



The Utilization of Durian's Albedo Flour as Substitution of Cornstarch in The Making of Ice Cream

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Abstract

This research is to find out the process to make an ice cream using durian's albedo flour. Start from to make durian albedo flour, to check content of durian's albedo flour ice cream (pectin, protein, fat, and carbohydrate), to find out respondents' opinion about display, color, smell, texture, and flavor of durian's albedo ice cream, and also interests of respondents about ice cream using durian's albedo flour. Populations of this research are spread at Wonorejo Permai Residence, Universitas Ciputra, and Bukit Darmo Boulevard. Researchers are choosing 30 random respondents as sample. There are few steps to collect the data. First, experiment method which had done three times for both of durian's albedo flour and ice cream using durian's albedo flour. Second, observation method, the researcher compared the result from experiments which had been done in the experiment method. Third, laboratory test, to find out the content of pectin, protein, fat, and carbohydrate from the ice cream using albedo durian flour. Fourth, organoleptic test to find out the shape, texture, flavor, and smell of ice cream using albedo durian flour. To do an organoleptic test, an ice cream will tested at laboratory, then distribute to the 30 random respondents and they will give their opinion in the questionnaires. Fifth is the descriptive statistics, where the researcher will process the questionnaire's results. Based on the research that has been done, it concluded that durian's albedo from the skin waste could be used as the ingredients for processed food. Moreover, based on organoleptic test with 30 respondents, shown that 96.7% of respondents interest with durian's albedo ice cream.

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INTRODUCTION

Ice cream is frozen foods that consist of milk, sugar, stabilizer, and emulsifier that have already pasteurized and homogenized to get the same result (Darma et al., 2013). Emulsifier and stabilizer are two things that needed to make an ice cream. Emulsifier is a substance which used as stabilizer of oil and water emulsion (Sumarso, 2013) and basic role of a stabilizer is binding and immobilizing water to reduce amount of water in ice cream mix (Soad et al., 2014). There're many emulsifiers and stabilizers that can used to make an ice cream. Beside soya and egg, emulsifier can get

from starch and powder milk (Sumarso, 2013). Soad et al. (2014) noted that the use of gelatin as a stabilizer produces thin mixes that require a long aging period.

Durian (*Durio Zibethinus Murray*) is a fruit from Southeast Asia that has tropical wet climate. Cornelia et al. (2015) reported that only a third of durians are edible, while seed (20-25%) and skin usually disposed. Actually, durian skin contains high cellulose and low lignin and starch, so it could indicate as mixture of processed food ingredients and other compressed product (Hatta, 2007; Darmawan, 2013). Sritastaya & Malviya (2011) noted that pectin is a functional food ingredient

Table 1. Ingredients to Make Durian’s Albedo Flour

No	Ingredient	Qty.	Unit
1	Durian skin	1	kilogram
2	Water	3	liter

Table 2. Ingredients to Make Ice Cream with Durian’s Albedo Flour

No	Ingredient	Qty.	Unit
1	Milk	500	milliliter
2	Durian’s albedo flour	20	gram
3	Cream cheese	50	gram
4	Salt	2	gram
5	Whipped cream	300	milliliter
6	Sugar	150	gram
7	Light corn syrup	32	gram

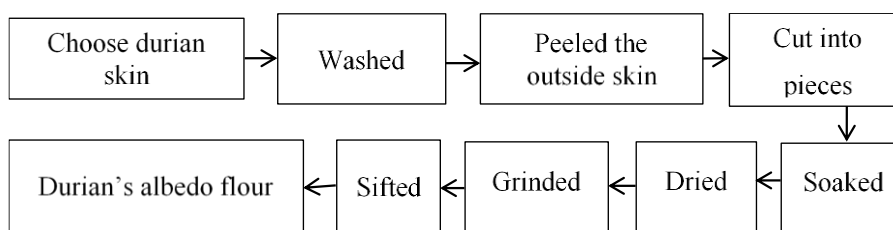


Figure 1. Process of Durian’s Albedo Flour

used as gelling agent and stabilizer. Durian’s albedo contains 2.56 % of pectin, which is durian’s albedo could use as starch (cornstarch) substitution in the making of ice cream. It used as stabilizer and thickener.

This research used American ice cream standard. Jacobs (2011) reported that American ice cream is a frozen dairy product made from cream, milk, sweeteners, flavorings, and other additions. Subcategory of American ice cream that used in this research is premium ice cream. Durian’s albedo flour is used in this research as cornstarch substitution. The purpose of this research are to find out the process of making durian’s albedo flour; the contain of pectin, protein, fat, and carbohydrate in ice cream using durian’s albedo flour; the process of making ice cream with durian’s albedo flour; to know respondents’ opinion of display, color, aroma, texture, and flavor of ice cream with durian’s albedo flour; and to know respondents’ interest of ice cream with durian’s albedo flour.

RESEARCH METHODOLOGY

Methods that used in this research are 1) experiment that has done in Universitas Ciputra (Tourism Faculty Laboratory) and Wonorejo Permai which had repeat 3 times for both of

durian’s albedo flour and ice cream with durian’s albedo flour; 2) observation that has done to compare each results of basic ingredients and ice cream. HUMAS LPM-PNL (2014) noted that observation is a method to collect data from observing and sensing; 3) laboratory test that has done in Balai Riset dan Standardisasi Industri Surabaya are to get the composition of pectin, protein, fat, and carbohydrate, also organoleptic test (shape, texture, flavor, and aroma) of durian’s albedo flour and ice cream with durian’s albedo flour; 4) organoleptic test for knowing the shape, texture, flavor, and aroma of durian’s albedo flour also ice cream with durian’s albedo flour from 30 random respondents; 5) descriptive statistic to make percentage of questionnaire results.

Collected information about durian’s albedo is the first step for this research, then do some experiment to process durian skin into flour and tested the pectin composition also organoleptic at laboratory. The best composition of an ice cream with durian’s albedo flour is tested. Organoleptic test also done by distributed questionnaires to 30 respondents then processed become descriptive data.

Population of this research is respondents from Wonorejo Permai, Universitas Ciputra, and Bukit Darmo Boulevard. Product sample of this

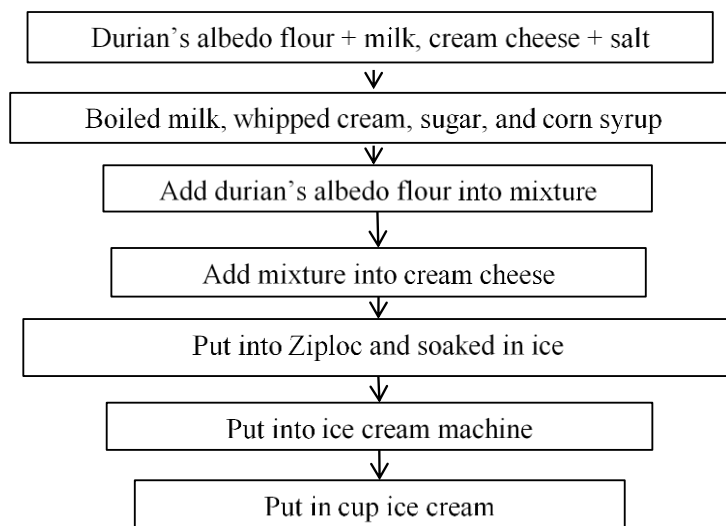


Figure 2. Production process of Ice Cream from Durian's Albedo Flour

Table 3. Experiment Result of Durian's Albedo Flour

No	Ingredient	First	Second	Third
1	Durian's albedo flour	5 gram (coarse)	3 gram (refine)	3 gram (refine)
2	Water	45 mililiter	90 mililiter	140 mililiter

Table 4. Experiment Result of Ice Cream with Durian's Albedo Flour

No	Ingredient	First	Second	Third
1	Milk	100 ml	100 ml	100 ml
2	Durian's albedo flour	3 gram (refine)	1 gram (refine)	4 gram (refine)
3	Cream cheese	10 gram	10 gram	10 gram
4	Salt	0,5 gram	0,5 gram	0,5 gram
5	Whipped cream	60 mililiter	60 mililiter	60 mililiter
6	Sugar	30 gram	30 gram	30 gram
7	Light corn syrup	7 gram	7 gram	7 gram
8	Conclusion	The color was brighter than third and darker than second. The flavor was sweet but a little durian's albedo flavor. No aroma. Smooth texture, but a little bit fluid.	The color was brightest. The flavor was only sweet. No aroma. Smoothest texture and very weak.	The color was darkest. Not too sweet and dominant durian's albedo flavor. No aroma. Smooth texture and thicker than others.

research was ice cream with durian's albedo flour that collected using probability sampling with simple random sampling category. This research took 30 respondents as a sample. (Freddy, 2002; Hartanto, 2014).

Ingredients and utilities that used in processed of durian's albedo flour and also ice cream with durian's albedo flour are shown in Tables 1 and 2.

Cream cheese in ice cream with durian's albedo flour was used to give creaminess as noted

by Foster et al. (2011). Light corn syrup used to make elasticity and softness, also prevent crystallization because there 20% of moisture inside durian albedo's flour as reported by The American Journal of Clinical Nutrition (2016). The production of durian's albedo flour and ice cream with durian's albedo flour is shown in Figures 1 and 2 respectively.

The inside part of durian skin (durian's albedo) is taken to be processed. Avoid use durian's albedo which has dark brown or black color, also

Table 5. Panelist Result of Ice Cream with Durian's Albedo Flour

No	Description	First Panelist	Second Panelist	Third Panelist
1	Sample A			
	Color	Between sample B and C.	A bit dark.	Soft brown, A and B was slightly different.
	Flavor	Slightly different between all sample.	A bit strong.	Too sweet, A little bit after taste.
	Aroma	No strong aroma, softer than aroma sample B.	A bit strong.	No aroma.
	Texture	Between sample B and C.	Less thick	Little sandy and fibrous, not like ice cream.
2	Sample B			
	Color	White color on the surface.	A bit light.	Soft brown, A and B was slightly different.
	Flavor	Slightly different between all sample.	Soft.	Too sweet.
	Aroma	Strongest aroma.	A little aroma.	A little aroma.
	Texture	Thinnest.	Thicker.	Not sandy, thicker, not like ice cream.
3	Sample C			
	Color	Brown.	A bit dark.	Darker.
	Rasa	Slightly different between all sample.	Less strong.	Not sweet, weird after taste.
	Aroma	No aroma.	A little aroma.	No aroma.
	Tekstur	Thickest.	Thicker.	Not sandy, thickest, not like ice cream.
4	Choosen	C	C	B
5	Comment	Need to maximum freeze.	Ice cream has to be frozen.	Sample B was more no aroma, but the best sweet flavor was sample C. The melting rate was too short.

has membranes like cotton. Durian's albedo were then washed and brushed until there wasn't any mucous. Durian skin was separated to two (durian's albedo and outside skin), and cut. Microwave was then heated at 100°C temperature for 10-12 minutes to dry the durian's albedo. Finally, durian's albedo was processed into flour by grinding it and shifted for three repetitions maximum for best result.

Ice cream production was started by combining Durian's albedo flour with 50 milliliter of milk. The cream cheese and salt were also mixed until they were perfectly combined. Warmed milk, whipped cream, sugar, and corn syrup were then mixed with durian's albedo flour and cream cheese. Final stage was Pouring ice cream with durian's albedo flour is into ice cream maker for five hours.

RESULT AND DISCUSSION

From the first experiment, durian's albedo flour was grainy and very difficult to become thick. The result from second experiment was dense like paste because less water used in this experiment. The third experiment's result was smooth like

porridge. It can be concluded that durian's albedo flour is not soluble in water and also it has a unique texture. From those three experiment, it can be concluded that durian's albedo flour will not affect the aroma, but it will affect the flavor, texture, color, and melting rate. These properties will vary based on the amount of albedo flour used as a mixture on food. The detail of each experimental results are shown in Table 3.

Each ice cream from three different composition were then tested by panelist. It was done to obtain the best composition of ice cream from durian albedo flour. The results are shown in Table 4. From Table 4, it can be concluded that the best sample for panelist test was sample C (third experiment) which used 4 gram of refine durian's albedo flour. Sample C was then tested in laboratory and organoleptic to 30 respondents. From Lab test of sample 3, it shows that, durian's albedo flour can be used as thickener in ice cream, but it will have several differences in organoleptic properties compared to another ice cream.

Ice cream with milk base and cornstarch would be dominant in sweet milky flavor.

Table 6. Questionnaire Result of Ice Cream with Durian's Albedo Flour

No	Description	Total	%
1	Gender		
	Male	10	33 %
	Female	20	66.7%
2	Age		
	≤ 19 years old	3	10%
	20 – 25 years old	18	60%
	26 – 30 years old	4	13.3%
	31 – 35 years old	1	3.3%
	36 – 40 years old	0	0%
	≥ 41 years old	4	13.3%
3	Display		
	Done	27	90%
	Not yet	3	10%
4	Ice Cream Color		
	Agree	30	100%
	Disagree	0	0%
5	Ice Cream Aroma		
	Agree	2	6.7%
	Disagree	28	93.3%
6	Ice Cream Texture		
	Done	19	63.3%
	Not yet	11	36.7%
7	Unique Flavor		
	Agree	17	56.7%
	Disagree	13	43.3%
8	Ice Cream Packaging		
	Done	26	86.7%
	Not yet	4	13.3%
9	Interest		
	Yes	29	96.7%
	No	1	3.3%
10	Price		
	Rp 10,000.00 – Rp 15,000.00	14	46.7%
	Rp 16,000.00 – Rp 20,000.00	16	53.3%
	Others	0	0%

Table 7. Differences of Ice Cream with Cornstarch and Ice Cream with Durian's Albedo Flour

No	Description	Ice Cream with Cornstarch	Ice Cream with Durian's Albedo Flour
1	Flavor	Milky, sugar sweet.	Durian's albedo, less sweet, nut, chocolate, mocca.
2	Texture	Not hard, smooth, and shiny.	Not hard, coarse, and little fibrous.
3	Aroma	Milk.	Durian's albedo
4	Color	Milky white.	Chocolate

Thompson et al. (2009) noted that the usage of thickener could decrease the sweetness and change ice cream flavor. It was shown in ice cream with durian's albedo flour. The flavor changed into

durian's albedo flavor and became less sweet.

Arbaiyah (2011) reported that the best ice cream texture was soft, smooth, and shiny. Ice cream with durian's albedo flour texture was coarse

and fibrous, so it was insoluble. Clarke (2004) noted that ice cream aroma was an attraction for consumer to buy.

Ramdani (1996) reported that in the making of ice cream, people usually add synthetic ingredients to increase ice cream color and aroma. Using durian's albedo flour as substitution of cornstarch made the aroma and color of the ice cream changed without added synthetic ingredients. The aroma was durian's albedo and the color was brown. Composition of durian's albedo flour effected to the brightness of ice cream color.

CONCLUSION

Durian skin especially durian's albedo could process into flour and has 12.8% pectin per 50 gram. Composition of pectin in durian's albedo flour made it as substitution for cornstarch in ice cream. From 30 respondents, 100% of respondents agreed that the color of ice cream with durian's albedo flour was brown like cappuccino; 93.3% agreed that ice cream with durian's albedo flour didn't have strong aroma; 63.3% agreed that the texture was smooth enough; 56.7% agreed that the flavor was unique. Inside 50 gram of durian's albedo flour contains 12.8% pectin. In 500 gram of ice cream with durian's albedo flour contains 0.05% pectin; 5.1% protein; 37.72% carbohydrate; and 12,58% fat. That concluded if ice cream with durian's albedo flour has uniqueness in texture and flavor. In the future, this research could continue with focus in composition of nutrition like vitamin, fiber, etc., inside ice cream with durian's albedo flour to enrich consumers' knowledge. More explore about waste that can process as substitution.

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