

Training of Banana Dodol Production at Ladang Bambu Village, Medan Tuntungan

Candra Sigalingging¹, Riswanti Sigalingging^{2*}, and Eni Duwita Sigalingging³

¹Department of Food Science and Technology, Universitas Nahdlatul Ulama Sumatera Utara, Medan, Indonesia

²Department of Agricultural and Biosystems Engineering, Universitas Sumatera Utara, Medan, 20155, Indonesia

²Department of Accounting, Universitas Quality Berastagi, Kabupaten Karo, Sumatera Utara, 22152, Indonesia

Abstract. Bananas are generally susceptible to mechanical, physiological, chemical and microbiological damage if handled inappropriately, thus requiring diversification in processing. Various ways of processing bananas have been developed to make various products with varied flavours, such as banana dodol. This service aims to provide knowledge about correctly processing banana dodol to produce delicious banana dodol with an attractive appearance, extend shelf life, increase the economic value of agricultural products, and increase food diversity. Providing technical guidance related to making banana dodol into food products can open new businesses for the community in district V of Ladang Bambu, Medan Tuntungan. Barangan bananas are preferable to using Kepok bananas in making banana dodol.

Keyword: Banana, Kepok Banana, Barangan Bananas, Dodol, Banana Dodol, Ladang Bambu

Abstrak. Pisang umumnya rentan terhadap kerusakan mekanis, fisiologis, kimia dan mikrobiologis jika ditangani secara tidak tepat, sehingga memerlukan diversifikasi dalam pengolahannya. Berbagai cara pengolahan pisang telah dikembangkan untuk membuat berbagai produk dengan rasa yang bervariasi, seperti dodol pisang. Pengabdian ini bertujuan untuk memberikan pengetahuan tentang pengolahan dodol pisang yang benar sehingga menghasilkan dodol pisang yang enak dengan tampilan yang menarik, memperpanjang umur simpan, meningkatkan nilai ekonomi produk pertanian, dan meningkatkan keragaman pangan. Pemberian bimbingan teknis terkait pembuatan dodol pisang menjadi produk makanan dapat membuka usaha baru bagi masyarakat di Ladang Bambu lingkungan V, Medan Tuntungan. Pisang barangan lebih disukai daripada menggunakan pisang kepok dalam pembuatan dodol pisang.

Kata Kunci : Pisang, Pisang Kepok, Pisang Barangan, Dodol, Dodol Pisang, Ladang Bambu

Received [1 November 2022] | Revised 20 November 2022 | Accepted [30 November 2022]

*Corresponding author at: Department of Agricultural and Biosystem Engineering, Universitas Sumatera Utara, Prof. A. Sofyan No. 3 Kampus USU, Medan

E-mail address: riswanti@usu.ac.id

1. Introduction

Bananas are widely cultivated in Indonesia because of their high nutritional value, low prices, and ease of cultivation. Banana trees are easy to find everywhere. According to BPS [1], banana production in North Sumatra increased from 100,254 tons in 2020 to 121,364 tons in 2021.

Banana varieties are divided into four: 1) Bananas are consumed Unripe conditions, namely *M. paradisiaca* var. *sapientum*, *M. nana* or *M. cavendishii*, and *M. sinensis*, such as Ambon, Susu, Raja, Cavendish, Barangan, 2) Bananas are consumed in ripe condition, namely *M. paradisiaca* forma *typica* (*M. paradisiaca normalis*), Such as Nangka, Tanduk, Kepok, 3) Banana seeds, namely *M. brachycarpa*, are used for their leaves in Indonesia. For example, Bananas Batu and klutuk and 4) Bananas, such as Manila bananas (*abaca*), are consumed as dietary fibre. Barangan banana is very popular with consumers, but the price is higher than other varieties [2-3].

Bananas have excellent nutritional content, especially energy from carbohydrates, which are high compared to other fruits. Bananas are rich in minerals such as potassium, magnesium, phosphorus, iron and calcium. Bananas also contain vitamins, namely C, B, B6 and serotonin complexes, which act as neurotransmitters in normal brain function. Bananas contain a lot of energy, protein, fat, vitamins, and minerals. According to [4], bananas have good nutritional content, providing sufficient energy compared to other fruits. Bananas are rich in minerals such as potassium, magnesium, iron, phosphorus, calcium, vitamins B, B6, C and serotonin, which acts as a neurotransmitter that helps the brain function properly. The average calorific value of a banana is 136 calories per 100g, whereas an apple has only 54 calories. The carbohydrates in bananas provide energy faster than rice and crackers, so athletes eat more bananas at rest to store energy. The carbohydrates in bananas are of moderate complexity and are available gradually so that they can provide energy in a short time.

The development of food processing technology impacts the increasing number of processed bananas often encountered in the market, including banana dodol. Dodol is a gel food made from rice flour, sugar, and other fillers such as fruit and seaweed. Dodol is a semi-wet food with high sugar content so it can be stored for a long time (from 1 to 3 months). According to Astawan [5], dodol is a food ingredient with relatively moist properties that can be consumed directly without pre-wetting (rehydration) and is also dry enough to be stable during storage. Making this dish is not difficult and can be done with tools commonly found in households so that it can become an industry at home.

Raw banana raw materials to be processed into heads must be selected when it is completely ripe. All types of bananas can be made into bananas, but the best dodol is made from Ambon bananas because of their delicious taste and intense aroma. Bananas for processing must choose ripe

bananas. Raw bananas can also be used as ingredients for lunch by making banana pita first. General quality requirements for slideways are given in Table 1.

Community capabilities can be developed, such as the ability to try, the ability to seek information, the ability for activity, the ability in agriculture and many more as needed or problems that arise in the community. What is developed from the community is potential or abilities and attitude to life. Community capabilities include, among others, the ability to farm, raise livestock, do entrepreneurship, or home-making skills industry, and many more abilities and community skills that can be developed.

Tabel 1. Dodol Quality Requirements, SNI No. 01-2986-1992

Nutrient content	unit	Total
Condition (aroma, taste and color)	-	Normal / typical dodol
Water content	% w/w	Max 20%
Ash	% w/w	Max 1.5%
Sugar that counts as saccharose	% w/w	Max 45%
Protein (N x 6,23)	% w/w	Min 3%
Fat	% w/w	Min 3%
Coarse Fiber	% w/w	Max 1.0%
Food Additives	-	In accordance with the SNI 0222-M and Regulation MenKes No. 722/MenKes/Per/Lx/88
Artificial sweeteners	-	Not real
Metal Contaminants:		
* Lead (Pb)	mg/kg	Max 1.0
* Copper	mg/kg	Max 10.0
* Zinc	mg/kg	Max 40.0
* Arsenic	mg/kg	Max 50.5
Microbial contamination:		
* Total Plate Number	Colony	Max 5 x 10 ²
* E. coli	APM/g	3
* Kapang dan Khamir	Colony/g	Max 1 x 10 ²

2. Method

The housewife group in Ladang Bambu Village, Medan Tuntung District, comprises homemakers from the lower to the middle class. The homemakers' husbands generally work as pedicabs and public transportation drivers. Based on this situation analysis, then some of the findings that have been identified as partner problems include 1) the low level of the workforce that does not complete SD/equivalent, 2) most of the women/girls there only as a housewife, 3) the low level of small home industries 4) low willingness of homemakers to start entrepreneurship. On the other hand, the location of the bamboo field is an agricultural area and a centre for traditional markets,

so the raw material for bananas is straightforward to obtain. Thus, technical guidance on processing Kepok and Barangan Bananas into dodol was conducted for the housewives, aiming to open business opportunities to increase the group's income. It must be completed and synergized between partners and the academic community to support this activity (Figure 1). The activities are divided into two stages, including the preparation stage and the mentoring stage. The ingredients used in making this banana dodol are ripe banana (kepok and barangan banana), sugar, brown sugar, glutinous rice flour, thick coconut milk, salt and water.



Figure 1. Team and partner of community service after socialization of technical guidance and bussiness oportunity of agricultural product processing

2.1 Procedure of Making Banana Dodol

There were 500 grams of banana (each type of banana kepok or barangan). The banana skin was peeled, and then mash it (it can be blended). Then the brown sugar (125 grams) was mashed using thin coconut milk. Prepare a container and mix the mashed bananas with the other ingredients (thick coconut milk 500 cc, 300 grams glutinous rice flour, Vanilla, and salt) and mix well. Then the dough is cooked while stirring until the dough becomes tough and thick. Then print with plastic coated and wait for it to cool. Cut into pieces according to taste, wrap with clean plastic, and serve. Next, perform organoleptic tests on taste, aroma, colour and texture.

2.2 Organoleptic Test

The total value of preference taste, aroma, colour and texture of dodol was determined by 22 panellists based on a hedonic scale and a numerical scale, as shown in Table 2.

Table 2. Hedonic and numerical scale of taste, aroma, colour and texture organoleptic test

Hedonic scale	Numerical scale
Like very much	4
Like moderate	3
Like slightly	2
Dislike	1

3. Results and Discussion

Colour is one of the main factors that are seen as the attractiveness of a food [6]. Several things cause food to have colour, including the pigment, the effect of heat on sugar (caramel), the reaction between sugar and amino acids, and the presence of mixing of other ingredients [7]. The best value of light brown colour is found in the treatment of banana dodol barangan, which was 3.68, with category 72.7% of panellists liking it very much and 27.3% like it (Table 3 and Figure 1). This result shows that the barangan banana will make the colour of dodol brighter and flashier than the addition of kepok bananas. According to [8], the pigment in Foodstuffs is a functional food that is very good for health because it is rich in nutrients and antioxidants.

Aroma is an important factor that affects food products received or rejected by consumers. According to [9] a good dodol emits a distinctive aroma of the materials used in processing. In the processing of banana dodol, the ingredients used are bananas, glutinous rice flour, coconut milk, sugar and salt. The scent of this dodol is a fragrant aroma, and it still smells like a banana. The best value for the distinctive aroma of bananas was found in the barangan treatment, which was 3.77, with a category 77.3% of panellists who liked the aroma very much and 22.7% of panellists liked it. This result means that the typical aroma of Barangan bananas used in making dodol is preferred to Kepok bananas.

Tabel 1. The percentage of panellist respond on hedonic test

	dodol kepok banana				dodol barangan banana			
	Colour (%)	aroma (%)	Taste (%)	texture (%)	Colour (%)	aroma (%)	Taste (%)	texture (%)
Like very much	40.9	40.9	36.4	59.1	72.7	77.3	72.7	95.5
Like moderate	59.1	59.1	63.6	40.9	27.3	22.7	27.3	4.5
Like slightly	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dislike	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

The delicious taste of banana dodol that panellists are interested in, and the smooth texture cannot be separated from the role of coconut milk added to the process of making this banana dodol. Hatta [10] states that the coconut milk used in making dodol consists of thick and thin coconut milk. The function of coconut milk, in general, is as a taste and aroma enhancer. Thick coconut milk is essential in making dodol because it contains fat, so dodol is produced, which has a delicious taste and forms a smooth texture. Meanwhile, the thin coconut milk melts the flour so that dough is formed to dissolve the sugar. [11] states that coconut milk in food processing functions as a heat transfer medium during cooking, increasing the delicacy (probability) of food by enhancing flavour, oiling food and equipment so that the dough does not easily stick to the utensils, and enhancing tenderness of dodol. This addition will improve the appearance of dodol and make it shinier.

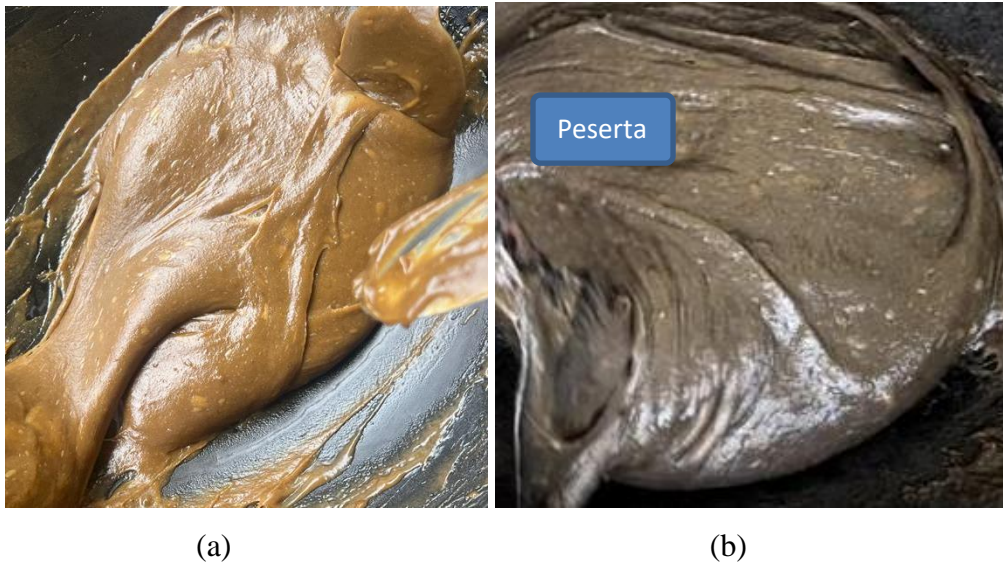


Figure 2. The colour and texture of banana dodol (a) barangan (b) kepok

The texture can be observed by being felt or seen while biting, chewing, swallowing and touching using fingers [12]. The main ingredient in making dodol is glutinous rice flour and coconut milk. During the heating process using coconut milk as a liquid, it will be absorbed by the starch contained in glutinous rice flour so that it forms a thick paste, and when it cools, it forms a chewy mass, resilient and tough [13]. Basito [14] also stated that the number of water levels could affect the texture, where the higher the water content in the food, the more it will be softer. The formation of the texture on this lunkhead is the result of starch from glutinous rice flour and corn that has been heated (gelatinized) [8]. Supiani [6] also stated that sugar affects the formation of dodol to make it more resilient and soft clay. The banana dodol's texture is smooth and non-sticky because it uses glutinous rice flour as the raw material for making dodol other than the banana itself. Glutinous flour has the highest amylopectin content, so the resulting product is elastic because coconut milk which contains fat and oil, is added. The outside of the shiny dodol is due to sugar coating or glazing. The best texture value (chewy and smooth) was Barangan bananas (3.95), with the category 95.5% of the panellists liking it very much and 4.5% of the panellists liking it. This result means that using barangan bananas is better than kepok bananas.

Taste is the main factor of food accepted or rejected by consumers. According to [9], the taste of food consists of three components: smell, taste and oral stimulation. [6] also states that granulated sugar gives a sweet taste to dodol. The brown sugar serves as an addition to the sweet and legit taste of dodol; mainly, the bananas used are already sweet (such as bananas kepok and barangan), then the addition of sugar can be reduced. The best taste value (sweet and sour) of banana dodol is in the addition of Barangan bananas, which was 3.73 with the category 72.7% of the panellists liked it very much, and 27.3% liked it. This result proves that adding Barangan bananas in manufacturing banana dodol is preferable to Kepok bananas. The final product was packed into box as shown in Figure 4.

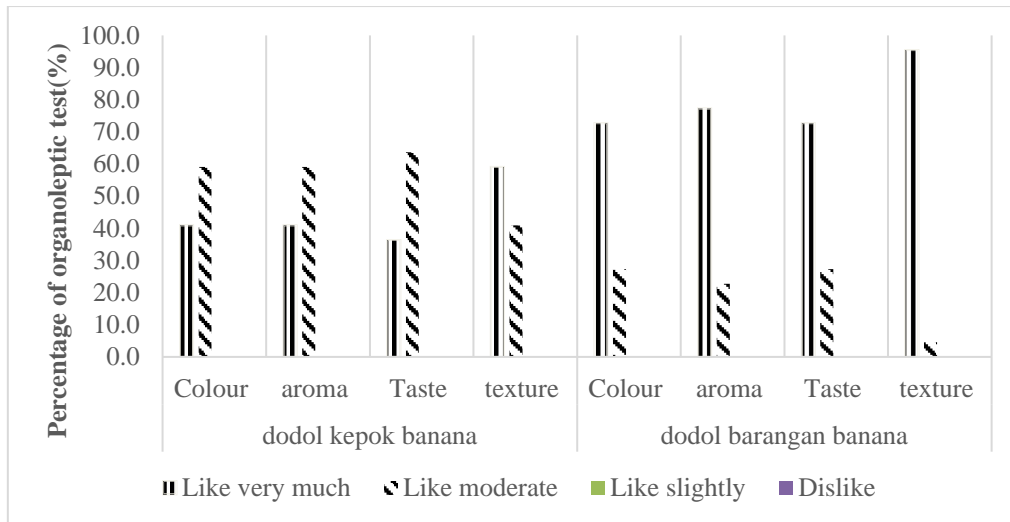


Figure 3. The percentage of panellist respond on hedonic test



Figure 4. The final product was packed into box

4. Conclusion

Barangan bananas are preferable to using Kepok bananas in making banana dodol. The percentage hedonic test value of 72.7 % of panellists liked very much the colour, 77.3 % of panellists liked very much on aroma, 72.7 % of panellists liked the taste very much, and 95.5 % of panellist liked very much texture. There is no dislike for the hedonic test using barangan banana or kepok banana as materials to make dodol.

REFERENCES

- [1] Badan Pusat Statistika, Produksi Tanaman Buah-buahan, 2022, <https://www.bps.go.id/indicator/55/62/1/produksi-tanaman-buah-buahan.html>
- [2] R. Novitasari, "Studi pembuatan dodol pisang, [Study of making banana dodol]" *Jurnal Teknologi Pertanian*, Vol. 2, No. 1, pp. 48-56, 2013.
- [3] S. Suryalita, "Review beraneka ragam jenis pisang dan manfaatnya,[Review of various types of bananas and their benefits]". *Prosiding Seminar Nasional Biologi*. Vol. 5, No. 1. 2019.
- [4] N. Harun and S. Fitriani, "Pemanfaatan tepung pisang kepok dan buah nangka kering dalam pembuatan snack bar, [Utilization of kepok banana flour and dried jackfruit in making snack bars]". *Jurnal Teknologi Pangan*, Vol. 13, No. 1, pp. 1-11. 2019.
- [5] M. Astawan and M. W. Astawan, Teknologi pengolahan pangan nabati tepat guna, [Appropriate plant-based food processing technology]. Akademika Pressindo, 1991.
- [6] S. W. Supiani and M. Syukri, "Analisis Organoleptik Dodol Pisang Raja (*Musa paradisiaca* L) Dengan Substitusi Tepung Wikau Maombo, [Organoleptic Analysis of Plantain Dodol (*Musa paradisiaca* L) With Wikau Maombo Flour Substitution]". *J. Sains dan Teknologi Pangan*, Vol. 1, No. 1, pp. 24-30, 2016.
- [7] F. G. Winarno, Kimia pangan dan gizi. PT Gramedia Jakarta, Indonesia, 2004.
- [8] A. Faridah, "The effect of Water extract of Brown Seaweed on the Characteristic of Jelly Candy as a Functional Food". *International Journal of Research and Review*. Vol. 6, No. 11, pp. 148-152. 2019.
- [9] A. Alyanti, P. Patang, and N. Nurmila, "Analisis Pembuatan Dodol Berbahan Baku Tepung Melinjo dan Tepung Beras Ketan, [Analysis of Making Dodol Made from Melinjo Flour and Glutinous Rice Flour]". *Jurnal Pendidikan Teknologi Pertanian*, Vol. 3, pp. S40-S51. 2017.
- [10] A. Rahim. "Karakteristik Fisikokimia dan Fungsional Pati Aren Asetat pada Konsentrasi Pati Aren yang Berbeda [Physicochemical and Functional Characteristics of Acetate Palm Starch at Different Palm Starch Concentrations]". *Prosiding*.
- [11] J. Genisa, Pengembangan pengolahan sereal untuk produk dodol dan bakso sehat, [Development of cereal processing for healthy dodol and meatball products]. 2014.
- [12] R. Wahyuni, "Pemanfaatan Buah Naga Super Merah (*Hylocereus costaricensis*) dalam Pembuatan Jenang dengan Perlakuan Penambahan Daging Buah yang Berbeda, [Utilization of Super Red Dragon Fruit (*Hylocereus costaricensis*) in Making Jenang with the Addition of Different Fruit Meat]" *Teknologi Pangan: Media Informasi dan Komunikasi Ilmiah Teknologi Pertanian*, Vol. 4, No. 1, 2012.
- [13] D. Kelmaskosu, R. Breemer, and F. J. Polnaya, "Pengaruh Konsentrasi Tepung Beras Ketan Terhadap Mutu Dodol Pepaya,[The Effect of Concentration of Glutinous Rice Flour on the Quality of Papaya Dodol]" *AGRITEKNO: Jurnal Teknologi Pertanian*. Vol. 4, No. 1, pp. 19-24, 2015.
- [14] B. Basito, "Sifat Fisik, Kimia, Dan Organoleptik Pada Pembuatan Dodol Yang Disubstitusi Dengan Wortel (*Daucus carota*, Linn),[Physical, Chemical, and Organoleptic Properties of Dodol Substituted with Carrot (*Daucus carota*, Linn) Production]" *Jurnal Teknologi Hasil Pertanian*, Vol. 4, No. 1, pp. 10-17. 2011.