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THEEFFECT OF ADDITION NILEM FISH PROTEIN CONCENTRATE ON KEMBANG GOYANG TRADITIONAL CAKE PREFFERED LEVEL

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ABSTRACT

This research aims to determine the best concentration of nilem fish protein concentrate concentration so as to obtain the most preferred kembang goyang product. This research was carried out in July to November 2020 at the Fishery Processing Technology Laboratorium, Faculty of Fisheries and Marine Sciences Universitas Padjadjaran. The research method used an experimental with 4 treatments the addition of nilem fish protein concentrate, namely 0%, 2.5%, 5% and 7.5% and 20 panelists as a repeat. The parameters observed in this research are organoleptic characteristics which include color, aroma, texture and taste. Based on the research results, all treatments favored by the panelists but 5% treatment has an alternative value higher than other treatments that is equal to 7.49.

INTRODUCTION

Traditional cakes are now increasingly marginalized among the peoples. This is because there are many modern cakes with a relatively easier and practical processing process for direct consumption. Traditional cakes have several advantages including lower prices and easily available ingredients. Traditional cakes are no longer preserved, one of them is kembang goyang.

Kembang goyang is a traditional cake that is much loved by the publics. Naming kembang goyang comes from the shape of the mold and the manufacturing process. The process of making a kembang goyang is by printing the batter using a typical floral printing tool (flower) then dipping it in oil and shaking it during the frying process to release it from the mold [1]. Kembang goyang cake is a traditional food made from rice flour and printed using flower-shaped molds. The process of making kembang goyang consists of three stages including the making of dough, frying and packaging [2].

The protein content of the kembang goyang is generally still relatively low at 5.18% [3]. Protein is a macro-molecular component that is needed by living things. Protein is a substance that serves as the main source of energy other than carbohydrates and fats, as a builder and also as a regulator [4].

Efforts can be made to increase the protein content of kembang goyang cake by adding fish protein concentrate. Fish protein concentrate is solid shaped flour which is the result of reducing fat and water content of whole fish so that a higher protein value is obtained compared to the original raw material [5]. Fish concentrate has been widely used in the fisheries processing industry. Fish processed into fish protein concentrate will make fishery products more durable and can increase protein content in food products [6].

One of the fish that is easily cultivated and can be used as a raw material for protein concentrate is nilem fish (*Osteochilus hasselti*). Nilem fish is native fish originating from Indonesian public waters. Nilem fish is one of the potential commodities from freshwater that is consumed by many people. Nilem fish protein content reaches 38.83%, which is why nilem fish fish is suitable as raw material for fish protein concentrate [7].

The addition of the protein concentrate of nilem fish with high protein content is expected to increase the protein content in the kembang goyang cake. So research needs to be done on the percentage of the addition of nilem fish protein concentrate to get the kembang goyang cake that is most preferred by panelists.

MATERIAL AND METHOD

Place and Time

This research was carried out in July to November 2020 at the Fishery Processing Technology Laboratorium, Faculty of Fisheries and Marine Sciences Universitas Padjadjaran.

Material and Tools

Tools used in this research include digital scales,spoons *stainless*, knives, basins*, food processors*, blends, cutting boards, measuring cups capacity of 50 ml, jars, cloths, stoves, sieves, sieves 60 mesh flour, *oven*, kembang goyang mold (flower-shaped), *mixer* and frying pan. The ingredients used in this research include nilem fish meat, hexane, sodium bicarbonate ($NaHCO_3$), NaCl, water, rice flour, tapioca flour, cooking oil, sugar, eggs and coconut milk.

Research Method

The method used in this research is an experimental method using 4 treatments and 20 semi-trained panelists as a repeat. As for the treatment of adding nilem fish protein concentrate in the making of shake cake cake as follows:

Treatment A: Addition of nilem fish protein concentrate 0% from rice flour
Treatment B: Addition of nilem fish protein concentrate 2,5% from rice flour
Treatment C: Addition of nilem fish protein concentrate 5% from rice flour
Treatment D: Addition of nilem fish protein concentrate 7,5% from rice flour

Following is a modified formulation of traditional cake kembang goyang:

Table 1. Formulation of Making Kembang Goyang

Name Ingredients	Treatments			
	0%	**2,5%**	**5%**	**7,5%**
Rice Flour (g)	200	200	200	200
Tapioca Flour (g)	100	100	100	100
Sugar (g)	100	100	100	100
Egg (g)	50	50	50	50
Santan (g)	32.5	32.5	32.5	32.5
Oil (g)	1000	1000	1000	1000
Fish protein concentrate (g)	0	5	10	15

Following is the procedure of making modified kembang goyang [8]:

1) Coconut milk, eggs, sugar mixed in one container and then stir until the mixture is swell and white.
2) Rice flour, tapioca, and fish protein concentrate are added gradually until the mixture is thoroughly mixed.
3) The mold is heated in cooking oil, then dipped in the batter.
4) Printed batter is fried in hot oil.
5) The frying process is done by shaking the mold in hot oil over medium heat for about 1 minute until golden yellow.

Parameter Observed

Parameters observed in this study are organoleptic characteristics which include color, aroma, texture and taste. Organoleptic characteristics were tested using a hedonic test by 20 semi-trained panelists consisting of students from the Faculty of Fisheries and Marine Sciences, Universitas Padjadjaran.

Data Analysis

Data from organoleptic and chemical testing results are analyzed in a comparative descriptive manner. The statistic used is the *Friedmantest* with the chi-square test defined by the formula as follows [9]:

$$X^2 = \left(\frac{12}{nk\ (k+1)} \sum_{t=1}^{k} (Rj)^2 \right) - 3n\ (k+1)$$

Information:

X^2: Statistics *Friedman* Test
n: Repeat
k: Treatment
Rj: Total ranking of each treatment

If there is a real effect among treatment followed by a multiple comparison test (*MultipleComparison*) by the formula:

$$Ri - Rj| \leq Z_{0.5} \left\{ \frac{\alpha}{k\ (k-1)} \right\} - \frac{\sqrt{nk-\ (k\ +\ 1)}}{6}$$

Information :

|Ri -Rj| : Difference in averageranking
Ri : Average ranking of the i-th sample
Rj : Average rank of the jth sample
α : Experiment *wise error rate* at 0.05
n : Number of data / repetition
k : Number of treatments
z : Value in table Z for *multiple comparison*

Analysts continued with *Bayes* method to determine the best treatment of several treatments.

RESULT AND DISCUSSION

Preference Level for Color of Kembang Goyang

Color has an important role in a food that is as an attraction, identity and determinant of quality. Color can give the impression whether a food is liked or not because color is the quality factor that most attracts the attention of consumers [10]. Data on the results of color observations on the kembang goyang are presented in Figure 1.

Figure 1. Average of Kembang GoyangColor

Assessment of the color of kembang goyang with the addition of the nilem fish protein concentrate showed significantly different results based on multiple comparison tests (*Multiple Comparison*) at the error level of 5%. This is supported by research that has been done that the addition of fish protein concentrate to a product can show significantly different results at the level of color preference [11]. Treatment A has the lowest average value, producing yellow kembang goyang and its shape is less neat and intact. Treatment C has the highest average value of 7.5 resulting in a yellowish yellow kembang goyang product and a still intact and neat shape. This is consistent with research conducted that the addition of fish protein concentrate to products with a treatment of 5% can still be accepted by panelists [11]. Changes in the color of the kembang goyang with the addition of the nilem fish protein concentrate due to the interaction between the protein in the fish protein concentrate with reducing sugar. Color is an important factor for the assessment of a product process or without the process [12].

Preference Level for Aroma of Kembang Goyang

Aroma is one of the sensory parameters that use the sense of smell [13]. Panelists will prefer foods with specific aromas [14]. Data on the results of observations of the aroma of the kembang goyang with the addition of the protein concentration of the nilem fish are presented in Figure 2.

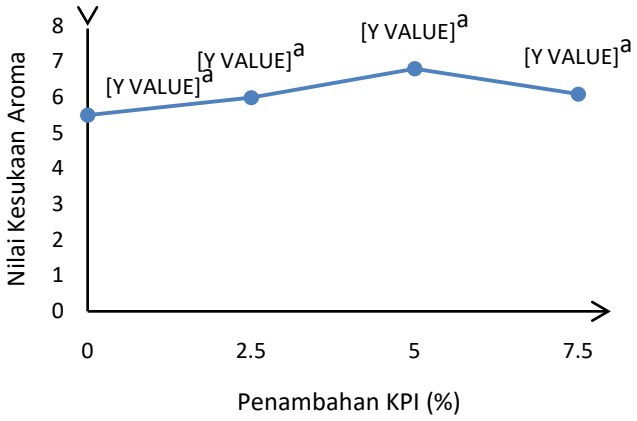

Figure 2. Average of Kembang GoyangAroma

Based on Figure 2, it can be seen that the addition of the protein concentrate of the nilem fish has no effect on the aroma of the kembang goyang. This is consistent with research [13] that the addition of fish protein concentrate has no effect on aroma characteristics.

A treatment with the addition of 0% nilem fish protein concentrate produces the aroma of kembang goyang which is dominated by the dis-

tinctive aroma of a mixture of sugar with eggs. Treatment C (addition of 5%) still smelled of sugar and eggs with a slight aroma of fish but not specific. This is consistent with research conducted that the addition of a 5% fish protein concentrate treatment produces the most preferred scent of panelists because it has not yet smelled the specific aroma of fish [15]. The average value obtained shows that all treatments can still be accepted by the panelists because they are not significantly different from control. The aroma is a parameter that determines the acceptance of a product, because it has its own charm and results in a fast response from consumers [16].

Preference Level for Texture of Kembang Goyang

Texture is an important trait in determining the quality of a food. Each food product has a difference in the nature and structure [17]. Data on the results of kembang goyang texture observations can be presented in Figure 3.

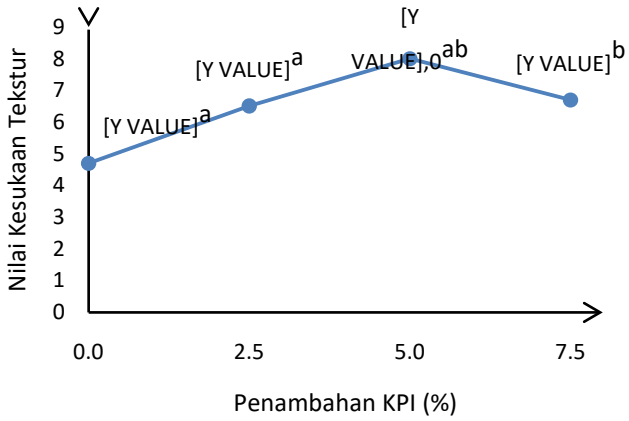

Figure 3. Average of Kembang Goyang Texture

Based on Figure 3, it can be seen that the addition of nilem fish protein concentrate has an influence on the characteristics of the kembang goyang texture. This is supported by research [9] that the addition of fish protein concentrate will affect the level of texture preference. The addition of the nilem fish has a significant effect on the level of texture preference.The average texture values range between 5-9, which means that all products are still preferred by panelists. This shows that all treatments are still acceptable to panelists.

Kembang goyang in treatment A with the addition of 0% nilem fish protein concentrate produces a rather fragile but neat texture, treatment C (with the addition of 5%) has the best texture because it is not fragile and the shape is still intact and neat. Higher concentration of KPI to the product will be more strong texture (Afriani et al 2016). Kembang goyang will be stronger because of an increase in solids in the batter.

This is consistent with research conducted that the addition of a 5% nilem fish protein concentrate treatment produces the most preferred texture of the panelists because it produces a dry, crisp, and soft texture due to the addition of eggs to the batters [9]. Texture or crispness will determine whether the product is dry or not. The texture of a food product will depend on the ingredients used especially the protein [18].

Preference Level for Taste of Kembang Goyang

Taste is one of the factors that influence the acceptance of a product by consumers. Taste is something that is received by the sense of taste, namely the tongue [14]. The taste observation data can be presented in Figure 4.

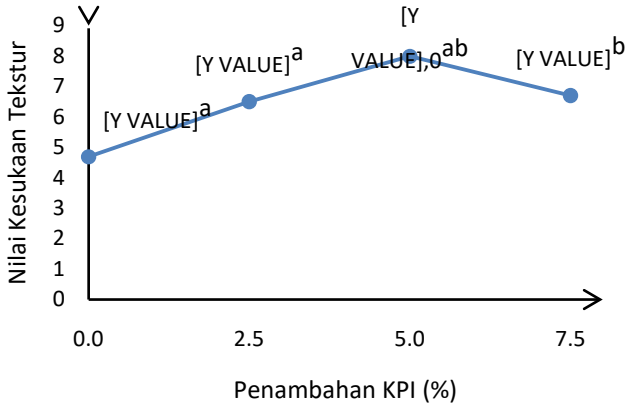

Figure 4. Average of Kembang GoyangTaste

Based on Figure 4, it can be seen that the addition of nilem fish protein concentrate gives an influence on the taste of kembang goyang. This is consistent with research that has been done [9] that the addition of fish protein concentrate has an influence on the level of taste preferences. Treatment A was not significantly different from treatment B and C, but significantly different from treatment D. Treatment D was significantly different from treatment A, but it was not significantly different from treatment B and C.Based on panelist tests on the taste of kembang goyang, the median value ranged from 5-7. The range of values means that the taste of all treatments is still preferred by panelists.

Treatment A with the addition of a 0% nilem fish protein concentrate produces a sweet taste derived from sugar. The C treatment of adding 5% nilem fish protein concentrate produces the best taste because it produces a sweet and savory taste from a mixture of sugar and nilem fish protein concentrate. Higher the concentration of KPI, the taste of fish will be stronger at the product.

This is consistent with research conducted that the addition of a 5% nilem fish protein concentrate produces the panelists most preferred taste because it produces a sweet and savory taste derived from the addition of tillapia protein concentrate [9]. Taste can be influenced by several factors namely chemical compounds, temperature, concentration and interaction of products with other components [9]. Kembang goyang with a 5% the addition of the nilem fish protein concentrate that is most preferred by panelists compared to other treatments.

Bayes Test

Bayes method is one way to analyze the decision-making the best of several alternatives that aim to produce priority value. Decision making for alternative weight values and criteria for color, aroma, texture and taste is carried out using a *Multiple Comparison Test*. The taste of kembang goyang is the most influential criterion for consumer ratings for kembang goyang cake with the addition of nilem fish protein concentrate. Calculation of criteria weights in determining the best treatment based on the criteria of color, aroma, texture and taste can be seen in Table 2.

Table 2. Decision Matrix of Kembang Goyang Assessment

Treatment(%)	Criteria for				Alternative Values
	Color	Aroma	Texture	Taste	
0	3	5	5	5	4, 70
2.5	6	5	7	5	5.64
5	7	7	9	7	**7.49**
7.5	6	5	7	7	6.64
Criteria Weight	0.15	0.10	0.25	**0.50**	24.47

Based on the table 2kembang goyang with the addition of KPI nilem of 5% has the highest alternative value of 7.49, while the 0% consultation has the lowest alternative value of 4.70. The highest criteria on taste is 0.50, while the lowest criteria on aroma is 0.10. This shows that most of the panelists agreed were those approved by KPI at 5% compared to 0%, 2.5%, and 7.5% treatments with the most appropriate taste characteristics.

Conclusion

Based on the results of research, the addition of 5% nilem fish protein concentrate is the best treatment for kembang goyang cake, because panelists are highly favored based on organoleptic characteristics and Bayes test with average value of color 7.5, aroma 6.8, texture 8.0 taste 7.4.

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