

# Porang flour: An alternative for healthy and halal food additive

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# Porang Flour: An Alternative for Healthy and Halal Food Additive

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**Abstract.** This research was aimed to determine the potential of porang flour to be used as an alternative for healthy and halal food additive in food processing. The method used in this research was an experimental method comparing the use of gelatin (0.10; 0.30; 0.5%) and porang flour (0.10; 0.30; 0.50%) as stabilizers of straw jack fruit ice cream. The effectiveness of porang flour as natural stabilizer was also studied on mango jelly drink with the following treatments: carrageenan 0.3% (control) and porang flour (0.10; 0.20; 0.30; 0.40; 0.5%). These trials indicated that porang flour, which contains a high glucomannan compound, significantly affected jack fruit ice cream's viscosity. It also performed as effectively as gelatin to form a good texture characteristic of ice cream. The use of porang flour in the mango jelly drink mixture also had the same effective effect as carrageenan on mango jelly drink's viscosity. Thus, porang flour can be used as an alternative for healthy and halal ice cream and jelly drink stabilizers.

## INTRODUCTION

The demand for halal foods is increasing in the last five years, not only for the domestic market in Indonesia who is a majority of Moslems that have a religious obligation to consume *halal* food [1] but is also growing these days globally [2], [3]. The availability of halal food products in West Nusa Tenggara is crucial to support halal tourism. However, the big concern related to this matter is the challenge of providing halal stabilizer substances for processing a particular type of food, such as ice cream or other food products. Ice cream is a trendy dessert, but the crucial issue is that many commercial ice creams available in the market are using gelatin as a stabilizer. Meanwhile, gelatin is made from animal by-products, and most of them are the product of pigs. Pork and related products such as bone are not halal and prohibited for Moslems.

Halal food is associated with making foods and producing foods that non-halal materials must not contaminate. Sadly, the awareness of the food producers about that issue is relatively low. There were many kinds of agricultural products, including those produced locally, such as seaweed, sweet potato, porang, and others that can be used as stabilizers for producing halal foods. Previous research has indicated that potential substances such as porang flour made from elephant yam [4] created excellent ice cream and other products [5]. Further study also reported that carrageenan extracted from seaweed produced good quality products. This paper discusses the effectiveness of porang flour in making high-quality ice cream. It can be used as an alternative for a healthy and halal food additive to support the halal food industry.

## METHOD

The methodology used in this research was an experimental method and was carried out in two trials. The first trial was conducted to study porang flour's effectiveness compared to gelatin (as a common stabilizer used in commercial ice cream production) on dami jackfruit ice cream. There were six treatments in this trial including gelatin 0.10%, gelatin 0.30%, gelatin 0.50%, porang flour 0.10%, porang flour 0.30%, and porang flour 0.50%. The second trial was conducted to examine the effect of porang flour on mango jelly drink quality. There were 6 treatments on this second trial including porang flour 0.10, 0.20, 0.30, 0.40, and 0.50%, and control. Each treatment in the first or second trials was made in 3 replications. The assessed parameters included Brookfield Viscometer's viscosity [6], the consistency, aroma, and the taste using the hedonic method [7]. The data were analyzed using the analysis of variance at a 5% significant level.

## RESULT AND DISCUSSION

This research indicated that the use of porang flour as a stabilizer for ice cream resulted in good quality ice cream with relatively the same quality characteristic as the ice cream made using gelatin as a stabilizer that is usually used in commercial ice cream production. The results of this study are discussed in more detail below.

### Result

#### *The effect of porang flour on jackfruit ice cream quality*

One aspect or parameter of ice cream quality is the viscosity of the product. Viscosity is a measure of liquid resistance to flow. The viscosity of ice cream affects water molecules' mobility in the space between particles in the ice cream becomes increasingly narrow or wide [8]. Results from this trial revealed that the type and concentration of stabilizers used in this trial had a significant effect on the viscosity of jackfruit ice cream (Figure 1). Data in the figure also indicated that treatments using porang flour as a stabilizer in the ice cream mixture significantly increased ice cream's viscosity.

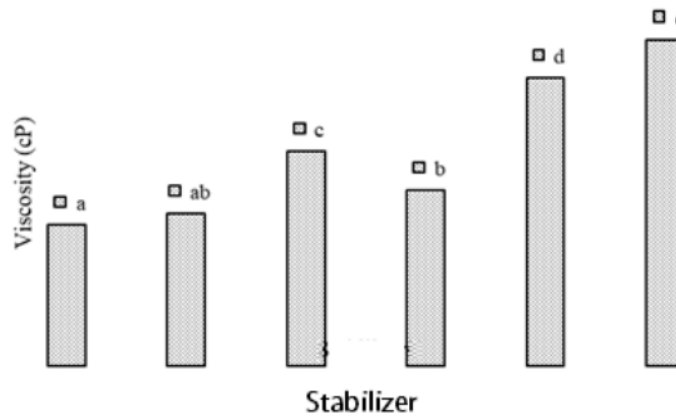


FIGURE 1. The viscosity of jackfruit ice cream treated with either gelatin or porang (konjac) at several different concentration levels

#### *The effect of porang flour on the quality of mango jelly drink.*

Data obtained from this research revealed that porang flour significantly increased mango jelly drinks' viscosity but did not significantly affect the consistency, aroma, and taste of mango jelly drinks (Table 1).

**TABLE 1.** The average and means test (HSD 5%) of the viscosity, consistency, aroma, and taste of mango jelly drink treated with porang flour.

Porang concentration (%)	flour	Average value*			
		Viscosity (cP)	Consistency (Score)	Aroma (Score)	Taste (Score)
	0.00	17,000e	3.15	3.13	2.90
	0.10	10,883f	3.12	3.22	3.00
	0.20	32,583d	3.02	3.25	3.07
	0.30	65,667c	3.22	3.30	3.28
	0.40	73,000b	3.35	3.37	3.18
	0.50	90,917a	3.28	3.33	3.10

\*Value is the mean of three replications. Means followed by the same letter within the same column are not significantly different ( $p < 0.05$ ).

## Discussion

### *The effect of porang flour on jackfruit ice cream quality.*

Figure 1 showed that the lowest level of ice cream viscosity was obtained on the ice cream treated with 0.1% gelatin, while the highest viscosity level was obtained on the ice cream treated using 0.5% porang flour. As the concentration of porang flour used in the ice cream processing was higher, jackfruit ice cream's viscosity also increased. This is mainly because the higher amount of stabilizer was added to the ice cream material, the more water may be bound by the stabilizer and formed a gel frame that can prevent water molecules from moving freely, which then causes the viscosity to increase. According to [9], viscosity is influenced by the concentration and molecular weight of the stabilizer. The higher the value of the molecular weight and stabilizer concentration, the more product viscosity will increase.

In general, the use of porang flour as stabilizers in this trial produced higher ice cream viscosity than ice cream's viscosity made using gelatin stabilizer at the same concentration. This may occur since porang flour contains high glucomannan and has high water absorption. According to [10], porang flour contains glucomannan as high as 43.98%. The glucomannan in porang flour can absorb water up to 200 times its molecular weight. Therefore it can solve with a higher viscosity. [11] Also, porang flour is the thickest soluble fiber in nature and has a thickening strength of 10 times greater than corn starch.

On the other hand, the stabilizers and the concentration of stabilizers had non-significant different effects on the texture of ice cream tested by the scoring method. However, there was a trend that flour tends to exceed gelatin in forming ice cream consistency. Data shows that the texture (score) of ice cream treated with porang flour as a stabilizer tends to be greater than the value of the texture (score) of ice cream treated with gelatin as a stabilizer. Gelatin with concentrations of 0.1-0.5% gave an average score of 3.4 (slightly soft), while the treatment with porang flour with concentrations of 0.1-0.5% resulted in a higher average score of 3.7 (almost smooth). Compared to the commercial ice cream made with another stabilizer type, the ice cream's texture made with porang flour was also acceptable (score 3.7 means almost soft). Besides, the use of porang did not affect the aroma of the ice cream. Although polysaccharides from animal sources tend to provide better physical and mechanical properties than polysaccharides from plant sources in terms of absorbing smell [11], the ice cream produced with porang flour resulted in an acceptable quality characteristic. This indicates that improving the processing of ice cream by using porang flour as a stabilizer can make good texture characteristics of ice cream, which means that porang flour can be used as a halal stabilizer to produce halal ice cream.

### *The effect of porang flour on the quality of mango jelly drink.*

The higher the porang flour concentration was added to the jelly drink mixture, the stronger the jelly drink was produced. The increase in jelly drink's viscosity as the concentration of porang flour added to the mix increased may be related to porang flour's ability to absorb water. This way is associated with the glucomannan content in porang flour, as mentioned in the previous section [12], which is about 64.77% [13]. Other authors [14] also stated that glucomannan is an an-ionic polysaccharide that has high water absorption.

Data in Table 1 also indicated that porang flour at the range of concentration used in the treatments did not cause a significant effect on the consistency, the aroma, and the taste of mango jelly drink. In this trial, the panelist had the

preference to all samples for the smell and the taste of mango jelly drink. Porang flour does not have a strange taste or aroma [13]. Thus the taste of the samples was not affected by the treatments.

## CONCLUSION

Based on the results obtained in this study, it can be concluded that porang flour was beneficial to form good quality characteristics of ice cream, as good as the ice cream made with gelatin as the stabilizer. The use of porang flour in mango jelly drink mixture was also produced good quality mango jelly drink with the organoleptic characteristics were preferred by the panelists. Therefore, porang flour can be used as an alternative stabilizer for making healthy and halal ice cream and jelly drinks.

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