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Potential of Coconut Dregs Flour and Tofu Dregs Flour As An Ingredient for Snack bar Production

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Abstract: *Waste or by-products from the food industry, such as coconut dregs and tofu dregs, are available in abundant quantities. The use of coconut dregs and tofu dregs as animal feed is generally limited. However, in both of these dregs, necessary nutrients are still present in the body Dregs. This can also be reprocessed into flour, supporting sustainable food security. Coconut dregs flour and tofu dregs flour can be used as raw materials in making several food products with economic value, such as snack bars, so that they can support product diversification. The snacks at the snack bar are stick-shaped and have a dense texture. Snack bars can be consumed as ready-to-eat food, fulfilling the necessity of public activity. This research aims to find the optimal formulation of coconut dregs flour and tofu dregs for making snack bars. The best formulation is determined in research carried out by organoleptic testing of the snack bars produced, including color, aroma, taste, and texture, which is then continued with analysis of carbohydrate content, protein content, fat content, ash content, water content, and crude fiber content. The research results show that coconut dregs flour and tofu dregs have the potential to be basic ingredients in making snack bars. From the organoleptic test results seen, the snack bar that has been rated highest by the panelists is a product made from 30% coconut pulp flour and 70% tofu pulp flour, which has quite good nutritional content and quite high fiber content.*
Keywords: *Dregs; Coconut; Snack Bar; Tofu, Flour*

I. Introduction

Coconut dregs are by-products of the coconut industry's processing. Dregs is a solid waste available in large quantities but has not been utilized optimally (Bahri, Hadati and Satrimafitrah, 2021). So far, the use of coconut dregs is still limited as an internal ingredient in bongkrek tempeh or as animal feed at a relatively cheap price. However, coconut dregs can be processed into flour, which is rich in fiber, and more carry-on can be processed into food products that have good economic value for health. Sufficient dietary fiber in the diet is very good for health, among other things, good for system digestion, lowering absorption of carbohydrates, and cholesterol. Recommended fiber intake for adults generally ranges from 20 – 35 g/day (Marlett, McBurney and Slavin, 2002).

Coconut dregs flour is made from grinding dry coconut dregs. Coconut dregs flour has a potential to be used as a main material in making food products because of its fairly good nutritional content. According to Azis and Akolo (2018), coconut dregs flour still contains carbohydrates 85%, protein 2.15%, fat 7.84%, ash 0.45%, and water 2.38%. Base on Putri (2018) research, found that fiber content increases as the coconut dregs formulation increases.

However, the internal protein content of flour coconut dregs is low, so its potential as a food processing ingredient must be combined with other ingredients such as tofu dregs. Tofu dregs are waste solids formed in the manufacturing process. According to Rahayu, Sudrajat, and Rinihapsari (2016), carbohydrates and protein content in dregs is relatively high because, in the manufacturing process, not all substances can be extracted, especially

if made with a simple or conventional method. Tofu dregs flour contains 59.59% carbohydrates, 10.8% protein, 14.49% fat, 9.02% ash, and 5.74% water (Sulistiani, 2004).

Therefore, flour coconut dregs, and dregs tofu can be used as a base ingredient or material substitute in the processing of several products, such as snack bars. Snack bars are snacks that are made from cereals or nuts and are usually consumed as food interludes and ready to eat. Murdiani, Kalsum and Sarono (2022) was conducted research on snack bars made from onggok flour as emergency food source of protein. A good snack bar is high in protein and fiber and low in calories. Meanwhile, the physical characteristics of the snack bar are that the shaped stems are uniform, dense in texture, brown in color, and have a sweet taste (Amalia, 2013). Making a snack bar in principle involves mixing ingredients, roasting, kneading, cooling, and cutting the product.

This study aim is to dig potency dregs, coconut, and dregs into making healthy food products, as well as look for formulation dregs, coconut, and flour dregs into the optimal inside making snack bars.

II. Materials and Method

The main ingredient used in this research is tofu dregs obtained from the tofu processing factory located on Jalan Baru Kemang, Tonjong, Tajur Halang, Pondok Udik, Kemang Subdistrict, Bogor Regency, West Java and coconut dregs from stalls around Depok City. Additional ingredients in making snack bars include: margarine, eggs, salt, sugar, honey, jam, cashew nuts and rice crispies

2.1 Tool

The equipment used is an oven, blender, 60 mesh sieve, questionnaire, analytical balance, beaker and others.

Research Design

The research used a Completely Randomized Design (CRD) with 5 treatment formulations of coconut dregs and flour tofu dregs, and 3 repetitions, so there are 15 experimental units. As for the formulation coconut dregs flour and tofu dregs flour are used in study This is as follows:

1. F1: 30% Coconut Dregs Flour + 70% Tofu Dregs Flour
2. F2: 40% Coconut Dregs Flour + 60% Tofu Dregs Flour
3. F3: 50% Coconut Dregs Flour + 50% Tofu Dregs Flour
4. F4: 60% Coconut Dregs Flour + 40% Tofu Dregs Flour
5. F5: 70% Coconut Dregs Flour + 30% Tofu Dregs Flour

2.2 Stages Study

Stages study includes: manufacturing coconut dregs flour, and tofu dregs flour , Making snack bars, Organoleptic tests , Proximate analysis to the best snack bar products.

2.3 Method

1 .Making Coconut Dreg Flour

a. Separate the coconut from coconut milk and oil to get coconut dregs,
b. Coconut dregs are washed clean and pressed using a filter cloth,
c. Added table salt and blanched for ± 3 minutes,
d. Pressed and removed the water content, and then dried at a temperature of 60o C for 3 days with oven,

e. Coconut dregs were ground with a blender and sieved with an 80 mesh sieve.

2. Making Tofu Dregs Flour

a. Squeeze out the dregs know wet use cloth with aim to reduce the water content in tofu dregs,
b. Steam the tofu dregs that have been squeezed for 15 minutes at a temperature of 100o C,
c. Dry the tofu dregs in oven until dry or at a temperature of 60-70o C for 5 hour
d. Then the tofu dregs are mashed using a blender, and sieved using a measuring mesh 40 and the end result will be becomes flour with the characteristic aroma of tofu dregs flour.

3. Making Snack Bars

a. Weighing raw materials in accordance formulation (table 1)
b. Mix tofu dregs flour and coconut dregs flour, salt, honey, jam and eggs.
c. Addition margarine and sugar,
d. Addition cashew nuts and rice crispies
e. The dough is molded and then baked in the oven at 110 o C for 40 minutes.
f. Once cooked, the snack bar is cooled at room temperature 30 o C for 20 minutes.

2.4 Procedure Analysis

Organoleptic tests against snack bar products were conducted by 25 untrained panelists on the parameters of taste, aroma, texture, color, and overall acceptability. The hedonic scale used is 1–5, with description 1 = dislike very much, 2 = dislike, 3 = neutral, 4 = like and 5 = like very much. Whereas analysis proximate to the selected snack bar formulation includes protein content using the Kjehdahl method, fat content using the Soxhlet method, water content, ash content, and crude fiber using the gravimetric method.

Table 1. Formulation of snack bar from coconut dregs flour with tofu dregs flour

Material	Material Weight (grams)				
	F1	**F2**	**F3**	**F4**	**F5**
Coconut dregs flour	30	40	50	60	70
Tofu dregs flour	70	60	50	40	30
Sugar	35	35	35	35	35
Salt	1	1	1	1	1
Egg	30	30	30	30	30
Margarine	35	35	35	35	35
Honey	30	30	30	30	30
Jam	60	60	60	60	60
Cashew nut	20	20	20	20	20
Rice crispies	15	15	15	15	15

III. Results and Discussion

3.1 Organoleptic Test

The results of the organoleptic assessment by the panelists on the highest parameters of color, taste, and texture are a snack bar with a flour formulation with 30% coconut dregs and flour tofu dregs 70%, while the highest aroma rating is at the snack bar with a flour

formulation 70% coconut dregs and flour tofu dregs 30% (table 2). Duncan test results for each formulation regarding color, aroma, taste, and texture can be seen in Table 3.

Table 2. Table of organoleptic test results for snack bars made from flour dregs coconut and flour dregs know

Parameter	Formulas	Values are mean ± SD	F	Sig
Color	F1	3.68 ± 0.75	2.716	0.034
	F2	3.52 ± 0.82		
	F3	3,16 ± 0,8		
	F4	3,36 ± 0,95		
	F5	3.24 ± 0.97		
Aroma	F1	3.28 ± 1.02	4.265	0.003
	F2	3.20 ± 1.04		
	F3	3,12 ± 1,01		
	F4	3.64 ± 0.91		
	F5	3.80±1.0		
Taste	F1	3.96 ± 1.14	4,354	0.001
	F2	3.24 ± 1.13		
	F3	2.96 ± 0.98		
	F4	3,08 ± 0,99		
	F5	3.40 ± 1.12		
Texture	F1	3.92 ± 0.76	5,137	0.003
	F2	3.60 ± 0.91		
	F3	3.08 ± 1.15		
	F4	3.12 ± 0.97		
	F5	3.04 ± 1.14		

Table 3. Duncan test results for each formulation to several parameters

Parameter	**F1**	**F 2**	**F 3**	**F 4**	**F 5**
Color	3.68*	3.52	3.16**	3.36	3.24
Aroma	3.28	3.20	3.12**	3.64	3.80*
Taste	3.96*	3.24	2.96**	3.08	3.40
Texture	3.92*	3.60	3.08	3.12	3.04**
Whole	3.92*	3.16	3.04**	3.24	3.20

Note: * = highest, ** = lowest

Color is a sensory parameter that has an important role in product assessment and is the first influencing factor for someone when choosing food. On research, the snack bar color with the highest assessment from panelists is a snack bar color with a 30% flour formula dregs coconut with 70% flour dregs. Formulation dregs tofu and dregs coconut in the creation of an influential snack bar due to the resulting color ($P < 0.05$). Use the flour dregs to learn more. Lots of work went into creating a snack bar, resulting in more yellowish-brownish products. That thing allegedly, because dregs know that when processed into flour, its own color base is yellow, then in the cooking process at high temperatures, there also occurs a browning reaction, i.e., change in color of food causes browning. Because of the reaction chemistry between amino acids and sugar (Tamanna and Mahmood, 2015).

On the contrary, the highest aroma rating by panelists is for the aroma of the snack bar being made with 70% flour dregs coconut with 30% flour dregs. Flour dregs in coconut have a more fragrant aroma, produced during the drying process in making flour, than the aroma of flour dregs. So that the panelists more like the product produced with dregs of coconut. According to statistical tests, formulation dregs (coconut and dregs) contribute to the aroma value of the resulting snack bar (P 0.05). Formulation with flour dregs and more coconut (lots) produces more aroma, which panelists on *snack bars like.* Distinctive aromas originate from component compound volatiles contained in the dregs of coconut. Unknown compound volatile is a compound containing organic carbon that easily evaporates under high pressure and forms a distinctive aroma from the drying process of dregs of coconut. Some component compound volatiles in dregs of coconut are known, i.e., aldehydes, ketones, and esters (Wang et al., 2020).

Flavor is another important factor in determining whether a consumer accepts or rejects a food. According to the taste panelists, the product with the highest taste value is a snack bar made with a formula of 30% flour dregs coconut and 70% dregs know. Statistical test results show that formulation dregs (coconut and dregs) have a very real effect on the assessment of snack bar taste by panelists ($P \leq 0.01$). According to panelists, the taste of the resulting snack *bar* is a combination of sweet and savory. Sensation tasty caused Because proportion giving flour dregs is more dominant (70% flour dregs know), they can add more taste and flavor than other formulations. The savory taste is caused because dregs know their own vegetable protein content from soybeans (Liu, 1999). Soya bean contains vegetable protein, i.e., a non-essential amino acid (glutamate) which provides a savory taste and is naturally occurring in the product *snack bar.* That caused Because when compound glutamate in *snack bars* enters the mouth, compound glutamate is capable of increasing salivary secretion, which then stimulates the savory taste and transmits important signals to the brain so that food can be chewed well (Karim, Swastawati, & Anggo, 2014). Whereas sweet taste is generated because of the usage of flour dregs from coconut as much as 30%, natural sugar content from sucrose contained in dregs from coconut can contribute to adding sweetness in a way experienced at *the snack bar*.

Evaluation panelists to texture, snack bar with a 30% flour formula dregs coconut and 70% dregs know have the highest texture. A number of panelists think that the resulting texture is so solid and more OK, and That allegedly flour dregs have their own characteristic hydrophilic or ability to impart good water absorption to dough (Suryani, Hakim, Yusrianti, Auvaria and Mustika, 2021). That thing makes a snack bar no too moist or not too dry, so when mixed with other materials such as sugar, butter, and eggs, the texture in the formulation is not easy and fragile compared to other formulations. On the contrary, texture is lowest at the snack bar, which is made with 70% flour dregs from coconut and 30% flour dregs from nuts. According to research, this is a snack bar with more flour dregs and coconut - tall give texture become more fragile. This thing can happen because dregs coconut is rich in fiber and gluten-free. High fiber can make the dough drier and less pliable, increasing the risk of snack bars becoming brittle. In the process of making snack bars, making the dough more elastic and easy to form requires the presence of gluten in the formulation material (Surono, Nurali and Moningka, 2017).

Overall, the product rated highest by panelists was a snack bar with a flour formulation of 70% coconut dregs and flour tofu dregs of 30% (figure 1). Organoleptic evaluation by panelists: For all parameters, provide significantly different results ($P \leq 0.01$) for each formulation material used to make a snack bar. Furthermore, Duncan's test shows that the best formulation of the five treatments was a snack bar made from 30% flour coconut dregs and 70% flour dregs of tofu.

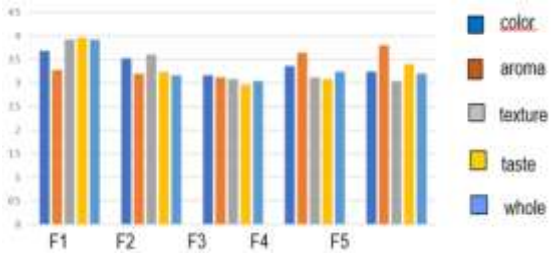

Figure 1. Organoleptic test results of snack bars made from coconut dregs flour and tofu dregs

3.2 Analysis proximate

The results of a proximate analysis of the product with the best formulation, namely a snack bar made from the basic ingredients of 30% coconut dregs flour and 70% tofu dregs flour, can be seen in Table 4.

Table 4. Proximate analysis results of a snack bar with formulation 30% coconut dregs flour and 70% tofu dregs flour

Parameter	Results (%)
Carbohydrate	53.07
Proteins	9.08
Fat	30.43
Ash	1.74
Water	5.68
Fiber	15,90

Based on the results analysis, content nutrition snack bars are made with a formula of 30% coconut dregs flour and 70% tofu dregs flour, that is, with a content of carbohydrates of 53.07%, protein of 9.08%, fat of 30.43%, ash of 1.74%, water content of 5.68%, and enough fiber of 15.90%. The comparison nutrient content of the best snack bar in the study compared to snack bars on the market, USDA (United States Department of Agriculture), and BPOM in 2020 can be seen in table 5.

The content of carbohydrates in the formulation should be at a sufficient level (high). Carbohydrate originates from coconut dregs flour, tofu dregs flour, and other ingredients added into the dough, such as eggs, margarine, and cashew nuts. The fat content of the snack bar results study is higher than *snack bars* that are commercially 20%, USDA 10.91%, and BPOM 30%. This can happen because there is an addition of as much as 35g of butter with the Forvita brand's own fat content of 31% of the quantity per packaging. Furthermore, the use of the base material from coconut dregs flour is said to increase the fat content in snack bars; it is known that the fat content present in coconut dregs flour is 9.2% (Marquez, 1999).

Table 5. Comparison of the proximate content of the best snack bars against several snack bars

Parameter	**SB1**	**Commercial***	**USDA****	**BPOM 2020 *****
Water content (%)	5.68	11.40	11.26	-
Ash Content (%)	1.74	-	1.72	-
Crude Fiber (%)	15.66	6	8.3	3 - 10
Protein (%)	9.08	10	9.30	20 - 50
Fat (%)	30.43	20	10.91	30
Carbohydrates (%)	53.07	-	-	-

Source: * Otsuka (2014); ** USDA (2015); *** BPOM (2020)

Temporary the protein content produced was 9.08% lower compared to commercial snack bars with an amount 10%, and also lower than the snack bar results study by Indrawan, Seveline and Ningrum (2018) made from coconut dregs flour and soybeans flour from 16.76%, this is not much different from USDA standards, that is 9.3%. The protein content of snack bars was low. The low protein content of the materials used causes this. Coconut dregs flour and tofu dregs flour result from waste residue, the protein's content has degraded, so snack bar content in this research is more affordable compared to commercial. The contents of coconut dregs flour, and tofu dregs flour own protein levels were 12.6% and 17.72%. Meanwhile, in the process of making commercial snack bars, the general material standard used is soya bean flour with a protein content of 41% (Indrawan, Seveline, and Ningrum, 2018).

The ash content of the product snack bar is 1.74%, 0.02% away from the USDA standard of 1.72%. There are a few of causal factors: the mark rate of ash going up, for one thing, because of mineral content in base material and food snack bars used. It is known that 100 g of has its own mineral content in the form of calcium of 19 g, phosphorus 29 g, and substances iron 0.004 g (Suprapti, 2005), the rate of ash in coconut dregs flour is 8.2%, with available mineral content such as sodium 0.085 g, potassium 0.33 g, calcium 0.27 g, magnesium 1.6 g, and iron 0.075 g (Herlina, Widiastuti and Dewi, 2020).

The water content of the snack bar is from the best formulation. This low, that is 5.68%, condition this can make a product more durable due to the condition. These microorganisms, especially bacteria, cannot grow well. The snack bar's water content can also directly influence the texture (Lucas et al., 2019). The low water content can be caused by the fact that in the manufacturing process of snack bars, there is material added to the food, namely sugar, jam, and honey. Third material food contains the compound sucrose, which has good water binding ability. Other factors that can influence water content are temperature and end production. According to research, the temperature used for making snack bars is 110°C for 40 minutes. The heating process can cause the water in the snack bar to evaporate.

The crude fiber in the resulting product is too high, caused by the material standard used, i.e., flour dregs from coconut contain rough fiber by 13%. In addition, other materials, such as cashews, also make fiber rough become high. In 100 g, cashew nuts contain fiber rough as much as 3.3 g (FatSecret, 2023). With the high fiber characteristics of this snack bar product so, after consumption, the soluble fiber goes into full effect and slows gastric emptying, so the stomach doesn't feel hungry as quickly (Murdiani, Kalsum, and Surono, 2022).Deep fiber body can help launch system digestion by inhibiting the absorption of carbohydrates or lowering the rate of glucose in the blood and lowering cholesterol in the body. So that is how the snack bar was created: use 30% flour dregs from coconut and 70% flour dregs from wheat. This is enough to nourish and supported with high fiber, so this product is good for health.

IV. Conclusion

Based on the results, the study concluded that flour dregs from coconut and flour dregs have potential as material bases for snack bars. The snack bar received the highest rating from panelists for a product made from formulation of 30% flour dregs from coconut and 70% flour dregs from wheat. The results of snack bars from flour dregs coconut and flour dregs are nutritious and good for health because they have a higher crude fiber than the USDA standard.

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