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Organoleptic characteristics and chemicals of cendol based on surimi seren flour from Jatigede reservoir

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Abstract
This research aims to find out the percentage of the most preferred surimi seren flour in cendol. This research was conducted in three locations and the time of implementation in February to March 2019. The making of surimi and cendol was carried out at the Fisheries Product Processing Laboratory, Faculty of Fisheries and Marine Sciences, Padjadjaran University. Making surimi flour is carried out at the Laboratory of Soil Chemistry and Plant Nutrition, Faculty of Agriculture, Padjadjaran University. Testing of chemical properties was carried out at the Food Technology Laboratory, Pasundan University. The method used was the experimental method with 5 treatments and 20 semi-trained panelists as replicates. The treatment used was the addition of surimi seren flour as much as 0%, 10%, 20%, 30% and 40% in cendol. The parameters tested were organoleptic including appearance, aroma, texture, and taste and the best treatment was tested with proximate test. The results showed that cendol with the addition of 10% surimi seren flour was the best treatment with organoleptic values obtained, appearance (7.2), aroma (5.6), texture (8.5), flavor (7) with nutrient content, protein (5.6%), carbohydrate (19.4%), and fat (1.18%).

Keywords: Cendol, *Surimi* seren flour, organoleptic

1. Introduction
In 2016 fish consumption in West Java only reached 27.7 kg/capita/year [1]. This figure is still below the ideal consumption standard of the World Health Organization (WHO), which is 36 kg/capita/year. The protein content derived from fish only accounts for 12% of the nutritional adequacy rate of the Indonesian people. Therefore, there needs to be an effort to increase fish consumption by diversifying food to meet the needs of animal protein sourced from fish.
The types of fish caught and identified in the Jatigede reservoir are 9 families of 17 species, one of them is seren fish [2]. The types of fish found in the Jatigede reservoir have a low utilization rate because generally the surrounding community still does not know how to process properly. One product that can be produced is surimi flour. Surimi flour is produced from dried surimi. The purpose of making surimi flour is for easier handling, low distribution costs, little storage space needed, and easy to use to produce homogeneous mixtures [3]. Surimi flour can also be used as a fortification ingredient for products that have low protein values. One product with a low protein value that has been circulating in the market is cendol.
Cendol is a type of traditional Indonesian food that uses the main raw material in the form of rice flour and mixed with lime water, pandan leaf extract and salt [4]. Cendol which is commonly found has a texture that is diverse, ranging from soft-chewy, chewy, springy rather hard and rather hard [5]. In general, cendol in the market contains high calories, which is 465 kcal per 300 g. Other nutrients contained in 300 g of cendol are 36% fat, 59% carbohydrate and 5% protein. Therefore, the use of surimi flour in making cendol has good potential. This is based on the addition of animal protein so that it increases nutrition from cendol without significantly changing the receiving power.
The purpose of this research is to utilize the catches in the Jatigede reservoir and find out the percentage of use of seren fish surimi flour in the production of cendol which is most preferred with the chemical characteristics it contains.

2. Materials and Method
2.1 Surimi powder preparations
The process of making seren fish surimi refers to the research of Amirullah [6] with modifications.

The seren fish was cleaned and make into a fillet. The meat fish was minced by meat grinder and washed with water (5-10°C) with a ratio of fish meat and water 1: 4. Soaking for 15 min while stirring. The leaching process was repeated twice with the addition of salt 0.3% of the weight of the meat and the meat filtered by filtered with cloth filters after 15 min. Surimi was dried using an oven blower at 60°C for 15 h. The dried surimi grinded by grinder.

2.2 Premixes preparations

There are five premixes were formulated by mixing hunkwe powder, surimi powder, water, whiting water, food colouring and salt. The premix formulas could be seen below.

Premix A = 0% surimi powder
Premix B = 10% surimi powder + 90% hunkwe powder
Premix C = 20% surimi powder + 80% hunkwe powder
Premix D = 30% surimi powder + 70% hunkwe powder
Premix E = 40% surimi powder + 60% hunkwe powder

2.3 Preparations of Cendol

Mixed all the ingredients according to the premix formulas. Cooked and stired until got thickened. Poured the cooked cendol mixture into the mold little by little and pressed until it falls into a container of ice water. Drained cendol and analysed with sensory attributes.

2.4 Parameters observed

Parameters observed in cendol products included rendemen, organoleptic tested (appearance, aroma, texture and taste), chemical tested (moisture content, ash content, fat, protein and carbohydrate by difference). The organoleptic tested using 20 semi-trained panelists as a repetition. This research is using hedonic scale include appearance, flavor, aroma, and texture. The hedonic scale was between 1-9 with the scores representing the hedonic attributes of 9,7,5,3,1 were “like very much”; “like”; “like moderately”; “dislike”; “dislike very much”, respectively. Chemical analysis of cendol based on surimi seren flour includes analysis of water, ash, fat, protein and carbohydrate levels using AOAC methods [7].

2.5 Data analysis

Non-parametric analysis performed for organoleptic testing using a two-way analysis of the Friedman test using the Chi-square test. The test method used to determine the selected product is the Bayes method. The results obtained are then discussed descriptively.

3. Results and Discussion

3.1 Rendemen

Fish yield is a ratio of meat weight to whole fish [8]. The yield of seren meat obtained was 30%, the yield of surimi was 58.9%, while the yield of surimi flour produced was 13.58%. The results of the results showed that the yield value of surimi and surimi flour decreased. Decreasing the yield of the weight of whole fish into surimi is due to the process of weeding and removing fish body parts that are not needed in the process of making surimi [9].

3.2 Organoleptic analysis

(a) Appearance

Organoleptic test results on the aspect of cendol surimi seren flour appearance with a concentration of 0%, 10%, 20%, 30%, and 40% can be seen in Figure 1.

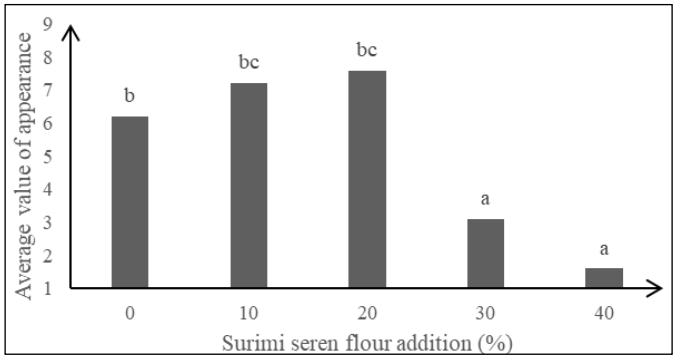

Fig 1: Histogram of cendol appearance value with the addition of surimi seren flour

The treatment of cendol with the addition of 20% surimi seren flour was favored by panelists because it has a bright green color, a form that is not too thick and not too thin, has a short size, and produces a homogeneous shape. The treatment of control cendol (0% surimi seren flour) and 10% cendol surimi seren flour had a lower average value than the 20% treatment because the color produced was lighter, a longer size, a less homogeneous shape. This is because during the cendol shaping process, the resulting cendol mixture is less integrated to produce a less homogeneous shape. The treatment of cendol surimi flour 30% and 40% has the lowest average value, this is due to the dull color and irregular and non-homogeneous shape. Products that have a solid and neat form will be preferred by panelists because they are considered good when compared to less tidy products [10].

The use of surimi seren flour which is too much will cause a more dull color because the color of the surimi seren flour was dominated. The resulting shape also decreases in quality. This can be caused by the use of surimi seren flour with an inappropriate comparison because, the concentration of the ingredients used in making the dough can affect the appearance of the resulting.

(b) Aroma

Control cendol is the best treatment on the aroma aspect because it has a neutral aroma while cendol surimi flour has a pretty fishy aroma. The results of the average value of aroma showed that the higher the concentration of surimi flour is used, the lower the preference level panelists to cendol product.

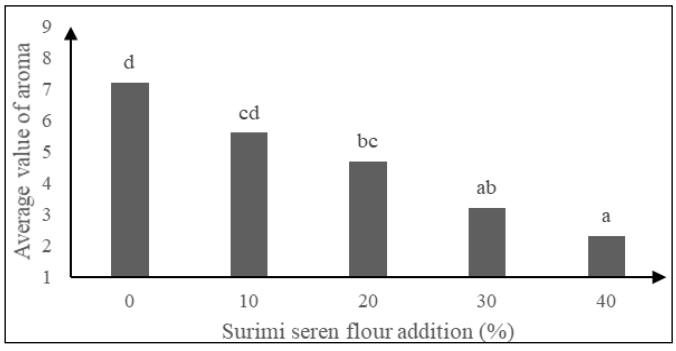

Fig 2: Histogram of cendol aroma value with the addition of surimi seren flour

This is due to the emergence of a fairly fishy aroma, that the constituent materials and ingredients added to a product will affect the aroma of the product itself. The fat content in Cendol surimi seren flour also affects the aroma produced.

This is because, fat is the source of volatile compounds that can affect the aroma of a food product [11].

(c) Texture

Organoleptic testing of the texture of cendol surimi seren flour showed that the best treatment was in cendol surimi flour 10% with an average value of 8.5. Cendol 10% surimi flour has a very thick, elastic and dense texture. Control cendol has a thick and dense texture. Cendol surimi flour 20% has a texture that is quite springy and quite elastic but, slightly soft. Cendol surimi flour 30% and 40% has a soft texture, not rubbery and easily broken. This is because the comparison of surimi flour and hunkwe flour used is not suitable so that when adding surimi flour seren too much it will produce a soft and easily destroyed product. According to Huda [12], surimi flour has a very small size that causes actin proteins and myosins in surimi flour to form small protein nets and lack strong bonds so that the resulting product becomes soft.

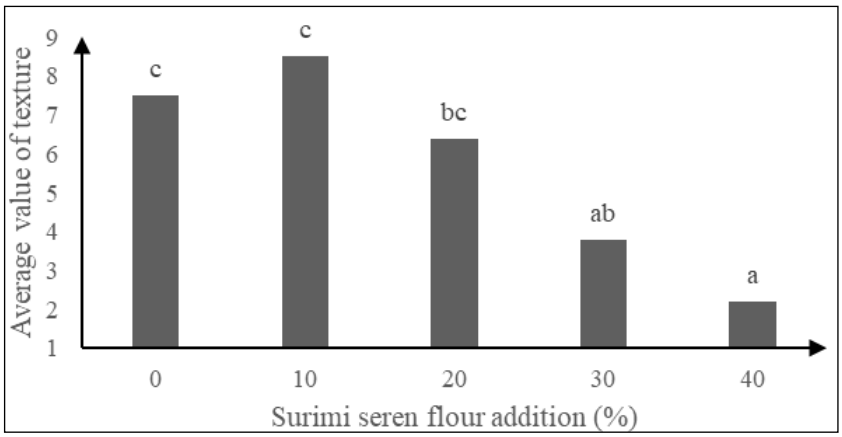

Fig 3: Histogram of cendol texture value with the addition of surimi seren flour

The more amount of surimi flour is added, the less the hardness and elasticity of the products produced [12]. Other ingredients that influence the texture of cendol serimi flour are hunkwe flour. The higher the amylopectin content the better the consistency of cendol gel [13]. In 10% and 20% cendol surimi flour seren, the content of hunkwe flour is quite large so that it produces a chewy texture. This is also in accordance with Tawali *et al.* [14] statement that the chewy texture produced in food products is determined by the ratio of amylose and amylopectin contained in starch.

d) Flavor

The use of 10% surimi flour produces cendol with a tasteless and not salty taste. Cendol with the use of surimi flour more than 10% produces a fishy and bitter taste derived from whiting used. While the cendol control produces a slightly salty taste that comes from the salt used. The 10% flavor caused by cendol surimi flour is caused by the use of salt. Salt is a material commonly used in fish-based products. However, the use of salt in fish-based products is not to provide flavor but to dissolve miofibril proteins during the kneading process [12]. This causes the flavor of cendol surimi flour to be 10% tastier than cendol control.

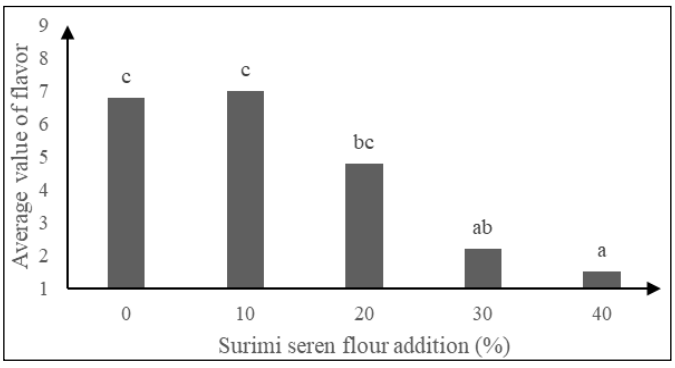

Fig 4: Histogram of condole flavor value with the addition of surimi seren flour

In cendol surimi flour seren 20%, 30% and 40% arises a bit bitter taste. This is because the taste of fish is too dominating so that the use of whiting water cannot reduce the bitter taste. But if the water content of betel lime is used excessively, it will cause a feeling of lime that dominates. This is in accordance with Siregar *et al.* [15] statement that the more lime water used, the original taste of a food product will be lost and the taste of whiting will dominate.

3.3 Chemical analysis

The analysis carried out included water content, ash, fat, protein, and carbohydrate (by difference). The proximate test results of cendol based surimi seren flour and control cendol can be seen in Table 1.

Table 1: The nutritional composition of cendol surimi seren flour and cendol control

Test type	0%	10%
Water content (%)	72.6157	71.2776
Ash content (%)	1.2311	1.1354
Fat content (%)	1.0145	1.1767
Protein content (%)	3.5230	5.6090
Carbohydrate content (%)	20.9018	19.4230

The results of measurements of water content in the control cendol showed higher results compared to cendol surimi flour which was equal to 72.61% while the water content in cendol surimi flour was 71.28%. According to Apriliana [16], fish meal has hygroscopic properties which can absorb water, so the water content in a product will decrease when proximate testing is carried out.

The results of the ash content analysis showed that the ash content in the control cendol was higher at 1.23% compared to cendol surimi flour at 1.13%. This difference in ash content can be influenced by raw materials from cendol, according to the statement of Patmawati [17], that ash content can be influenced by components in the raw materials used in making cendol. The difference in the levels of ash in cendol

of surimi seren flour can also be caused by the release of water from the product. This is confirmed by the statement of Winarno [18] that the content of ash content can be influenced by the release of water from the product and the concentration of minerals and proteins added.

Fat content in surimi cendol is 1.18%, while the fat content in the control cendol is 1.01%. This difference is caused by differences in the raw materials used. The use of surimi is more increasing results in high fat content in a product. High fat content can also cause rancid aroma on cendol products caused by the presence of fat oxidation. One of the causes of rancidity in food is due to the content of fat and oxygen [17].

The level of surimi cendol protein is 5.61%, while the control cendol is 3.52%. The higher levels of protein present in cendol products, the higher the concentration of surimi used [17]. Increased levels of protein in cendol surimi flour can also be caused by a decrease in water content, according to Wawasto *et al.* [19] statement that increased protein levels are caused by shrinking the measured water content in surimi, so the proportion of protein levels increases.

The carbohydrate level in surimi cendol flour is 19.42%, while the carbohydrate content in the control cendol is 20.9%. Decreasing carbohydrate levels in cendol serimi seren flour is caused by the use of flour in the mixture. In cendol, surimi flour uses 80% hunkwe flour and 20% surimi flour. Carbohydrates contained in hunkwe flour are higher than surimi seren flour so there is a decrease in carbohydrate levels in cendol surimi seren flour [20].

4. Conclusions

The selected formula of the premix for cendol was Premix-B formula which consisted of 10% surimi seren flour and 90% hunkwe flour. This formula contains protein (5.6%), carbohydrate (19.4%), fat (1.18%), water (71.28%), and ash (1.13%). Overall, this research showed that it was possible to make cendol with surimi seren flour to increase the nutrient content with characteristics that are accepted by society.

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