

# Consumer Acceptability of Special Wafer Made from Pregelatinized Cassava Flour

Winda Haliza<sup>1</sup>, Ayu Kusuma<sup>1</sup>, Endang Yuli Purwani<sup>1</sup> and I. Putu Wardana<sup>2</sup>

<sup>1</sup>Balai Besar Penelitian dan Pengembangan Pascapanen Pertanian,  
Jl. Tentara Pelajar No. 12, Cimanggu, Bogor 16114, Indonesia

<sup>2</sup>Pusat Penelitian dan Pengembangan Tanaman Pangan, Jalan Merdeka 147 Bogor 16111, Indonesia

**Keywords:** Wafer, Pregelatinized, Cassava Flour, Gluten-free, Market Research.

**Abstract:** The identification of key extrinsic (marketing) and the intrinsic (sensory) product is important in new gluten-free food development to know consumer acceptance. Involving the consumer in the process of developing and marketing gluten-free foods through market research provides a more systematic means of managing consumer knowledge. The objective of this research was to assess consumers' interest and acceptability toward new products "Special Wafer Made from Pregelatinized Cassava Flour". The online survey was applied to consumers using google forms and the respondents were distributed randomly. Results revealed that the respondent's age was 39 years old on average, more than 70% of respondent desperately needed healthy snacks for their daily life with specific nutritional content. Less sugar, gluten-free, and good taste also greatly affected the willingness to pay for the product. When combined with a specific flavor the consumer would like to pay more. Also, the potential market of this product could be broadened not only for those people with a health problem such as celiac diseases but also for those people with a healthy lifestyle.

## 1 INTRODUCTION

Cassava (*Manihot esculenta*) is one type of native tuber from Indonesia. As third staple food after rice and corn (Murniati et al., 2020), cassava productivity in various regions in Indonesia (2012 to 2016) increases on average by 2.85%, and the production reached 22.819,484 tons in the same period (Nuryati et al., 2016). This fact proved that Indonesia is the largest cassava producer in Asia, with a production rate of 44 kg per capita per year compared to 37.3 kg of the regional average (Howeler et al., 2013). Cassava is considered inferior because of its presentation as ready-to-eat food less attractive and perishable (Hariyadi, 2011). Cassava flour has the potential to be used as a substituent of flour in making bakery products.

For wider utility, the cassava flour needs to be modified to become more flexible than the existing cassava flour through the pre-gelatinization of starch. Starch gelatinization is a physical process of breaking down the intermolecular bonds of starch molecules in the presence of water and heat, allowing the hydrogen bonding sites (the hydroxyl hydrogen and oxygen) to engage more water. This irreversibly dissolves the

starch granule in water. Water acts as a plasticizer (Niba et al., 2006).

A physical modification was carried out in the cassava through a heating process close to the gelatinization temperature (70-80 degrees Celsius) under conditions of limited water content. The flour showed high quality in terms of fine texture and bright colors. Pregelatinized cassava flour was the newest innovation of the IAARD (BB Pascapanen, 2017).

Nowadays, a wafer is a popular snack in Indonesia. The application of cassava flour in wafer products would have a bigger impact on people with health problems such as celiac disease (Fasano & Catassi, 2012) and healthy lifestyles.

The identification of key extrinsic (marketing) and the intrinsic (sensory) product is important in new gluten-free food development to know the consumer acceptance Involving the consumer in the process of developing and marketing gluten-free foods through market research provides more systematic means of managing consumer knowledge. The objective of this research was to assess consumers' interest and acceptability toward new products "Special Wafer Made from Pregelatinized Cassava Flour".

## 2 RESEARCH METHODOLOGY

The online survey was applied to consumers using google forms. The consumers were selected randomly and invited to provide their preference for these products. Also, the secondary data including scientific papers such as journals, proceedings, annual reports, and books were reviewed. Both qualitative and quantitative approaches were applied. The qualitative approach was carried out to have an in-depth analysis of understanding the knowledge and perception of customers and related stakeholders of pregelatinized cassava flour and value chain. The quantitative approach was used to evaluate the product properties.

## 3 RESULTS

Most respondent (42%) was living in Bogor, followed by Jakarta (12.5%), and other cities such as Surabaya, Lampung, Sukabumi, Palu, Malang, and Semarang. The proportion of female and male respondents was 52.5% and 47.5%, respectively (Table 1).

The respondents with >39 years old dominated the survey (70%), followed by the age of 24-39 years, 19-23 years, and <19 years with percentages of 22.5%, 5%, and 2.5%, respectively. Most of the respondents were civil servants (37.5%), followed by private employees and self-employed (at 22.5%), and students (7.5%). A total of 45% of respondents have income of IDR 5,000,000 - 10,000,000. Then, the rest have income of 1,000,000-5,000,000 (30%) and 10,000,000 (20%). The respondents' activity in social media was varied, about 20% of respondents were very active on social media, followed by active (27.5%), quite active (37.5%), and not active at all (15%).

Table 1: The characteristics of the respondent.

Characteristic of respondent	Percentage			
Male	52.5%			
Female	47.5%			
Age	70% (>39)	23% (24-39)	5% (19-23)	2% (10-18)
Monthly income (IDR)	45% (5.000K-10.000K)	30% (1.000K-5.000K)	20% (>10.000K)	5% (<1.000K)

The respondents' perceptions of the nutritional value of wafer products were important. Most respondents were aware of the important nutrients (i.e. vitamins, antioxidants, calcium, less sugar, and gluten-free) but fewer respondents have disagreed

with a gluten-free - non-dairy wafer (Figure 1). The best knowledge was expressed by people of >39 years old, followed by 24-39 years old. Healthy snacks such as healthy wafers were also very popular. Almost all age groups were agreed that healthy wafer contained high nutritional value and important as healthy food.

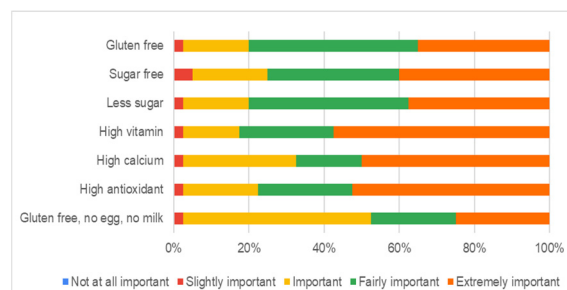


Figure 1: The awareness of respondents to nutrition value.

All respondents have experience in consuming wafers. The frequency of wafer product consumption was dominated by 1-3 times/month, followed by several times/year and once/week (Table 2). More consumers like the wafer product with chocolate and thick wafer.

Table 2: Character habits of subjects.

Character habits of subjects	Decision	Share (%)
Frequency of consumption of wafer products	Every day	0%
	1-3 times/week	1%
	Once/week	21%
	1-3 times/month	45%
	Once/month	10%
	Several times/year	23%
Consumption of wafer products	Yes	100%
	No	0%
Consumer preference: flavoured wafer products	Chocolate	36%
	Vanilla	28%
	Strawbery	19%
	Cheesy/salty/sovoiry	17%
Varian wafer products	Thin	48%
	Thick	53%

Specific factors that contribute to the selection of products, like quality, sensory properties, packaging, brand, price, special properties, and net weight, have been classified as “not at all important”, “slightly important”, “important”, “rather important” or “extremely important” for the buying decision process. Product quality and sensory properties were perceived as “extremely important” by all subjects, regardless of age. All subjects rate was rated as “important” when making buying decisions. The brand was “important” or “fairly important” for everyone, as the price and packaging. The effect of special properties has been classified as “important” or “extremely important” by all subjects regardless of age (Figure 2).

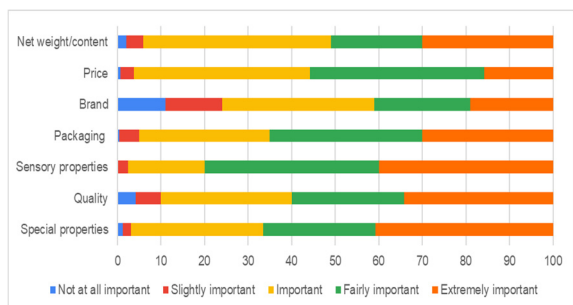


Figure 2: The importance of specific factors influencing food purchasing decisions.

Based on the public perception, the special wafers (wafers with additional functional value) were highly appreciated by the market. The respondent gave high enough points to this product (score of 4-5) and this indicated that the respondents agreed or extremely agree. Besides, the consumers would willing to pay more if the special wafers were combined with an acceptable taste. Approximately 80% of respondents thought that a special wafer would have an excellent selling value, and 75% of respondents predicted that a special wafer would have a good target market (Figure 3). The percentage of respondents willing to buy wafers at Rp. 2000-3000 per pack was 35%, followed by at Rp. 1000-2000 per pack (20%), and at a price of less than Rp. 1000 (7.5%).

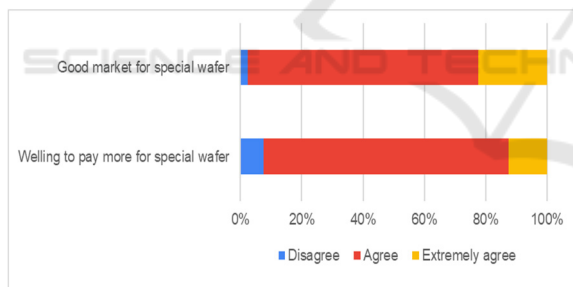


Figure 3: Respondents perception of the special wafer.

The new wafer products have been described into 5 sensory properties (i.e. appearance, aroma, texture, taste, and overall categories). The aroma of the wafer sheets and the filling of special wafer products were characterized. The filling was uniform and spread evenly between wafer sheets. The aroma was medium sweet with a distinctive smell of flavor. No cassava flavor was present. Also, the product was not tough texturally and have ideal chewiness (Figure 4).

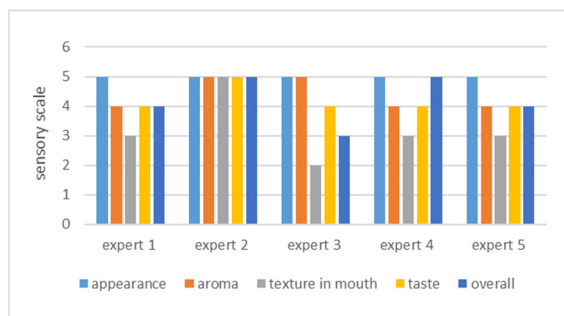


Figure 4: The sensory profile of the new products.

Most segments of consumer age preferred new wafer products made from pregelatinized cassava flour, except for those over 39 years old and 10-18 years old (Figure 5).

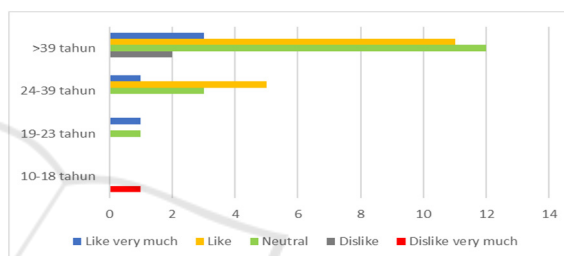


Figure 5: The consumer preferences for special wafer.

## 4 CONCLUSIONS

More than 70% of respondents desperately needed healthy snacks for their daily lives with specific nutritional content. Less sugar, gluten-free, and good taste also greatly affected the willingness to pay for the product. When combined with a specific flavor the consumer would like to pay more. Also, the potential market of this product could be broadened not only for those people with health problems such as celiac diseases but also for those people with a healthy lifestyle.

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## REFERENCES

- BB Pascapanen. 2017. Pengembangan Teknologi Tepung Ubikayu Termodifikasi Untuk Substitusi Terigu. Laporan Akhir Kegiatan
- Fasano, A., & Catassi, C. (2012). Celiac disease. *The New England Journal of Medicine*, 367, 2419–2426. <https://doi.org/10.1056/NEJMcp1113994>
- Hariyadi, H. (2011). Teknologi modifikasi tepung kasava. *Agritech*, 31(2), 86–92. <https://doi.org/10.22146/agritech.9730>
- Howeler, R., Litaladio, N., & Thomas, G. (2013). *Save and grow: Cassava – a guide to sustainable production intensification*. Food and Agriculture Organization.
- Murniati, K., Widjaya, S., Adawiyah, R., & Listiana, I. (2020). Cassava production and food security of cassava farmers' household, Lampung, Indonesia. *Plant Archives*, 20 (Supplement 2), 1764–1768.
- Niba, L., Bokanga, M., Jackson, F., Schlimme, D., & Li, B. (2006). Physicochemical properties and starch granular characteristics of flour from various *Manihot esculenta* (cassava) genotypes. *Journal of Food Science*, 67(5), 1701–1705. <https://doi.org/10.1111/j.1365-2621.2002.tb08709.x>
- Nuryati, L., Waryanto, B., & Akbar, A. (2016). *Outlook: Komoditas SubSektor Tanaman Pangan - Ubi Kayu*. Ministry of Agriculture, Republic of Indonesia.

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