COMPARISON CHARACTER PHYSIQUE AND CHEMISTRY SUGAR RED COCONUT PALM (*Elaeis guineensis* Jacq.) WITH BROWN SUGAR COCONUT (*Cocos nucifera*)

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Abstract

Palm sap can be used as raw material for making brown sugar, but the glucose and calorie content is not yet known so the quality cannot be compared with brown sugar made from coconut sap, so a comparison of the glucose content and calorie content of palm palm sap brown sugar and brown sugar was carried out. coconut sap. Brown sugar is a food ingredient made from palm sap from coconut, sugar palm and palm oil. This research aims to determine the glucose content and calorie content of palm brown sugar and coconut brown sugar. The experimental procedure starts from tapping palm sap and coconut sap, making brown sugar, testing a sample of 100% brown sugar palm sap, a sample of 100% brown sugar coconut sap, and 50% brown sugar palm sap 50% coconut sap. The research results showed that the highest glucose content was found in the second sample of 50% palm sap and 50% coconut sap, namely 4.45% and the highest calorie or total energy content was found in the third sample of 100% coconut sap with a total energy value of 408.27. Oil palm plants that do not produce and waste oil palm stems from replanting or land conversion are still present can be utilized by taking the sap as raw material for making brown sugar.

Keywords: *sap, brown sugar, palm oil.*

I. INTRODUCTION

Brown sugar is a food ingredient made from coconut sap, palm sugar and palm oil. The demand for brown sugar is increasing due to increasing public awareness of staying healthy by reducing consumption of granulated sugar and replacing it with brown sugar. The advantages of brown sugar include its brownish color, distinctive aroma, and lower glycemic index value than granulated sugar (Pertiwi, 2015), making it suitable for consumption by diabetes sufferers or people who want to stay healthy. Brown sugar is produced by brown sugar craftsmen with a capacity of 10-20 kg/day (Nawansih, 2013).

Brown sugar made from sap can help meet the demand for coconut brown sugar, which is often unable to meet demand due to high market demand, resulting in a decrease in the quality of brown sugar. The market is down. Apart from that, limited coconut sap also affects brown sugar production because coconut trees only produce around 1.5 liters per day.

The production period for oil palm plants (Elaeis guineensis Jacq.) is 25 years. Oil palm plants (Elaeis guineensis Jacq.) were replanted after 25 years. Trees older than 25 years are removed and replanted. In the replanting process, palm oil stem waste is produced which can be utilized.
Palm oil stem waste is a problem because it is large so it takes up a lot of space and is not easily decomposed in plantation areas (Sunarko, 2009). Apart from grating palm oil stem waste, the juice can also be used as raw material for making brown sugar. According to BPPSDMP (2010), these oil palm trunks can produce quite large amounts of sap, that is, one felled palm oil tree will produce approximately 10 liters of sap per day within 1 month.

Apart from replanting waste, the raw material for palm oil palm sugar can also be obtained from palm oil that is no longer producing (TTM) and also from waste that diverts the function of palm oil, this is very useful considering the large number of non-productive plants and diversion of the function of oil palm land. available. Processing palm sap into brown sugar is the same as processing palm sap. It is hoped that the presence of palm oil brown sugar can help meet the demand for brown sugar on the market.

II. METHODOLOGY

The experiment was structured using descriptive experiments. This experiment consisted of three treatments, namely: 100% brown sugar from palm sap, 100% brown sugar from coconut sap, and 50% brown sugar from palm sap + 50% from coconut sap.

Making brown sugar from palm sap begins by taking palm sap from a fallen oil palm tree. The sap is taken by cleaning the midrib down to the shoot, after that cutting off the tip of the shoot and scraping the tip of the shoot or what is usually called the tapping process, after the shoot has been tapped it is given a sap water holding container that has been filled with whiting liquid and left for approximately 12 hours to wait for the sap water to collect.

Tapping activities are also carried out to collect coconut sap, the difference is that coconut sap is tapped on the part of the coconut flower that has not yet bloomed or what is usually called coconut mayang. Tapping coconut sap is done by tying the stems of coconut flowers that have not yet bloomed and are tied tightly with a rope. The next process is to gradually slice the coconut flower to release the sap. The liquid sap that comes out will be collected in a container that has been filled with whiting liquid.

Making brown sugar is done after the required palm juice has been collected, this sap liquid must be filtered first to make it cleaner. After that, the filtered sap will be boiled in a large frying pan and over high heat. The sap liquid must be stirred frequently during the boiling process. The sap liquid is stirred so that the heat from the fire can be distributed evenly into the sap liquid. If the sap liquid is not stirred, the bottom will burn. So it can damage the results of the brown sugar that will be finished. During the boiling process, the fire can be high, but the flame must not touch the sugar liquid in the pan. Flames touching liquid sugar can cause the sugar to burn and turn black. Apart from that, flames will also make the resulting sugar taste bitter.

After boiling for a while, the sugar liquid will slowly change color to brown. Apart from that, the sugar liquid that has turned brown will emit small explosions like magma. The two things above indicate that the sugar liquid is cooked. The sugar liquid can then be poured into molds such as empty bamboo or coconut shells. Empty bamboo is used to form cylindrical molds and coconut shells are used to mold brown sugar shells. In making 100% palm sap brown sugar, 1 liter of palm sap is used, for 100% coconut palm sap the palm sap used is 1 liter of coconut sap, while for making 50% palm sap brown sugar, 50% coconut sap uses 0.5 raw materials. liter of palm sap and 0.5 liter of coconut sap are cooked simultaneously. The flow diagram for making brown sugar can be seen in Figure 7.

III. RESULTS AND DISCUSSION

Content glucosan And energy total in sugar red Which made by using material 100% roomie coconut palm oil, 100% roomie coconut And 50% roomie Palm oil with 50% coconut sap produces different content results. Based on tests carried out in the Saraswati Indo Genetech laboratory, it shows that of the three samples the highest glucose content was in brown sugar with 50% palm sap and 50% coconut sap. The results of glucose and calorie testing can be seen in Table 1, the nutritional values of various types sugar can seen on Table 2, And condition quality sugar palm can seen in Table 3.

Table 1. Results glucose testing And calories

Treatment	Glucose (%)	Energy Total (kcal/100 g)
100% Roomie coconut palm	1.4 %	390.59
50% Roomie coconut + 50% roomie coconut palm	4.45 %	398.37
100% Coconut sap	2.47 %	408.27

Table 2. Nutritional value from various type sugar

Composition (mg)	Sugar sugar palm	Sugar coconut	Sugar sand	Sugar red sugarcane
Calories	386.0	386.0	364.0	356.0

Source : Tan, 1980 in Utami, 2008 Table 3.

Table 3. Palm sugar quality requirements

Criteria Test	Unit	Condition	
		Print	Granules/granules
Sugar reducer	% b/b	Max. 10.0	Max. 3.0

Source : SNI 01-3743-1995 (1995)

On Table 1 seen that difference material from sample sugar red in above influences the differences in glucose content and total energy. In the first sample of brown sugar, the laboratory test results for date sap were 100%, showing a glucose level of 1.4% and total energy of 390.59. Organoleptic test results were normal. The glucose content of the first sample is the sample with the lowest glucose content. The second sample of 50% date palm sap + 50% coconut sap had the highest glucose content, namely 4.45% and a total calorie or energy content of 398.37. Organoleptic test results normal. The third 100% coconut water sample had the lowest glucose yield of 2.47% and the highest calorie or total energy content of 408.27. Brown sugar tends to have a lower glucose content than granulated sugar, so it has the advantage of having a lower glycemic index value of 35 compared to granulated sugar (Pertiwi, 2015). Although brown sugar appears denser than white sugar, its particles are smaller in volume and contain more calories (Tan, 1980).

From table 1, the results of this research on the calorie content can be compared with the calories from palm sugar, coconut sugar, granulated sugar and brown cane sugar which are in table 2. The calorific values of the three samples in this study were 390.59, 398, respectively. 37, and 408.27. These values are in accordance with the calorific values of jaggery, coconut sugar, granulated sugar and cane sugar recorded by Tan (1980). As seen in Table 2 above, sugar is 386.0, 386.0, 364.0 and 356.0. Through a comparison of calorific values, the three brown sugar samples all met the brown sugar calorie quality standards.

Judging from the glucose content values of the three samples in Table 1, the glucose values of the three samples, namely 1.4%, 4.45% and 2.47%, all meet the palm sugar quality requirements determined by the Indonesian national standard (SNI) 01-3743. -1995 (1995) maximum value. 10.0 Mold Sugar and Max. 3.0 granules of sugar. Reducing sugars are a class of carbohydrates that can reduce electron-accepting compounds such as glucose and fructose.

Apart from testing glucose and calorie content, this research also carried out organoleptic testing on each sample. This organoleptic testing refers to the standard requirements for the characteristics of palm sugar according to the Indonesian National Standard (SNI) 01-3743-1995 (1995). In the Indonesian National Standard (SNI) 01-3743-1995 (1995) the requirements for good brown sugar characteristics include having smell normal, own texture normal, own flavor sweet, And has a yellow to brownish color. To see the results of organoleptic testing of this research, see Table 4.
Table 4. Results organoleptic testing

Treatment	Form	Texture	Flavor	Color	Smell
100% Roomie coconut palm	Liquid	Thick	Sweet	Chocolate	Normal
50% Roomie coconut + 50% palm sap	Liquid	Thick	Sweet	Chocolate	Normal
100% Coconut sap	Congested	Mushy	Sweet	Chocolate	Normal

From table 2 above, it shows that the organoleptic test results for the three samples are in accordance with the Indonesian National Standard brown sugar characteristic quality. (SNI) 01-3743-1995 (1995). On Standard National Indonesia (SNI) 01-3743-1995 (1995) requirements for good brown sugar include having a normal smell, having texture normal, own rassa sweet, And own color yellow until brown.

IV. CONCLUSIONS AND NEWNESS

Palm oil stem waste resulting from replanting can be utilized by taking the sap as raw material for making brown sugar and the highest glucose content is found in the second sample, 50% palm sap, 50% coconut sap, namely 4.45% and the highest calorie or total energy content is found in the third sample. 100% coconut sap with a total energy value of 408.27.

V. REFERENCES

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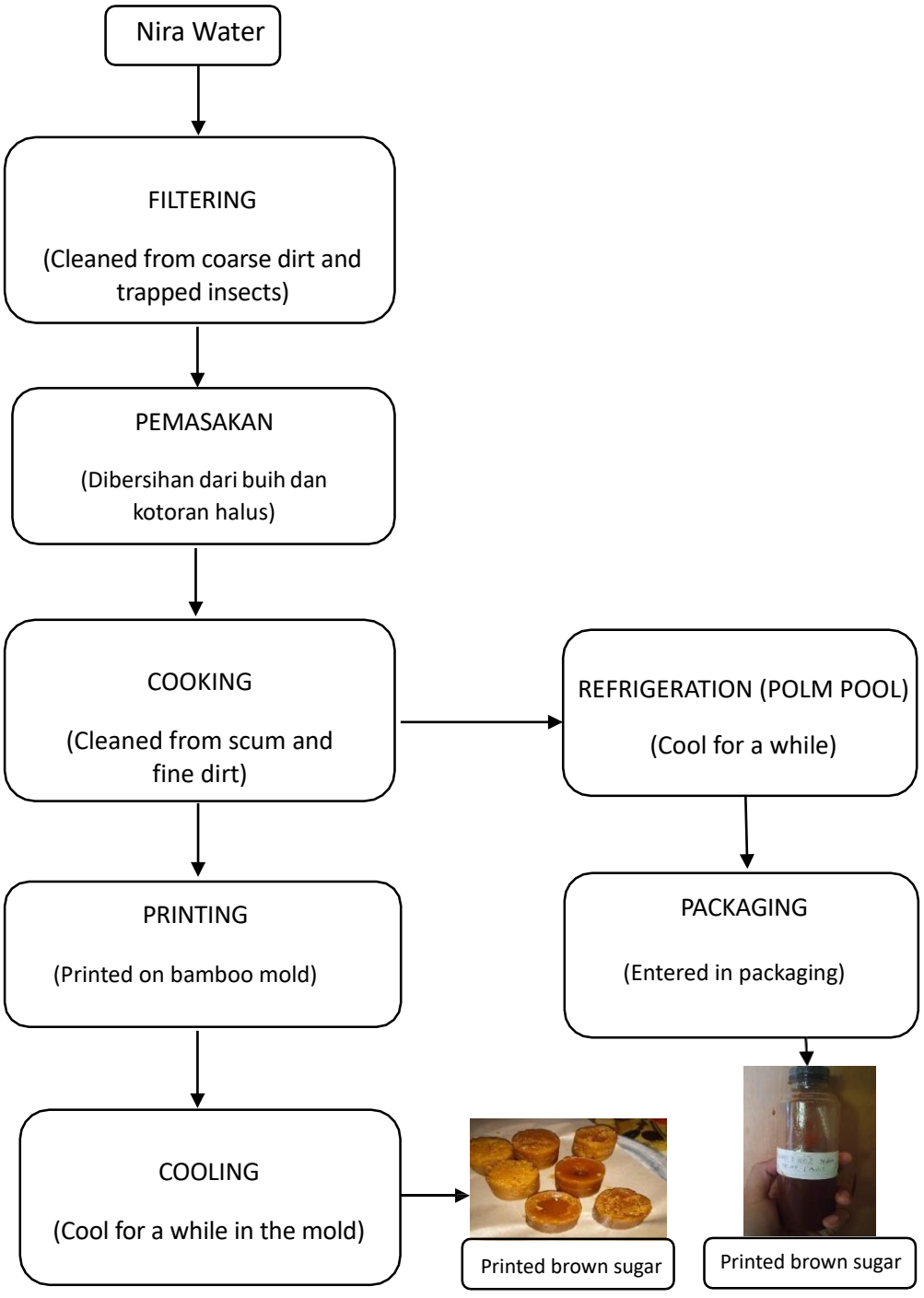
Picture 7. Diagram manufacturing flow sugar red



Picture 7. Diagram manufacturing flow sugar red

Attachment 1. Results testing sample 100% roomie palm oil

RESULT OF ANALYSIS

Laporan Hasil Pengujian : SIG.LHP.V.2021.064412

No.	Parameter	Unit	Result		Limit Of Detection	Method
			Simplo	Duplo		
1	Glukosa	%	1.26	1.27	-	18-5-15/MU/SMM-SIG (HPLC)
2	Protein	%	2.08	2.04	-	18-8-31/MU/SMM - SIG (Kjeltec)
3	Kadar Abu	%	4.82	4.85	-	SNI 01-2891-1992, 6.1
4	Energi dari lemak	kcal/100 g	0	0	-	Calculation
5	Lemak Total	%	<0.02	<0.02	-	18-8-5/MU/SMM-SIG point 3.2.2 (Weibull)
6	Kadar Air	%	9.75	9.62	-	SNI 01-2891 - 1992, point 5 . 1
7	Energi Total	kcal/100 g	341.72	342.12	-	Calculation
8	Karbohidrat	%	83.35	83.49	-	18-8-9 /MU/SMM-SIG
9	Bentuk	-	Cair	Cair	-	SNI 01-2891- 1992 point 1.2
10	Tekstur	-	Kental	Kental	-	SNI 01-2891- 1992 point 1.2

RESULT OF ANALYSIS

Laporan Hasil Pengujian : SIG.LHP.V.2021.064412

No.	Parameter	Unit	Result		Limit Of Detection	Method
			Simplo	Duplo		
11	Rasa	-	Manis	Manis	-	SNI 01-2891- 1992 point 1.2
12	Penampakan	-	Normal	Normal	-	SNI 01-2891- 1992 point 1.2
13	Warna	-	Coklat	Coklat	-	SNI 01-2891- 1992 point 1.2
14	Bau	-	Normal	Normal	-	SNI 01-2891- 1992 point 1.2

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Attachment 2. Results testing sample 50% roomie coconut palm + 50% coconut sap

RESULT OF ANALYSIS

Laporan Hasil Pengujian : SIG.LHP.V.2021.064413

No.	Parameter	Unit	Result		Limit Of Detection	Method
			Simplo	Duplo		
1	Glukosa	%	3.74	3.75	-	18-5-15/MU/SMM-SIG (HPLC)
2	Protein	%	2.03	1.94	-	18-8-31/MU/SMM - SIG (Kjeltec)
3	Kadar Abu	%	3.23	3.26	-	SNI 01-2891-1992, 6.1
4	Energi dari lemak	kcal/100 g	0	0	-	Calculation
5	Lemak Total	%	<0.02	<0.02	-	18-8-5/MU/SMM-SIG point 3.2.2 (Weibull)
6	Kadar Air	%	8.25	8.15	-	SNI 01-2891 - 1992, point 5 . 1
7	Energi Total	kcal/100 g	354.08	354.36	-	Calculation
8	Karbohidrat	%	86.49	86.65	-	18-8-9 /MU/SMM-SIG
9	Bentuk	-	Cair	Cair	-	SNI 01-2891- 1992 point 1.2
10	Tekstur	-	Kental	Kental	-	SNI 01-2891- 1992 point 1.2

RESULT OF ANALYSIS

Laporan Hasil Pengujian : SIG.LHP.V.2021.064413

No.	Parameter	Unit	Result		Limit Of Detection	Method
			Simplo	Duplo		
11	Rasa	-	Manis	Manis	-	SNI 01-2891- 1992 point 1.2
12	Penampakan	-	Normal	Normal	-	SNI 01-2891- 1992 point 1.2
13	Warna	-	Coklat	Coklat	-	SNI 01-2891- 1992 point 1.2
14	Bau	-	Normal	Normal	-	SNI 01-2891- 1992 point 1.2

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Attachment 3. Results sample testing 100% coconut sap

RESULT OF ANALYSIS

Laporan Hasil Pengujian : SIG.LHP.VI.2021.068699

No.	Parameter	Unit	Result		Limit Of Detection	Method
			Simplo	Duplo		
1	Glukosa	%	2.20	2.21	-	18-5-15/MU/SMM-SIG (HPLC)
2	Protein	%	0.52	0.54	-	18-8-31/MU/SMM - SIG (Kjeltec)
3	Kadar Abu	%	0.59	0.58	-	SNI 01-2891-1992, 6.1
4	Energi dari lemak	kcal/100 g	0	0	-	Calculation
5	Lemak Total	%	<0.02	<0.02	-	18-8-5/MU/SMM-SIG point 3.2.2 (Weibull)
6	Kadar Air	%	8.70	8.56	-	SNI 01-2891 - 1992, point 5 . 1
7	Energi Total	kcal/100 g	362.84	363.44	-	Calculation
8	Karbohidrat	%	90.19	90.32	-	18-8-9 /MU/SMM-SIG
9	Bentuk	-	Padat	Padat	-	SNI 01-2891- 1992 point 1.2
10	Tekstur	-	Lembek	Lembek	-	SNI 01-2891- 1992 point 1.2

RESULT OF ANALYSIS

Laporan Hasil Pengujian : SIG.LHP.VI.2021.068699

No.	Parameter	Unit	Result		Limit Of Detection	Method
			Simplo	Duplo		
11	Rasa	-	Manis	Manis	-	SNI 01-2891- 1992 point 1.2
12	Penampakan	-	Normal	Normal	-	SNI 01-2891- 1992 point 1.2
13	Warna	-	Coklat	Coklat	-	SNI 01-2891- 1992 point 1.2
14	Bau	-	Normal	Normal	-	SNI 01-2891- 1992 point 1.2

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