifat Quasi experimental berupa pemberian media pendidikan seks berupa penyuluhan dan *booklet* tentang pendidikan seks pada remaja usia 12-15 tahun di Kecamatan Cianjur Kabupaten Cianjur. Desain penelitian ini menggunakan *pretest-posttest design with control group.*

Dalam penelitian ini populasinya adalah seluruh remaja yang berusia 12 - 15 tahun di Kecamatan Cianjur Kabupaten Cianjur. Teknik pengambilan sampel menggunakan *cluster sampling sampling* dengan perhitungan sampel menggunakan rumus Lemeshow (2000). sampel dalam penelitian ini perkelompok masing-masing 96 orang sehingga total sampel adalah 192 orang.

Peneliti mengumpulkan data primer. Data primer didapatkan langsung oleh peneliti dengan menggunakan kuesioner. Kuesioner dibuat sendiri oleh peneliti dengan terlebih dahulu membuat *blue print* kuesioner berdasarkan kerangka konseptual yang telah ada. Pertanyaan yang digunakan dalam kuesioner ini menggunakan pertanyaan tertutup. Untuk variabel pengetahuan menggunakan pertanyaan dengan alternative jawaban benar salah, sedangkan variabel sikap menggunakan pernyataan dengan skala likert (1-4).

Data hasil penelitian yang dikumpulkan akan diolah dengan lengkap, ditabulasi dan dianalisa secara deskriptif. Pengolahan data yang dilakukan peneliti terdiri dari *editing, coding, entering data* dan *cleaning.* Analisis data yang digunakan adalah analisis univariat untuk mendapat gambaran distribusi frekuensi dari variabel bebas meliputi variabel pengetahuan dan sikap remaja dalam berperilaku seksual.

Untuk mengetahui pengaruh pemberian media pendidikan seks (booklet) terhadap pengetahuan dan sikap remaja menggunakan uji wilcoxon. Kemudian untuk mengetahui perbedaan pengetahuan dan sikap remaja yang tidak diberikan media pendidikan seks menggunakan Uji Mann Whitney.

Jika p value > 0,05 maka Ho gagal ditolak artinya tidak ada perbedaan yang bermakna rata- rata selisih pengetahuan dan sikap *pre* dan *post* antara remaja yang diberikan media pendidikan seks berupa penyuluhan dan *booklet* dengan remaja yang tidak diberikan media pendidikan seks (pemberian media pendidikan seks tidak efektif untuk meningkatkan pengetahuan dan sikap remaja).

Jika p value ≤ 0,05 maka Ho ditolak artinya ada perbedaan yang bermakna rata-rata selisih pengetahuan dan sikap *pre* dan *post* antara remaja yang diberikan media pendidikan seks berupa penyuluhan dan *booklet* dengan remaja yang tidak diberikan media pendidikan seks (pemberian media pendidikan seks efektif untuk meningkatkan pengetahuan dan sikap remaja).

Comment [a2]: kaedah

Comment [a3]: bahagian ini terlalu lemah. Sila perincikan

Comment [U4]: bahagian ini terlalu lemah. Sila perincikan

Comment [U5]: kaedah

HASIL KAJIAN

a. Analisis Univariat

Tabel 6.1Distribusi Frekuensi responden Berdasarkan Usia dan Jenis Kelamin

Karakteristik Responden	Jumlah (n)	Presentase (%)
Usia		
12 tahun	48	25
13 tahun	52	27.08
14 tahun	39	20.31
15 tahun	53	27.60
Jenis Kelamin	192	100
Laki-Laki	80	41.7
Perempuan	112	58.3

Berdasarkan tabel 4.1, data karakterisistik usia responden menunjukkan bahwa sebagian besar responden berusia 15 tahun sebanyak 53 orang (27.60%). Dari data karakteristik jenis kelamin diketahui bahwa responden perempuan lebih besar dibandingkan responden laki-laki, yaitu sebanyak 112 orang (58.3%).

b. Analisa Bivariat

Tabel 4.2 Distribusi Perbedaan Rata-Rata Nilai Pengetahuan Dalam Berperilaku Seksual Pada Kelompok *Booklet* dan Tanpa Intervensi Di Kecamatan Cianjur Kabupaten Cianjur Tahun 2020

Kelompok		n	Median (Minumum-Maksimum)	Perbedaan Rerata ±s.b	*p-value*
Booklet	Pretest	96	18 (12-26)	18.56±2.941	0.00
	Posttest		22 (15-29)	22.06±3.402	
Tanpa Intervensi	Pretest	96	18 (12-26)	18.07± 2.446	0.157
	Posttest		18 (12-26)	18.09±2.441	

Tabel 4.2 diatas menunjukkan rata-rata nilai pengetahuan sebelum dan setelah diberikan intervensi melalui *booklet* tentang berperilaku seksual pada remaja adalah 18.56 dan 22.06 dengan standar deviasi 2.941 dan 3.402. Nilai sig (*2-tailed*) adalah 0.000 < *p value* (0,05) artinya terdapat perbedaan pengetahuan yang bermakna antara sebelum dan sesudah penyuluhan dengan media *booklet.*

Sedangkan pada kelompok responden tanpa diberikan intervensi, rata-rata nilai pengetahuan adalah 18.07 dan 18.27 dengan standar deviasi 2.446 dan 2.441. Nilai sig (*2-tailed*) yang didapatkan adalah 0.157 (*p value* > 0.05) artinya tidak terdapat perbedaan pengetahuan antara sebelum dan artinya terdapat perbedaan rerata sebelum dan sesudah tanpa intervensi.

Tabel 4.3 Distribusi Perbedaan Rata-Rata Nilai Sikap Dalam Berperilaku Seksual Sebelum dan Sesudah Diberikan Intervensi Dengan *Booklet* Di Kecamatan Cianjur Kabupaten Cianjur Tahun 2020

Kelompok		n	Median (Minumum-Maksimum)	Perbedaan Rerata ±s.b	*p-value*
Booklet	Pretest	96	48 (28-62)	47.02±6.073	0.00
	Posttest		49 (28-62)	48.32±5.776	
Tanpa Intervensi	Pretest	96	46.50 (28-62)	45.89± 6.616	0.157
	Posttest		48 (28-62)	45.91±6.617	

Tabel 4.3 diatas menunjukkan rata-rata nilai sikap sebelum dan setelah diberikan intervensi melalui *booklet* tentang berperilaku seksual pada remaja adalah 47.02 dan 49 dengan standar deviasi 6.073 dan 5.776. Nilai sig (*2-tailed*) adalah 0.000 < *p value* (0,05) artinya terdapat perbedaan sikap yang bermakna antara sebelum dan sesudah penyuluhan dengan media *booklet.*

Sedangkan pada kelompok responden tanpa diberikan intervensi, rata-rata nilai pengetahuan adalah 45.89 dan 45.91 dengan standar deviasi 6.616 dan 6.617 Nilai sig (*2-tailed*) yang didapatkan adalah 0.157 (*p value* > 0.05) artinya tidak terdapat perbedaan rerata sebelum dan sesudah pada kelompok tanpa intervensi.

Tabel 4.4 Distribusi Beda Rata-Rata Tingkat Pengetahuan Dalam Berperilaku Seksual Pada Kelompok *Booklet* dan Tanpa Intervensi Di Kecamatan Cianjur Kabupaten Cianjur Kabupaten Cianjur Tahun 2020

Kelompok		n	Median (Minumum-Maksimum)	Perbedaan Rerata ±s.b	*p-value*
Booklet	Pretest	96	18 (12-26)	18.56±2.941	0.000
	Posttest		22 (15-29)	22.06±3.402	
Tanpa Intervensi	Pretest	96	18 (12-26)	18.07± 2.446	
	Posttest		18 (12-26)	18.09±2.441	

c.

Tabel 4.4 diatas menunjukkan hasil uji statistik didapatkan nilai sig. (*2-tailed*) adalah 0.000 (p< 0.05) artinya terdapat perbedaan rerata skor tingkat pengetahuan responden menggunakan media *booklet* dengan tanpa intervensi.

Tabel 4.5 Distribusi Beda Rata-Rata Sikap Dalam Berperilaku Seksual Pada Kelompok Tanpa Intervensi dan *Booklet* Di Kecamatan Cianjur Kabupaten Cianjur Kabupaten Cianjur Tahun 2020

Kelompok		n	Median (Minumum-Maksimum)	Perbedaan Rerata ±s.b	*p-value*
Booklet	Pretest	96	48.00 (28-62)	47.02±6.073	0.006
	Posttest		49 (28-62)	48.32±5.776	
Tanpa Intervensi	Pretest	96	46.50 (28-62)	45.89± 6.616	
	Posttest		48 28-62)	45.91±6.617	

Tabel 4.5 diatas menunjukkan hasil uji statistik didapatkan nilai sig. (*2-tailed*) adalah 0.006 (p< 0.05) artinya terdapat perbedaan rerata skor tingkat sikap responden menggunakan media *booklet* dengan tanpa intervensi.

PERBINCANGAN HASIL KAJIAN

Comment [U6]: Sub heading letak tajuk yang bersesuaian dengan apa yang ingin dibincangkan

Faktor-faktor yang mempengaruhi perilaku menurut Green dalam Notoatmodjo (2014) adalah salah satunya umur. Umur mempunyai pengaruh terhadap daya tangkap dan pola pikir seseorang. Semakin bertambah usia seseorang, maka semakin menurun kemampuan seseorang dalam menerima informasi (Notoatmodjo, 2010). Berdasarkan data karakterisistik usia responden menunjukkan bahwa sebagian besar responden berusia 15 tahun sebanyak 53 orang (27.60%). Dari data karakteristik jenis kelamin diketahui bahwa responden perempuan lebih besar dibandingkan responden laki-laki, yaitu sebanyak 112 orang (58.3%).

Media penyuluhan kesehatan pada hakikatnya adalah alat bantupenyuluhan (AVA). Disebut media penyuluhan karena alat-alat tersebut merupakan alat saluran dalam (*chanel*) untuk menyampaikan kesehatan karena alat-alat tersebut digunakan untuk mempermudah penerimaan pesan-pesan kesehatan bagi masyarakat atau 'klien'.(Rotua, 2016).

Salah satu strategi untuk memperoleh perubahan perilaku menurut WHO adalah dengan pemberian informasi untuk meningkatkan pengetahuan untuk meningkatkan derajat kesehatan. Salah satu upaya pemberian informasi itu adalah dengan menggunakan media *booklet*. Penentuan metode ini diawali dengan melakukan analisis situasi agar informasi yang akan diberikan dapat diterima dengan baik oleh kelompok siswa remaja dan efektif untuk merubah pengetahuan siswa tentang perilaku seksual.

Hasil penelitian ini sesuai dengan penelitian Septiana (2015), penyuluhan tentang kesehatan reproduksi berpengaruh terhadap tingkat pengetahuan pada siswa SMA/sederajat. Diperlukan perhatian lebih dalam masyarakat mengenai pendidikan tentang kesehatan reproduksi, misalnya meningkatkan komunikasi antara anak dan orang tua, kerjasama antara Kementerian Pendidikan, Kementerian Kesehatan, dan kementerian terkait lainnya untuk bersinergi sehingga kegiatan penyuluhan mengenai kesehatan reproduksi dapat dikembangkan untuk dapat menunjang kurikulum

Menurut asumsi peneliti, peningkatan pengetahuan remaja salah satunya didukung oleh penggunaan media *booklet*. Isi *booklet* sesuai dengan materi penyuluhan yang disampaikan dengan gambar dan warna serta menyajikan seluruh poin - poin materi pada booklet di dalam kuesioner. Media *booklet* mempunyai keunggulan salah satunya yang dapat disesuaikan dengan waktu remaja dan dapat belajar mandiri, remaja dapat dengan lebih santai melihat isinya, dapat

memberikan detil seperti menggunakan gambar-gambar`untuk penguatan pesan. Disamping memiliki keunggulan, kelemahan *booklet* adalah tidak tahan lama dan mudah hilang.

Menurut peneliti, keunggulan *booklet* dalam hal ini, dapat meningkatkan pengetahuan remaja, karena setelah selesai penyuluhan, *booklet* dibagikan kepada masing-masing remaja dan dapat dibawa pulang. Oleh karena itu remaja dapat membaca tentang perilaku seksual pada *booklet* dengan santai dan berulang-ulang dan dapat didiskusikan kembali dengan teman sehingga dapat meningkatkan pengetahuan tentang perilaku seksual.

Tabel 4.3 diatas menunjukkan rata-rata nilai sikap sebelum dan setelah diberikan intervensi melalui *booklet* tentang berperilaku seksual pada remaja adalah 47.02 dan 49 dengan standar deviasi 6.073 dan 5.776. Nilai sig (*2-tailed*) adalah 0.000 < *p value* (0,05) artinya terdapat perbedaan sikap yang bermakna antara sebelum dan sesudah penyuluhan dengan media *booklet.*

Sedangkan pada kelompok responden tanpa diberikan intervensi, rata-rata nilai pengetahuan adalah 45.89 dan 45.91 dengan standar deviasi 6.616 dan 6.617 Nilai sig (*2-tailed*) yang didapatkan adalah 0.157 (*p value* > 0.05) artinya tidak terdapat perbedaan rerata sebelum dan sesudah pada kelompok tanpa intervensi.

Berdasarkan hasil penelitian yang diperoleh terdapat proses yang sejalan antara peningkatan pengetahuan dengan kenaikan dalam perubahan siswa tentang pornografi, hal ini sesuai dengan teori Difusi Inovasi yang dikemukan oleh Rogers (1983) dalam Rotua (2016) berhubungan dengan hasil penelitian yang menyatakan bahwa sumber media melalui gagasan baru melalui penyebaran informasi untuk mempengaruhi sikap dan motivasi. Tahapan yang harus dilalui sebelum terbentuknya sikap dari sebuah gagasan baru adalah dengan terbentuknya pengetahuan.

Penyuluhan kesehatan adalah proses belajar. Pendidikan kesehatan membantu agar orang mengambil sikap yang bijaksana terhadap kesehatan dan kualitas hidup. Merubah sikap seseorang menjadi lebih baik. Hal ini terbukti dari sikap responden setelah diberikan penyuluhan memberikan perubahan yang berarti dari sikap sebelum diberikan penyuluhan.

Upaya peningkatan sikap dari para remaja perilaku seksual perlu dilakukan dengan pemberian KIE melalui media *booklet*. Kegiatan ini menjadi penting karena pemberian informasi dalam skala yang luas akan meningkatkan kesadaran dalam meningkatkan kesehatan reproduksi. Pemberian informasi dalam bentuk *booklet* ternyata mampu meningkatkan pengetahuan siswa yang berdampak positif terhadap sikap yang terbentuk. Perubahan sikap dipengaruhi oleh faktor pengetahuan dan kepercayaan yang didapatkan dari hasil penginderaan, salah satunya didapatkan pada pendidikan dan proses belajar. Sikap yang didasari oleh pengetahuan akan lebih langgeng daripada sikap yang tidak didasari pengetahuan.

Informasi mengenai perilaku seksual lebih mudah terserap dengan media *booklet* karena disertai gambar yang menarik, sehingga praktik-praktik paparan terhadap perilaku seksual lebih mudah dilihat karena dapat menampilkan setiap gambar, sedangkan kelompok tanpa intervensi tidak mendapat tambahan informasi yang cukup mengenai perilaku seksual.

Melihat hasil yang diperoleh bahwa dengan bantuan media cetak (*booklet*) mampu merubah pengetahuan dan mampu mengubah sikap/persepsi remaja mengenai perilaku seksual. Hal ini menandakan telah terjadi dampak positif bagi remaja agar mau dan mampu bertanggung jawab terhadap perilakunya dan juga dapat menyalurkan ataupun mentransfer informasi ke banyak orang perilaku seksual, sehingga dapat mencegah prilaku seksual beresiko yang pada akhirnya dapat meningkatkan kesehatan reproduksi remaja tersebut.

KESIMPULAN

Kesimpulan dari penelitian ini tentang pengaruh media pendidikan seks terhadap perubahan pengetahuan dan sikap remaja usia 12-15 tahun dalam berperilaku seksual di Kecamatan Cianjur Kabupaten Cianjur Tahun 2020 yakni :

1. Hasil penelitian didapatkan ada pengaruh metode pendidikan kesehatan menggunakan *booklet* pengetahuan menggunakan *booklet.*. Pada kelompok *booklet* median skala *pretest* 18 dengan nilai terendah 12 dan nilai tertinggi 26 sedangkan setelah intervensi median menjadi 22 dengan nilai terendah 15 dan nilai tertinggi 29. Sementara pada kelompok tanpa intervensi tidak ada perbedaan pengetahuan *pretest* dan *posttest* dengan median sebelum adalah 18 dengan nilai terendah 12 dan nilai tertinggi 26 sedangkan hasil *posttes* nilai median adalah 18 dengan nilai terendah 12 dan nilai tertinggi 26.
2. Hasil penelitian didapatkan ada perbedaan sikap menggunakan *booklet.*. Pada kelompok *booklet* median skala *pretest* 49 dengan nilai terendah 28 dan nilai tertinggi 62 sedangkan setelah intervensi median menjadi 48.32 dengan nilai terendah 28 dan nilai tertinggi 62. Sementara pada kelompok tanpa intervensi tidak ada perbedaan sikap *pretest* dan *posttest* dengan median sebelum adalah 46.50 dengan nilai terendah 28 dan nilai tertinggi 62 sedangkan hasil *posttes* nilai median adalah 48 dengan nilai terendah 28 dan nilai tertinggi 62.
3. Terdapat perbedaan yang bermakna antara kelompok *booklet* dan tanpa intervensi terhadap peningkatan pengetahuan remaja dalam perilaku seksual.
4. Terdapat perbedaan yang bermakna antara kelompok *booklet* dan tanpa intervensi terhadap peningkatan sikap remaja dalam perilaku seksual.

PENGHARGAAN

Penulis mengucapkan banyak terimaksih kepada pihak pihak terkait yang telah mendukung atas terlaksannya penelaitian ini, terutama kepada kemenristek Dikti yang telah memberikan dana Hibah PDP. Kepada direktur Akademi Kebidanan Cianjur, Kelurahan Cianjur Kota dan Desa Bojong Herang Serta Sawah Gede atas ijin penelitian yang diberikan.

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Comment [U7]: Sila ikut jurnal tenplate rujukan

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PENULIS

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THE ACTIVITY OF EXTRACT VISCOUS ETHANOL PANDANUS TEST A NEW KIND OF FOREST (*Freycinetia sessiliflora* Rizki) ON THE GROWTH OF THE BACTERIA *Streptococcus mutans*

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ABSTRACT

A new kind of forest of the pandanus *(Freycinetia sessiliflora* Rizki) is one species found in the year 2015 on mount passi west Kalimantan. The researchers found the pandanus new species that is very different from other pandanus. The results of skrinning phytochemical leaves of the pandanus (*Freycinetia sessiliflora* Rizki) containing a compound of a metabolite sekunder namely an alkaloid , flavonoid , terpenoid-steroid , saponin , phenol and tannin. Based on secondary these compounds contained so done research to test the activity of the pandanus extract bacteria *Streptococcus mutans*. Plant extracts pandanus in get maceration with a solvent use of ethanol to achieve a extract will be used to test the activity of obstruent against bacteria *Streptococcus mutans* by using the method discs kirby-bauer disk. Extract pandanus made in 5 concentration different the 5 % , 10 % , 15 % , 20 % and 25 %. Then it will be the measurement of clear zone formed about paper discs .Analysis by anova data in one direction with the levels of trust 95 %. Based on the research done an obstruent extracts the results of a new kind of pandanus against bacteria Streptococcus mutans with an average diameter obstruent concentration 5% of 10,86, mm the concentration of 10 % of 11,46, mm the concentration of 15 % of 11,8, mm the concentration of 20% of 12,24 mm and the highest 25% of 12,9 mm.

Key word : *Freycinetia sessiliflora* rizki , a new kind of pandanus extract and *Streptococcus mutans*

INTRODUCTION

Pandanus is plants often used its leaves. Pandanus included in the family pandanaceae consisting of several marga namely pandanus ,sararanga , freycinetia , martelidendron and benstoneana. Have been found pandan that including marga freycinetia in west kalimantan cover an constitute a single species with the new one which there are on the hill and fortified passi singkawang , pandan until now from its name freycinetia sessili flora rizki . Pandanaceae has long been known and used not only by the people in indonesia , but also by the world community well as an ornamental as well as another function . According to stone (1976) , the plants freycinetia having uses for man. Roots hanging old, mine used to make in addition plants is also the plants producing a scented oil derived from cobs flowers. Based on empirical data, in many places the tunny edible flowers after steamed. The leaves the tuner of the cob in red lights can be used as a red dye to spring from china for example off Gaudichaudii (heyne, 1927). Leaves of the pandanus *freycinetia sessiliflora* Rizki compounds containing an alkaloid of a metabolite , flavonoid , terpenoid-steroid , saponin , of phenol and tannin . Based on secondary metabolite compounds contained by the pandanus, then pandanusfreycinetiasessiliflora this rizki have efficacy and the benefits that can be developed in the health sector, pharmacy, biology and medicine. Research Mardiyaningsih, A (2014), extract ethyl acetate leaves pandanus fragrant could hinder the growth of bacteria *Streptococcus mutans* with an average diameter zone obstruent 10 mm. 11,33 mm. Then extract mixture of etanol- ethyl acetate (1:1 v/v) can also inhibit bacterial growth *Streptococcus mutans* with rata-rata diameter zone obstruent each 13,33 mm and 15,67 mm . Extract ethyl acetate and blend ethanol ethyl acetate is probably capable of filter antimikrobial active compounds having of the character .

MATERIAL AND METHODE

The tools used in this research among other: autoclaf (american 75x) , the stem a stirrer , a basin , a petri dish , enkas , erlenmeyer (pyrex) , a beaker a cup piece of pyrex) , a measuring glass (piece of pyrex) , an incubator (memmert) , spritus lights , a period of mizzen (insize) , filter paper , paper covers , pipet (dragon med) micro , the balance of analytic (hwh) , an oven (memret of incubator in30) , ose , a tube the reaction (pyrex) , a jar glass and vacum rotary evaporators (scilogex). Materials used in this study included: aqua pro injection , amoxicillin as control

positive , bacteria *Streptococcus mutans* , ethanol 96 % solution NaCl physiological , medium Muller-Hinton Agar (MHA) , pandanus the *F . sessiliflora* Rizki. Sample forest pandanus *F . sessiliflora* Rizki that has been smoothed inserted into toples glass .Then poured solvent ethanol 96 % 3:1 , and closed and left for 3x24 hours , while often stir. The results maceration filtered using flannel , lees then squeezed to achieve extract liquid ethanol. Extract liquid ethanol concentrated using rotary evaporators at a temperature 40°C. Congelation was done until obtained extract viscous .The calculation randemen extract done. Extract ethanol pandanus forest. *F. Sessiliflora* Rizki will be made in each 5 %, 10 %, 15 %, 20 % and 25 % b/v made by means of weighing extract pandanus forest *F.sessiliflora* as many as, 0,5 g, 1 g, 1,5 g, 2 g, 2,5 g and each put in a pot ointment already contains aqua pro injection to 10 ml and shake until homogeny. Sterile filter paper 1 diameter cm which has prepared soaked in an aqueous solution of each sample in aseptic 15 for minutes. Then ready to laid on a petri dish that contains MHA medium.

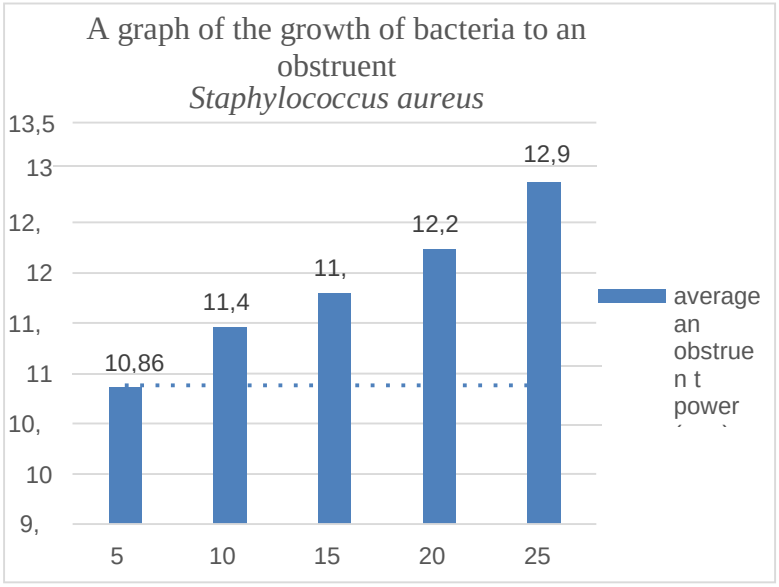
Testing of an obstruent extract ethanol pandanus forest. *F sessiliflora* Rizki made with use the diffusion. filter paper the suspension bacteria is poured into 1 mL in a petri dish then added 10 ml medium Muller-Hinton Agar (MHA) sterile to have cooled to a temperature 40^{o}c-45^{o}c. Petri glass dish to shut and stir mixed, homogeneous and left to freeze. Next, filter paper that has been in soak in the sample in each concentration laid on the surface medium Muller-Hinton Agar (MHA) who already contains the bacteria then di Incubated inside an incubator at a temperature 37 ^{o}c for 24 hours with an inverted position.

The determination of obstruent the growth of bacteria test is performed by measuring area around strain of paper .The observation is made after inkubated in an incubator for 24 hours using mizzen a term , next clear zone formed on each one discs measured by 3 different sides , then in rata-ratakan , with calculation of the value of the main scale plus result of scale nonius with the precision.

RESULT

The table 1: table the testing of pandanus extract new forest species (*Freycinetia sessiliflora*. Rizki) on the bacteria *Streptococcus mutans* with the incubation period for 2x24 hours.

Concentration	Replication I	Replication II	Replication III	Total (mm)	Average (mm)
5%	11.13	10.6	10.85	32.58	10.86
10%	11.68	11.63	11.08	34.39	11.46
15%	12.03	11.36	12.01	35.4	11.8
20%	12.15	11.96	12.61	36.72	12.24
25%	13.29	12.38	13.03	38.7	12.9
Control positive	15.83	14.75	16.9	47.48	15.82
Control negative	-	-	-	-	-



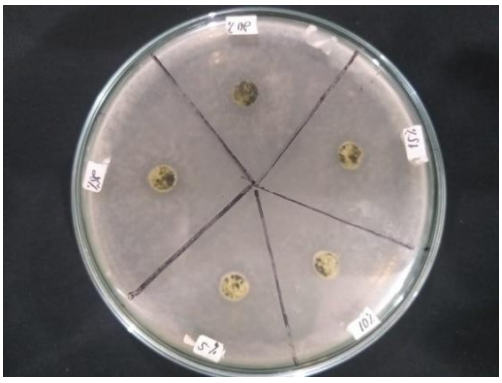
DISCUSSION

The sample used in this study is pandanus forest species new latin name *Freycinetia sessiliflora* Rizki. Which sample taken from mount Passi, Singkawang. West Kalimantan province. Sample and processed into simplisia dry with a heavy wetness 1 kg chopped to ease, process of drying then dried using dry cabinet 3 during the day and get severe dry 224,81. grams. Simplisia produced to ease the process of diffusion of an active substance to a solvent , then extracted by a method of maceration because this method either used efforts to draw a substance efficacious and it is the sustainability and warming does not hold in heating , as well as simple in construction and the tools used . Solvent used to maceration are ethanol 96%. Solvent ethanol used for universal that can be pulled polar substance and non polar . Illegal minimarts simplisia macerated for an hour ago filtrat obtained evaporated using evaporator rotary to get the randemen extract 18,28 % (<10%.). The results of randemen or show effectiveness at the time of the extraction . Due to the stability of much value yield extraction nor the process then it would be more effective . This time influenced by, extraction a kind of, filter used as a solvent size of particles , and the length of the method of extracting (Leksono, dkk 2016).

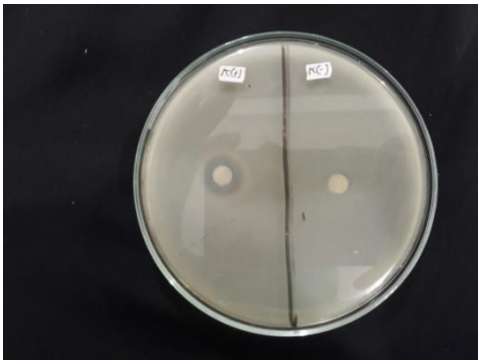
Antibacterial activity test was preceded by process of sterilizing for the purpose of kill

microorganism and prevent the incidence of contamination microbes . Glass was autoclave sterilization tools for having the same time sterilization is a relative short and effective for tools glass having a cavity. Next is the restoration of bacteria to bacteria get active and prevent damage to bacteria. Before done by bacteria with antibacterial activity suspense on bacteria nacl physiological test aimed at diluting the bacteria that can spread flattened and homogenized. Testing an obstruent extract resources viscous ethanol pandanus the forest a new kind of (*Freycinetia sessiliflora* Rizki) on the growth of the staphylococcus bacteria aureus by using 5 percent concentration , 10 % , 15 % , 20 % , and 25 % . Microbiology who test run based on the disc for pour it use .Was used in the testing positive and negative control , as a control positive for the negative amoxicillin and control the use of aqua pro injection .Then incubated for 24 hours and 48 hours at a temperature 37 C^o

Based on observation after inkubated 2x24, for hours extract leaves pandanus forest this new species have a obstruent about the bacteria *Streptococcus mutans* zone and there are clear at concentrations that has been in ujikan.The diameter of an obstruent. 1 can be seen in table. Based on table 1 can be seen that each concentration can extract inhibiting the growth of bacteria *Streptococcus mutans* .Each concentration extract inhibiting the growth of bacteria *Streptococcus mutans* with an average concentration of 5 % the diameter of an obstruent 10,86 mm , the concentration of 10 % as much as 11,46 mm , the concentration of 15 % as much as 11,8 mm , the concentration of 20 % as much as 12,24 mm and highest concentration of 12.9 mm. 25 %. The clear formed by samples from the bacteria *Streptococcus mutans* can be seen in the picture below.



To control (+) used antibiotics amoxicillin of the penicillin (ß-laktam) which the observation is made for 48 hours . An obstruent zone diameter measurement result in bacteria Streptococcus mutans with an average 15,82 mm. clear control zone formed by positive and negative against bacteria *Streptococcus mutans* can be seen in the picture below.



As antibiotics amoxicillin synthesis capable of forming an obstruent diameter zone on all bacteria. Amoxicillin having broad spectrum of work covering many gram-negative bacteria and garm-positive (Tjay, T.H, Rahadja and Kirana , 2007).

Amoxicillin mechanism kill bacteria in a inhibits the synthesis of the formation of peptidoglikan the cell membrane in three phases .The first and second happened to cytoplasm that is disturbing synthesis amino acid with the addition of specific amino acids (l-alanine , d-glutamic , l-lysine) .The third stage occurring outside a cell to complete cross-link the sub new unit .

All antibiotics the beta -laktam is selective inhibitor against synthesis bacterium cell wall thus active on bacteria that in phase growth . An early stage with the antibiotic drugs in binding will begin with the bacterial cell receptor protein fastener penicillin (pbps = penicillin-binding) proteins. After the drug attached to one or more the receptors transpeptidasi amounts of will and then synthesis peptidoglikan amounts of will. The next stage isinaktivasi and loss of a enzyme autolitik. in the cell walls.The consequence is that activation lytic enzyme will cause lysis bacteria.

An obstruent formed at the power plant extracts pandanus forest species because this new active compound. Contained there in the compound has a the obstruent against bacteria Streptococcus mutans.Active compounds contained therein (flavonoid , saponin and tannin).

Is the largest of flavonoid.compound of phenol a compound bioaktif is allegedly. antibacterial potential as a compound Biological compounds flavonoid activities carried out against bacteria in their cell walls of bacteria which consists of lipids and amino acids will react with an alcohol to compounds flavonoid. According to the pendit. et al(2016), said that a mechanism is flavonoid as antibacterial way hinder, synthesis of nucleic acids inhibiting the function of a cell membrane, and impeded. energy metabolism.

Besides flavonoid ,saponin having broad spectrum antibacterial activity which mechanism it works in a destructive manner plasma membrane bacteria with ways to improve the cell membrane bacteria. Saponin diffuses through a then

raises the cytoplasm of so as to interfere with and reduce stability of the membrane and the cause to the cytoplasm of leaking out of cells (Hopkins , 1999) .

A compound tannin is a compound bioaktif owning amount minimize highest other compound .The ability of tannin as an antibacterial seen from its action against a membrane (Marfuah dkk , 2018) .Tannin have mechanism work which is equal to other phenolic in inhibiting the growth of bacteria of *Streptococcus mutans* and *Eschericia coli* and can reacted by incarnation an enzyme essential and destructor or incarnation a function of material used to call as genetic (Branen , 1993) .

CONCLUSION

But in this study inconclusive as follows:

1. Plant pandanus new woodland species by its latin name (*Freycinetia sessiliflora* Rizki .) can be inhibiting the growth of bacteria *Streptococcus mutans.*
2. An obstruent power has risen and other that is produced on a the bacteria *Streptococcus mutans* by concentration of the 5 % as much as 10,86 mm , the concentration of 10 % as much as 11,46 mm , the concentration of 15 % as much as 11,8 mm , the concentration of 20 % as much as 12,24 a mm and the concentration of with the highest overall performance 25 % as much as 12,9 mm.

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MEAT SENSORY QUALITY OF FEMALE ALABIO DUCKS FED COMMERCIAL RATIONS SUPPLEMENTED WITH MANGOSTEEN (*Garcinia mangostana L)* PERICARP MEAL

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ABSTRACT

Duck is a potential local Indonesian poultry to be developed as a protein source as it produces both egg and meat. This study was aimed at assessing the sensory quality of meat of female Alabio ducks fed commercial rations containing mangosteen peel meal (TKM). The study was conducted at the Poultry Farm of Animal Husbandry Department, Faculty of Agriculture, Djuanda University, Bogor. Eighty female Alabio day old ducks were used. The animals were allocated into 20 experimental units (4 ducks in each) and exposed to 4 treatments and 5 replicates in a completely randomized design. Treatments consisted of the inclusion of TKM in rations of 0% (R0, control), 1.5% (R1), 3.0% (R2), and 4.5% (R3). Data were subjected to an analysis of variance and a Duncan test. Results showed that the inclusion of 4.5% TKM in rations (R) significantly reduced strong aroma and color of meat. Vitamin E and C (antioxidant) in TKM were found to lower fat content and reduce meat off-odor intensity. Xanthone has some antiaging property that may hamper the oxidation of vitamins and double bonds unsaturated fatty acids by free radicals. It was concluded that feeding TKM for 40 days improved duck meat quality by enhancing meat aroma and color. Meat of treated ducks had less off-odor and brighter color.

Key words: sensory quality, duck, mangosteen peel meal

INTRODUCTION

1.1 Background to the Study

As a potential meat and egg producing poultry, duck is a promising protein supplier. In Indonesia, several local ducks including *tegal, mojosari, bali, cirebon, pegagan,* and *kerinci* ducks have been identified as having distinctive characteristics.

Sensory quality is a characteristic affecting consumers' acceptance of meat. Color, aroma, tenderness, taste, and juiciness are factors determining the quality of meat. Sensory quality of

meat is affected by type of animal, animal age, feed, animal husbandry, and pre-slaughter animal handling[1]

Mangosteen is a functional food with exceptional health benefits. However, these are not well known even by people in this country. In Indonesia, the utilization of this fruit is still done by using a simple processing method. In several countries, this fruit, particularly its pericarp, has been utilized as a medicinal substance in health therapy[2]. Mangosteen pericarp meal contains vitamin A, 62.05% water, 1.01% ash, 0.63% fat, 0.71% protein, 1.17% total sugar, dan 35.61% carbohydrate[2]. Mangosteen is found to contain antioxidant, antibacterial, antiinflammation, anticarcinogenic, and antiploriferative substances which have health benefits[3]. Mangosteen pericarp contains xanthone compounds with antioxidative, antiploriferative, and antimicrobial properties which are not found in other fruits. These xanthone compounds include mangostin, mangostenol A, mangostinon A, mangostinon B, trapezifolixanthone, tovophyllin B, alfa mangostin, beta mangostin, garcinon B, mangostanol, flavonoid epicatechin, and gartanin[4]. Mangosteen pericarp has a potential ability to capture free radicals to increase body immunity, improve performance, reduce stress level, improve blood lipid profile, and reduce abdominal fat level in ducks. This is attributed to antioxidative property of xanthone bioactive substance contained in mangosteen pericarp[5]. Xanthone was found to have higher antioxidative property than vitamin E and C tinggi[6]. This study was aimed at assessing meat sensory quality of *alabio* ducks fed commercial rations supplemented with mangosteen pericarp meal (TKM).

Methods

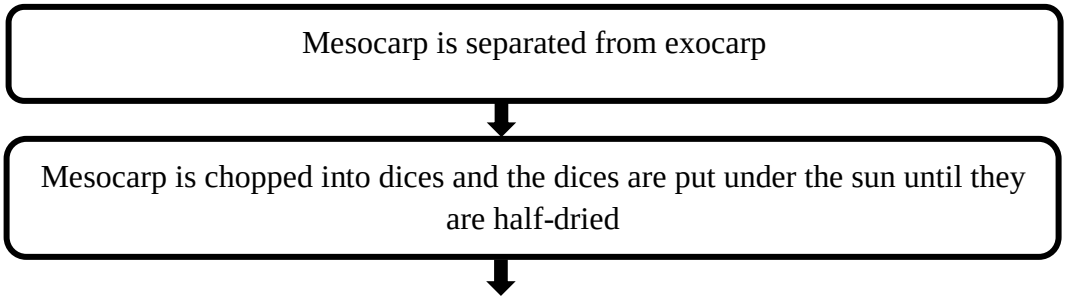
A completely randomized design with 4 treatments and 5 replicates was used. Eighty day-old ducks (DOD) were allocated into 20 experimental units (4 DODs per unit). Treatments consisted of:

R0 = commercial ration 100% (control),
R1 = commercial ration + 1.5% mangosteen pericarp meal,
R2 = commercial ration + 3.0% mangosteen pericarp meal, and
R3 = commercial ration + 4.5% mangosteen pericarp meal.

Hedonic and quality hedonic tests were conducted. Measurements were taken on meat aroma, color, tenderness, taste, and juiciness.

Mangosteen Pericarp Meal Preparation

Mangosteen pericarp meal was prepared from good quality mangosteen peels as indicated by their purplish red color and soft tenderness. The preparation procedures are depicted in Figure 1.



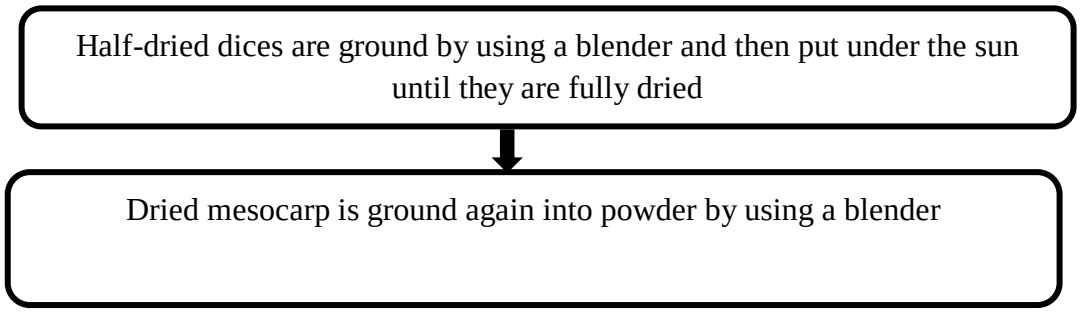


Figure 1 Mangosteen Pericarp Meal Preparation

Mangosteen pericarp meal was analyzed for its nutrient contents (Table 1).

Table 1 Nutrient Contents of Mangosteen Pericarp Meal

Sample	Water (%)	Protein (%)	Fat (%)	Fiber (%)	Ash (%)	Ca (%)	P (%)
TKM	28.46	1.17	7.54	17.44	2.82	<0.01	0.08

Source: Laboratory of Indonesian Research Institute for Animal Production, Ciawi, Bogor.

Sampling for Organoleptic Test

Samples for organoleptic test were taken from mangosteen pericarp of 300 g. Sample for each treatment was boiled for 15 minutes. Boiling time was counted since the water started to boil.

RESULTS AND DISCUSSION

Hedonic Test

Sensory test is a method to measure, assess, and observe the aroma, tenderness, color, taste, and juiciness of a product. This test plays an important role in quality control implementation

Results of Kruskal Wallis test showed that no treatment gave significant effects (P>0.05) on the aroma, tenderness, color, taste, and juiciness of duck meat. Ducks of similar age and the types pf feed given were suspected to be the cause of this finding. The meat did not content excessive fat so that meat off odor was found. Meat aroma or off odor is one the most difficult sensory characteristics to classify and explain as the number of panelists participating in the test are considerably high and the sensitivity level of their sensing organs is considerably varied. In this study, the inclusion of TKM in rations gave no differences (P>0.05) in meat tenderness. The mean value of meat tenderness given by panelists in hedonic test was 3.39. This value of meat

tenderness was within the neutral range. The fat content in meat was found two affect meat tenderness level. Fat accumulation dissolved collagen in meat making meat become softer[7].

Hedonic quality test

Mangosteen Pericarp Meal (TKM) inclusion in rations was found to give no effects (P>0.05) on meat aroma, color, and juiciness

Table 2 Mean Duck Meat Hedonic Quality Test Values

Parameter	Treatment				Mean ± Std
	R0	R1	R2	R3	
Aroma	2.40±1.19[b]	2.50±0.82[b]	2.30±0.75[b]	1.83±0.69[a]	2.26±0.91
Tenderness	3.03±0.96	2.60±0.62	2.53±1.13	2.90±0.99	2.77±0.95
Color	2.10±1.09[b]	1.97±1.12[ab]	1.93±1.01[ab]	1.50±0.82[a]	1.88±1.03
Taste	3.07±0.90	2.83±0.98	3.10±0.84	2.80±0.71	2.95±0.86
Juiciness	2.70±1.23[a]	2.80±1.18[a]	2.53±1.07[b]	2.50±1.28[b]	2.63±1.18

Note: Different superscripts in the same rows indicate significant differences (P<0.05). Treatments: R0 = Commercial ration + 0% Mangosteen Pericarp Meal (TKM), R1 = Commercial ration + 1.5% TKM, R2 = Commercial ration + 3.0% TKM, R3 = Commercial ration + 4.5% TKM

The inclusion of 4.5% TKM in commercial ration (R3) resulted in meat aroma value of 1.8 indicating no off odor was found. This was in line with the notion that antioxidant compound could delay, retard, and avoid oxidative reaction of free radicals in fat degradation[8].

Significant differences (P<0.01) were found in meat color with the highest values of 2.10–1.93 indicating bright color were found in meat of ducks in R0, R1, and R2. Considerably bright color of meat as indicated by the lowest value of 1.50 was found in R3 ducks. Xanthone can function as an antiaging as it avoids the oxidation of vitamins and polyunsaturated fatty acids (components of neuron cell wall) by free radicals. This leads to the inhibition of cell tissue damages which are commonly characterized by the formation of pigment spots or plagues.

CONCLUSION AND RECOMMENDATION

Conclusion

It was concluded that the inclusion of mangosteen pericarp meal in rations improved duck meat quality color. Mangosteen pericarp meal /TKM inclusion in rations resulted in meat with less off odor and brighter color.

Recommendation

In further research, it is recommended to give 4.5% mangosteen pericarp meal to improve the hedonic quality test of aroma and color in duck meat.

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Performance of Male and Female Local Grower Ducks Fed Fermented Non-Conventional Rations Supplemented with *Asam Gelugur* Leaf Meal

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Background-Increasing consumption of local duck meat is expected to be an alternative solution for dependency on imported meat. Efforts to increase duck meat consumption should be taken toward the improvement of production and consumers' acceptance of duck meat (Mattitaputty and Suryana 2010). Sex and feed are two of important factors affecting duck growth. Feed additives including herbs can be used to improve growth performance of ducks. In this study, the use of *asam gelugur* leaves (*Garcinia atroviridis*) containing organic acids and phenolic compounds was expected to improve digestive functions and improve duck production performance.

Purpose – This study was aimed at assessing the effects of *asam gelugur* leaf meal inclusion in rations on the production performance of ducks of different sexes.

Design/methodology/approach – The study was conducted for 2 months in the Poultry Farm of Faculty of Agriculture, Djuanda University, Bogor. Eighty male and female grower ducks were allocated into a 2 x 2 completely randomized factorial design. Factor A consisted of sexes (male and female) and factor B consisted of levels of *asam gelugur* leaf meal inclusion in rations (0, 2, 3, 4, and 6%). Three replicates were used for each treatment. Measurements were taken on feed intake, body weight gain, feed conversion ratio, and mortality rate.

Findings– Results showed that no interaction between sexes and levels of *asam gelugur* leaf meal inclusion in rations was found. However, body weight gain and feed conversion ratio were significantly affected by sex. Significant effects of levels of *asam gelugur* leaf meal inclusion in rations were found on feed intake and body weight gain. The inclusion of *asam gelugur* leaf meal of 6% in rations of male ducks was found to be more effective as it increased body weight gain and lowered feed conversion ratio.

Research limitations– Results of this study were limitedly found in male and female grower ducks.

Originality/value – Assessment of production performance of male and female ducks fed rations containing *asam gelugur* leaf meal.

Keywords: hydroxycitric acid, flavonoid, garcinia atroviridis, organic acid, body weight gain

I. INTRODUCTION

Today, meat of commercial and native chickens is the main source of animal protein intake for Indonesian people. However, demand for duck meat is increasing as reflected from the increasing duck population from 50,528 in 2018 to 51,950 in 2019 (Ditjen PKH Direktorat Jendral Peternakan dan Kesehatan Hewan 2019). Local ducks are expected to be an alternative source of meat to reduce the country dependence on imported meat. Improvement of production and consumers' acceptance of duck meat should become the main objective of the efforts done to increase duck meat consumption (Mattitaputty and Suryana 2010).

Factors affecting duck growth include breed, species, sex, and feed (Soeparno 2005). The feed given to ducks should quantitatively and qualitatively meet the animal requirements. Providing feed additive such as herbs is a potential way to improve the quality of meat. *Asam gelugur* leaf (*Garcinia atroviridis*) contains various kinds of organic acids including malic and

hydroxycitric acids (Meer *et al* 2013). In addition, phenolic acid, flavonoid, and tannin having antioxidative activity is found in *asam gelugur* leaf (Shabrina 2017). Other phenolic compounds (flavonoid, phenylpropanoid, phenolic acid, antosianin, quinone pigment, melanin pigment, lignin, and tannin) contained in plants are known to raise appetite and improve the work of the digestive system which may eventually improve the animal performance. Therefore, this study was conducted to assess the effects of the inclusion of *asam gelugur* leaf meal in rations on the production performance, particularly body weight gain and feed conversion ratio of male and female ducks.

II. LITERATURE REVIEW

Based on zoological classification, duck is a waterfowl belonging to Aves Class, *Anseriformes* Order, *Anatidae* Family, and *Anas* Genus, and *Platyrhynchos* Species (Crawford 1993). Ducks are meat and egg producers. Indonesian local ducks with Indian Runner physical characteristics are mainly egg producers. In other areas including China, America, and Europe, ducks are mostly developed as meat producers.

Feed intake in male local ducks aged 10 weeks was on average 9.67 g/head/day (Triyastuti 2005). Average body weight of male local ducks might reach 24.8–26.2 g/head/day (Purba and Ketaren 2011) and a carcass percentage of 52.06-54.55% within 8-week duck raising period (Dewanti *et al*. 2013).

Asam gelugur leaf with organic acids in it may act as an acidifier which is beneficial in preserving feed as it protects feed from any damaging action from microbes and fungi. This brings a direct effect on the improvement of feed digestibility. The inclusion of 1% *asam gelugur leaf* was found to increase carcass percentage and meat components and reduce carcass bone components (Damanik 2014).

III. METHODOLOGY

This study was conducted in 2 months in the Poultry Farm of Animal Husbandry Department, Faculty of Agriculture, Djuanda University, Bogor. Forty male and female grower local ducks were used. Experimental rations were made of fermented non-conventional feed and *asam gelugur leaf* meal. Feedstuffs used to formulate the rations included ground corn, ground rice bran, soybean cake, fishmeal, premix, DCP, and CaCO3. Fermented non-conventional feed consisted of coconut cake, palm kernel cake, and *Aspergillus niger* fungi. The ducks were placed in battery cages equipped with feed trough and drink containers. Other equipment used in this study included plastic bags, digital balance, gas stove, oven, blender, big pans, and pails. A factorial completely randomized design with 2 factors was used. The first factor (A) was sexes (male and female) and the second factor (B) was the inclusion of *asam gelugur leaf* meal in rations (0, 2, 4, and 6%). Three replicates were applied in each treatment. Treatments consisted of male ducks + 0% *asam gelugur* leaf meal (R0), male ducks + 2% *asam gelugur* leaf meal (R1), male ducks + 4% *asam gelugur* leaf meal (R2), male ducks + 6% *asam gelugur* leaf meal (R3), female ducks + 0% *asam gelugur* leaf meal (R4), female ducks + 2% *asam gelugur* leaf meal (R5), female ducks + 4% *asam gelugur* leaf meal (R6), and female ducks + 6% *asam gelugur* leaf meal (R7). Measurements were taken on production performance parameters including feed intake, body weight gain, feed conversion ratio, and mortality rate.

Comment [BM1]: 40 atau 80?

Feed fermentation process was done based on procedures developed by Supriyati *et al.* (1998). *Asam gelugur* leaf meal preparation was done by firstly separating the leaves from the midrib. The leaves were then dried under the sun for 1-2 days before they were in an oven at 62 ºC for 10 minutes. Dried leaves were ground by using a blender. Rations of 100 g/head/day were given to the ducks twice a day. Treatments were given to the ducks for 6 weeks.

IV. RESULTS AND DISCUSSION

Results showed that there was no interaction between sex and levels of *asam gelugur* leaf meal inclusion. However, significant effects of sex on daily body weight gain and feed conversion ratio. Effects of levels of *asam gelugur* leaf inclusion on feed intake and body weight gain were also significant.

Daily feed intake was not affected by the interaction between sex and levels of *asam gelugur* leaf meal inclusion. Effects of sex on feed intake was not significantly different either. In contrast, levels of *asam gelugur* leaf inclusion gave significant effects on feed intake. Average feed intakes in male and female ducks were 93.54 and 92.87 g/head/day, respectively. Although they were not statistically different, feed intakes in male ducks tended to be higher than those in female ducks. Results of this study were in line with those found by Syaifudin *et al.* (2015) which showed that average feed intakes in male and female ducks were not different.

It was also shown that the inclusion of *asam gelugur* leaf meal of 0 and 2% gave different feed intake from that of 4 and 6% (90.45 and 88.37 versus 95.38 and 98.62 g/head/day, respectively). This increased feed intake was suspected to be caused by the notion that organic acid and phenolic compounds contained in *asam gelugur* leaf meal. This finding was in line with what was found by Magdalena (2013) that phenolic compounds raised appetite. Feed intakes found in this study were lower than the figures of 129.09-135.09 g/head/day found by Mulyani *et al*. (2013) who added citric acid to rations of grower male ducks and 108.38-110.00 g/head/day found by Sudiyono and Purwatri (2007).

Body weight is an indicator of economic success in animal raising. In this study, daily body weight gain was significantly affected by both sex and the inclusion of *asam gelugur* leaf meal. Average body weight gains were 11.27 g/head/day in male ducks and 6.04 g/head/day in female ducks. This indicated that male ducks were able to utilize feed better than female ducks (Syaifudin *et al* 2015). This difference might be attributed to androgen hormone as found by Sari *et al*. (2012) in male and female *pegagan* ducks. In addition, male ducks were found to have relatively higher feed intake and feed efficiency allowing them to have faster growth than female ducks (Matitaputty *et al*. 2011).

Regarding levels of *asam gelugur* inclusion, it was found that body weight in ducks given ration with 0% *asam gelugur* inclusion (7.47 g/head/day) was different from those (9.27 and 9.32 g/head/day) in ducks given rations with 4 and 6% *asam gelugur* inclusion. This might be caused by organic acids and phenolic compounds including flavonoid which could improve the condition of digestive system in ducks. Tannin contained in *asam gelugur* leaves was not found to give negative effect on body weight gain.

Feed conversion ratio was significantly affected by sex but not by levels of *asam gelugur* leaf meal inclusion. Male ducks had better feed conversion ratio (8.38) than female ducks (15.79). In another study by Wulandari *et al*. (2005), male ducks were found to have higher feed intake and identified to have better digestibility as they also had lower values of feed conversion than female ducks.

No death of ducks was found in this study. This mortality rate of 0% indicated that the inclusion of *asam gelugur* leaf meal in rations gave no negative effect on the growth of ducks.

V. CONCLUSION

It was concluded that the inclusion of *asam gelugur* leaf meal in rations of up to 6% was more effectively done in male ducks as it could increase body weight gain and lowered feed conversion ratio.

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Effects of the Inclusion of Papaya (*Carica Papaya L*) Leaf Meal in Rations on the Productivity of Quail (*Coturnix-coturnix japonica*) Layers Title (Capitalize First Letter)

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Abstract

Demand for quail eggs in Indonesia is increasing as they are highly nutritious and preferred. Alternative solutions to improve the productivity of quail layers without increasing production cost are needed in order to fulfill quail egg demand. This study was aimed at assessing the effects of the inclusion of papaya leaf meal in rations on the productivity of quail layers. The study was conducted in 5 weeks from 28 December 2019 to 31 January 2020 at the Poultry Farm of Animal Husbandry Department, Faculty of Agriculture, Djuanda University, Bogor. Quail layers aged 42 days with average initial body weight of 100 g were used. A completely randomized design with 4 treatments and 4 replicates were used. Treatments consisted of rations containing no papaya leaf meal (R0), 1% papaya leaf meal (R1), 1.5% papaya leaf meal (R2), 2% papaya leaf meal (R3). Data were subjected to an analysis of variance (Anova). Measurements were taken on feed intake, feed conversion ratio, egg production, egg biomass production, and mortality rate. Results showed that treatments gave no significant effects ($P>0.05$) on quail layer productivity. It was concluded that the inclusion of papaya leaf meal in rations by up to 2% could maintain laying productivity in quails.

Key words: quail, papaya leaf meal

I. INTRODUCTION

There are several types of quail, including the Japonica quail (Coturnix coturnix japonica). This type of quail is the most popular breed raised by farmer as a producer of eggs and meat. Based on data from Badan Pusat Statistik (2019) the quail population in Indonesia in 2018 was 14,062 birds, in 2019 it increased to 14,107 birds. The advantages of quail livestock include a short reproductive cycle, being able to produce at a young age, easy to maintain, not requiring large capital, can be raised in large numbers but in a limited space, and has a high egg production rate but low feed consumption (Harvest et al 2013). Production of quail eggs in one year ranges from 200-300 eggs with peak production occurring at the age of 4-5 months (Amo et al 2013).

The problem that is often faced today is that the main productivity of quail as egg production is not optimal. Production of quail eggs is influenced by several factors, one of which is feed. One of the most important things in quail maintenance is complete feed (Widyatmoko et al 2013). One of the causes is inefficient feeding management (Primacita et al 2014). In general, quail breeders provide feed in the form of feed from the feed company or make their own rations with less knowledge of the quail nutrition need. Besides being able to affect egg production, feed is also the most important component in production costs because 60-80% of the costs incurred are used as feed costs (Khalil 2015).

Papaya is a fruit plant from the Caricaeae family originating from Central America and the West Indies and even around Mexico and Costa Rica. Papaya plants are widely grown in tropical and subtropical areas, in wet and dry areas or in lowlands and mountains up to 1000 meters above sea level (masl). Papaya leaves contain several compounds including alkaloid compounds and proteolytic enzymes, papain, khimopapain and lysizim which can facilitate intestinal work and are useful for the digestive process (Kamaruddin and Salim 2003). The purpose of this study was to examine the effect of feeding papaya leaf flour in rations on the productivity of quail eggs.

II. LITERATURE REVIEW

Papaya plants contain a lot of substances that are nutritious for medicine. The leaves contain papain, karpain, alkaloids, saponins, glycosides, carposids, the fruit contains cartenoid, pectin D-glucose, 1-acabinose, while the roots contain papalna, potassium, minorate, mirosin, papayatin, resin and tannins (Sutarpa et al. 2008). In 100 grams of papaya leaves contain 2.1 mg of nisin, 140 mg of vitamin C, 136 mg of vitamin E and beta-carotene (pro-vitamin A) in papaya leaves can reduce cholesterol and act as antioxidants (Anwar and Bambang, 2010).

Papaya leaves also contain a lot of papain enzymes which have the ability to form new proteins, namely plastein and proteolytic enzymes that can increase the efficiency of the digestive process. According to Sudjatinah et al. (2005) the proteolytic enzyme papain has the ability to prevent protein and convert its portion into arginine, because arginine in its original form has been shown to affect the production of human growth hormone produced in the pituitary gland. Meanwhile (Kiha et al 2012) said that papain and chymopapain in papaya leaves are proteolytic enzymes that can help improve protein digestibility and absorption, while lipase is an enzyme that hydrolyzes fat into fatty acids and glycerol so that increased protein and fat digestibility will have an impact on increasing metabolic energy.

The effect of feeding papaya leaf meal on poultry has been investigated by several researchers. Machasin (2007) stated that the addition of papaya leaf flour up to 18% in the basal ration of 3 week old male super-native chickens with an initial body weight of 290.04 g had no significant effect on hemoglobin and erythrocytes, but had a significant effect on blood uric acid levels. Widjastuti (2009) research on Sentul chickens aged 36 weeks by giving papaya leaf flour to a limit of 10% did not have a negative effect on egg production. Feeding papaya leaf flour in this study is expected to be able to increase the productivity of quail eggs so that the production costs incurred by farmers, especially feed costs can be covered by the production of eggs produced.

III. METHODOLOGY

Animals and Diets

The materials used in this study were 64 quails with a ratio of male and female =1:3. The quail used in this study was 42 days old with an average initial weight of 100 g. The feed ingredients used are papaya leaf flour, DCP, corn flour, soybean meal, fish meal, premix, CaCO3, CPO. Food substance content and metabolic energy and composition of quail feed ingredients during the study are presented in Table 1. Treatment rations were arranged in terms of iso-energy and iso-protein (Protein 18%, ME 2900 Kkal/kg).

Table 1 Composition of feed ingredients and nutrient composition of laying quail rations for each treatment

Feeds/ Nutrient	R0	R1	R2	R3
Corn meal	62.5	62	61.5	61
Soy bean meal	22	22	22	19.5
Fish meal	4.5	6	6	6.5
Premix	1	1	1	1
DCP	2.5	2.5	2.5	2.3
$CaCO_3$	5	5	5	5
CPO	2.5	2.5	2.5	2.5
TDP	0	1	1.5	2

DCP = Dicalsium Phospate, CPO = Crude Palm Oil, PLM = Papaya Leaf Meal

The making of papaya leaf flour was done by separating the leaves from the leaf bones, then drying them in the sun to dry, after which the papaya leaves are put in the oven at a temperature of 620C with an oven time of 3 hours. After being roasted the papaya leaves are then blended so that they become flour. Provision of papaya leaf flour, namely by mixing it into rations made using other feed ingredients by giving according to the provisions of the treatment.

Reseach Design

The research design used in this study was a completely randomized design (CRD). There are four treatments that were tested. Each treatment was repeated four times. From the number of treatments and repetitions, 16 units of experimental cage were used. In one cage unit consists of 4 quails, 1 male 3 female. The treatments to be carried out in this study are as follows: R0: Feeding without papaya leaf meal (Control); R1: Inclusion 1% papaya leaf flour in the ration; R2: Inclusion 1.5% papaya leaf flour in the ration; R3: Inclusion 2% papaya leaf flour in the ration.

The variables measured in this study were feed intake, egg production, feed conversion ratio, egg mass production and mortality. All collected data were analyzed as analyses of variance (UNIANOVA) under a randomized block design and if applicable, Duncan's Multiple Range Test was applied to repeal statistical different among treatment (Steel & Torrie, 1980). The treatment different was considered to be significant when $P < 0.05$.

IV. RESULT AND DISCUSSION

Feed Intake

Feed intake is an important factor that is very influential for survival and livestock production quail. The amount of consumption is obtained from reducing the provision of rations with the remaining rations every week.

Tabel 1 Quail performance during the study

Variabels	R0	R1	R2	R3
Feed Intake (g)	19,29 ± 0,08	19,54 ± 0,25	19,52 ± 0,12	19,38 ± 0,16
Egg Production (%)	57,48 ± 1,96	62,49 ± 5,45	63,16 ± 5,50	57,50 ± 1,69
Mass Production (g/head)	3,78 ± 0,14	4,21 ± 0,19	4,35 ± 0,35	3,91 ± 0,13
Feed Conversion ratio	2,92 ± 0,06	2,86 ± 0,14	2,80 ± 0,02	2,83 ± 0,08

Note: All mean data were not significantly different (P > 0.05).

The results of the analysis of variance showed that the inclusion of papaya leaf flour into ration up to 2% was not significantly different (P> 0.05) on feed intake (Table 1). The feed intake did not have a significant effect. This could be caused by the energy content contained in the ration for each treatment which was arranged iso-energy anf iso-protein, causing an effect that was not significantly different. Based on the results of the study, the average consumption of quail rations during the study was 19.42 ± 0.18 grams / head / day. The quail feed intakefigure is lower when compared to the results of the study (Fitri et al 2019) which stated that the average daily quail feed intakewas 25.08 ± 0.44 grams / head / day. According to research (Yunita et al 2014) consumption of quail leaves treated with 4% papaya leaf flour was able to increase feed intakebut at the level of 6% papaya leaf flour in the ration tended to be lower than those receiving 2% papaya leaf treatment and control (without papaya leaf). Feed intakeis an important factor in determining the productivity of quails. The factors that influence the consumption of quail rations, namely, the energy content of the ration and environmental temperature. Apart from that, strain, body weight, egg weight, feather growth, stress level and poultry activity (Nurmil et al 2017).

Egg Production

The results of the analysis of the variety of production of quail eggs fed with papaya leaf flour had no significant effect (P> 0.05). This shows that the average data on quail egg production during the study in each treatment was relatively the same, ranging from 57-63%. According to research (Yunita et al. 2014) rations containing 6% papaya leaf flour resulted in lower egg production if compared to egg production with the treatment of papaya leaf flour 4% and below. But research (Widjastuti, 2009) on 36 week old sentul chickens which were given up to 10% papaya leaf flour did not significantly affect egg production. In line with the research (Sutama, 2008) also said that the addition of papaya leaf flour up to 3% had no significant effect on egg production of 19 weeks old Hysex Brown chicken. Adequate nutritional content in rations causes the quail to be healthy, so that the process of egg formation and production can run normally (Sudrajat et al. 2014). In addition, low egg production can be caused because the age of the quail has not reached its peak production. This is in accordance with the opinion (Triyanto, 2007) that at the beginning of laying eggs, egg production is still low and increases with age until it reaches peak production at the 15th week.

Egg Mass

Egg mass production is the total egg weight produced by the hen, in this case the egg mass calculation were carried out every week. The analysis of variance showed that the results were not significantly different (P> 0.05) in egg mass production. the average value of egg mass production during the study was 4.06 ± 0.30 grams. The average egg mass production is quite low when compared to research conducted by (Maknun et al 2015) which states that quails fed with hatched egg waste flour in quail rations have egg mass production between 5.43-6.08 grams. This is because the productivity of the quail is still low. According to (Putri et al 2017) giving papaya leaf waste in the form of flour or liquid up to a level of distribution of 8% does not affect the performance of Arab chicken egg production (ration consumption, egg weight, ration conversion, number of eggs, egg mass, HDP, and shell thickness.). Protein is one of the factors needed in the egg formation process besides phosphorus and calcium. Egg mass is influenced by quail protein consumption, egg production and weight (Maknun et al 2015). If egg production fluctuates, the egg mass also fluctuates.

Feed Convernsion Ratio (FCR)

The results of the analysis of variance showed that the average conversion of quail rations during the study was not significantly different (P> 0.05). The average conversion value of the ration treatment R2 has the smallest average of 2.80 ± 0.02 meaning that R2 has the best feed conversion value. This is different from the statement (Imam et al 2017) which states that the highest average ration conversion is found in treatment R3 (provision of 15% papaya leaf flour), which is 7.48, this is because ration consumption and ration protein content have a real effect. The average conversion of quail rations during the study was 2.85 ± 0.09. This figure is said to be good when compared with the results of research conducted by (Hazim et al 2010) which showed that the conversion rate of quail rations ranged from 3.76-4.71. The results of this study are in line with several opinions. Previous research, namely Sudjatinah et al. (2005) stated that giving papaya leaf extract to broiler chickens did not have a significant effect (P> 0.05) on ration conversion. Furthermore, giving different protein levels in quail rations had no significant effect (P> 0.05) on the conversion of quail rations (Soares et al. 2003). In line with research (Zahra et al. 2012), the provision of free-to-choose rations also did not have a significant effect (P> 0.05) on ration conversion. This is presumably due to an effect on ration consumption, but there was no effect on egg weight treatment that affected ration conversion.

V. CONCLUSION

Inclusion of papaya leaf flour in the ration did not affect the performance of egg production. However, giving papaya leaf flour into ration up to to 2% can maintain the productivity of layer-phase quail eggs

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UTILIZATION OF FERMENTED FISH WASTE AS MULTIPURPOSE FEED AGAINST THE PERFORMANCE OF ALABIO DUCKS

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ABSTRACT

This study is in charge of analyzing the utilization of fish waste modified through fermentation using EM-4 against the appearance of egg-laying Alabio ducks. Alabio ducks used are 5-6 months old as many as 50 tails are placed in cage cages that are filled with 2 tails each. Feed given refers to the needs of laying ducks with 18% protein and Metabolic Energy 2900 Kcal. Feed is given 150-200 g/tail/day. As for drinking water is given on an ad libitum. The research design used is a Complete Random design with 5 feed treatments each fermented fish waste of 0%, 5%, 10%, 15% and 20% with 5 replays. The results showed that the utilization of fermented fish waste has a positive influence on the increased production of Alabio duck eggs (% duck day), exterior quality and interior of Alabio duck eggs. The use of fermented fish waste up to 15% in duck rations, providing the best results against the appearance of production and interior quality of alabio duck eggs.

Keyword : *Fish waste, Fermentation, cholesterol, alabio ducks*

I. INTRODUCTION

Alabio duck is a germplasm that is very well known especially in South Kalimantan. The advantages of duck eggs compared to other poultry eggs include rich in minerals, vitamin B6, pantoteic acid, thiamine, vitamin A, vitamin E, niacin, and vitamin B12. In addition to the advantages, duck eggs also have a deficiency compared to other poultry eggs that have a high content of saturated fatty acids that stimulate increased blood cholesterol levels. The cholesterol levels of duck eggs are approximately twice as high as chicken eggs. To increase the content of omega–3 fatty acids and lower cholesterol in livestock products especially egg products can be done through feed engineering with the addition of alesandry plant oil et al. 1998; Sceideler et al; 1998; Apriyanto et al; 1997; Herber and Van Elswyk;1996) or fermented feed (Collins et al,1997).

Fish waste is the remains of parts on the body of fish that can no longer be used or consumed by humans. If left to accumulate alone it will cause organic pollution, odor, and reduce the aesthetic value of the surrounding environment. Fish waste is quite abundant in South Kalimantan, but its utilization for livestock is still limited despite the advantages of its protein content, and its high omega 3 content. Besides, fish waste does not compete with humans, hence it is a very large potential for animal feed. There are obstacles dali waste this

fish among others high enough water content that if stored long will smell rotten because it is easily overgrown microbes. To increase the value of fish waste, it is necessary to breakthrough modification of feed processing so that the deficiencies can be overcome, among others by fermentation. Fermentation process in addition to increasing the nutritional value of feed, reducing odor and juda can improve feed digestibility.

Fish waste can be fish that are no longer worth consuming or processing, or from processing waste such as fish stomach contents and other parts that are not commercialized. Fresh fish waste is not much different from fresh fish. Fish innards waste contains high protein and unsaturated fats, in addition fresh fish waste also contains omega 3 fatty acids. Omega 3 fatty acids are essential fatty acids that are very useful for the human body. The purpose of this study is to analyze the utilization of fermented fish waste in rations against the production and quality of alabio duck eggs.

II. LITERATURE REVIEW

The issue of feed is still one of the main issues in the activities cultivation of livestock, both for poultry and ruminansia. This is mainly because feed is a significant component in the structure of livestock production costs. In addition to factors the cost, content and nutritional composition of feed will also have a direct effect on the health of Livestock. The health of livestock will also directly affect the productivity and quality of farm products. Feed is a major need in the livestock business and is very sustainability. The adequacy of feed, in terms of quantity and quality, is requirements that must be met to ensure that livestock are healthy, growing normally and production as expected. The needs and availability of feed, especially duck livestock laying, is currently greatly disrupted by the availability of feed materials and prices are soaring High. This condition has been going on for quite a while and causes the availability of feed Fluctuate. On industrial-scale farms the availability of feed can be addressed by procurement of feed specifically and or supplies of preserved feed, but for farms with very little ownership, so it is a problem that's hard. Reliance on imported feed components needs to be reduced in order for feed costs to be Pressed. Therefore, it is necessary to intensify efforts to explore local feed raw materials with good nutritional content, available in adequate quantities, and affordable by local/domestic farmers. Soedjana (2007) also agreed that efforts to improve livestock production must be based on local resources, meaning all potential and resources we have to be more optimized. Lisson et al. (2010) reported that although technology to increase productivity is basically available; but in general general, the adoption of technology to improve livestock cultivation system is still very slow.

Nutrient Needs on Laying Ducks One of the challenges for tropical countries such as Indonesia in the development of livestock especially poultry livestock is related to the availability and adequacy of nutrients is a protracted problem that must be solved with a sustainable approach to integrated feed technology. Integrated program of providing animal feed quality needs to be supported with round-the-clock availability in order to support our

intensive farming. Animal protein source feed ingredients have an advantage because the content of amino acids is complete, so it is very good for the growth and livestock production. In line with the development of feed technology, fish market waste can be effectively used as an alternative to animal feed laying ducks by providing treatment aimed at improving the productivity of laying ducks. Duck Egg Duck Egg is a source of animal protein that has a very delicious taste, easy to digested and highly nutritious. Duck eggs are generally large and white until bluish green. The average weight of duck eggs is 60-75 g (Resi, 2009).

Fish Waste is a waste resulting from a production process both industrial and (household), better known as garbage, whose presence at some point and certain places do not want the environment because it has no economic value. When chemically reviewed, this waste consists of organic compound chemicals and Inorganic. With a certain concentration and quantity, the presence of waste can negatively impact environment, especially for human health, so it is necessary to address the against waste. Fishery waste contains nutrients that are no different from mainly and has tiresFishery waste contains nutrients that are no different from and has also been extensively researched (Syukron, 2013). Fishery waste can come from upstream fisheries activities (aquaculture), and downstream fisheries activities (processing, transportation, marketing). Industrial by-results fishery treatment is generally in the form of head, innards, skin, bones, fins, blood and water used Production. Traditional processing activities are generally less able to utilize this side result, not even made use of it at all so it is wasted just like that. The by-products of fishery industry activities can be classified into five groups i.e. by-results in the utilization of a species or resource; residual processing from freezing, canning, and traditional industries, participating products; surplus from a harvest and remaining distribution (Syukron 2013).

III. METHODOLOGY

Time and Place

The research was conducted at the Agricultural Laboratory of the Center for the Study of Agricultural Technology of South Kalimantan and the Feed Technology Laboratory of the Faculty of Agriculture of the Islamic University of Kalimantan MAB from March to November 2020.

Materials

Ingredients used include: 40 adult Alabio ducks fermented fish waste, other conventional feed materials such as yellow corn, soybean meal, rice bran, fishmeal, coconut meal, premix, DL Methionine, Bone meal, EM-4. The tools used are grinder machines, feed mixers, cages as many as 25 units, bulb lamps, feed places and drinking places, digital scales. The amount of feed given as much as 750Kg for 50 alabio ducks laying for 60 days. Feeding trial was conducted in the cage of Duck Poultry Laboratory Of The Agricultural Technology Assessment Agency of South Kalimantan. Feed milling is carried out using a grinder machine capacity of 200 kg/h and feed mixing is carried out using horizontal mixer capacity of 100 kg.

Methods

The study used a Complete Randomized Design (RAL) of laying ducks with 5 treatments and 5 replays and each replay consisted of 2 tails. The treatment used is the level of feeding of fermented fish waste as additional feed against the content of omega 3 and egg cholesterol of ducks. The treatment in this study consisted of control, 0%, 5%, 10%, 15% and 20% fermentation of fish waste in rations. The variables observed in this study are Duck day egg production (%), Exterior quality and interior of duck eggs.

Statistical Analysis

In observations during the study, data was collected and analyzed to determine the difference in the effect of treatment on observed variables. The data obtained first tested its homogeneity with barlett tests, then analyzed statistics using variety analysis. If there is a real or very real influence then continue with the middle score test using duncan multiple area test (DMRT) according to Steel and Torrie (1993).

IV. RESULT AND DISCUSSION

In this study the composition of feed treatment is presented in Table 1. The preparation of treatment rations based on the nutritional needs of laying ducks is 18% 84 Coarse Protein and metabolic energy 2750-2800 Kcal (Nutrient Requirement of Duck from 85 NRC, 2004). Based on the results of the study for 6 weeks obtained results as presented in Table 1.

Table 1. Nutritional composition of treatment rations

Nutrition Content	Perlakuan				
	R 0	R 5	R 10	R 15	R 20
Crude Protein (%)	18,00	18,12	18,12	18,17	18,07
Crude fiber (%)	5,14	5,47	5,47	5,61	6,12
Crude fat (%)	4,80	6,57	6,57	6,72	6,84
Metabolizable Energy (Kkal)	2755	2758	2758	2786	2804
Metionin (%)	0,37	0,38	0,38	0,41	0,43
Lisin (%)	1,03	0,99	0,99	0,98	0,99
Calsium (%)	3,20	3,32	3,32	3,41	3,56
Phosfor Total (%)	0,65	0,71	0,71	0,76	0,82
Balanced Ca : P	4,92	4,67	4,67	4,48	4,34

Description : R 0 = Use of 0% Fermented Fish Waste in rations
R 5 = Use of 5% fermented Fish Waste in rations
R 10 = Use of 10% fermented Fish Waste in rations
R 15 = Use of 15% fermented Fish Waste in rations
R 20 = Use of 20% fermented Fish Waste in rations

Table 2. Average Performance of Alabio duck egg production during study

No	Variabel	Treatment				
		R0	R5	R10	R15	R20
1.	Duck day production (%)	82,05a	65,58c	73,22b	82,47a	83,22a
2.	Egg Weight (g)	72,39b	69,71a	70,15a	69,24a	70,48a
3.	Ration Consumption (g.bird^{-1}.day^{-1})	190a	177b	178b	178b	184ab
4.	Ration Convertion	2,62	2,54	2,54	2,57	2,61
5.	Shape egg index	74,66	75,14	75,31	75,18	76,12
6.	Eggshell thickness (μm)	358	352	347	348	357
7.	Eggshell weight percentage (%)	10,16a	9,21b	9,68b	10,13a	9,24b
8.	Yolk egg color (%)	37,18a	36,28b	36,32b	37,24a	37,47a

Egg Production

Duck day production (%) Alabio ducks showed the highest scores on R20 treatment, while R5 and R10 treatments were still under control. This indicates that the use of fermented fish waste begins to be seen when it reaches 15% in rations. Actually this is very profitable because with the amount of 15%-20% able to replace khewani proteins such as fishmeal that are relatively expensive. This value is much higher than Biyatmoko research (2007), whose alabio duck egg production reached 67.32% with the administration of Niacin on its feed. It is suspected that in addition to the production life is close to peak production, also the difference in feeding of better sources of khewani protein., although the content of Protein and Energy is relatively the same. Solihat et al. (2003) states that egg production is influenced by feed, genetic and sex cooking speed. Egg Weight Based on DMRT test results, control treatment is higher than all treatments. This means the use of fermented fish waste in rations has not been able to increase the weight of alabio duck eggs, although in duck day egg production (%) the highest number of R20 treatments.

Ration Consumption

Based on the results of ration consumption, control treatment (R0) shows the highest feed consumption disbanding other treatments. This is in line with the weight of the resulting eggs including the highest. Even the treatment that can match the consumption of rations is the R20 treatment, although statistically the R20 treatment is no different from R5, R10 and R15. 108 4

Ration Conversion

For ration conversions, it turns out to show no real different results for all treatments. This value is a comparison between ration consumption and egg weight. So it is suspected that overall there is a physiological state leading towards normality where if feed consumption is high it will be manifested with a high egg weight, as well as vice versa. So by comparison it shows a relatively normal hail.

Egg Shape Index

The egg shape index also shows results that do not show statistical differences. This indicates that the resulting egg represents the normal shape of the oval egg. It is suspected that eggs that tend to be normal ovals are produced from ducks that are approaching peak production. Here iti used in the study is already 28 weeks old. Thick eggshell In the thick parameters of the kerabang does not show any difference, it is suspected that up to 20% of the use of fermented fish waste, still does not increase the thickness of the kerabang. The thickness of this ape is closely related to calcium and phosphor consumption as well as the balance of Ca:P. In this study the thickness of the brotherly ranges from 347-358 (μm) or 0.35- 125 0.36 mm. According to Fajarwati et al. the thickness of alabio 0.01 mm. Percentage Of eggshell Weight The thickness of the brotherly is closely related to the percentage of the

weight of the brother. The thicker it will increase the weight of the brotherly. However, there is a difference between the weight of the control treatment (R0) with all treatments except R15. The highest percentage of weight gained in R0 was 10.16% and the lowest was R5 treatment (9.21%). Egg Yolk Index The Yolk Index is related to the size of the egg. Usually the larger the yolk then the weight of the egg will be greater. This yolk index is a high comparison of the yolk with the diameter of the yolk. The value of the treatment egg yolk index ranges from 36.28 to 37.47. This value is higher than the average egg yolk index in chickens which ranges from 33% – 50%. The highest yolk index is obtained in R20 treatment.

V.CONCLUSIONS

Utilization of fermented fish waste on Alabio ducks is able to provide the result of ration conversion, egg shape index and thick forging that is not different from control (R0), but the treatment of fish waste to egg production (% duck day), and egg yolk index shows better results than control especially R20 treatment. The utilization of fermented fish waste can be used in alabio duck rations up to 20%, without a negative effect on the performance of alabio duck egg
production. It is recommended that fermented fish waste can be used as a substitute for a protein source of animal up to 20% in Alabio ducks.

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CONFLICT OF INTEREST

All the authors were declaring that they have no conflict of interest.

AUTHORS CONTRIBUTION

The experimental design was achieved by Achmad Jaelani, the actual research organized by Taufikurrahman and Tintin Rostini tabularized the data and done the statistical analyses.

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Sensory Evaluation of Meat of Spent Ducks In Fed Nonconventional Ration with Garcinia Atroviridis Leaf

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Abstract

Background The higher fat content of the spent duck will result in off-odor and disturb consumer health. Feeding ration with Garcinia to solve the problem.

Purpose The present study evaluated the sensory quality of the meat from the spent ducks in fed nonconventional ration with Garcinia Atroviridis Leaf.

Design/methodology/approach A total of 20 spent ducks were distributed according to completely randomized into two treatments (R0: nonconventional ration; R1: nonconventional ration with Garcinia Atroviridis 6%. Sensory quality testing is done with a quantitative descriptive test on flavor, taste, tenderness, and juiciness on the meat of spent ducks.

Findings A 6% of Garcinia Atrovidis reduces the intensity of flavor (fishy, fatty, brothy), increases the tenderness, and lowers the fatty mouth.

Research limitations So the result of this study were limited to the local spent ducks.

Originality/value Sensory quality test results from the meat of spent ducks in fed non-conventional ration with Garcinia Atrovidis Leaf.

Keywords: Hidroxicitrate acid, flavor, taste, juiciness.

I. INTRODUCTION

The meat of spent ducks is a by-product obtained from the slaughtered bird after they reached the end of their laying lives. The general characteristics of spent duck meat are tough, dark in color, and strong odor which is objectionable to most consumers (Sumarmono and Wasito, 2010).

II. LITERATURE REVIEW

The sensory characteristics of meat can be affected by factors intrinsic to animals, such as age at slaughter, sex, race, strains, muscle type or production systems, food and pre-slaughter management and post-harvest (Berri, 2000; Qiao *et al*., 2001). According to Miller (2003), to acquire a meat product, the first feature observed by the consumer is the appearance and after are considered other features such as tenderness, juiciness, and useful life, adding value to the product.

The juiciness of meat is directly related to the intramuscular lipid and moisture content of the meat (Cross *et al*., 1986). In combination with water, the melted lipid constitutes a broth which when retained in meat is released upon chewing. Juiciness is made up of two-effect viz, the impression of moisture released during chewing and also the salivation produced by flavor factors (Omojola *et al*., 2003).

Tenderness is regarded as the most important sensory attribute affecting meat acceptability (Cross *et al*., 1986; Quali, 1990 and Walkup *et al*., 1995). Tenderness has also been identified as the most critical eating quality, which determines whether consumers are repeat buyers. Koohmarate *et al*., (1998) and Dransfield (1997) reported that consumers prefer to pay a premium for high-quality products. The male Rouen duck produced the most tender meat as adjusted by the taste panelist while the toughest ($P \leq 0.05$) meat was obtained from the male Pekin duck.

The perception of taste involves five basic sensations of bitter, sweet, sour, salty (Aberle *et al*., 2019) and ummami (Maga, 1994). One of the factor on flavour intensity is a fat content meat. The meat of spent ducks had high-fat content and a strong odor.

Hydroxycitrate acid {-(HCA)} has an anti-obesity effect by suppressing appetite, giving a sense of satiety, lowering the speed of fat oxidation, and lowering the lipid synthesis of de novo. The Garcinia Atroviridis has a major active substance of hydroxycitrate acid. Researching the bioactivity of water-ethanol extract in this plant is that the extract has antibacterial, antifungal, antioxidant, antitumor, and antimalarial activities. Garcinia atroviridis acid can lower cholesterol. (2)

III. METHODOLOGY

A total of 20 spent ducks were distributed according to completely randomized into two treatments (R0: nonconventional ration; R1: nonconventional ration with Garcinia Atroviridis 6%. Sensory quality testing is done with a quantitative descriptive test on flavor, taste, tenderness, and juiciness on the meat of spent ducks. The aroma sensory evaluations, flavor, tenderness, juiciness, chewiness, color, and general appearance were performed as described by Hashim et al (1995).

IV. RESULT AND DISCUSSION

The statistical means of the fishy flavor, fatty flavor, brothy flavor, tenderness, and fatty mouthfeel the meat sample from spent ducks fed nonconventional ration and nonconventional ration with 6% Granicia Atrovidis leaf differ significantly ($P \leq 0.05$). Whereas Juiceness color and general appearance .the meat spent ducks no significantly ($P \geq 0.05$).

V. CONCLUSION

A 6% of Garcinia Atrovidis added to the meat of spent ducks, which reduces the intensity of flavor (fishy, fatty, brothy), increases the tenderness, and lowers the fatty mouth.

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Collate acknowledgments in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, or proofreading the article, etc.).

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COMPOSITION OF AFFECT ITIC CARCAS THROUGH THE FLOUR OF GELUGUR ACID LEAVES (GARCINIA ANTROVIRIDIS) IN A FERMENTED NONCONVENTIONAL Ratio

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ABSTRAC

People's awareness of consuming meat as a protein source is increasing. Duck is potential meat-producing poultry. This study was aimed at assessing the effects of feeding (Garcinia antroviridis) leaf meal on carcass composition of culled ducks. The study was conducted within 40 days from May to June 2019 at the Poultry Farm of Animal Science Department, Faculty of Agriculture, Djuanda Univesity, Bogor. A completely randomized design with 4 treatments and 5 (20 experimental units) replicates were used. Data were subjected to an analysis of variance and a Duncan test. Treatments consisted of the inclusion of garcinia leaf meal in rations by 0% (R0), 2% (R1), 4% (R2), and 6% (R3). Measurements were taken on slaughter weight, carcass weight, carcass percentage, thigh carcass composition (thigh, thigh meat, the thigh bone, thigh skin), breast carcass composition (breast, breast meat, breast bone, breast skin), meat and bone ratio (thigh and breast), and meat and fat ratio (thigh and breast). Results showed that the inclusion of garcinia leaf meal up to 6% in rations did not give significant effects on all parameters measured.

Keywords: Carcass composition, duck, garcinia

PRELIMINARY

Background

Public awareness to consume meat as protein derived from animal sources is increasing every year. Efforts to meet consumer demand include increasing production and quality of poultry meat because poultry is a livestock product preferred by consumers at a more affordable price. Poultry that is quite potent in producing meat other than chicken is ducks. According to Animal Husbandry and Animal Health statistical data (2018) duck meat production has increased, seen from 2017 amounting to 36,392 tons and in 2018 amounting to 38,044 tons. The results of these data indicate that duck meat is starting to be in great demand by Indonesians.

The savory taste of duck meat is the characteristic of duck meat that makes it different from other poultry meat and is starting to be in great demand by the consumer. Behind the demand for duck meat, duck meat has a weakness, namely, it has a distinctive aroma that tends to smell fishy, and the meat is tough, as well as a low level of meat with a higher fat content when compared to broilers. The fat content in ducks is 8.2% per 100g, but it is higher when compared to the fat content in broilers, which is 4.8% per 100g (Srigandono, 1997). Judging from the deficiencies contained in duck meat, it is necessary an innovation so that ducks can be accepted by consumers with good carcass quality.

In line with efforts to reduce fat content in duck meat and improve carcass composition, one way to do this is by adding feed additives to the ration. The addition of feed additives in the ration, namely gelugur acid leaf flour. Gelugur acid (Garcinia antroviridis) is believed to be able to reduce fat levels because it contains hydroxycitric acid (HCA) which functions as an antiobesity compound and weight loss. In addition, according to Chung (2006), gelugur acid is antioxidant and can reduce body weight and cholesterol.

Destination

The purpose of this study was to examine the effect of giving gelugur tamarind flour on the carcass composition of rejected ducks.

Benefits

This research is expected to provide information on the composition of the carcass of rejected ducks fed with tamarind leaf flour.

Hypothesis

The addition of tamarind leaf flour in non-conventional rations can reduce carcass fat content in rejected ducks.

MATERIALS AND METHODS

Time and place

This research was conducted in May - June 2019, for 40 days, located in the poultry cage of the Animal Husbandry Study Program, Faculty of Agriculture, Djuanda University, Bogor.

Tools and Materials

The materials used in this study were 40 ducks of Tegal afkir originating from Cirebon with body weights ranging from 1kg to 1.5kg. The feed ingredients used in this study as basic rations were yellow corn, fine bran, soybean meal, fish meal, premix, DCP, CaCO3. The unconventional feed used is coconut cake and palm kernel cake. The feed was fermented using Aspergillus niger mold. The fermented feed is used as a substitute for the basic feed of tegal ducks with the addition of tamarind leaf flour. The cages used in this study are 40 units of battery cages with a length of 40 cm, width 35 cm, the height of 35 cm made of iron wire. The tools used in this research are a place to eat, a place to drink, a plastic bag, a digital scale with an accuracy of 0.1 gram, a gas stove, an oven, a blender, a large pot, a rice filter, a bucket, and a measuring cup. The following is the composition of the feed ingredients used as research ducks rations can be seen in Table 1.

Table 1. Feed ingredients for research ducks ration

No.	Feed ingredients	Amount (%)
1	Yellow corn	40
2	Fine bran	19
3	Soybean meal	4.5
4	Fish flour	4
5	Premix	0.5
6	DCP	1
7	CaCO3	1
8	Coconut cake	15
9	Palm kernel meal	15
	Total	100

Table 2. Nutritional Content of Rations

Treatment	R1	R2	R3	R4
Water (%)	11.61	10.74	10.23	9.21
Ash (%)	8.43	7.71	7.54	7.80
Fat (%)	2.57	3.76	3.74	3.34
Protein (%)	13.32	13.08	13.18	12.00
Crude Fiber (%)	4.25	6.20	8.97	9.30
BETN (%)	59.82	58.51	56.34	58.35
Gross Energy (Cal / grm)	3814	4099	3918	4022

Information: R0 = Fermented Non-Conventional Ration + 0% Gelugue Acid Leaf Flour (Control), R1 = Fermented Non-Conventional Ration + 2% Gelugur Acid Leaf Flour, R2 = Fermented Non-Conventional Ration + 4% Gelugur Acid Leaf Flour, R3 = Ration Non Conventional Fermented + 6% Asam Gelugur Leaf Flour.

Research methods

Research Treatment

This study used a completely randomized design method with 4 treatments of 5 replications so that a total of 20 units of observation units, each unit consisted of 1 fish. The treatments given are:

R0 = There was no use of gelugur acid flour in the ration (control).

R1 = Addition of 2% tamarind leaf flour to the ratio.

R2 = Add 4% of tamarind leaf flour to the ration.

R3 = Addition of 6% tamarind leaf flour to the ratio.

The mathematical method of research according to Sastrosipadi (2000) is as follows:

$$\mathbf{Yij = \mu + Ti + £ ij}$$

Information :

Yij = The observed value of the i-th treatment in the j-th repetition (1,2,3).

μ = Common mean.

Ti = The effect of the frequency of giving tamarind leaf flour.

£ ij = Error treatment I and repeat j

Research procedure

Cage Preparation

Preparation of the research cage begins with cleaning the cage and

providing a source of light. Prepare equipment for research such as food containers, drinking containers, scales, buckets, measuring cups, etc.

Preparation of Ducks

The ducks used in the study were 40 ducks in a healthy condition and were not disabled. First, the initial body weight of ducks was weighed and recorded and given a treatment identity code for each cage, the placement of the cage, and the treatment was carried out randomly.

Feed Making

The feed ingredients used for fermentation are Aspergillus niger mold consisting of palm kernel cake and coconut cake. The ingredients of the ration consist of corn, fine bran, soybean meal, fish meal, premix, DPC, CaCO3. The following is the feed fermentation process according to Supriyati et al. (1998).

Table 3. Feed fermentation process

No.	Information
1.	Prepared coconut/palm kernel meal mixed with water (1 kg of feed: 600 ml of water
2.	The coconut/oil palm cake is then stirred and steamed for 30 minutes
3.	The steamed coconut/palm oil cake is cooled before being mixed with the fermented Aspergillus niger
4.	The coconut cake/palm kernel is mixed with fermented inoculants, the inoculants used include (Urea 3.5g, CaCl 0.25g, KCL 0.75g, MgSO4 2g, NaPO4 12.5g) Aspergillus niger 75g.
5.	The coconut/palm kernel meal and inoculant are evenly mixed, wrapped, and ready to ferment anaerobically for 3 days. The feed ingredients that have been fermented are dried for 3-4 days using sunlight.
6.	The final stage (Jagungkuning, fine bran, soybean meal, fish meal, premix, DCP, CaCO3) is mixed with fermented feed ingredients

The Process of Making Asam Gelugur Leaf Flour

The tamarind leaves used in this study were tamarind leaves (Garcinia antroviridis). Here is the process of making tamarind leaf flour.

Table 4. making gelugur acid leaf flour

No.	Information
1.	Drying fresh tamarind leaves using direct sunlight for 1-2 days
2.	Sour drying using oven 62°C for about 10 minutes
3.	The dried tamarind leaves are kneaded then blended until they become flour

Cutting Carcass of Ducks in Thigh and Chest

The carcass of the thigh and chest was cut for data collection after 40 days of maintenance. After the study ducks were slaughtered, the ducks were left hanging for a range of 1-4 minutes until no blood was dripped. Furthermore, the ducks without blood are weighed, then dipped in hot water to make it easier for their feathers to come off by pulling them manually, the ducks without feathers are then weighed. The carcass is obtained by separating the head, neck, legs, and viscera. The carcass is weighed, then the chest, thighs, back, and wings are cut. The carcasses taken are the thighs and the breasts, which are boned, namely

separating the skin, bones, meat, and fat. Finally, the weight of the meat of the thigh, breast, skin, bone, and fat has been cloned.

Observed variables

1. Cut Weight
   Cut weight is weighed before the livestock is slaughtered.
2. Carcass weight
   Carcass weight is obtained by weighing it after the ducks are cut and separated from the head, neck, feathers, lower legs, and offal.
3. Percentage of Carcass
   The carcass percentage is calculated by dividing the carcass weight by the slaughtered weight of ducks multiplied by 100% using the following formula:
   $$\%\ \text{Karkas} = \frac{\text{bobot karkas}}{\text{bobot potong}} \times 100\%$$
4. Thigh Percentage
   The thigh percentage is obtained by weighing the Thigh part. The thigh is divided into 3 parts, namely meat, bones, and fat (subcutaneous). Then divided by carcass weight. The calculation can be done in the following way:
   $$\%\ \text{paha} = \frac{\text{bobot paha}}{\text{bobot karkas}} \times 100\%$$
   $$\%\ \text{daging paha} = \frac{\text{bobot daging paha}}{\text{bobot paha}} \times 100\%$$
   $$\%\ \text{tulang paha} = \frac{\text{bobot tulang paha}}{\text{bobot paha}} \times 100\%$$
   $$\%\ \text{lemak (subkutan) paha} = \frac{\text{bobot kulit paha}}{\text{bobot paha}} \times 100\%$$
5. Percentage of the Chest
   The percentage of the chest is calculated by weighing the chest. The breast is divided into 3 parts, namely meat, bones, and fat (subcutaneous). Then divided by carcass weight. The calculation can be done in the following way:
   $$\%\ \text{dada} = \frac{\text{bobot dada}}{\text{bobot karkas}} \times 100\%$$
   $$\%\ \text{daging dada} = \frac{\text{bobot daging dada}}{\text{bobot dada}} \times 100\%$$
   $$\%\ \text{tulang dada} = \frac{\text{bobot tulang dada}}{\text{bobot dada}} \times 100\%$$
   $$\%\ \text{lemak (subkutan) dada} = \frac{\text{bobot kulit dada}}{\text{bobot dada}} \times 100\%$$
6. Meat Bone Ratio
   The breastbone meat balance is calculated after obtaining the bone weight and meat weight data, the formula is as follows:
   $$\text{Imbangan daging dan tulang dada} = \frac{\%\ \text{daging dada}}{\%\ \text{tulang dada}}$$
7. Meat Bone Ratio
   Bone meat balance was calculated after obtaining bone weight and meat weight data. Meat and bone weight data are used to calculate the meat and bone balance with the following formula:
   $$\text{Imbangan daging dan tulang paha} = \frac{\%\ \text{daging paha}}{\%\ \text{tulang paha}}$$
8. Balance of Meat and Chest Fat (Meat Fat Ratio)
   Calculation of the balance of breast fat is done by knowing the weight of breast meat and the weight of breast fat and calculating the percentage. Meat percentage data and breast fat percentage are used to calculate the meat and fat balance with the following formula:
   $$\text{Imbangan daging dan lemak dada} = \frac{\%\ \text{Daging dada}}{\%\ \text{Lemak dada}}$$
9. Balance of Meat and Thigh Fat (Meat Fat Ratio)
   Calculation of the fat meat balance is done by knowing the thigh meat

weight and thigh fat weight and calculating the percentage. The meat percentage data and the thigh fat percentage are used to calculate the meat and fat balance with the following formula:

$$\text{Imbangan daging dan lemak paha} = \frac{\%\ \text{Daging paha}}{\%\ \text{Lemak paha}}$$

RESULTS AND DISCUSSION

Percentage of Carcass

The percentage of carcass is obtained from weighing the carcass weight divided by the weight of the duck cut then multiplied by 100%. The percentage of carcass is to get the amount of meat in ducks by making a comparison between carcass weight and slaughter weight. The average slaughter weight, carcass weight, carcass percentage of rejected ducks are presented in Table 5.

Table 5. Average cut weight, carcass weight, carcass percentage of rejected ducks by giving tamarind leaf flour in fermented non-conventional rations.

Treatment	Variable		
	Cut Weight (gr / head)	Carcass Weight	%Carcass
R0	1312.50 ± 93.58	709.00 ± 69.76	53.94 ± 1.55
R1	1456.66 ± 140.47	813.00 ± 52.02	55.93 ± 1.88
R2	1302.50 ± 72.74	745.00 ± 129.02	57.07 ± 8.09
R3	1417.50 ± 79.32	744.50 ± 59.83	52.54 ± 3.28
Total	1366.66 ± 108.01	748.86 ± 84.31	54.80 ± 4.55

In the table above, the results of the analysis of variance show that giving tamarind leaf flour to the cutting weight had no significant effect (P> 0.05). In accordance with the results of research by Dihansih et al (2019) that the addition of tamarind leaf flour to the ration did not have a significant effect on body weight or cut weight. The addition of tamarind leaf flour has not shown a significant effect on the slaughter weight of ducks. Gelugur tamarind leaves did not decrease or increase cut weight even though they contained hydroxycitric acid (HCA) but did not reduce body weight gain. This is because the ducks used are ducks that are not used in the growth process.

According to Moreng and Avens, (1985) carcass weight is the weight of the duck's body part after deducting feathers, blood, internal organs excluding the lungs and kidneys, neck, head, and feet. The average carcass weight of rejected ducks by giving gelugur acid leaf flour (garcinia antriviridis).) can be seen in table 5. The results of the analysis of diversity can be seen that the provision of tamarind leaf flour (garcinia antroviridis) shows no significant effect (P> 0.05) on the carcass weight of rejected ducks. In accordance with the results of research by Rengga et al (2014) that giving soy sauce dregs immersed in acetic acid to a level of 15% in feed has no effect on the local duck carcass weight with an average of 659.75%, but the average is greater with the addition of tamarind leaf flour, which is equal to748.86%. This is presumably because carcass weight is influenced by cut weight. Subhan et al. (2009) stated that carcass weight is related to slaughtered live weight. The higher the cutting weight, the higher the carcass weight produced (Matitaputty et al).

The results of the percentage of rejected duck carcasses fed with tamarind leaf flour in the fermented ration above showed no significant effect (P> 0.05) on the carcass percentage. The average percentage of carcass obtained is54.80 ± 4.55%. The resulting average is lower than

the results of the study by Solihin et al. (2018) that the effect of giving betel leaf solution in the feed on the percentage of male local duck carcasses is in the range of 56.848 ± 4.12% because the ducks used in this study are rejected ducks, while the research of Solihin et al. (2018) using ducks in the growth period, the average percentage is lower. According to Yuniarty (2011), the percentage of carcass is influenced by the weight of the cut produced. If the components of the carcass yield are said to be the same as the yield of body weight, the percentage of carcass will not be different.

Composition of Thigh Carcass

Results of **The percentage of thighs, the percentage of thigh meat, the percentage of thigh bones, the percentage of the skin of the thighs of rejected ducks fed with tamarind leaf flour in fermented rations are presented in table 6.**

Table 6. Average of thigh percentage, thigh meat percentage, femur bone percentage, and discarded duck skin percentage.

Treatment	Variable			
	%Thigh	% Thigh meat	%Femur	% Thigh skin
R0	25.42 ± 1.19	51.52 ± 3.95	15.74 ± 2.35	30.89 ± 0.44
R1	26.21 ± 1.57	48.64 ± 0.78	14.69 ± 3.38	32.20 ± 1.01
R2	24.96 ± 1.85	44.78 ± 9.69	18.48 ± 3.32	26.76 ± 0.38
R3	24.44 ± 2.18	47.28 ± 3.17	16.38 ± 2.77	31.45 ± 0.96
Total	25.19 ± 1.68	48.02 ± 5.69	16.43 ± 2.97	30.20 ± 0.81

The most place for depositing meat on duck carcasses beside the chest is the thigh (Putra, 2015). The results of the analysis of variance with the addition of tamarind leaf flour in the ration showed no significant effect (P> 0.05) on the percentage of thighs, thigh meat, thighbone, and thigh skin. As reported by Wahyudin (2006), the effect of giving beluntas leaf flour in the feed at a dose of 1% and 2% did not affect the average percentage of meat and thigh bone respectively on the weight of the thigh. This study has not affected all the parameters of the thigh, it is assumed that the same carcass weight has no significant effect so that it produces the same weight of carcass pieces. According to Soeparno's (1994) opinion that the final result of cut and carcass weight produces an independent effect, it will cause no difference to the parts of the carcass, because between carcass and cut weight has a close relationship. Erasir et al. (2009) stated that the older the ducks were, the lower the percentage of their thighs on carcass weight

Composition of Chest Carcass

The breast is one of the largest deposits of meat found in duck carcasses. Below is the average percentage of breasts (meat, bones, and subcutaneous skin) of rejected ducks fed with tamarind leaf flour in fermented rations is presented in Table 7.

Table 7. Percentage of the breast, percentage of breast meat, percentage of the breastbone, percentage of the skin of rejected ducks

Treatment	Variable			
	%Chest	% Breast meat	%Sternum	% Chest skin
R0	27.88 ± 1.33	48.82 ± 2.67	16.48 ± 3.85	28.52 ± 3.85
R1	27.40 ± 1.49	57.59 ± 3.38	14.25 ± 0.91	21.82 ± 3.22
R2	26.89 ± 1.89	48.93 ± 5.40	16.89 ± 3.28	25.99 ± 5.44
R3	25.95 ± 3.58	51.09 ± 5.50	15.71 ± 1.70	28.98 ± 3.54

Total	26.99 ± 2.19	51.21 ± 5.27	15.94 ± 2.68	26.63 ± 4.62

The results of the analysis of variance in Table 7 show that giving tamarind leaf flour to a level of 6% in the ration has no significant effect (P> 0.05) on the percentage of breast, breast meat, and breastbone. The results of the same study were reported by Sale et al (2017) with the addition of betel leaf solution in the feed did not provide a significant difference in the percentage of breast meat, breastbone, and breast skin of ducks. It does not affect the addition of betel leaf solution in the feed to the percentage of duck breasts, because the addition of betel leaf solution has no effect on the age of the duck pieces that are too young.

The percentage of the chest area will increase as bone growth decreases and muscle growth increases. In contrast to Nober et al (2014) stated that the addition of gelugur acid in the ration had a significant impact on increasing the carcass meat produced. The provision of tamarind flour in rations up to a level of 6% in this study has not had a significant effect on all breast parameters, it is suspected that Gelugur acid plays a significant role in the digestive tract such as the stomach and small intestine, where the organic acids contained in Gelugur acid do not decrease intestinal pH so as not to suppress the number of pathogenic bacteria and increase the number of non-pathogenic bacteria. The reduction in pathogenic bacteria causes the absorption of nutrients in the intestine to be maximized.

The Meat Bone Ratio of the thigh and chest

Meat bone ratio or what is called the ratio of meat to bone is the ratio between the weight of meat to the bone is the ratio of the weight of the bone, this is the ratio to find out how much meat is produced instead of the bone.

It can be seen from Table 8 that the results of the analysis of variety show that the effect of giving tamarind leaf flour up to a level of 6% has no significant effect (P> 0.05) on the meat bone ratio of the chest and thighs. Maccording to Hayse (1973) the standard meat bone ratio is 2.43%. The balance of the meat and breastbone of the rejected ducks can be seen that more meat is produced than the bones, the large size of the bones allows the amount of meat to be deposited compared to the size of the smaller bones.

Table 8. The balance of the meat and thighbones and chest

Treatment	Variable	
	Meat Bone Ratio (chest)	*Meat Bone Ratio* (thigh)
R0	3.14 ± 0.44	2.01 ± 0.59
R1	4.07 ± 1.01	2.29 ± 0.67
R2	2.69 ± 0.38	1.48 ± 0.31
R3	3.24 ± 0.96	1.97 ± 0.46
Total	3.23 ± 0.81	1.92 ± 0.54

The Meat Fat Ratio of the thighs and breasts

The results of the Meat Fat Ratio of the thighs and breasts of rejected ducks by giving tamarind leaf flour in fermented non-conventional rations are presented in table 9.

Table 9. The average balance of meat and fat (subcutaneous) thigh and breast of rejected ducks by giving tamarind leaf flour in fermented non-conventional rations.

Treatment	Variable	
	Meat Fat Ratio (chest)	*Meat Fat Ratio* (thigh)
R0	1.74 ± 0.32	0.96 ± 0.25

R1	2.68 ± 0.45	0.71 ± 0.12
R2	1.96 ± 0.59	0.95 ± 0.36
R3	1.79 ± 0.38	0.83 ± 0.11
Total	2.00 ± 0.53	0.87 ± 0.24

Meat fat ratio is a balance of meat and fat, to determine the ratio of meat and fat, namely by calculating the percentage of meat and divided by the percentage of subcutaneous fat and then multiplying by 100% it will get the balance of meat and fat.

The results of the analysis of variance in Table 9 show that giving tamarind leaves flour in the ration did not have a significant effect up to the level of 6% (P> 0.05) on the meat fat ratio of the chest and thighs. A good average meat fat ratio for the thighs and breasts of rejected ducks is that the fat contained in the meat tends to be minimal and the meat obtained is the maximum.

CONCLUSION

Conclusion

The addition of tamarind leaf flour (Garcinia Antroviridis) had no effect on cut weight, carcass weight, carcass percentage, breast percentage (meat, bone, and skin), percentage of thighs (meat, bones, and skin), meat bone ratio of thigh and chest, and Meat fat Ratio of thigh and chest.

Suggestion

The suggestion of this research is that the level of giving tamarind leaf flour is more than 6%.

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Testing Study of Micro Gas Turbine (MGT) Based on Turbocharger DH300-7 Using LPG

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Abstract

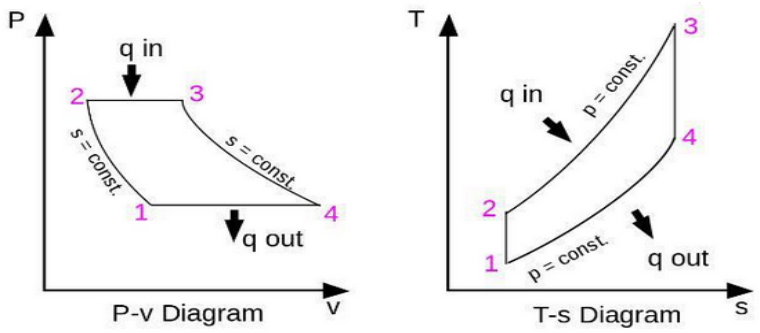
Micro Gas Turbine (MGT) can be made using a turbocharger which is connected to the combustion chamber on the cold side (compressor) and the hot side (turbine). In this research for the first test using LPG, the 1st round was carried out at 6,000 Rpm. It resulted in the compressor inlet temperature T1 29^{o}C, inlet combustion chamber temperature T2 39 ^{o}C, combustion chamber exit temperature T3 122^{o}C, turbine exhaust temperature T4 420^{o}C, nozzle temperature T5 224 ^{o}C. The second test, third test, fourth test respectively are 10,300, 16,500, 20,600 Rpm. The working temperature will increase along with the fuel flow rate of LPG icrease also and variations in rotational speed the increased speed will reduce the temperature at the turbine exit nozzle. The result of voltage will increase along with the gas turbine rotational speed and power produce reaches 150 watt, depends on the size of generator used. This research is made on a micro gas turbine (MGT) that uses turbocharger with fueled LPG as a learning model for gas turbine engines and a subset course of mechanical engineering program. In this research results the data of the working temperature of the MGT machine, pressure at work inlet and outlet of combustion chamber besides that the data of direct current voltage inwhich result from variation speed of MGT. Research uses the qualitative method of testing the direct MGT machine intothe study. Research limits only use turbocharger fueled LPG, working temperature, observation pressure inlet and oulet combustion chamber and use 2nd turbine which is hooked up pulley to power the small electric generator. Next, it will use briquette from waste bamboo and biogas as a substitute for LPG and high speed generator direct coupled to 2nd turbine. This research uses experiments from assembly of turbocharger DH300-7 as and 2nd turbine turns pulley and small direct current generator produce electricity.

Keywords: Micro, Gas, Turbine, Turbocharger, LPG

I. INTRODUCTION

Using liquid petroleum gas (LPG) yang nantinya akan dilakukan kepada biogas sebagai energi baru dan terbarukan new and renewable energy that impact energy independence. Energy generation in micro scale very suitable needed in vilage, small business and housing. Testing of micro gas turbine is needed in order to produce an alternative to a combustion engine generator set. As for this research related to temperature

of compressor, combustion chamber, and turbine and other supporting components, is described in the next section. The combustion chamber is made of metal connected to the compressor (cold side) and turbine (hot side) including installed instruments as a measure. As for the simple gas turbine cycle can be seen in picture 1.



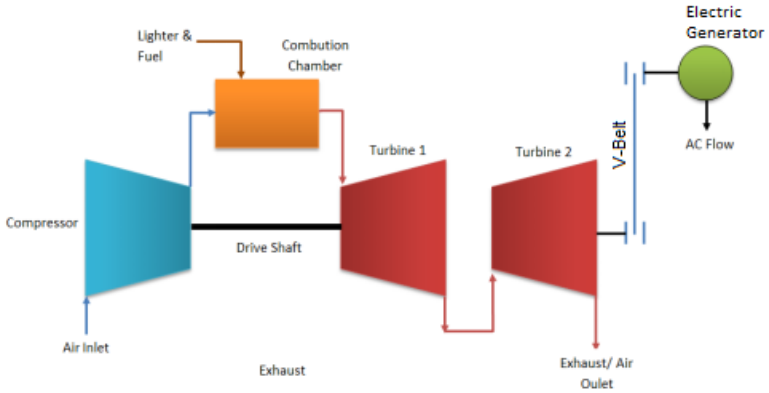
picture 1. Simple Cycle Gas Turbine Ideally (Brayton Cycle)

Gas turbine is a power plant with an external combustion system, using air sucked by the compressor and compressed the the air enters the combustion chamber. In the combustion chmaber, fuel and air are burned using spark plugs. The result of combustion is in the form of heat energy flows into the turbine which will be connected to the compressor shaft so that the compressor rotates.

In the previous research has been done, namely TET (*turbine exhaust temperature*) lower than TIT (*turbine inlet temperature*) and TIT higher than intake temperature of the combustion chamber T2, intake temperature of the compressor T1 [1]. Study describe performance in research for 1.5 kW micro gas turbines that use temperature variation in the intake air systems (compressor) produces output power decreasing linearly with an increase in the intake air temperature [2]. Axial Micro gas turbine rotates 20,000-150,000 rpm [3]. Micro gas turbine using fuel briquette made from waste of bamboo and LPG [4].

II. LITERATURE REVIEW

Principle of Micro Gas Turbine equal as gas turbine in industry basically. However based in size of electricity , Micro Gas Turbine (MGT) will produce upto 2,5 kW [5]. There is scheme of process micro gas turbine which is in this research as in picture 2.



picture 2. Micro Gas Turbine Scheme

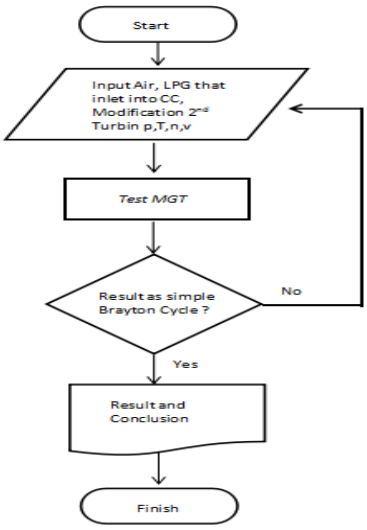
There methods and testing are validity in simple and common as gas turbine. Centrifugal Compressor turn and casing are fixed.

Air enters in the inlet impeller in axial diection and increase its pressure toward radial by blade and no inlet guide vane (igv) used in this gas turbine configuration. Inpeller delivers energy to the operating gas medallion's powers of blade and the distribution of the distribution of the pressure in the blade track as compressed air from axial directions into radial, causing increased angular momentum and increased total concentration. Air goes into fuel and spark plugs in the igniter so that the combustion occurs in the fuel chamber and the ignition drives the turbine 1 and the rest of the turbine 1 is used again by turbines 2 which are then released in the air. Turbine 2 turns a pulley round with the belt as a mechanical transmission drives an electric generator current and voltage

III. METHODOLOGY

Methodology uses research based on qualitative's data by testing machine / performance of micro gas turbine. As for research methods to be illustrated on the flow diagram as shown in picture 3.

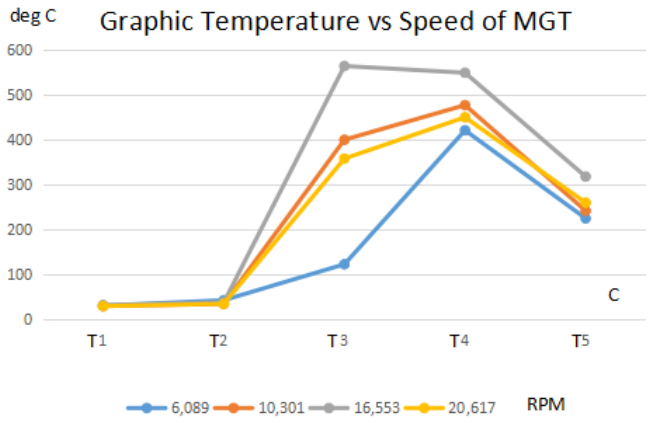
Tools and materials are consist turbocharger set, combustion chamber , LPG, Oil coolant tank, oil pump, oil radiator, cooling fan, Instruments for measurement.



picture 3. Flowchart of Research

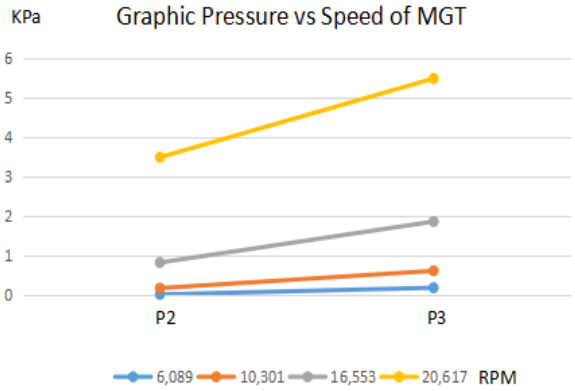
IV. RESULT AND DISCUSSION

There are the several result dari tiga kali pengujian dan diambil rata-rata adalah sebagai seperti picture 4.

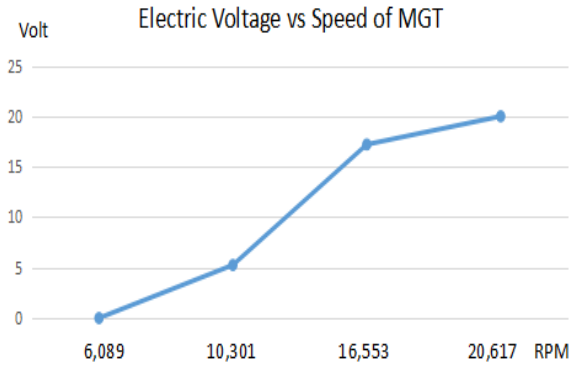


picture 4. Speed of MGT vs Working Temperature

In picture no 4, it seen that MGT speed is do intense that it will result in increased work temperatures, particularly inlet 1st turbine, or out of the combustion chamber (T3).



picture 5. Variation of Speed will effect to Pressure of MGT



picture 6. Variation of speed will Produce Variation of Electric Voltage

In picture 5 shows that increasing velocity of micro gas turbine that will generate high pressure in P2 and P3. Further in picture 6 shows that increasing velocity of micro gas turbine that will cause the electric voltage generated by the generator to rise.

V. CONCLUSION

From result were obtained that the increasing speed of micro gas turbine became increasingly high the working temperature of the machine also increased the pressure and electricity generated. This micro gas turbine engine procedures an electric power of 150 watts DC depending on the size of the electric generator. However, it is difficult if the big generator is due to the little twist moment produced by the shaft, so unlikely that it will be unable to turn and produce electicity if the generator is too large. Further research advises using high-speed generators incwhich reduct of mechanical loosenes. And it will use briquette from waste bamboo and biogas as a substitute for LPG and high speed generator direct coupled to 2nd turbine

ACKNOWLEDGEMENT

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The Making of Instant Porridge of Pumpkin (*Cucurbita moschata D*.) for the Elderly

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Abstract

As someone gets older, the health condition of an elderly person becomes susceptible to various diseases, both degenerative diseases with a deterioration of a tissue/organ and a decrease in physiological function in the form of taste disturbances, tooth loss making it difficult to chew, and disorders of the digestive system. In general, it is difficult for the elderly to chew hard foods, while soft foods generally lack Vitamin A, Vitamin C, and fiber, resulting in constipation in the elderly. The application of pumpkin flour as instant porridge is perfect for elderly people who need foods that are soft-textured, rich in fiber and vitamins, and easy to cook and pack. Therefore we need a food formulation that can meet the needs of the elderly under the nutritional adequacy standards of the elderly.

The aim of this research is to develop food diversification in terms of making pumpkin flour by increasing local food defenses, especially to get the right formulation for instant pumpkin porridge for the elderly that meets the food standards of the elderly and is liked by the elderly.

This research was conducted in three stages, namely: making pumpkin flour, making instant pumpkin porridge, and continued with testing its physical properties and organoleptic tests. The making of pumpkin flour begins with soaking the pumpkin flesh with ammonium bisulfite. After washing, it is dried with a tray drier and then made into flour. Instant porridge is made by mixing the ingredients with 3 types of formulations and then cooking them until they thicken. The slurry obtained is then dried with a drum drier and followed by sieving and filtering. The resulting instant porridge was then subjected to a physical test to calculate the brewing time, density of the cages, and rehydration power. An organoleptic test was also carried out by semi-trained panelists to assess the color, taste, smell, texture, and general assessment of this instant porridge product.

This research obtained: 1) Pumpkin pulp formulation following food standards for the elderly, 2) The effect of differences in the composition of instant pumpkin pulp on the physicochemical and organoleptic properties of instant porridge, and 3) Acceptance rate of instant pumpkin porridge by the elderly

After finding a suitable formulation for pumpkin instant porridge for the elderly, it is necessary to test its shelf life and complement it by researching other micronutrient formulations, namely vitamins and minerals in pumpkin instant porridge for the elderly.

By this research, it was found that the instant pumpkin porridge product formulation took into account the macronutrient composition of each ingredient used which refers to the fulfillment of the RDA standard for the elderly issued by the Ministry of Health in 2019 both from fulfilling energy, protein, fat, and carbohydrates.

Keywords: Instant Porridge, Pumpkin, Elderly

I. BACKGROUND

Elderly according to Law Number 13 the year 1998 is someone who has reached the age of 60 (sixty) years and over. In 2019, the percentage of elderly reached 9.60% or around 25.64 million people, of which approximately one percent more elderly women than male seniors (10.10% vs 9.10%). Of all the elderly in Indonesia, young elderly (60-69 years) dominate with a magnitude of 63.82 percent, followed by middle elderly (70- 79 years) and elderly (80+ years) with their respective magnitudes. 27.68% and 8.50% respectively (BPS, 2019).

As you get older, the health condition of an elderly person becomes susceptible to various diseases, both degenerative diseases with the deterioration of a tissue/organ and a decrease in physiological function in the form of taste disturbances, tooth loss making it difficult to chew, and disorders of the digestive system. In general, it is difficult for the elderly to chew hard foods, while soft foods generally lack Vitamin A, Vitamin C, and fiber, resulting in constipation in the elderly.

Yellow pumpkin (*Cucurbita moschata D.*) is a local food ingredient that contains high levels of antioxidants, namely beta carotene 1569 mcg / 100g (Ministry of Health, 2020) which is very useful in preventing degenerative diseases. Yellow squash also contains high amounts of food fiber, ranging from 44.6 g / 100 g (Pla et al., 2006). Dietary fiber can prevent constipation or constipation (difficulty defecating) and the formation of lumps in the intestines which is a problem that many elderly people suffer (Trisnawati et al, 2014).

The application of pumpkin flour as instant porridge is perfect for elderly people who need foods that are soft-textured, rich in fiber and vitamins, and easy to cook and pack. Therefore we need a food formulation that can meet the needs of the elderly by the nutritional adequacy standards of the elderly.

II. LITERATURE REVIEW

The pumpkin plant (Cucurbita moschata) is a type of vegetable that propagates from the Cucurbitaceae family, which is classified as a seasonal plant which after fruiting will immediately die. The nutritional content of pumpkin consists of protein, carbohydrates, several minerals such as calcium, phosphorus, iron, and vitamins, namely Vitamins B and C. Pumpkin fruit contains active compounds such as saponins, tannins, and flavonoids (Hakimah, 2010). Pumpkin pulp is rich in fiber. Vitamin C, Vitamin E, Magnesium, Potassium, and various carotenoids make it a great source of phytonutrients.

The bright yellow color of the fruit flesh indicates that pumpkin contains one of the carotenoid pigments, including beta-carotene, which is a carotenoid compound that has very high vitamin A activity compared to other carotenoids. Gonzalez et al (2002) conducted a study on the carotenoid composition in pumpkin and found that the main carotenoids that could be identified were β-carotene, α-carotene, and lutein. Meanwhile, the minor carotenoids are phytofluene, β-carotene, neurosporene, violaxanthin, and neoxanthin. In some samples, 5,6,5 ', 6'-carotene diepoxide, and flavoxanthin were detected. The total content of β-carotene in pumpkin is influenced by the level of fruit maturity where the riper the fruit, the higher the content (Majid, 2010).

Besides containing β-Carotene, pumpkin is also high in fiber. Based on the research of Trisnawati et al (2014), Foschia et al (2013) state that pumpkin flour can be categorized as high fiber food because it meets the requirements for fiber-rich food categories, namely a minimum of 6 g / 100 g of foodstuffs.

Pumpkin flour is flour with fine grains, passing a 60 mesh sieve, yellowish-white, typical pumpkin smell, ± 13% moisture content. The physical condition of this pumpkin flour is greatly influenced by the conditions of the basic ingredients and the drying temperature used. The older the pumpkin, the higher the sugar content. Because of the high sugar content of pumpkin, if the temperature used in the drying process is too high, the resulting flour will be lumpy and smell like caramel (Hendrasty, 2003). The quality of pumpkin flour is determined by its constituent components which determine the functional properties of the dough and the resulting flour products and its suspension in water. Pumpkin flour has good quality flour because it has good gelatinization properties, so it will be able to form a dough with good consistency, chewiness, viscosity and elasticity (Hendrasty, 2003).

Porridge is also known as puree which comes from the English word pure which means thick soup. Porridge has a soft texture so it's easy to digest. Instant porridge is slurry which in its presentation does

not require a cooking process because it has undergone previous processing (Hartomo and Widiatmoko, 1993). The raw materials for instant porridge generally use rice flour, tubers, and cereals. However, to meet the nutritional adequacy rate, other ingredients are substituted or fortified with other ingredients.

The process of instant slurry processing is carried out by cooking a mixture of the ingredients of the pulp so that it undergoes a pre-gelatinization process. Pregelatinization is the simplest physical starch modification technique which is done by cooking the starch in water so that it is perfectly gelatinized, then drying the resulting starch paste using a spray dryer or drum dryer, then mashing it to form fine flour measuring 80 mesh. The flour obtained is then packaged into instant pulp (Perdana, 2003). Serving instant porridge can be done by simply adding hot water or milk according to taste.

The instant product must be easy to disperse in water even without heating treatment or carried out with minimum heating. The solubility of instant slurry is influenced by the starch content contained in the constituent flour. Starch will experience denaturation if given heat treatment, starch granules do not dissolve in cold water but will expand in warm water. The development of starch granules is reversible if the heating applied to the starch has not passed the gelatinization temperature.

According to Hartomo and Widiatmoko (1992), the criteria that food ingredients must have to form instant food products include a) having hydrophilic properties, which are easy to bind water, b) not having a gel layer that is not permeable before use which can inhibit the wetting rate, and c) rehydration of the final product does not result in a clumping and settling product.

III. METHODOLOGY

The research was conducted in three stages, namely: making pumpkin flour, making instant pumpkin porridge, and continued with testing its physical properties and organoleptic tests. Making pumpkin flour begins with soaking pumpkin flesh with 0.3% ammonium bisulfite for 15 minutes, then after washing it is dried with a tray dryer at 60^{o}C for 8 hours and then made into flour. Instant porridge is made by mixing the ingredients with 3 types of formulations and then cooking them until they thicken. Through the results of calculations and preliminary trials of the resulting taste, 3 ingredients formulas were selected whose composition meets the RDA standard for elderly food. The slurry obtained was then dried with a drum dryer (temperature 120^{o}C, 2 rpm) and continued with sieving and filtering. The resulting instant slurry was then subjected to a physical test to calculate the brewing time, density of the cages, and rehydration power. Also, an organoleptic test was carried out by semi-trained panelists to assess the color, taste, smell, texture, and general assessment of this instant porridge product. This organoleptic test was carried out by 30 semi-trained panelists whose test results were stated as the chosen formula, while the hedonic test was carried out on the hedonic test of the elderly panelists.

IV. RESULTS AND DISCUSSION

The results of the proximate analysis of pumpkin flour as seen in Table 1 show that the main content is carbohydrates, while other macronutrients, namely protein and low fat so that other ingredients must be added as a source of protein and fat to produce a product with complete nutrition for the needs of the elderly. The crude fiber content of 7.83% indicates that pumpkin flour can be used as a high-fiber food regarding the BPOM (2018) where the minimum content of high-fiber food is at least 6%.

The formulation is made to meet the food standards for the elderly based on the daily RDA for elderly aged 65-80 years of 1,675 kcal, with an energy composition of 60-65% carbohydrates, 10–15% protein, and 20–25% fat (Ministry of Health, 2019). The total calorific value is obtained from the number of macronutrients of the ingredients used multiplied by the respective caloric value. Protein has an energy value of 4 kcal/gram, fat 9 kcal/gram, and carbohydrates contain energy of 4 kcal/gram (Almatsier, 2001). The formulation is calculated based on energy-producing macronutrients, namely carbohydrates, proteins, and fats. The micro nutrient measured was crude fiber content with an adequacy rate of 20-25 g / day and the content of beta carotene as proVitamin A of 600-650 RE/day.

Table 1. Results of the proximate analysis of pumpkin flour

PARAMETERS	NUMBER	UNITS
Water content	8.03	%
Ashes	5.47	%
Protein levels	5.64	%
Fat levels	4.0	%
Gross fiber content	7.83	%
Carbohydrate levels	69.03	%
Beta carotene	2260	µg/g

Table 2. Macronutrient content of ingredients for instant slurry

Materials	Macronutrient content (g/100 g)		
	Carbohydrate	Fat	Protein
Pumpkin flour *	69.03	4	5.64
Soy flour **	24.9	16.7	40.4
Skim milk **	52	1	35.6
Coconut oil***	-	100	-

Note: * based on proximate analysis
** based on DKPI Ministry of Health 2020
*** based on the packaging label

The formulation was obtained by modifying the composition of pumpkin flour, soy flour, and skim milk with other additives in the form of vegetable oil, sucralose, vanilla, and salt. The addition of additional ingredients is intended so that the instant porridge has an interesting taste and flavor. The desired taste target is sweetness, so sucralose is chosen which can provide a sweet taste without increasing calories. Vanilla is added as a flavoring that matches the smell of pumpkin, while salt is added to enhance the sweetness of sucralose. The material formulation used and the calculation of the energy content prediction based on the number of nutrients per 100 grams in this study can be seen in Tables 3 and 4 below.

Table 3. Material formulations

Amount of ingredients (g)	F1	F2	F3
Pumpkin flour	70	65	65
Soy flour	10	10	15
Skim milk	15	20	15
Coconut oil	4.5	4.5	4.5
Sucralose	0.2	0.2	0.2
Vanilla	0.1	0.1	0.1
Salt	0.1	0.1	0.1
Total	100	100	100

Table 4. Calculation of energy content prediction based on the number of nutrients per 100 grams

Macro Nutrition	Energy Content (kkal)		
	Formula 1	Formula 2	Formula 3
Carbohydrate	234.44	231.04	225.62
Protein	53.31	59.30	60.26
Fat	82.08	80.73	87.79
Total	369.84	371.07	373.68

The process of instant slurry processing is carried out by cooking a mixture of the ingredients of the slurry so that it undergoes a gelatinization process and then dries it with a drum dryer. Before cooking, the dry ingredients that make up the slurry are mixed with water in a ratio of 1: 5 to form a slurry which is then cooked at 70 ºC for ± 10 minutes until fully gelatinized and the viscosity increases (thick). After going through the cooking process, the slurry was dried using a double drum dryer.

4.1 Physical Analysis of Instant Porridge

Before the organoleptic test was carried out, an analysis was carried out on several physical properties of instant slurry which included yield, bulk density, brewing test, and rehydration power. The results of the physical analysis of instant slurry can be seen in Table 5 below.

Table 5. The results of the physical analysis of instant slurry

Formula	Rendement	Bulk Density	Brewing test	Rehydration time
F1	85 %	0.6193 g/mL	1 g/3 mL	57.15 det
F2	87.6 %	0.6435 g/mL	1 g/3 mL	55.14 det
F3	86.7 %	0.6244 g/mL	1 g/3 mL	56 23 det

The yield measurement aims to determine the efficiency of the instant slurry-making process. From 1 Kg dry weight of the ingredients of the slurry, the instant slurry weight after drying the drum dryer is 850 g (F1), 876.5 g (F2), and F3 is 867.5 g. It can be concluded that the drying process with a drum dryer can evaporate about 15% of the water in dry raw materials. This yield is influenced by the moisture content in the ingredients of the slurry. The higher the water content in the slurry, the more water needs to be evaporated so that the yield will increase. From the calculation results, the lowest yield was obtained by Formula 1, namely 85%, where the content in Formula 1 contained the highest pumpkin flour content compared to the other two formulas.

Bulk density measurement results yielded values 0.6193–0.6435 g / mL. This value is still in the range of bulk density for powdered food in general, which is between 0.3-0.8 g / ml. The difference in the density value of the bulk is strongly influenced by the size and shape of the particles. The high density of the cage indicates that there is less air space between the product particles so that the product occupies a relatively small space. Food products with high bulk density tend to be desirable because they can occupy less space in the digestive tract so that more nutrients can be received. At the time of packaging, products with high bulk density can also save packaging volume.

The reference used in this rehydration test is the suggestion for serving baby porridge brand A which is served using a 3: 1 ratio of water and pulp. The brewing of instant porridge is carried out until it gets a pulp texture that is relatively the same as that of brand A. The brewing is done according to one serving according to the suggestion for serving porridge with brand A, namely 20 grams of porridge in 60 grams of the warm cooking water. The difference in basic ingredients causes the texture and appearance of brewing the slurry with different references. However, it is determined that the volume of water that has a relatively similar texture to the texture of brand A slurry is 3 mL / 1 gram of slurry or 60 mL of water / 20 grams for one serving of slurry. The ratio of water and pulp in this amount results in a slurry texture that is neither too thick nor too runny.

To get ready-to-eat instant slurry, it takes time to rehydrate the instant slurry which is still dry powder. The slurry rehydration time relates to the ability of the slurry particles to absorb the added water. The absorption time of instant slurry water is strongly influenced by the size and distribution of powder particles, the process of mixing the ingredients, and the composition of the constituent materials. The rehydration time required to produce one serving of slurry is 55-57 seconds.

The product produced after drying will experience changes on its surface, namely open porous, allowing the rehydration process to occur very quickly. The diffusion of water increases as the porosity increases and opens. The rehydration time is short for instant products, making the serving process easier. Rehydration time can be increased by stirring.

4.2 Organoleptic Test

The organoleptic test consists of the hedonic quality test and the hedonic test. The purpose of this organoleptic test was to determine the formula of selected instant pumpkin porridge that will be used in

further research, namely elderly consumer panelists (elderly). The rating scale ranges from 1 to 9. Panelists who were involved in the organoleptic test were 30 moderately trained panelists.

a. Hedonic Quality Test

The hedonic quality test uses a scale of 1-9. The attributes assessed were color (brightness), aroma (pumpkin aroma, vanilla aroma, and unpleasant aroma), taste (sweetness), and texture (thickness and tenderness). The results of the hedonic quality test can be seen in Table 6 below.

Table 6.Hedonic Quality Test Results

FORMULA	ATTRIBUTE RATE						
	BRIGHTNESS	PUMPKIN AROMA	VANILLA AROMA	OFF FLAVOR	SWEET TASTE	THICKNESS	SOFTNESS
F1	6.60±1.69	7.00±1.51	3.83±2.53	3.80±2.51	6.23±1.41	4.80±1.88	5.87±1.43
F2	5.97±1.45	6.20±1.62	4.43±2.64	4.30±2.50	6.17±1.39	4.83±1.88	5.93±1.53
F3	5.80±1.80	6.17±1.74	3.87±2.31	3.93±2.36	5.80±1.24	5.33±1.75	5.57±1.35
Average	6.12±1.67	6.46±1.66	4.04±2.49	4.01±2.44	6.07±1.35	4.99±1.83	5.79±1.43

The average product brightness values are in the range of 5.80-6.60 (medium-light). The results of the analysis of variance on the brightness value showed that there was no significant difference in the brightness value of each formula (p> 0.05). The formula with the highest brightness value is F1 which has the highest pumpkin starch content. The hedonic quality test on brightness needs to be done because when heating with a drum dryer, the instant slurry will be exposed to high temperatures which can affect the appearance of beta carotene which causes a yellow color in the product.

The average value of pumpkin aroma ranged from 6.17 to 7.00 (slightly smelling). The results of the analysis of variance on the value of the aroma of the pumpkin showed that there was no significant difference between the three formulas (p> 0.05). The formula with the highest pumpkin aroma value was F1, with the highest pumpkin content among the three formulas (70 g).

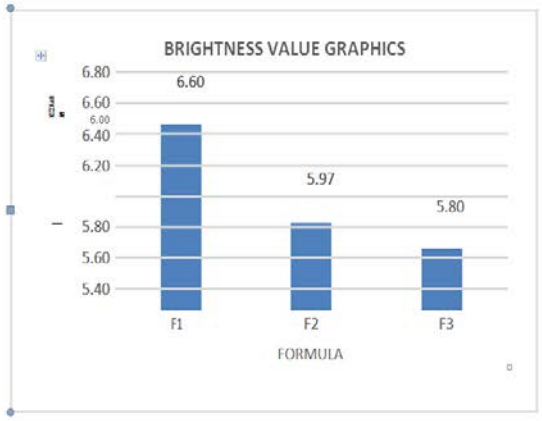

Figure 1. Brightness Value Graphics

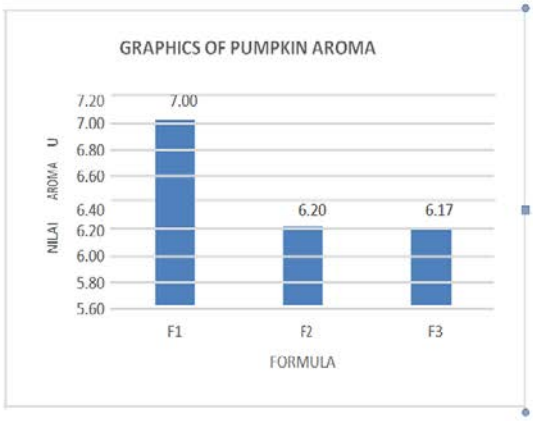

Figure 2. Graphic of Pumpkin Aroma

The average value of vanilla aroma ranged from 3.83-4.43 (odorless). The results of the analysis of variance on the vanilla aroma showed that there was no significant difference between the three formulas (p> 0.05). The formula with the highest vanilla aroma value is F2. The vanilla aroma is added to cover the unpleasant aroma that usually appears in products that use flour derived from beans, in this case, soybeans are added as a source of protein. The aroma of vanilla was chosen because it is considered very compatible with the aroma of pumpkin as the main ingredient.

The average value of unpleasant aroma ranges from 3.80-4.30 (not smelled-slightly smelled). The results of the analysis of variance showed that there was no significant difference between the odor value of the three formulas (p> 0.05). The formula with the highest odor value was F2 with an average value of

4.30 or slightly smelled. The higher the value given, the stronger the unpleasant aroma. The unpleasant taste is caused by the enzyme lypoxidase which hydrolyzes or breaks down soybean fat into compounds that cause off flavor, which are classified as hexanal and hexanol groups.

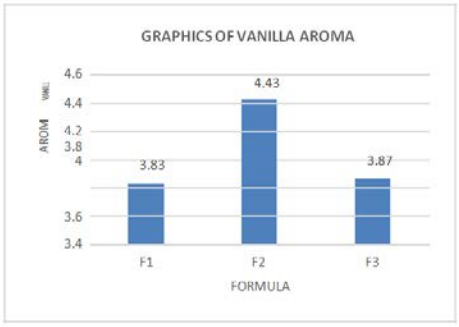

Figure 3. Graph of vanilla aroma.

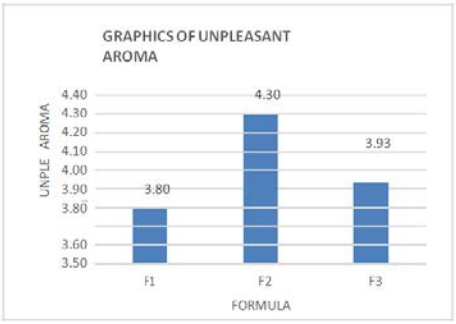

Figure 4. Graph of Off flavor

Average sweetness values ranged from 5.80-6.23 (medium-slightly sweet). The results of the analysis of variance on the sweetness value showed that there was no significant difference between the three formulas. The formula with the highest sweetness value is the F1 formula with a value of 6.23 or slightly sweet. Sweetness is caused by the addition of 0.2% sucralose sugar per formula. Sucralose was chosen because it does not increase additional calories so it is safe for elderly people with diabetes, has a high sweetness level (600 times sucrose), and has been declared safe for use by the BPOM.

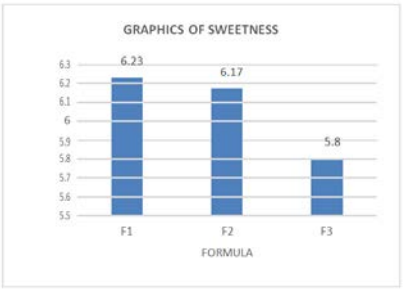

Figure 5. Graph of sweetness value

The average viscosity values ranged from 4.80-5.33 (slightly thick-medium). The results of the analysis of variance on the viscosity value showed that there was no significant difference between the three formulas ($p > 0.05$). The highest viscosity value is formula F3 with a value of 5.33 or in the medium range. Thickness is important for elderly porridge products. If the porridge is too thick, it will make it difficult for the elderly to swallow food, but if it is too runny the product will resemble milk. The viscosity is also closely related to the volume of water added at the time of brewing. Based on the results of the brewing test of instant flask pulp, a ratio of 1: 3 was obtained to obtain the desired consistency of instant pumpkin pulp.

The average values for tenderness were 5.57-5.93 (moderate). The results of the analysis of variance on the softness value showed that there was no significant difference between the three formulas ($p > 0.05$). The highest average softness value is formula F2 with a value of 5.93 or in the moderate range. Soft food texture is very important for the elderly's diet, considering that many elderly people don't have teeth so it's difficult to chew.

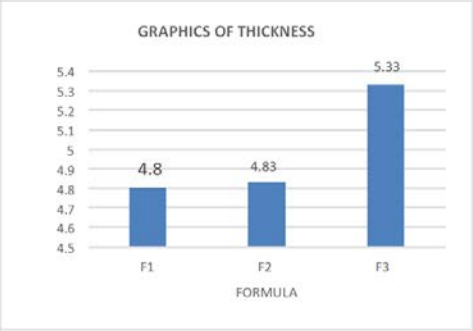

Figure 6. Graph of Thickness value

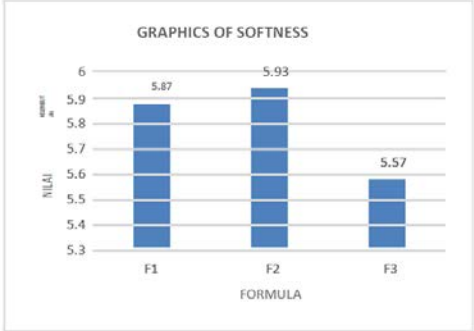

Figure 7. Graph of softness value

b. Hedonic Test

Organoleptic tests were carried out using a scale of 1-9. In the hedonic test the higher the value, the more favorable the panelists are to the product. Panelists are considered to receive porridge if the given preference value is greater than 5. The hedonic test results can be seen in Table 7 below.

Table 7. Hedonic test results

FORMULA	AVERAGE ATTRIBUTES				
	Color	Aroma	Taste	Texture	ALL
F1	6.27±1.46	7.30±1.29	6.50±2.17	6.80±1.47	7.27±1.17
F2	5.97±1.60	6.73±1.50	6.70±1.60	6.47±1.43	7.13±1.55
F3	6.07±1.87	6.70±1.49	6.47±1.81	6.27±1.25	6.97±1.47
Averages	6.10±1.64	6.91±1.44	6.56±1.86	6.51±1.39	7.12±1.39

The hedonic mean values of the colors ranged from 5.97-6.27 (moderate-somewhat likable). The results of the analysis of variance on the hedonic value of color showed no significant difference in the hedonic value of color between the three formulas ($p > 0.05$). The formula with the highest hedonic value is F1 with a value of 6.27 or somewhat like it. The appearance of the instant pulp is a yellow-orange color, which is caused by the beta carotene content of pumpkin flour.

Color is the main attribute that quickly and easily gives an impression in determining consumer rejection or acceptance of Soekarto's (1985) products. Before other factors are considered, visually the color factor will appear first (Winarno 2008). The color factor will be the first consideration when the food ingredients are selected. A food that is considered nutritious and has a very good texture will not be eaten if it has an unsightly color or gives the impression that it has deviated from the color it should have (Soekarto 1985).

The hedonic average values of aroma ranged from 6.70 to 7.30 (somewhat likable). The results of the analysis of variance on the hedonic value of aroma showed that there was no significant difference between the three formulas ($p > 0.05$). The formula with the highest aroma hedonic value was F1 with an average score of 7.30 or within the like range. Formula F1 is an instant porridge formula with the highest pumpkin flour content.

The parameter that gives the second-biggest contribution after color is the aroma. The good taste of food is determined by the smell of the food. Aroma has its charm in determining the good taste of the food product itself. The human smell can recognize whether or not a food that has not been seen can only smell the food from a distance.

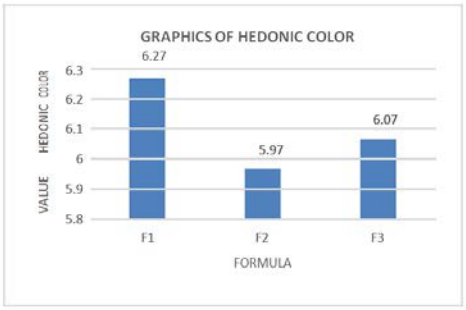

Figure 8. Graph of color hedonic.

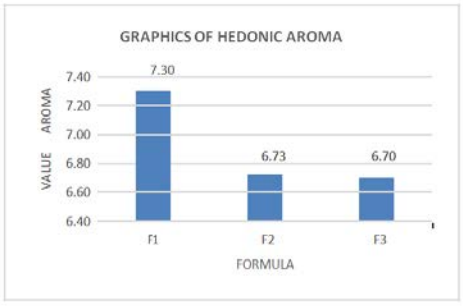

Figure 9. Graph of hedonic aroma

The mean hedonic values of taste ranged from 6.47 to 6.70 (rather like). The results of the analysis of variance on the hedonic value of taste showed no significant difference between the three formulas ($p > 0.05$). The highest hedonic value is formula F2 with an average value of 6.70 or in the somewhat favorable range.

The parameter that gives the third largest contribution is taste. This is because the taste is a very determining factor in a consumer's final decision to accept or reject a food, even though the other parameters are good, but if it tastes bad or dislikes the food will be rejected (Soekarto 1985). The consumer's preference for the taste of a product is also supported by an interest in the color and aroma of the product. According to Winarno (2008), the color captured by sight and smell captured by nasal olfactory cells can stimulate the taste buds and taste of the tongue.

The hedonic mean values for texture ranged from 6.27 to 6.80 (rather like). The results of the analysis of variance on the hedonic value of taste between the three formulas did not show a significant difference ($p > 0.05$). The formula with the highest tasting hedonic value is F1 with an average value of 6.80 or in the somewhat like range.

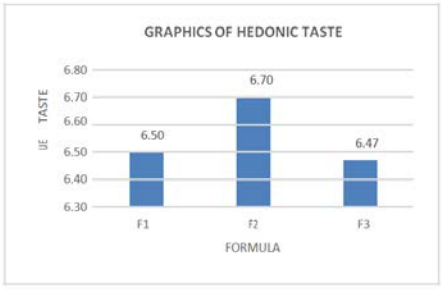

Figure 10. Graph of Hedonic taste

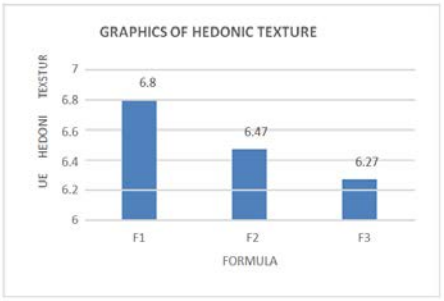

Figure 11. Graph of Hedonic Texture

The overall hedonic mean scores ranged from 6.97 to 7.27 (likes). The results of the analysis of variance on the overall hedonic value showed no significant difference between the overall hedonic values between the 3 formulas ($p > 0.05$). The formula with the highest overall hedonic value is F1 with a value of 7.27 or is in the like range, so it is determined that the preferred formula is the F1 formula.

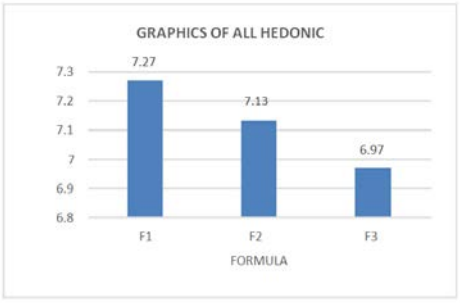

Figure 12. Graph of the overall hedonic value

4.3 Chemical Analysis

The nutritional content analyzed consisted of carbohydrates, fat, protein, water, ash, crude fiber content, and beta carotene content. The data from the analysis were then tested for a variance to determine

the effect of differences in the composition of each formulation on its nutritional content. The results of the chemical analysis of instant slurry are presented in Table 8 below.

Table 8. Results of instant slurry chemical analysis

Nutrient Content	Formula		
	F1	F2	F3
Water (%)	4.64[a]	4.60[a]	4.81[a]
Ash (%)	5.78[a]	5.88[a]	5.87[a]
Protein (%)	11.79[a]	13.86[b]	13.89[b]
Fat (%)	15.25[a]	14.87[a]	16.78[a]
Carbohydrate (%)	62.52[a]	60.78[ab]	58.63[b]
Crude fiber (%)	7.72[a]	7.44[a]	7.83[a]
Beta carotene µg / g	1723	1435	1492

The results of the water content analysis showed that the moisture content of the product ranged from 4.60-4.81%. The results of the analysis of variance show that there is no significant difference between the three formulas. This is because the drying process is carried out with the same method and tool, namely the drum dryer. Hariyadi (2015) revealed that by using a drum dryer, to get a product moisture content of less than 5% a box takes 2-20 seconds on the drum surface. Water content affects the product shelf life. The lower the water content, the longer the product's shelf life (Astawan, 2009). The moisture content of the product is already close to the water content requirement of SNI instant powder, which is not more than 4%.

The protein content in instant porridge products ranged from 11.79-13.89%, there was a significant difference between the protein content in F1 and the protein content in F2 and F3. The protein content in F1 is the lowest compared to the other two formulas because formula 1 is the formula with the highest pumpkin flour content and the low protein content.

Fat content in instant porridge products ranges from 14.87-16.78%. From the results of variance, there is no significant difference between the three formulas. The fat content in the product is still in an amount according to the SNI standard for instant powder 6-15%.

The carbohydrate content of instant porridge is determined by the method by difference. The carbohydrate content in the product ranges from 58.63-62.52%. There is a real difference between the F1 formula and the F2 and F3 formulas. Formula F1 has the highest carbohydrate content because in Formula F1 the content of pumpkin flour is the highest.

Crude fiber content ranges from 7.44-7.83%. The results of the analysis of variance showed that there was no significant difference between the three formulas. Crude fiber content indicates that instant porridge products can be categorized as high-fiber food according to BPOM standards of at least 6%. Crude fiber is very important for the elderly because it can prevent constipation which is very often experienced by the elderly as a result of lack of fiber intake in their diet. Lack of fiber intake is also related to the condition of the oral organs of the elderly who are unable to chew fibrous food because many teeth have fallen out.

4.4 Contribution of Nutrients to the RDA for the elderly

The serving size of this pumpkin-based instant porridge is determined according to the habits of the elderly in consuming food, where according to Rahman's research (2013) the average elderly can consume 50 g of instant porridge so that in this pumpkin-based instant milk porridge product uses a serving size equal to 50 g.

If it is assumed that the selected instant porridge (F1) as a food (porridge) interlude that contributes 10-20% to the RDA of the elderly by 1675 kcal, then one serving size (50 grams) of instant porridge contains 201.82 kcal. The contribution of energy content to the RDA for elderly aged 65-80 years is presented in Table 9 below.

Table 9. Contribution of energy content to the RDA for elderly aged 65-80 years

Energy and nutrients	Nutritional content per dose serving (50 g)	Energy contribution to the RDA (%)
Calories	201.82 kkal	12.04
Protein	7.63 g	12.5
Fat	5.9 g	12.42
Carbohydrate	27.4 g	10.85
Crude fiber	3.9 g	16.59
Beta carotene	1723	

V. CONCLUSION

From this research on making instant pumpkin porridge for the elderly, we can conclude:

a. Instant porridge for the elderly which is rich in fiber and beta carotene can be made from pumpkin flour as the main ingredient plus soy flour and skim milk as additional ingredients.

b. The results of the hedonic quality test concluded that the instant porridge tested had organoleptic characters, a slightly bright color, pumpkin flavor, slightly vanilla and unpleasant odor, rather sweet, medium thickness, and slightly soft texture.

c. The results of the chemical and physical analysis showed that the selected slurry formula had a density of 0.6193 g / mL, 57.15 seconds of rehydration time, 4.64% moisture content, 5.78% ash content, 11.79% protein content, 15.25% fat content, 62.52% carbohydrate content, crude fiber 7.72%, and beta carotene 1646 µg / g.

d. One serving of pumpkin-based instant porridge of 50 g can contribute 12.04% of energy from the RDA for elderly aged 65-80 years.

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Pembuatan Goat Milk Soap yang Diperkaya dengan Binahong Leaf Extract pada Ph Value, Water Content and Free Fatty Acids

Goat Milk Soap Enriched with Binahong Leaf Extract: Analysis on Ph Value, Water Content and Free Fatty Acids

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Abstract

Background – The antibacterial properties of goat milk kefir soap are made optimum by incorporating substance with antibacterial quality, such as binahong leaves. Binahong leaf extract is expected to improve the functional characteristics of the goat milk kefir soap, and it requires investigations on the water content, pH, and fatty acid level.
Purpose – This study aimed to determine the addition level of binahong leaf extract on the water content, pH, and free fatty acid level to produce the best quality soap.
Design/methodology/approach – The present study used a Completely Randomized Design with five treatments and three replicates. The treatments were the addition levels of binahong leaf extract, i.e. 0, 0.25, 0.5, 0.75, and 1%.
Findings – The result showed that incorporating binahong leaf extract could modify pH value and free fatty acids but did not affect the water content. The optimum addition of binahong leaf extract was 0.25% reflected on the characteristics of soap under observation.
Research limitation – The findings are expected to improve the functional properties of goat milk kefir soap as the solution for issues posed by natural soap.
Originality – Incorporating binahong leaf extract can improve the optimal quality of soap. Further investigation is expected to evaluate the addition of other natural ingredients to produce a soap with optimal activities/qualities.

I. INTRODUCTION

Soap is the outcome of a chemical reaction between oil and alkali solution. Most soap in the market contains chemical compounds that may harm the body and environment. A survey reported that around 75% of commercial self-care products (soap, toothpaste, hand sanitizer) contain triclosan (TCS) (Weatherly and Gosse, 2017). Natural ingredients for soap making has gained popularity, such as milk and dairy product. Fermented goat milk is a source of animal fat that is viable for soap because it contains high unsaturated fatty acids by 69,9% (Sumarmono and Sulistyowati, 2015).

Goat milk soap is a soap renowned for its nutritional value. Goat milk contains vitamins A, B1, B6, B12, C, and E that regenerate skin, exfoliate dead skin cells, exhibit antioxidant properties,

protect the skin against bacteria and moisturize the skin. Additionally, goat skin exhibits natural antimicrobial characteristics, as well as improving acne. Goat milk soap is best for people with eczema or dry skin (Faioula, 2019).

A previous study reported that goat milk kefir for soap making produced soap that met with SNI (Indonesia National Standard) for bar soap despite the non-maximum antibacterial activity (Wulansari et al., 2019). Binahong leaves are a natural ingredient with optimum antibacterial effectiveness, so incorporating binahong leaf extract into goat milk kefir soap may improve its functional properties. Binahong leaf extract contains flavonoid, saponin, and steroid/interpernoid. A screening test on antimicrobial quality showed that binahong leaf extract has a considerable potential to be harnessed or developed as an antibacterial. The binahong leaf extract has a broad spectrum of antibacterial because it can inhibit the growth of gram-positive and gram-negative bacteria, as well as fungi, especially against *Bacillus subtilis, Escherichia coli, MRCNS,* and *Pseudomonas aeruginosa* (Garmana et al., 2014).

II. LITERATURE REVIEW

Goat milk is a white fluid produced by Caprinidae ruminants. Goat milk contains fluorine (F) that serves as a natural antiseptic and helps inhibit bacteria growth in the body. The other benefits of goat milk include healing allergic reactions on the skin, containing vitamin C, E, and B as skin nutrition, as well as high saturated fatty acids (Molejanto and Wiryanta, 2002).

Fermented goat milk is a source of animal protein that is viable for making soap because it contains high saturated fatty acids around 69,9% (Sumarmono and Sulistyowati, 2015). Goat milk that undergoes the fermentation process into kefir product is the potential source of a natural antibacterial agent (Wulansari et al., 2018). According to Kurniawan and Aryana (2015), binahong leaves contain antibiotics as follow:

1. Flavonoid. Flavonoid exhibits pharmacological activities, such as antiinflammation, antibacterial, analgesic, and antioxidant. As a polar compound, flavonoid is generally easy to dissolve in polar solvents like ethanol, methanol, butanol, and acetone. Also, flavonoid is the major cluster in phenolic compounds that is highly efficient to inhibit the growth of virus, bacteria, and fungi. Flavonoid compounds are generally antioxidants and widely used as the main ingredients of medicine.

2. Essential oil. Essential oil plays a role as an antibacterial agent that helps build cell membrane or cell walls. It is because essential oil has a hydroxyl group that binds through the absorption process.
3. Saponin. Saponin is a powerful, active compound that forms lather when shaken. As an antibacterial agent, saponin distracts the stability of membrane cells of bacteria and causes bacterial cell lysis.
4. Terpenoid. Terpenoid in plants is usually harnessed as an aromatic compound, gives a sweet flavor to cinnamon, clove, and ginger, as well as gives a yellow color to flowers. Plant terpenoid gives a vital benefit as traditional medicine, antibacterial, antifungal, and prevents health disorder.
5. Alkaloid. As the biggest secondary phytochemicals, alkaloid is an antibacterial agent. Alkaloid is assumed to distract the building blocks of peptidoglycan in bacterial cells to prevent the complete formation of the cell membranes; hence, the cells perish.

Bath soap is a by-product of oil, derived from a reaction between oil, fat, or both with KOH and NaOH bases. Bath soap is a sodium or kalium compound with fatty acids from the plant oil, animal oil, or both and may take different forms, such as bar, soft, or liquid, as well as incorporated with fragrance or other substances that are harmless to health (Badan Standarisasi Nasional, 1994).

III. METHODOLOGY

3.1.Research Materials

The primary material in this study was fresh milk of Ettawah goat derived from 'As-Salam' Agribusiness Farming Group in Tasikmalaya City, West Java. Binahong leaves were obtained from Baturraden area in Banyumas regency. The experiment was conducted in a Completely Randomized Design (CRD) with a formula to get the replicates T(R-1) = 12. The present study used five treatments and five replicates, namely goat milk soap making incorporated with 0, 0.25, 0.5, 0.75, and 1% of binahong leaf extract. Three observed variables were pH value, water content and free fatty acids.

3.2. Procedure of making binahong leaf extract

Binahong leaves were washed and drained under the sun until the water content did not exceed 5%. The dried leaves were pulverized using a mill. Then, 100gr of binahong leaves were soaked

in a sealed bottle of 600ml methanol, let sit for three days, and the bottle was occasionally shaken. The extract was filtered to obtain filtrate I and residual simplicial. The residual simplicial was re-extracted with 400ml methanol, let sit for two days with an occasional shake. Then the extract yield (filtrate II) was mixed with filtrate I and evaporated at 40 °C until a thick produced (Rachman et al., 2018).

3.3.The procedure of making soap

The procedure started by making culture from one liter of goat milk, pre-pasteurized at 70 °C, and let cool to reach room temperature. Five grams of dried kefir powder was incorporated into the milk and let sit for 24h in a closed container. Kefir was made using 10% of the culture mixed with one liter of pre-pasteurized goat milk and let sit in a closed container for 24h (Wulansari et al., 2018). The bar soap was made in the cold process method. The procedure of the present study was the modification of a method by Sukawaty et al. (2016). NaOH was dissolved in the goat milk kefir and added with a mixture of palm oil, coconut oil, olive oil, and binahong leaf extract. The solution was stirred with a hand mixer until homogenous and thick. The solvent was poured into the mold and let sit to harden for 24h, then removed from the mold. The hardened soap was let sit at room temperature for 30 days to be analyzed. The formulation of bar soap is presented in Table 1.

Table 1. The formulation of goat milk kefir soap

Formula	Ingredients
T0	24% Goat milk kefir + 31% Palm oil + 24% Coconut oil + 11% Olive oil + 10% NaOH
T1	23,75% Goat milk kefir + 31% Palm oil + 24% Coconut oil + 11% Olive oil + 10% NaOH + 0,25% of binahong leaf extract
T2	23,5% Goat milk kefir + 31% Palm oil + 24% Coconut oil + 11% Olive oil + 10% NaOH + 0,5% of binahong leaf extract
T	23,25% Goat milk kefir + 31% Palm oil + 24% Coconut oil + 11% Olive oil + 10% NaOH + 0,75% of binahong leaf extract
T4	23% Goat milk kefir + 31% Palm oil + 24% Coconut oil + 11% Olive oil + 10% NaOH + 1% of binahong leaf extract

Treatments = T0 (control with aquades); T1 (added 0.25% of binahong leaf extract); T2 (added 0.5% of binahong leaf extract); T3 (added 0.75% of binahong leaf extract); and T4 (added 0.1% of binahong leaf extract) (Wulansari, et al., 2018)

3.4.Procedure of product testing

The procedure of pH analysis (acidity level) using a pH meter was initiated by calibration with a standard solution. The 10% soap solution was made by dissolving 1gr soap in 10ml Aquadest then a few ml was taken and put into the pH meter for analysis (Susilorini et al., 2006). The water content was measured by weighing 4gr soap in a weighing bottle (fixed weight measured). The bottle was heated in a drying cabinet at 105 °C for 2 hour (National Standardization Agency, 1994) (Badan Standarisasi Nasional, 1994). The free fatty acids were measured using neutral alcohol that was made by bringing 100ml alcohol to boil in a 250ml Erlenmeyer, then incorporated with 0.5N PP solution, let cool until 70 °C, and neutra with 0,1 N KOH in alcohol. After that, 5gr of soap was incorporated into the neutral alcohol, added with boiling chips, set a straight condenser, heated on the water heater to allow faster dissolve, and let boil for 30 minutes. The free fatty acids were calculated using the formula {(V x N x 0,205)/W} x 100% (National Standardization Agency, 1994) (Badan Standarisasi Nasional, 1994).

IV. RESULT AND DISCUSION

4.1. pH value

Incorporating binahong leaf extract to make goat milk kefir soap significantly affected ($P<0.05$) the soap pH. The pH value of the bath soap bar is around 9-11 (Hambali, Bunasor, Suryani, and Kusumah, 2005). An optimum pH value is at base condition because it can break fat, so the impurities are washed down in the water. Additionally, pH value may affect the skin absorption; pH that is too high or too low could render irritated skin (Parmadi and Andrianti, 2016).

The acidity level (pH) in the soap making must be measured to identify the acidity level of soap against the skin. Table 2 shows that the lowest pH is 10.14, the highest is 10.26, and the average is 10.18. This result is higher than pH 8.6 of transparent soap added with noni/mengkudu extract (Sukeksi et al., 2018) but similar to pH 9.5-10.8 of soap added with buas-buas leaf extract (Fitriani, 2017). Both noni/mengkudu extract and buas-buas leaf extract share common properties with binahong leaf extract, namely the source of natural antibacterial agent.

4.2.Water content

Table 2 illustrates that the addition of binahong leaf extract in goat milk kefir soap did not significantly affect (P>0.05) the water content of the soap. The lowest and the highest water content of soap in this study were 18.51% and 25.41%, respectively, and the average water content was 20.82%. The analysis result showed that the water content did not conform to the national standard, i.e., under 15% (National Standardization Agency, 1994) (Badan Standarisasi Nasional, 1994).

The water content of the soap was analyzed by inserting the soap into a drying machine for 2hours at 105 °C. The water water content would make the soap shrink faster, hence reducing the shelf life (Simbolon et al., 2018). Sukawaty et al. (2016) stated that the longer the storage, the smaller the water content due to evaporation.

Water content in the present study was higher than 12.8% reported by Jalalludin et al. (2018); meanwhile, Fitiarni () stated that 4.25% of water content in soap. These results have conformed to the SNI standard. The contributing factors to high water content include storage time; the longer the soap is stored, the lower the water content due to the evaporation process (Sukawaty et al., 2016). The total NaOH concentration also contributes to the soap water content; the higher the NaOH, the higher the water content (Langingi et al., 2012). Furthermore, the more quantity of extract is added to the soap, the lower the water content (Simbolon et al., 2018).

4.3.Free fatty acids

Incorporating binahong leaf extract when making goat milk kefir soap significantly affected (P<0.05) the free fatty acids of the soap. Free fatty acids are not favorable in soap because it can obstruct the process of removing impurities. The result of free fatty acids analysis (Table 2) shows that the lowest, highest, and average free fatty acids in this study were 0.41%, 1.35%, and 0.75%, respectively.

According to the national standard, the free fatty acids of a quality bar soap is under 2.5% (Badan Standarisasi Nasional, 1994).

The decreased free fatty acids could remove unfavorable flavor and smell, such as pungent (Zulkifli and Estiasih, 2014). Hardian and Ali (2014) reported that free fatty acids could affect the cleansing process by decreasing the cleansing power of the soap. A contributing factor to free fatty acids is the level of fatty acid and the amount of base. The addition of NaOH must be done properly because NaOH deficit may result in a high level of free fatty acids.

Free fatty acids in this study were 0.75%, similar to 0.3% - 0.7% that was reported by a previous study (Simbolon et al., 2018)

This study found that the addition of 0.25% binahong leaf extract (T1) produced the optimum quality soap with pH 10.14. Meanwhile, T0 (0% binahong leaf extract) resulted in the optimum quality soap with 0.41% fatty acids. The water content of goat milk kefir soap enriched with binahong leaf extract remained high, i.e., 20.33%, due to the short storage time. This study reported that goat milk kefir soap enriched with binahong leaf extract produced pH, water content, and free fatty acids that rendered the product worthy of use. However, the durability was low due to the high water content that allowed the soap to shrink faster.

Table 2. pH value, Water content, and Free fatty acids tests

Treatments	pH	Water content (%)	Free fatty acids (%)
T0	10.26 ± 0.46^{b}	25.41 ± 10.09	0.41 ± 0.16^{a}
T1	10.14 ± 0.06^{ab}	20.33 ± 1.98	0.49 ± 0.29^{ab}
T2	10.2 ± 0.05^{ab}	18.51 ± 1.06	1.35 ± 0.41^{b}
T3	10.15 ± 0.45^{ab}	20.98 ± 0.59	0.98 ± 0.14^{ab}
T4	10.17 ± 0.06^{a}	18.88 ± 1.87	0.52 ± 0.17^{ab}

V. CONCLUSION

The addition of binahong leaf extract affected pH value and free fatty acids, but not the water content. Binahong leaf extract could decrease pH value.

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Effect of Drying Method (Tray Drying dan Freeze Drying) on The Yield and Total Phenolic Content of Indonesian Citrus Peel

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Abstract

The more citrus fruit production, the more in the number of its peel left as waste which have not been optimally used. So far, researchers in many countries have examined the potential of citrus peels as a source of antioxidants and total phenolic content, but no research has specifically discussed the comparison of the antioxidant potential of citrus peels from various varieties in Indonesia. Studies of drying method on citrus peels have also not yet conducted. The objective of this study was to determine the effect of drying on the yield characteristics and total phenolic content of Indonesian citrus peels. This study used three citrus cultivars (pummelo, mandarin citrus, and tangerine). The drying method used was the tray drying and freeze drying. The difference in drying methods (tray drying and freeze drying) produced a yield that was not much different in pummelo, mandarin citrus, or tangerine. Mandarin citrus have the highest yield 30.37% in the tray drying and 32.37 in the freeze drying. The citrus peels with tray drying had highest total phenolic content in tangerine (19.78 mg GAE/g extract) following by pummelo and mandarin citrus, which was found to be 18.43 mg GAE/g extract and 18.80 mg GAE/g extract, respectively. The drying method affects the total phenolic content of the three Indonesian citrus peels, but does not affect in the yield of the resulting powder. The highest total phenolic content was found in powder of tangerine peel.

Keywords: citrus peel, total phenol, tray drying, freeze drying.

I. INTRODUCTION

Citrus fruit (*Citrus* sp.) is an annual fruit crop that has been grown since hundreds of years ago in Indonesia both naturally and cultivated (Kementrian Pertanian 2016). Three types of Indonesian citrus fruits that are widely cultivated include pummelo (*Citrus maxima* Merr.), mandarin citrus (*Citrus reticulata* L.), and tangerine (*Citrus Sinensis* L). Kementrian Pertanian (2016) stated that in 2016 the production of citrus in Indonesia reached 2.64 million tons and will continue to increase until 2020 with an estimated production of 3.25 million tons, so that the average increase in production in five year period is estimated up to 4.93% per year. So far, only the flesh of citrus fruits has been used, while the peel has not been optimally used. The more citrus fruit production, the more in the number of its peel left as waste.

So far, many researchers in various countries have examined the potential of citrus peel as a source of antioxidants and total phenolic content by utilizing various citrus varieties from their countries, but in Indonesia there has been no research specifically reported the comparison of the potential phenolic content of citrus peels of various Indonesian varieties. Phenolic compounds are a type of natural antioxidant found in plants. This type of antioxidant is more effective and safer than synthetic antioxidants (Setyabudi *et al.* 2015). According to the Elkhatim *et al.* (2019) with the citrus peels of lemons, citrus, and grapefruit contain higher phenolic compounds than the part of pulp and seeds.

The high water content in fresh citrus peel is predicted to have an effect on the phenolic content concentration. The aromatic ring in phenol has one or two groups (-OH) that are directly attached to the aromatic hydrocarbonyl group making phenol tend to dissolve easily in water (Rappoport 2003). The attachment of phenol to the –OH group due to the high water content of the citrus peel will reduce the phenol concentration. Thus, reducing the water content by drying the citrus peel is an alternative to obtain its peels which are high in phenol as a raw material for food processing. In addition, citrus peels with a low water concentration will be protected by the presence of rotting bacteria or fungi so that they have a longer shelf life.

Based on this study, the related research of the total phenolic content and drying methods of Indonesian citrus fruit peels is necessary to be conducted. Therefore, the aim of this study was to determine the effect of drying methods on yield characteristics and total phenolic content of Indonesian lcitrus peels.

II. LITERATURE REVIEW

A. Citrus

Citrus fruit plant (*Citrus* sp.) has grown since hundreds of years ago in Indonesia, both naturally and cultivated. In general, there are three types of citrus that are cultivated in Indonesia, namely pummelo (*Citrus maxima* Merr.), mandarin citrus (*Citrus reticulata* L.), and tangerine (*Citrus Sinensis* L) citrus fruits (Kemenristek 2000). Pummelo has greenish yellow skin and pink flesh. The pulp of pummelo has a hard to soft texture with a sweet to slightly sour and has no seeds (Susanto *et al.* 2011). Mandarin citrus have a sweet, slightly sour, and fresh taste. Its skin color is green to light citrus and is easy to peel because it has a cavity between the skin of the fruit and the pulp. The tangerine has a sweet tastes, the skin is thin and easy to peel. Its size is relatively smaller than mandarin citrus. The skin of the tangerine is green, yellowish and shiny. However, tangerine peels are relatively thinner than mandarin citrusand have a smoother surface texture due to tighter and smaller pores. The albedo texture of the tangerine is smoother and has a softer pulp than mandarin citrus (Andayani 2016).

B. Phenolic Compound

Phenolic compound has one or more hydroxyl groups attached to the aromatic ring, or it can also be stated that phenolic compounds are compounds that have at least one phenolic group (Vermerris and Ralph 2006). The hydroxyl group can act as a contributor to hydrogen atoms by transferring electrons when reacting with radical compounds so that the oxidation process can be inhibited. According to Som *et al.* (2019) phenolic compounds are included in secondary metabolite compounds that can act as antioxidants, these bioactive components can be obtained from plants and fruits and as antimicrobial, antimutagenic, anticancer and anti-inflammatory so that be useful for human health. The characteristic of phenolic compounds is found a benzene core that binds to a hydroxy group (Vermerris and Ralph 2006).

C. Drying of Citrus Peel

Citrus peel waste promises economic value as a source of valuable bioactive materials and nutrients so that it can be used as food ingredients. However, this secondary product is sensitive to microbiological and biochemical damage due to the high moisture content of citrus fruit peels (70-80%). In addition, the phenolic compounds of citrus peel are easy to undergo enzymatic oxidation reactions at various stages of processing. The drying process under certain conditions can reduce the moisture content and the Aw value of the citrus peel, thereby inhibiting the enzymatic oxidation reaction. Axtell (2011) states that the tray drying method has the advantage of a faster drying rate when compared to an oven one, the risk of over drying is smaller and has a lower drying air pressure than oven so that it can pass through the dried material layer. Freeze drying (freeze dryer) or lyophilization is the process of drying liquid materials that are frozen, so treated by a light heating process in a chamber or vacuum chamber. The resulting product is porous, does not disturb materials or compounds and maintains its quality and safety (Anna *et al.* 2013).

III. METHODOLOGY

A. Sample Preparation

The sample preparation procedure was done by following Dewi (2019). The material that used in this research was fresh citrus fruit peel with a maturity level of 80%, characterized by a smooth, thin, shiny peel texture and a firm color and has good quality without blemishes or rot. After washing, the citrus peel was then separated from the fruit and thinly sliced.

B. Drying of Citrus Peel

The drying stage of the citrus peel used two drying methods, namely the tray drying and freeze drying method. Fresh citrus peels that have been thinly sliced are dried using a tray dryer machine at 90 ℃ for 12 hours (Dewi 2019) and using a freeze dyer machine at -30 ℃ for 4 days (Mahyuni 2016). The dried

citrus peels are then crushed using a blender and sieved to obtain a powder with a uniform degree of fineness. The citrus peel powder was then analyzed for moisture content.

C. Determining Citrus Peel Powder

The yield of citrus peel powder was calculated by weighing the fresh citrus peel and the citrus peel powder produced from each drying. The yield of citrus peel powder was calculated by using the following formula:

$$\text{Yield (\%)} = \frac{\text{Weight of citrus peel powder}}{\text{Weight of fresh peel powder}} \times 100\%$$

D. Extraction of Citrus Peel

The citrus peel extract was prepared with modified method from the Paulpriya and Mohan (2012). Samples that prepared were then continued with the maceration process using ethanol solvent 96% with a ratio of 1:10 and closed tightly so that they were avoided from direct light exposure, followed by an agitation process at 500 rpm at room temperature within 2 hours, then left to stand until it reaches a maceration time of 24 hours. The extract was filtered through Whatman filter paper and stored in the freezer for further testing.

E. Determining Total Phenolic Content

Determining total phenolic content was carried out using the Folin-Ciocalteau (Singleton & Rossi 1965). A total of 0.2 ml of sample extract was mixed with 1.8 ml of Folin-Ciocalteau reagent (Merck, Germany) which was diluted 10 times (prepared fresh) then vortexed and left for 6 minutes. Next, 1.8 mL of 60 g/L Na_2CO_3 was added (Himedia, India) and re-vortexed. Samples were incubated for 90 minutes in a dark room. Samples were analyzed using a spectrophotometer (GENESYSTM 150 UV-Visible) at a wave length of 725 nm. Making standard curves was done by making a standard dilution series of gallic acid concentrations of 0 - 150 ppm.

IV. RESULT AND DISCUSSION

A. Yield of Citrus Peel Powder

The yield of citrus peel powder is greenish yellow. The yield values of the three types of citrus with two different drying methods are presented in Table 1.

Table 1. Yield of citrus peel powder

Citrus	Powder yield (%)	
	Tray drying	*Freeze drying*
Pummelo	19,26	19,9
Mandarin citrus	30,37	32,37
Tangerine	21,47	22,98

Based on the obtained data, different drying methods (tray drying and freeze drying) gave the yields that are not much different as well as on pummelo, mandarin citrus, or tangerine peels. Mandarin citrus have the highest yield, 30.37% in the tray drying and 32.37 in the freeze drying method. It was followed by tangerine found to be 21.47% in the tray drying and 22.98% in the freeze drying method. However, Pummelo has the lowest yield, amounting to be 19.26 in the tray drying and 19.9% in the freeze drying method. This is similar resulted with the low water content of Pummelo peel powder, 12.07%. In the drying process, free water on the surface of the material can be easily evaporated so that the resulting yield is relatively small (Kumalla *et al.* 2013).

B. Total Phenolic Content

The total phenolic content was determined by extracting the dried citrus peel powder using two methods. The data obtained are presented in Table 2.

Table 2. Content of total fenolic powder

Citrus	Kadar total fenol mg GAE/g		
	Fresh	*Tray drying*	*Freeze drying*
Pummelo	$5{,}32 \pm 0{,}57^{ef}$	$18{,}43 \pm 0{,}60^{ab}$	$14{,}80 \pm 0{,}21^{d}$
Mandarin citrus	$6{,}20 \pm 1{,}08^{e}$	$18{,}80 \pm 1{,}44^{ab}$	$15{,}59 \pm 1{,}07^{cd}$
Tangerine	$3{,}60 \pm 0{,}78^{f}$	$19{,}78 \pm 0{,}49^{a}$	$17{,}35 \pm 0{,}29^{bc}$

Based on the data above, the highest total phenolic content was tangerine peel powder using the tray drying method. In general, the total phenolic content of fresh citrus peel has a relatively lower value, i.e. in pummelo 5.32 ± 0,57 mg GAE/g, mandarin citrus 6.20 ± 1,08^{e} mg GAE/g, and tangerine 3.60 ± 0,78 mg GAE/g. Citrus peels that have gone through the tray drying method with a temperature of 90 ℃ for 12 hours have a higher total phenolic content, i.e. in pummelo 18.43 ± 0,60 mg GAE/g, mandarin citrus 18.80 ± 1,44 mg GAE/g, tangerine 19.78 ± 0,49 mg GAE/g. This is consistent with the statement of Chen *et al.* (2011) stated that temperature and drying time can affect the antioxidant activity and polyphenol content of citrus peels (Chen *et al.* 2011).

Chen *et al.* (2011) reported that in the drying of the citrus peel (*Citrus sinensi* (L)) Osbeck, there was a decrease in total phenolic and flavonoid levels at low heating temperatures (50 and 60 ℃), but it actually increased at higher temperatures (70, 80, 100 ℃). The total phenolic content of citrus peel powder using the freeze drying method was lower than tray drying, i.e. in pummelo 14.80 ± 0,21 mg GAE/g, mandarin citrus 15.59 ± 1,07 mg GAE/g, and tangerine 17.35 ± 0,29 mg GAE/g. Adhayanti and Tahir (2020) stated that the drying method affects antioxidant activity, drying by direct heating provides the higher antioxidant activity compared to drying using the freeze dry method. This is likely due to several potential ingredients as antioxidant materials that are degraded due to the drying process long enough (4 days).

V. CONCLUSION

The difference in drying methods between tray drying and freeze drying resulted in a yield that was not much different in value for all citrus cultivars tested. Mandarin citrus have the highest yield i.e., 30.37% in the tray drying and 32.37% in the freeze drying method. The drying method affects the total phenolic content of the three Indonesian citrus peels. Citrus peels with tray drying method had higher total phenolic content, pummelo 18.43 ± 0,60 mg GAE/g, mandarin citrus 18.80 ± 1,44 mg GAE/g, and tangerine 19.78 ± 0,49 mg GAE/g. The highest total phenolic content is found in tangerine peel powder.

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