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QUALITY ANALYSIS OF MODIFIED ICE CREAM BASED ON
SOY MILK WITH A MIXTURE OF
SALAK FRUIT EXTRACT

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ABSTRACT

It is rare to find ice cream products using vegetable milk (soy milk) because they generally use cow's milk. Salak fruit is a local food that has never been studied to be used as a mixture of ice cream. However, salak fruit has the advantage that it contains nutrients that are good for health. This study aims to determine the organoleptic quality of modified ice cream products made from soy milk with a mixture of salak fruit extract. This type of research is a true experiment with two treatments, namely formula 1: soy milk 1000 ml – salak fruit 500 gr, formula 2: soy milk 500 ml – salak fruit 500 gr. The results of the organoleptic quality analysis test in formula 1 obtained the highest results with a value of 73.3% in the taste category in the assessment criteria like very much. While the lowest result with a value of 16.7% in the category of aroma criteria for liking. In formula 2, the highest results obtained with a value of 83.3% in the aroma category are in the category of liking ratings. While the lowest result with a value of 16.7% in the category of aroma, texture in the criteria for the assessment of likes. Conclusion: In formula 1 and formula 2, the result is $p = 0.000$, which means that there is a difference. Suggestion: It this also necessary to do further research on the parameters to determine the quality of ice cream such as : overrun and melting point ice cream

Keywords: quality analysis, ice cream, soy milk, salak fruit.

BACKGROUND

Currently, there have been many developed various kinds of processed products from various types of food that are used as a snack or dessert, one of which is ice cream. Ice cream is one of the most popular foods for all ages, from children to adults. Many people like ice cream because of its delicious, sweet taste and soft texture. This trend is realized by the consumption of ice cream in terms of quantity and value from 2011 - 2014 from 3.34%% to an increase of 3.44% (Food Consumption Statistics, 2015).

Most of the ice cream products on the market use cow's milk as the main ingredient. It is rare to find ice cream products using vegetable milk. The results of research on the group of teenagers from Habibi Ahmad et al in 2016, concluded that there was an effect of increasing body weight by 0.90 ± 4.37 kg in the control group in giving ice cream to adolescents (Habibi Ahmad et al., 2016), increasing the frequency of consumption of milk-based ice cream which high fat content has an effect on weight gain in adolescents. At the age of teenagers, ice cream snacks are in great demand.

Soy milk comes from soybeans that are processed into milk. Soybean production in Indonesia in 2018 increased by 82.39% and soybean production in North Sulawesi Province in 2018 which was 50,026 tons increased by 13.06% compared to 2017 (Ministry of Agriculture RI, 2018).

In 100 g of soy milk contains 3.6 g of protein, 2.0 g of fat, 2.9 g of carbohydrates and isoflavones. Isoflavones are compounds known to function as antioxidants. Soy milk is white like milk. In addition, soy milk also contains calcium, phosphorus, iron, provitamin A, vitamin B complex (except B12), and water (Margono et al, 2000). Another advantage of soy milk is that it does not contain lactose, so this milk is suitable for consumption by people with lactose intolerance, namely someone who does not have the enzyme lactase in their body. For this reason, soy milk is good to use as a substitute for cow's milk (Wikan, 2017).

Soy milk has a characteristic unpleasant odor so it is necessary to add other food ingredients to neutralize the smell and taste in soy milk, including using fruit extracts. Salak fruit is a local food that has never been studied to be used as a mixture of ice cream. However, salak fruit has the advantage that it contains nutrients that are good for health. The nutritional content of salak fruit flesh in 100 g is Protein 0.40 g. Carbohydrate 20.90 g, iron 4.20 mg, Vit C 2.00 mg (Directorate of Nutrition, Ministry of Health RI, 2002).

Salak (*Salacca edulis*) is a fruit plant that grows in the tropics which has a fairly high nutritional content. Salak is a fruit that can be consumed directly without being processed before. The content of salak fruit consists of calcium, tannins, saponins, and flavonoids (Sukandar, 2010). The content of salak fruit in the form of tannins and flavonoids that can play a role in overcoming diarrhea. There is an effect of juice of salak fruit (*Salacca edulis*) on the frequency of defecation and duration of diarrhea in *Rattus norvegicus* (Fifi Alviana, 2019).

Data from the Agriculture Service of Southeast Minahasa Regency in 2014 shows that the East Ratahan District, especially the Pangu area which consists of Pangu Parent, Pangu Satu, Pangu Dua is an area that has the potential to develop salak fruit farming with production of salak fruit reaching 44,256 tons and the number of plants that produce as much as 553,200 trees (Tambulus, 2015). Salak fruit productivity in Indonesia in 2019 experienced a growth of 1.15% compared to 2018 (Central Statistics Agency, 2018).

The abundance of salak during the harvest season makes the price reduction very cheap, so the fruit often rots and is thrown away. This gave rise to the creation of the Pangu community to process fresh salak fruit into various kinds of processed products including salak lunkhead, salak jam, salak seed coffee. Salak fruit has a distinctive taste, namely sweet, sweet, slightly sour which if added to ice cream products will add flavor and nutritional value.

Based on this background, research has been done on modified ice cream made from soy milk with a mixture of salak fruit extract, the quality of the product will be assessed organoleptically. The aim of the study was to determine the organoleptic quality of modified ice cream products made from soy milk with a mixture of salak fruit extract.

RESEARCH METHODS

The type of research used is experimental research with a true experiment in laboratory. This research was conducted in June 2022. The location of the research was at the Poltekkes Campus of the Ministry of Health, Manado, Department of Nutrition. To make soy milk ice cream with a mixture of salak fruit extract, it was carried out at the Culinary Laboratory of the Department of Nutrition. For organoleptic quality testing, includes aspects of color, flavour, taste and texture. The independent variable

(independent) is soy milk ice cream with a mixture of salak fruit extract formulas 1 and 2 and the dependent variable is organoleptic quality (taste, aroma, color, texture).

The panelists in this research were classified as semi-trained panelists from applied undergraduate student of the Nutrition and Dietetics, Department of Nutrition, Poltekkes, Ministry of Health, Manado as many as 30 people who had passed the Food Technology Science Course (ITP).

Primary data was obtained from the general data of the panelists and the results of organoleptic testing using an organoleptic test questionnaire using a hedonic scale. Secondary data includes an overview of the Food Technology Laboratory, Department of Nutrition, Poltekkes, Ministry of Health, Manado. For the presentation, formula 1 and formula 2 will be provided, which are prepared in the same container in the same shape, size and material and have been given their respective codes. Each formula will be presented on a test table that is strong and not easily brittle and is equipped with chambers. Researchers will provide drinking water that will be used by the panelists to rinse their mouths before trying other formulas. This is intended to avoid possible bias. Bivariate analysis was conducted to see the difference between the independent variable and the dependent variable. The analysis in this study used the Wilcoxon test to see whether there was a difference in the organoleptic quality of the 2 formulas of soy milk ice cream with a mixture of salak fruit extract. Technical data analysis using computer program SPSS 16.0 for Windows.

RESULTS AND DISCUSSION

Based on the results of the organoleptic quality analysis test of soy milk ice cream with a mixture of salak fruit extract in formula 1, the highest results were obtained with a value of 73.3% in the taste category in the assessment criteria of very like. While the lowest result with a value of 16.7% in the category of aroma in the assessment criteria like. In formula 2, the highest result was obtained with a value of 83.3% in the aroma category which was in the like rating scale. While the lowest result with a value of 16.7% in the category of aroma, texture in the rating scale likes.

Based on the distribution of the average value of soy milk ice cream with a mixture of salak fruit extract, the highest average value of taste assessment is in formula 1 with a value of 4.73 and the lowest is in formula 2 which is 4.27. The highest average color rating is in formula 1 with a value of 4.67 and the lowest is in formula 2 with a value of 4.23. For the average aroma rating, the highest is in formula

1 with a value of 4.83 and the lowest is in formula 2 with a value of 4.17. For the average texture assessment, the highest is in formula 1 with a value of 4.57 and the lowest is in formula 2 with a value of 4.17.

The average value of organoleptic quality of soy milk ice cream with a mixture of salak fruit extract obtained the highest results, namely at F1 with a value of 4.7 on the organoleptic test assessment criteria very like.

The results of bivariate data analysis using the Wilcoxon test with a significant level of 0.005 for the organoleptic quality of soy milk ice cream with a mixture of salak fruit extract in formula 1 and formula 2. both formulas of soy milk ice cream with a mixture of salak fruit extract, namely on taste, color, aroma and texture.

Ice cream is the result of a mixture of several raw materials such as milk, sugar, stabilizer, emulsifier and other additives through a heating and homogenization process. Additional ingredients such as fruit can be used to improve the quality of ice cream. Fruit substitution with the right concentration can improve the organoleptic quality of ice cream as well as consumer preference (Aisiyah et al, 2010).

From the results of the organoleptic quality assessment, soy milk ice cream with a mixture of salak fruit extract in formula 1 has advantages in terms of taste, color, aroma and texture, which are highly favored by the panelists. This indicates that this ice cream product is acceptable and liked by the panelists. This product can be further developed to see more specific nutritional content through the proximate test and can be used for healthy snacks.

Soy milk can be an alternative that can be used as a substitute for cow's milk because it has the advantages that it does not contain lactose, the protein does not cause allergies, is low in fat, free of cholesterol, the manufacturing technology is relatively easy, the production cost is relatively cheap, and can be further processed into ice cream (Pamungkasari, 2008). Salak fruit flesh extract has high antioxidant activity, lowers cholesterol levels and is anti-diarrhea (Novrianti, 2014).

Taste is a very influential thing in a product. Taste is a stimulus by the sense of taste caused by the material eaten. A product can be liked or accepted by consumers if it has the desired taste (Kartika, et al 1998 in Yohana 2017).

Taste is one of the parameters that generally determines the preference of a food. Comments that usually appear after tasting a food is the taste of the food. The memory of the five types of taste perception is stronger when compared to color. There are five types of flavors that are commonly detected by the human sense of taste, namely taste, sour, bitter, salty, and savory (Giyatmi et al, 2018).

Based on the results obtained, there are differences in the taste test on soy milk ice cream with a mixture of salak fruit extract between formula 1 and formula 2. In the formula 1 test there are 22 panelists who choose very like with a value of 73.3%, 8 people choose like with a value of 30% . While in the formula 2 test there are 8 people who choose very like with a value of 30% .22 people choose like with a value of 73.3%. This means that the panelists are more interested in organoleptic quality in formula 1 with the assessment criteria being very like.

According to Manurung (2018), the delicious taste that appears in the product is influenced by the addition of salak fruit extract which has a unique taste, namely sweet and sour. Panelists really like formula one because the 1:1 composition is 1000 ml of soy milk: 500 g of salak fruit produces a taste that is not too sour and tends to be sweeter than formula 2 which uses a 1:1 composition of 500 ml of soy milk: 500 g of salak fruit .

The color factor is more influential and sometimes very decisive for a food ingredient that is considered delicious, nutritious, and has a very good texture, it will not be eaten if it has a color that gives the impression that it has deviated from the color it should be (Winarno, 1995 in Sanggur 2017). Color is the first impression of a product that determines the panelists' acceptance or rejection of the product (Lanusu, et al 2017).

Based on the results obtained, it can be seen that there are differences in the color test on soy milk ice cream with a mixture of salak fruit extract between formula 1 and formula 2. In the formula 1 test there are 20 panelists who choose very like with a value of 66.7%, 10 people choose like with value 33.3%. While in the formula 2 test there are 7 people who choose very like with a value of 23.3%, 23 people choose like with a value of 76.7%. Most of the panelists chose to like formula 1 but for the criteria of very like it was superior to formula 1 which indicated that the quality of formula 1 was the most favored or accepted by the panelists. Actually the resulting color is not much different, but because formula 1 uses more milk, the color in formula 1 is whiter than formula 2 which is a bit cloudy.

The contribution of aroma to the diversity of food tastes comes from volatile compounds detected by the sense of smell. Scent helps to distinguish and recognize food. Even familiar foods may not be recognized if the sense of smell is not functioning. Similar

to taste perception, memory perception of aroma is stronger when compared to color (Delahunty, 2018).

Based on the results obtained, it can be seen that there are differences in the aroma test on soy milk ice cream with a mixture of salak fruit extract between formula 1 and formula 2. In the formula 1 test there are 25 panelists who choose very like with a value of 83.3%, 5 people choose like with value 16.7%. While in the formula 2 test there are 5 people who choose very like with a value of 16.7%, 25 people choose to like with a value of 83.3%. In accordance with the results of the panelists' assessment, it can be seen that most of the panelists chose the quality of formula 1 which was on the criteria of very like, but in formula 2 the panelists also chose the same value but were on the criteria of rating like. This indicates that the quality of formula 1 is superior to formula 2. The aroma of milk generally characterizes a distinctive aroma that can change when exposed to certain compounds or objects (Nurwantoro, 2009).

According to (Delahunty, 2018) In terms of food preferences, texture is considered important and contributes significantly to food palatability. Food will not appeal to the taste buds if the food loses its texture and texture can also determine whether a product is acceptable or not by consumers. One of the quality parameters that plays a very important role in displaying the characteristics of ice cream is texture. The ideal ice cream texture is smooth and the solid particles are too small to be felt in the mouth. The texture referred to in the sensory testing of this study is the level of softness of the ice cream mouth when chewed. This reference can be used as a reference for further ice cream development.

Based on the results obtained, there are differences in the flavour test on soy milk ice cream with a mixture of salak fruit extract between formula 1 and formula 2. In the formula 1 test there are 17 panelists who choose very like with a value of 56.7%, 13 people choose like with a value of 43, 3%. While in the formula 2 test there are 5 people who choose very like with a value of 16.7, 25 people choose like with a value of 83.3%.

Based on the results of the data normality test, a significant value was obtained ($0.000 < (0.005)$), which means the data was not normally distributed, then the data was tested using the Wilcoxon test with a significant value of ($0.000 < (0.005)$). So it can be concluded that there are organoleptic differences between modified soy milk ice cream with a mixture of salak fruit extract between formula 1 and formula 2 and the most preferred is formula 1 with the assessment criteria being very like. This means that H_0 is rejected and H_1 is accepted.

CONCLUSIONS AND RECOMMENDATIONS

The organoleptic quality of modified soy milk ice cream with a mixture of salak fruit extract in formula 1, most of the panelists' assessments were on the criteria of very liking for taste with a value of 73.3%, color 66.7%, aroma 83.3% and texture 56.7%. In formula 2, most of the panelists' assessments were on the criteria for liking the taste with a value of 73.3%, color 76.7%, aroma 83.3% and texture 83.3%. There is a difference between the organoleptic quality of soy milk ice cream with a mixture of salak fruit extract between formula 1 and formula 2 with $p \text{ value} = 0.000 < (0.005)$.

This research is expected to provide product innovations through modifications of soy milk and salak fruit into healthy ice cream product. This research needs to be further developed by referring to the parameters of the quality of the ice cream, choosing the right design, etc.

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