

PHYSICAL AND SENSORY TEST OF ICE CREAM WITH THE ADDITION OF SAGO FLOUR AND COCONUT DREGS FLOUR

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Abstract

Ice cream is a processed food product with a semi-solid texture that can be easily modified. Sago flour and coconut dregs flour as an alternative to local food that can be added to ice cream. This study aims to produce ice cream with good quality standards with preferred sensory properties. This study used a completely randomized design (CRD). The results of the research on overrun ice cream with the addition of sago flour and coconut dregs flour obtained an average value between 13-41.6%, melting power obtained an average value ranging from 17.3-31.3 minutes, sensory testing of preference level (color, texture, aroma, taste) obtained an average value of 3.32-3.8 (color), 2.92-3.44 (texture), 2.88-3.28 (aroma) and 1.76-3, 92 (flavor). Based on the results of the study, the addition of sago flour and pulp flour had the highest melting power in the 5% addition treatment, the highest overrun value was in the 0% control treatment and from the panelists' preference for ice cream, the addition of sag flour and coconut dregs flour in terms of color, texture, aroma, , flavor.

Keywords: Ice cream; Sago flour; coconut dregs flour.

INTRODUCTION

Local food is one of the wealth of the Indonesian people, which is currently widely used in various processed food products to increase food diversification (food diversification).

Ice cream is one of the foods favored by many people, especially the people of Indonesia. Consumption of ice cream itself continues to increase which is marked by an increase in the variety and number of ice cream on the market (Safora et al, 2014). Ice cream is a food processed product with a semi-solid texture made from freezing ice cream powder or a mixture of milk, animal or vegetable fat, sugar with or without other food ingredients and permitted food ingredients (National Standardization Agency, 1995). Ice cream is also one of the products that can be easily modified with other food ingredients.

In the process of making ice cream, the weakness that is often found is the melting power (Mulyani et al, 2017). Melting

power in ice cream is one of the important factors in determining the quality of ice cream. Melting power is closely related to overrun or degree of development.

Sago flour is one of the local food ingredients that can be used as a potential source of carbohydrates in Indonesia. Sago flour can be used as an alternative to local food in the modification of making ice cream. Sago flour has amylose content of 29.88% and amylopectin content of 70.12% (Jading et al, 2011). The functional properties of starch contained in sago flour in the manufacture of ice cream can act as a stabilizer, increase viscosity, prevent crystallization, act as a binder, and improve texture (Putri, 2015).

Coconut dregs flour as a local food product can be used in making ice cream. The nutritional content of coconut dregs flour is still quite high such as carbohydrates, fat and protein as well as fiber. In the manufacture of ice cream, fat and protein are one of the important factors to produce ice cream texture and good

melting power. Coconut pulp flour contains 38.2% fat and 5.7% protein, also coconut pulp flour has a fiber content of 33.6% (Putri, 2014). In addition, the addition of sago flour and coconut pulp flour will also increase the total solids in the ice cream dough, where according to Sanggur (2017), ice cream with high total solids can reduce the degree of swelling, the lower the degree of development the longer the ice cream melts.

By looking at the potential of sago flour and coconut pulp flour that can be used in the process of making ice cream, the researcher wants to carry out research on how the effect of adding sago flour and coconut pulp flour to the physical and sensory properties of ice cream which is later expected to produce new product innovations that utilize food. local.

MATERIALS AND METHODS

The raw materials used are sago baruk flour, coconut dregs flour, indoprime skim milk powder (100 g), Frisian flag full cream milk powder (100 g), gulaku granulated sugar (30 g), 1 egg (16 g), salt two smart children (0.5 g), water (130 mL).

The tools used are scales, 120 mL container, mixer, grinder, blender, oven, stove, frying pan, spoon, thermogun, stirrer, refrigerator.

The method used in this study is a completely randomized design (CRD) method consisting of 4 (four) treatments with 3 (three) replications. The resulting data is processed by using the Analysis of Diversity Analysis (ANOVA), if it is significantly different, it will be continued with the 5% level LSD test.

This study was divided into several procedures, namely: (1) Drying of sago flour (Tarigan et al, 2015), (2) Making coconut dregs flour (Nurhasanah, 2018), (3) Making ice cream (Ntau et al, 2021) with all formulations materials used according to treatment, (4) Test physical properties (overrun, melting power) and sensory preference level (color, texture, aroma, taste).

The parameters tested were overrun (Zahro and Nisa, 2015) and melting power (Achmad et al., 2012) and the level of preference for ice cream (Meilgaard, 2016).

Table 1. Formulation of addition of sago flour and coconut dregs flour.

Treatment	Sago Flour	Coconut Dregs Flour
A	0%	0%
B	1%	1%
C	3%	3%
D	5%	5%

RESULTS AND DISCUSSION

Overrun

The overrun test was carried out to determine the increase in volume of ice cream. The following are the results of the overrun test on ice cream with the addition of sago flour and coconut pulp flour.

The highest value of overrun was found in ice cream with Control (A) treatment or without the addition of sago flour and

coconut pulp flour, which was 41.6%, while the lowest value was found in the addition of 5% (D) sago flour and coconut dregs flour, which was 13. %.

The results of the variance test on the overrun of ice cream with the addition of sago flour and coconut pulp flour showed that the calculated F was greater than the F table, then the addition of sago flour and coconut pulp flour had an effect on the

resulting ice cream overrun, then the test continued with the BNT test with a level 5%.

The results of the LSD test showed that each treatment with the addition of sago flour and coconut pulp flour 0% (A), 1% (B), 3% (C) and 5% (D) was significantly different. Based on the results of the study, the higher the concentration of addition of sago flour and coconut dregs flour, the lower the resulting overrun.

This is due to the very high carbohydrate content of sago flour, which is 90.61%. The carbohydrate content of sago flour with starch content in the form of amylose 29.88% and amylopectin 70.12% caused the ice cream dough viscosity to increase, causing a decrease in overrun.

Xie et al, (2009) stated that the higher the amylose content, the thicker the material. This is because during the pasteurization process of ice cream dough, carbohydrates in sago flour in this case starch undergo gelatinization where gel formation occurs due to water absorption during the heating process which makes the ice cream dough thicken.

Susilawati et al (2014) stated that the more viscous a material will result in the

movement of water molecules being limited because the space between particles is getting narrower. Goff and Hartel (2013) added that the thicker the ice cream dough causes the air that enters during the aeration during the freezing process to decrease, so that the resulting overrun value is low.

Oksilia et al, (2012) stated that the overrun value of ice cream on an industrial scale was at 70-80% while on a household scale it was around 35-50%. The overrun value of ice cream in the treatment of adding sago flour and coconut pulp flour 1% (B), 3% (C), and 5% (D) did not meet the existing standards, while the control treatment met the standard for the household scale.

Melting Power

Melting power test is carried out to find out how long the ice cream can last at room temperature until it melts. Based on the tests that have been carried out, the melting time of each treatment was obtained. The following are the results of the melting power test on ice cream with the addition of sago flour and coconut dregs flour.

Table 2. Average value of overrun

Treatment	Overrun (%)
A (0%)	41,6 ^a
B (1%)	28 ^b
C (3%)	20,3 ^c
D (5%)	13 ^d

Note: Different notation indicates a difference (LSD 5%)

Table 3. Average value of melting power

Treatment	Melting power (minute)
A (0%)	17,3 ^a
B (1%)	21,3 ^b
C (3%)	25 ^c
D (5%)	31,3 ^d

Note: Different notation indicates a difference (LSD 5%)

The longest melting time was found in ice cream with the addition of 5% sago flour and coconut pulp flour (D), which was 31.3 minutes, while the fastest time was in the control treatment 0% (A) or without the addition of sago flour and coconut pulp flour. which is 17.3 minutes.

The results of the variance test on the melting power of ice cream with the addition of sago flour and coconut pulp flour showed that the calculated F was greater than the F table, then the addition of sago flour and coconut pulp flour affected the melting power of the resulting ice cream, so the test continued with the LSD test. with a level of 5%.

The results of the LSD test showed that the addition of sago flour and coconut pulp flour in each treatment of 0% (A), 1% (B), 3% (C) and 5% (D) was significantly different.

The results obtained showed that the higher the concentration of addition of sago flour and coconut dregs flour, the longer the melting power produced.

Parera et al, (2018) stated that melting power is related to the overrun value, melting will occur quickly if the ice cream has a high overrun, namely in the control treatment ice cream 0%. Conversely, a low overrun will make the ice cream have a longer time to melt, namely in the addition of sago flour and 5% coconut pulp flour (D).

In line with Sanggur (2017) which states that the lower the overrun value of ice cream, the longer the resulting melting time. Oksilia et al, (2012) also stated that the more air cavities can make ice cream melt quickly at room temperature because the air cavities formed in the ice cream will be released along with the melting of the ice cream.

Sago flour acts as a natural stabilizer. According to Sundari and Saati (2007), stabilizers added to ice cream play a role in improving the stability of the emulsion, improves the smoothness of the texture and

slows down the time for the ice cream to melt. Sago flour also has the ability to bind water in this case the carbohydrate content in the form of starch contained in sago flour which makes the ice cream dough thicker due to the gelatinization process, so that water crystallization is reduced which affects the overrun value in this case becomes lower so that it makes the melting power of ice cream becomes longer.

Coconut dregs flour also contains 38.2% fat and 5.7% protein. Muse and Hartel (2004) stated that the fat crystals formed have a higher melting point than water where fat will melt longer than water. Hartatie, (2011) states, The higher the fat content in ice cream, the longer the melting power of the resulting ice cream will be. The same statement was conveyed by Herlambang (2011), fat affects the melting rate of ice cream, the higher the fat aggregate, the higher the resistance of the ice cream to melt. The protein in coconut pulp flour can also play a role in stabilizing the fat emulsion (McClements 2016) which provides good melting properties in ice cream.

Based on the resulting melting time, the ice cream with the addition of sago flour and coconut pulp flour met the existing quality requirements.

Color

The color preference level test was carried out directly by the panelists by looking at the ice cream products served. Based on the tests carried out, it was obtained the value of the level of preference for the color of ice cream with the addition of sago flour and coconut pulp flour.

Visually, the resulting color is a slightly yellowish white. The results of the ice cream color preference test, the control treatment 0% (A) and 1% (B) was favored by the panelists while the 3% (C) and 5% (D) treatments were neutral.

Texture

The texture of the ice cream with the addition of sago flour and coconut pulp flour was tested by the panelists by touching. The following is the average value of the panelists' preference for the texture of ice cream.

The results of the test of the level of texture preference by the panelists, each treatment was neutral (Table 5.) The resulting texture in treatment 0% (A) was a soft texture like ice cream in general, while in treatment 1% (B), 3% (C) and 5%(D) produced a soft and fibrous texture due to the addition of coconut pulp flour, where coconut pulp flour contains fiber. The fiber content in coconut dregs flour and the functional properties of sago flour which is able to bind water thereby reducing water crystallization can also provide a soft texture to the ice cream. The fat in the ingredients for making ice cream also plays a role in inhibiting the formation of ice crystals in the ice cream matrix which

can slow down the recrystallization rate (Goff and Hartel, 2013).

Scent

Aroma is an added value in a food product. Based on the test results of the level of preference for the aroma of ice cream with the addition of sago flour and coconut dregs flour, the value of the level of preference for the aroma of ice cream was obtained.

The average value of the aroma test results is 2.88-3.28. The dominant aroma produced is the aroma of milk. Based on the results of the test of the level of preference for aroma, according to the panelists, each treatment was neutral (Table 6).

Flavor

Taste is one of the important parameters that determine consumer acceptance of a food product. The test results get the value of the level of preference for the taste of ice cream with the addition of sago flour and coconut dregs flour as follows (Table 7).

Table 4. Color liking level

Treatment	Value	Criteria
A (0%)	3,8	Suka
B (1%)	3,76	Suka
C (3%)	3,48	Netral
D (5%)	3,32	Netral

Table 5. Texture liking level

Treatment	Value	Criteria
A (0%)	3,28	Netral
B (1%)	3,44	Netral
C (3%)	3,08	Netral
D (5%)	2,92	Netral

Table 6. Scent liking level

Treatment	Value	Criteria
A (0%)	3,28	Netral
B (1%)	3,16	Netral
C (3%)	2,88	Netral
D (5%)	2,92	Netral

Table 7. Flavor liking level

Treatment	Value	Criteria
A (0%)	3,56 ^a	Netral
B (1%)	3,92 ^{ab}	Suka
C (3%)	2,12 ^c	Tidak suka
D (5%)	1,76 ^d	Tidak suka

Note: Different notation indicates a difference (LSD 5%)

The results of the test of variance of ice cream flavors with the addition of sago flour and coconut pulp flour showed that F count was greater than F table, then the addition of sago flour and coconut pulp flour had an effect on the taste of the resulting ice cream, then the test was continued with the LSD test with a level of 5% .

The results of the LSD test showed that treatment 0%(A) was not significantly different from treatment 1%(B), treatment 0%(A) and 1%(B) was significantly different from treatment 3%(C) and treatment 5%(D) , while the 3%(C) treatment was significantly different from the 5%(D) treatment.

According to the panelists, the taste in the control treatment, the dominant taste produced was the taste of milk, in treatments B and C the resulting taste was a combination of milk taste and a little coconut and fibrous taste due to the addition of coconut dregs flour. According to the panelists, the resulting taste is relatively new and unique, although the milk flavor is still dominant. In treatment D, the taste produced was dominantly coconut flavor and very fibrous.

Based on the results of the study, the average value of the taste test (Table 10) was 1.76-3.92 where the panelist's preferred ice cream taste was ice cream with the addition of sago flour and 1% coconut pulp flour (B), while the unfavorable is the addition of 3% (C) and 5% (D) sago flour and coconut pulp flour.

CONCLUSION

The highest melting power of ice cream was found in the 5% treatment (D)

with a melting time of 31.3 minutes. The lowest melting power of ice cream was found in the control treatment, melting time was 17.3 minutes. The melting power of ice cream meets SNI standards. The highest overrun value was found in the control treatment 0% (A) with an overrun value of 41.6% (meets the home industry standard). The lowest overrun is found in the 5% treatment, the 13% overrun value. The overrun values for treatment B, C, D did not meet the standard.

The color of the ice cream that the panelists preferred was the 0% control treatment (A). Ice cream texture treatment 0% (A), 1% (B), 3% (C), 5% (D) Neutral. Aroma of ice cream treatment 0% (A), 1% (B), 3% (C), 5% (D) Neutral. The ice cream flavor that the panelists preferred was the 1% (A) treatment.

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