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The Effects of Sensory Attributes of Food on Consumer Preference

Riyanti ISASKAR[1], Dwidjono Hadi DARWANTO[2], Lestari Rahayu WALUYATI[3], Irham IRHAM[4]

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Abstract

The purpose of this study is to compare preferences of consumers between food items made from modified cassava flour and plain flour using sensory tests. This study is a qualitative research with an experimental approach and four food items, namely streamed brownies, cookies, fried mushrooms, and seasoning flour have been used for the study. Each of these food items are made from modified cassava flour and plain flour. Panelists wore blindfolds and tasted the food items except the seasoning flour. Based on the data analysis, the panelists have different preferences towards the four food items. The result of the paired Wilcoxon test showed that there is not any different preference in terms of taste of steamed brownies made from mocaf or plain flour, while there is a significant difference in terms of color, aroma, texture, and appearance between the steamed brownies made from mocaf and plain flour. Consumers decide to buy products made from mocaf because these products use local flour and are gluten-free. This article describes the customer's preference based on sensory analysis between products made from mocaf and ones made from plain flour. The result can be used as the basis for developing food items made from local flour and alternative food for customers allergic to gluten.

Keywords: Consumers Preferences, Gluten, Modified Cassava Flour, Sensory, Wheat Flour

JEL Classification Code: D11, D18, L67, P46

1. Introduction

To understand customer's buying decision is a pivotal element in marketing. In the agricultural industry, information on customer's preferences is needed to develop a product that matches customer's expectations. Various attributes, for example, quality, price, packaging, and promotion, can influence customer's preference towards goods and services. Each consumer has his or her preference for a product and this can be evaluated using sensory evaluation. Sensory test has been conducted for a long time to evaluate the quality of food, water and everything else human beings consumed and used (Meilgaard et al., 1999).

Sensory evaluation is conducted in various business sectors, including product development and quality control. Carbonell-Barrachina (2007) mentioned that large companies conduct sensory evaluation every day in several divisions, for instance, quality control, research and development, and marketing. Middle-scale companies use sensory evaluation as one of the modern instruments to improve efficiency and generate higher income. A small company does not have either personal structure or qualification to conduct sensory test, but this company is interested in this test, Carbonell-Barrachina (2007) explained. To maintain product quality, knowledge of raw materials and technology for sensory attributes can develop an organized system from characteristics of product quality (Vazquez-Araujo et al., 2008). The sensory expert is responsible for providing sufficient information about the products and its customers. Between 75 to 90 percent of products, particularly food and beverages, fail in their first year (Kemp & Hort, 2015). Knowledge of sensory,

[1]First Author and Corresponding Author. Lecturer, Brawijaya University, Indonesia [Postal Address: Veteran Street, Lowokwaru, Malang City, East Java, 65145, Indonesia]
Email: riyanti.ub.fp@gmail.com
[2]Lecturer, Gadjah Mada University, Indonesia [Postal Address: Bulaksumur, Caturtunggal, Kec. Depok, Kabupaten Sleman, Daerah Istimewa Yogyakarta 55281, Indonesia]
Email: dwidjonodarwanto@gmail.com
[3]Lecturer, Gadjah Mada University, Indonesia [Postal Address: Bulaksumur, Caturtunggal, Kec. Depok, Kabupaten Sleman, Daerah Istimewa Yogyakarta 55281, Indonesia]
Email: waluyatilestari@gmail.com
[4]Lecturer, Gadjah Mada University, Indonesia [Postal Address: Bulaksumur, Caturtunggal, Kec. Depok, Kabupaten Sleman, Daerah Istimewa Yogyakarta 55281, Indonesia]
Email: irhamirham.ugm@gmail.com

combined with other branches of science in research and development (RandD) and marketing, can provide a more holistic contribution once applied correctly to understand product characteristics and develop products that match customer's preference (Talavera & Chambers, 2016). Sensory evaluation is a basic instrument in food science and widely used in research and industry (Bower, 1995). In the last few years, the development of sophisticated methods for sensory evaluation lies in two separate techniques. The first technique is Quantitative Sensory Description (QSP) with skilled panelists for food evaluation, while the other is to invite customers as sensory panelists (Seaman et al., 1993). Sudarsono and Nugrohowati (2020), showed that the relationship of religiosity, knowledge, and attitude has a positive effect on consumer intention to consume halal food. Nguyen et al. (2019) showed that Five food image attributes (taste, health issues, price, style of presentation, restaurant vendor/staff) show a positive relationship with satisfaction leading to positive word of mouth promotion and return to tourism.

Most processed food items available in the market, such as bread, biscuit, cakes, and crackers, are made from plain flour (Pongjanta et al., 2006). In 2016, APTINDO showed that the increasing demand of the food industry towards plain flour will result in higher dependence of Indonesia on imported wheat and plain flour from time to time. Food and beverage entrepreneurs should take advantage of this condition and use local flour for product innovation (Hakim & Fernandes, 2017). Local flour has similar characteristics to plain flour and food scientists began to develop mocaf (Modified Cassava Flour). Mocaf is made from processed cassava fermented using enzymes (Rangkuti et al., 2020). This flour has a distinctive cassava aroma and flavor consumers dislike (Subagyo, 2006). Mocaf is gluten-free and is suitable for consumers with celiac disease who is allergic to flour (Morais et al., 2013). Pham (2020) showed that considerations for food security have received little research consideration across the organic produce field.

Several food items such as steamed brownies, cookies, fried mushroom, and seasoning flour made from mocaf and plain flour are used in sensory tests conducted in this study. The objective of this study is to compare consumer's preferences on the four food items made from mocaf. The result can be used for developing alternative products (processed food) made from mocaf.

2. Literature Review

2.1. Quality Management in Increasing Customer Satisfaction

Various definitions of quality have been conveyed by many experts, including Heizer and Render (2004) that "Quality is the totality of features and characteristics of a product or service that bears on its ability to satisfy stated or implied need". The concept of quality is a measure of each individual's relative satisfaction with a good or service that relies on design quality and conformity quality. A product is said to be of quality when the perceived quality is the same or more than the expected quality by consumers (Parasuraman et al., 1985).

2.2. Consumer Preference through the Sensory Test approach

An understanding of why consumers make decisions to buy and consume a product is very important in the marketing process, especially for the agro-industry, information related to consumer preferences is needed in product development so that the resulting product is expected to be following consumer wants and needs. Various attributes such as product quality, price, packaging, and promotion can affect consumer preferences for a product or service. However, the preferences of each consumer is not necessarily the same for one product and this can also be traced through sensory evaluation. Sensory tests have been carried out for as long as there are humans who evaluate the good or bad of food, water, and everything else that is used and consumed (Meilgaard et al., 1999).

2.3. Clusterization Analysis in the Marketing Sector

The purpose of cluster analysis is to classify objects based on their characteristics. Cluster analysis groups objects (respondents, products, or other entities) so that they become objects that are similar to others in a cluster. Cluster analysis is actually similar to factor analysis, namely both assess a structure, the difference is cluster analysis analyzes objects while factor analysis analyzes variable grouping (Ghozali, 2016). Cluster analysis is widely used in marketing such as forming segments based on demographic data, psychographic profiles of test market cities, determining similar markets in different countries and searching for similar groups (clusters) of magazine readers to assist in media / magazine selection (Supranto, 2004). Cluster analysis is divided into two methods, namely the hierarchical method and the non-hierarchical method.

2.4. Potential Development of MOCAF Flour (Modified Cassava Flour)

With the growing need for food by forcing the government together, the food industry and universities need to design strategies to achieve food self-sufficiency so that they can meet food needs independently based on the diversity of

food resources and local culture (diversification). One of them, food sources of carbohydrates based on local materials (indigenous resources), namely cassava which plays an important role in the food structure of Indonesian society, because this plant is an important source of carbohydrates besides rice, corn, and sago. The high starch content of cassava is a great potential to be developed into a higher value product for food, feed, and industry. One of the products that can be developed from the commodity of cassava is mocaf flour (Subagyo et al., 2008).

2.5. Theoretical Basis

2.5.1. Theory of Planned Behavior

Humans usually behave in a way that makes sense, they consider their behavior based on available information, and implicitly or explicitly also consider the consequences of their actions (Ajzen, 2005; Wong, 2012). Furthermore, in Ajzen (2005) it is explained that behavior is based on the will factor which involves considerations to do or not perform a behavior, wherein the process, these various considerations will form the intention to carry out a behavior.

2.5.2. Consumer Satisfaction Theory

Various experts say that consumer satisfaction is a condition in which the product's expectations are met (Kotler & Amstrong, 2012). Meanwhile, Kotler and Keller (2009) also explained that consumer satisfaction is a feeling of pleasure or disappointment for someone who appears after comparing the performance of the product that is thought of against the expected performance. Lonial and Zaim (2000) also provide a similar definition that consumer satisfaction is an inevitable result of product purchases and consumption experiences resulting from a comparison of what is expected and what is received. In other words, customer satisfaction is a particular response as a result of his evaluation of the gap in expectations and the performance of the product or service being consumed.

2.6. Business Cost and Income Theory

2.6.1. Cost Theory

In producing output, every agro-industry requires production factors such as raw materials, labor, capital, and so on. To obtain these production factors, it is necessary to make sacrifices in the form of costs that must be incurred or what is often referred to as production costs.

Production costs incurred in a business are divided into two, namely fixed costs and variable costs (Sukirno, 2011). Fixed costs are costs that are not influenced by the amount of output produced. Meanwhile, variable costs are the costs incurred that are influenced by the amount of products produced. In the mocaf flour agro-industry, fixed costs consist of depreciation costs for equipment, loan interest on working capital, and rental costs (if the agro-industry rents a special place). Variable costs can be in the form of raw material costs (cassava), other supporting material costs, labor costs, and packaging costs.

2.6.2. Income Theory

The performance of an agro-industry is an implementation of a previously prepared plan. Performance measurement needs to be done to find out whether there are deviations in the implementation of the plan that can interfere with the achievements of the goals. Various agro-industry performance measurements can be seen from the aspects of productivity, quality aspects, and aspects of finance or business income.

According to Soekartawi (2000), agro-industry income can be obtained by calculating the difference between the total revenue received from business results and the total production costs incurred. Agro-industry total revenue is the amount of money received from the sale of the products produced, while the cost is the amount of money spent during the processing.

2.7. Marketing Management Theory

Marketing is an important factor in the industrial activities related to meeting consumer needs and wants. The definition of marketing is broader than just selling. According to the American Marketing Association in Kotler and Keller (2008) that marketing is an organizational function and a series of processes for creating, communicating, and providing value to customers to manage customer relationships in a way that benefits the organization and the parties who have expectations from the organization. Furthermore, it is stated in Kotler and Keller (2009) that marketing is a total business activity designed to plan, determine prices, promote and distribute products and services with the desire to satisfy consumer needs which are expected to be able to anticipate global developments.

2.7.1. Segmentation

The basis for segmenting depends on the type of segmentation: consumer market segmentation, business market segmentation, and international market segmentation. For consumer segmentation, several main variables can be used (Widjaya, 2017):

1. Geographical, geographic segmentation includes nation, region, country, district, city, or even neighbors. Companies can decide to operate in one

or more of these geographic areas or even all areas entered but still pay attention to the different needs and wants of consumers in these areas.
2. Demography, demographic segmentation is a process of dividing the market into groups of demographic variables: age, life cycle, gender, family size, income, occupation, education, religion, ethnicity, and nationality.
3. Psychography, psychographic segmentation divides consumers based on social class, lifestyle, or personal characteristics/personality.
4. Behavior, this segment divides buyers based on their knowledge, behavior, use of goods, or responses to goods.

2.7.2. Targeting

The company must evaluate the various segments and decide how many and which segments to target. In evaluating different market segments a company must pay attention to three factors, namely:

1. Segment size and growth.
2. Segment structural attractiveness.
3. The company's goals and resources.

2.7.3. Positioning

After deciding which market segment to enter into, the company must decide on a competitive position with competitors that can be embedded in the minds of consumers. Some positioning strategies that can be done:

1. Identify distinct set of competitive advantages on which to build a position.
2. Choosing the right competitive advantage.
3. Choose an overall positioning strategy.

2.8. Consumer Behavior Theory

Zaltman and Wallendorf (1979) in Mangkunegara (2002) explained that consumer behavior is the actions, processes, and social relationships carried out by individuals, groups, and organizations in obtaining and using a product or another as a result of their experience with products, services, and other resources. According to Kotler and Keller (2008) consumer behavior is a study of how individuals, groups, and organizations choose, buy, use and place goods, services, ideas, or experiences to satisfy their wants and needs. The same thing was also conveyed by Hawkins and David (2010), consumer behavior is a field of science that studies how individuals, groups, and organizations choose, make purchases, use, and utilize goods, services, ideas, or experiences to satisfy their needs and desires.

2.8.1. Factors Affecting Consumer Behavior

Broadly speaking, in consumer behavior, purchasing decisions are influenced by two major factors, namely external factors and internal factors. The external factors are:

a. Cultural factors
   Simamora (2004) explained that cultural factors have the widest and deepest influence on consumer behavior. Marketers must understand the role played by the culture, sub-culture, and social class of buyers.
   1. Culture
   2. Sub-culture
   3. Social class
b. Social Factors
   Consumer behavior will also be influenced by social factors such as small groups, family, role, and social status of the consumer. This factor greatly affects consumer responses, therefore marketers must take it into account to formulate a marketing strategy.
   1. Group
   2. Family
   3. Role and Status
c. Personal Factors
   A buyer's decision is also influenced by personal characteristics such as age and stage of the buyer's life cycle, position, economic situation, lifestyle, personality, and the buyer's self-concept.
   1. Age and stage of the life cycle
   2. Profession
   3. The state of the economy
   4. Lifestyle
   5. Personality and self-concept
d. Psychological factors
   The choice of goods and services purchased by a person is further influenced by several psychological factors include: motivation, perception, learning process, beliefs, and attitudes.
   1. Motivation
   2. Perception
   3. Learning
   4. Beliefs and Attitudes
e. Buying decision
   Purchasing is a process in which the buying activity itself is one of the stages of the entire consumer buying process, starting from the experience of needs and wants to post-purchase behavior. According to Kotler (2002), there is a five-stage model in the consumer purchasing process, namely:
   1. Introduction to Problems
   2. Information Search
   3. Evaluation of Alternatives
   4. Purchasing Decisions
   5. Post Purchase Behavior

2.9. Research Hypothesis

Based on the flow of thought and objectives to be achieved in this study, the research hypothesis is formulated as follows:

Objective 1: There are differences in consumer preferences for each processed food product made from mocaf and made from flour.

Objective 2: Perceptions of product quality, product prices, product value, service quality, and information sources influence the intention of re-consumption.

Objective 3: The response of the food product agro-industry based on mocaf flour to the quality of mocaf flour products is quite satisfactory.

Objective 4: The agro-industry for making mocaf flour in Malang Regency is profitable and feasible to develop.

3. Methodology

This study is qualitative research with an experimental approach (Swahn et al., 2012; Zhao et al., 2018). Sensory analysis is used to capture consumer's preference for products made from mocaf. Sensory analysis plays a pivotal role in the food and beverage industry as it helps to increase the quality of product (Watson, 1992; Limba et al., 2019; Irie et al., 2018; Pacheco et al., 2018). There are six parameters used in the sensory analysis, namely taste, color, texture, aroma, appearance and overall attribute (Kulkarni & Joshi, 2013). An individual responsible for sensory test is a panelist or assessor (Watson, 1992).

Panelists are selected based on a nonprobability sampling design with convenience sampling (Pacheco, et al., 2018; Kubberod et al., 2002). The panelists are 18 to 60-year-old customers who are willing to try out the tested products. The panelists are not categorized based on their sex. Sensory tests can be conducted in the panelists' homes or campuses. Total panelists for each product are 50 and thus, the total panelists for all food items being tasted are 200 panelists (Table 1).

Food items being tested are steamed brownies, cookies, fried mushrooms, and instant seasoning flour. Each product is made from two types of flour with the same composition. The panelists wore blindfolds and tasted the food (blind test) (Kubberod et al., 2002; Ackaradejruangsri, 2013) and they did not know which food is made from plain flour and which one is made from mocaf. An organoleptic test (non-blind test) was conducted for the seasoning flour to prevent the panelists from identifying the types of flour used to make the product (Hutahayan & Wahyono, 2019).

Sensory data are obtained from hedonic evaluation test in which consumer's preference is scored between 1 (dislike extremely) and 5 (like extremely) (Ana et al., 2017; Ismail et al., 2014; Solimun and Mangesti, 2019; Sumarto et al., 2018) for five sensory aspects, namely taste, color, aroma, and texture (Omoba & Azeez, 2016), as well as appearance (Hulten, 2011). In other words, the panelists should score food items made from both plain flour and mocaf based on the five sensory aspects. The data are then analyzed based on two related sample nonparametric statistics (Wilcoxon Sign Rank Test) and SPSS to find out whether or not there is a difference in terms of customer's preference between food items made from local flour (mocaf) and plain flour (Fernandes et al., 2014). The hypotheses are as follows:

***H0*:** There is no difference in terms of customer's preference, measured with a sensory test, between food items made from mocaf and plain flour;

Ha: There is a significant difference in terms of customer's preference, measured with a sensory test, between food items made from mocaf and plain flour.

4. Results and Discussion

Submission There is a relationship between consumer's characteristics, such as sex, age, number of children, income, and background of education (Verbeke, W., 2004) and participation or awareness towards food item (Verbeke & Vackier, 2005) including consumer's preference. Table 1 described panelist or consumer profiles.

Table 1 showed that the percentage of female consumers are higher than the male consumers since females are understood to be more consumptive, particularly towards healthy products (gluten-free product and products made from mocaf). In general, literature also show that women are more health-conscious than men (Fagerli & Wandel, 1999; Beardsworth et al., 2002; Kubberod et al., 2002). 63% of the consumers are between 18 and 39 years old and 67% of them are university graduates. It means the panelists are within productive age and well-educated, and thus, are interested in discussing product development that uses local commodity and are healthy. 47% of the panelists are either government officers or work in private companies. 70% of them make lower than 3.5 million per month and 80% of them have between 3 to 8 family members. The number of family members is also associated with opportunity for product development, in which intervention from parents to their children becomes one of the most important factors Crockett and Sims (1995), Story et al. (2002), Shepherd et al. (2006), and Pearson et al. 2008). Sensory analysis for the four products, Wilcoxon Signed Ranks Test, gives different significant outcomes for each attribute. This significant difference may happen due to production (process), and other ingredients and as a result, customers have a different preference towards each sensory attribute. Consumer's preference for each product can be explained as follows:

Table 1: Characteristics of Panelist in Sensory Test for Products Made from Mocaf

Characteristics	Code	N	%
Gender	Male	42	21
	Female	158	79
	Total	200	100
Age (Years)	18–28.5	94	42
	> 28.5–39	42	21
	> 39–49.5	36	18
	> 49.5–60	28	14
	Total	200	100
Education Level	Elementary	2	1
	Junior High	6	3
	Senior High	44	22
	3-Year Diploma	14	7
	Bachelor's Degree	84	42
	> Master's Degree	50	25
	Total	200	100
Job	Government officer	44	22
	Private	54	27
	House Wife	39	19.5
	Student	63	31.5
	Total	200	100
Income (Millions)	Less than 1	46	23.0
	1–2	47	23.5
	> 2–3.5	47	23.5
	> 3.5–5	27	13.5
	More than 5	33	16.5
	Total	200	100
Household Size	1 person	10	5
	2 persons	31	15.5
	3 persons	52	26
	4 persons	57	28.5
	5–8 persons	50	25
	Total	200	100

4.1. Steamed Brownies

Customer's preference for each product is different (Wang & Adhikari, 2018). The decision to select and consume one product (food item) is affected by several factors (Ackaradejruangsri, 2013). Several sensory attributes influence the result of the Wilcoxon Sign Rank showing customer's preference towards steamed brownies made from mocaf and plain flour.

Figure 1 showed that consumers prefer steamed brownies made from plain flour to one made from mocaf. 40.80% of consumers prefer steamed brownies made from plain flour while 12.80% of consumers prefer steamed brownies made from mocaf (Table 2). Texture is the sensory attributes of steamed brownies made from plain flour with the highest average preference (4.22). The average preference of taste is 4.10. Taste is the sensory attribute of steamed brownies made from mocaf with the highest percentage (3.84) and the average preference of appearance is 3.78.

P-value of taste, one of the five sensory attributes, is 0.086 or higher than 0.05. It shows that there is not any significant difference between steamed brownies made from mocaf and steamed brownies made from plain flour. *P*-values of the other four sensory attributes are <0.05 which means there is a significant difference in terms of color, aroma, texture, and appearance between steamed brownies made from mocaf and steamed brownies made from plain flour. The consumers stated that the steamed brownies made from plain flour are more delicious and softer than the one made from mocaf. Most of the customers are not familiar with food items made from mocaf, particularly steamed brownies and as the result, an organoleptic test revealed that consumers can distinguish between steamed brownies made from mocaf and one made from plain flour. As an addition, mocaf, the main ingredient of the food items, is produced manually by small-scale agroindustry and as the result, mocaf has a slightly coarser particle size than plain flour and steamed brownies made from plain flour is softer than steamed brownies made from mocaf.

4.2. Cookies

Snack plays an important role in our daily consumption (Kahlon et al., 2017). Cookie is one of the most favorite snacks and thus, nearly all supermarkets and shops sell one. Most cookies are made from plain flour. However, a sensory test revealed that mocaf can potentially be used as a substitute for plain flour in cookie baking.

Based on Figure 2, the consumers prefer the color, aroma, and appearance of cookies made from mocaf to the color, aroma, and appearance of cookies made from plain flour. The average score of cookies made from mocaf color is 3.98, that of its appearance is 3.96 and that of its aroma is 3.92. These scores indicate that the consumers like cookies made from mocaf. Furthermore, the average score showing a taste of mocaf cookies made from plain flour taste is 4.10, while that of its texture is 3.92. These two are dominant factors in the customer's preference.

The result of the paired test Wilcoxon shows that *p*-values of the five sensory attributes of the cookies are >0.05 which

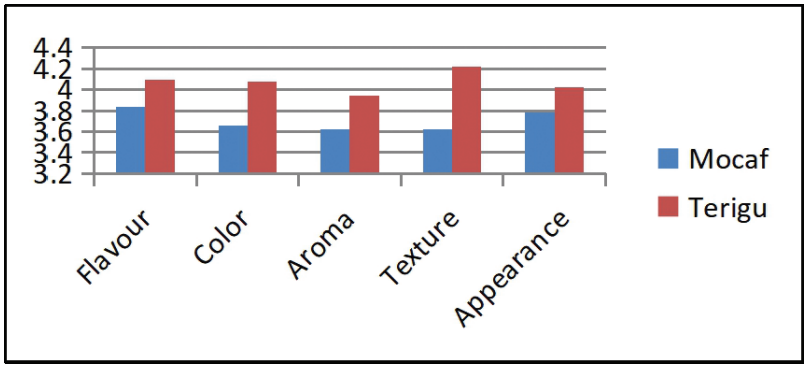

Figure 1: Average Score of Consumer's Preference towards Steamed Brownies made from Mocaf and Plain Flour

Table 2: Mean Score and *P*-Value of Brownies Steam Product Base on Result Wilcoxon Signed Ranks Test

Information	Prefer	Sensory Attribute					Mean
		Flavor	Color	Aroma	Texture	Appearance	
% Respondents	Mocaf	22	10	10	14	8	12.80
	Plain Flour	48	40	32	60	24	40.80
	Mocaf + Plain Flour	30	50	58	26	68	46.40
Statistical Test	*P*-Value	0.086	0.008	0.007	0.001	0.022	

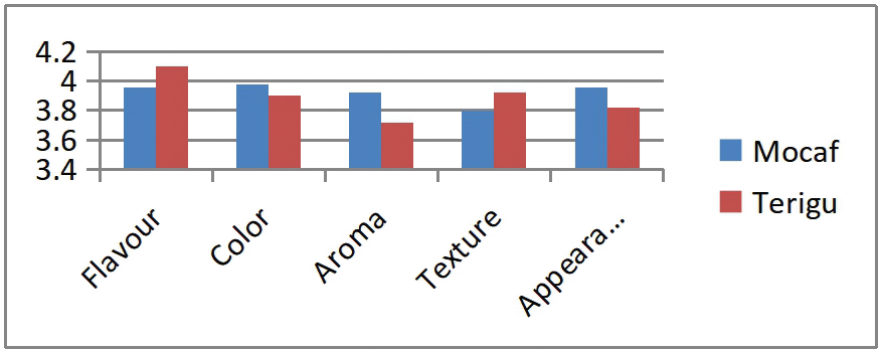

Figure 2: Average Score of Consumer's Preference towards Cookies made from Mocaf and Plain Flour

means there is no significant difference between taste, color, aroma, texture, and appearance of cookies made from mocaf and plain flour. Besides, 47.20% of the customers like both types of cookies. In other words, the customers cannot distinguish cookies made from mocaf and cookies made from plain flour.

4.3. Fried Mushroom

Consumers who live in Malang can find fried mushrooms easily. Nearly all snack stores provide different flavors of this product. The main ingredient is oyster mushroom and plain flour coating helps to make the product crispy. One challenge which fried mushroom sellers encounter is to substitute plain flour with mocaf. Based on the sensory test, the customers like fried mushrooms made from mocaf.

Table 3 showed that the customers prefer fried mushrooms made from mocaf to fried mushrooms made from plain flour. 46.80% of the customers prefer fried mushrooms made from mocaf to fried mushrooms made from plain flour (Table 4). Average scores of the taste and texture of fried mushrooms

made from mocaf are 4.20 each (the highest score). The average score of the appearance of fried mushrooms made from plain flour is 3.80 (the highest score).

Table 4 showed that the *p*-value of color, aroma, and appearance of the fried mushroom is >0.05 which means there is no significant difference between color, aroma, and appearance of fried mushroom made from mocaf and those of fried mushroom made from plain flour. On the opposite, the *p*-values of the other two attributes are <0.05, which means there is a significant difference between the two attributes. The scores in line with the result of the sensory test that fried mushroom made from mocaf is tastier and crunchier than fried mushroom made from plain flour. Agroindustry practitioners also mentioned that fried mushroom made from mocaf is crunchier than fried mushroom made from plain flour since mocaf is gluten-free.

Seasoning Flour

Advance in technology encourages customers to use pre-packaged products, including seasoning flour. People use prepackaged seasoning flour for fried chicken or other fried foods because prepackaged seasoning flour saves more cooking time. Seasoning flour is made from plain flour, rice flour, and other seasonings.

Figure 4 showed that the consumers prefer seasoning flour made from mocaf to seasoning flour made from plain flour. Average scores showing flavor and texture of the seasoning flour made from mocaf are 4.20 and 4.20 respectively. Also, the average score showing the appearance of seasoning flour made from plain flour is 3.80 (the highest).

Table 5 shows that *p*-values of color and appearance of the seasoning flour are 0.835 and 0.134, which means there

Table 3: Mean Score and *P*-Value of Cookies Products based on Result Wilcoxon Signed Ranks Test

Information	Preference	Sensory Attribute					Mean
		Flavor	Color	Aroma	Texture	Appearance	
% Respondent	Mocaf	32	26	36	32	16	28.40
	Plain Flour	40	12	20	42	8	24.40
	Mocaf + Plain Flour	28	62	44	26	76	47.20
Statistical Test	*P*-Value	0.314	0.298	0.114	0.423	0.154	

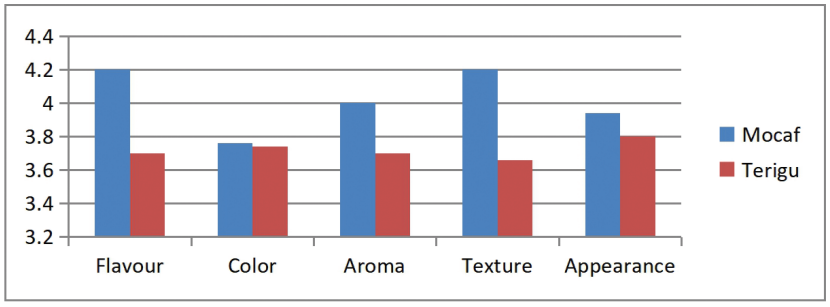

Figure 3: Average Score of Consumer's Preference towards Fried Mushroom made from Mocaf and Plain Flour

Table 4: Mean Score and *P*-Value of Crispy Mushroom Products Base on Result Wilcoxon Signed Ranks Test

Information	Preference	Sensory Attribute					Mean
		Flavor	Color	Aroma	Texture	Appearance	
% Respondent	Mocaf	78	20	40	74	22	46.80
	Plain Flour	12	18	14	12	42	19.60
	Mocaf + Plain Flour	10	62	46	14	36	33.60
Statistical Test	*P*-Value	0.000	0.883	0.102	0.000	0.057	

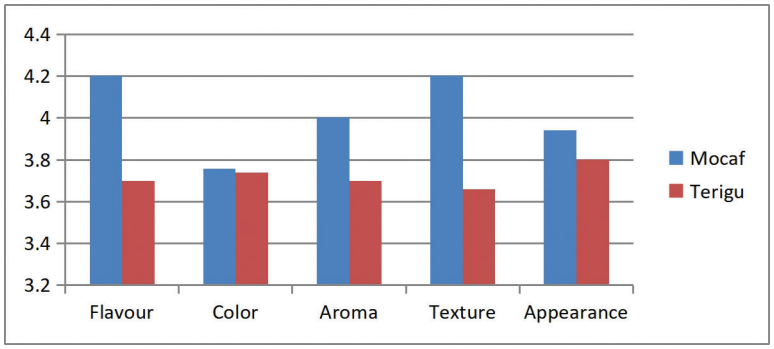

Figure 4: Average Score of Consumer's Preference towards Seasoning Flour made from Mocaf and Plain Flour

Table 5: Mean Score and *P*-Value of Seasoned Flour Products based on Result Wilcoxon Signed Ranks Test

Information	Preference	Sensory Attribute					Mean
		Flavor	Color	Aroma	Texture	Appearance	
% Respondent	Mocaf	54	20	38	60	18	38.00
	Plain Flour	10	20	12	12	10	12.80
	Mocaf + Plain Flour	36	60	50	28	72	49.20
Statistical Test	*P*-Value	0.000	0.835	0.007	0.000	0.134	

is no significant difference between color and appearance of seasoning flour made from mocaf and seasoning flour made from plain flour. On the opposite, *p*-values of taste, aroma, and texture of the seasoning flour are <0.05 which means there is a significant difference between taste, aroma, and texture of seasoning flour made from mocaf and seasoning flour made from plain flour. The consumers prefer seasoning flour made from mocaf because using the seasoning flour, food is tastier and crunchier. As an addition, the customers can also smell citrus aroma and taste other seasonings when their food has seasoning flour made from mocaf coating.

4.4. Consumer's Total Preference from the Four Food Items

Figure 5, describing customer's preference from the four food items, shows that average scores of the three sensory attributes of the steamed brownies made from mocaf are 4.05, the average score of its aroma is 3.85 and the average score of its texture is 4.01. These averages scores are higher than the average scores of steamed brownies made from plain flour.

Table 6 shows that *p*-values of color, aroma, and appearance of the food items are >0.05 which means that there is no significant difference between color, aroma, and appearance of the food items made from mocaf and the food items made from plain flour. On the opposite, *p*-values of taste and texture of the food items are <0.05, which indicates that there is a significant difference between taste and texture of the food items made from mocaf and the food items made from plain flour.

Table 5 and 6 revealed that taste and texture are two attributes customers pay attention to in consuming food items made from mocaf. It is in line with the result of data analysis where 46% of consumers like how food items are made from mocaf taste and 45% like their textures. The organoleptic test result explained that the consumers did not find any difference between color, aroma, and appearance of food items made from mocaf and food items made from plain flour. In other words, the food items made from mocaf are as good as those made from plain flour. The findings also show that 44.10% like both types of food making 75% of the consumers like food items made from mocaf. Indonesian agroindustry should make use of this opportunity to replace imported plain flour with local flour. In an addition, an increasing number of customers start paying attention to their health and prefer to consume healthy food (Hutahayan, 2020). It is in accordance to the following article that every individual can cut down gluten from his or her diet due to several reasons, for example, increase of gastrointestinal and non-gastrointestinal symptoms and perception that gluten can potentially be harmful for our health (Niland & Cash, 2018).

Analysis on the impact of food allergy explains that food allergy is one of the most pivotal issues in health sectors and people should pay attention to the food they are allergic to prevent certain diseases (Tanabe, 2008). Mocaf is gluten-free

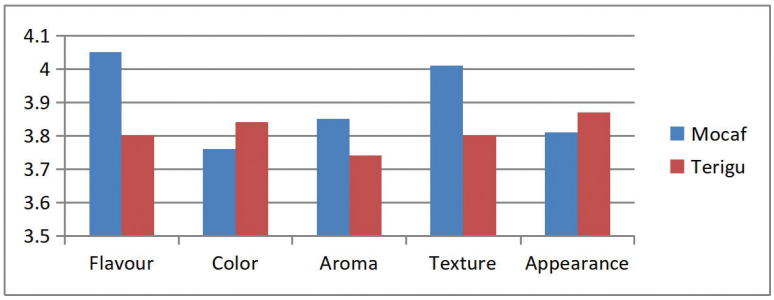

Figure 5: Average Consumer's Preference towards the Four Food Items made from Mocaf and Plain Flour

Table 6: Mean Score and *P*-Value of Combine Fourth Products based on Result Wilcoxon Signed Ranks Test

Information	Preference	Sensory Attribute					Mean
		Flavor	Color	Aroma	Texture	Appearance	
% Respondents	Mocaf	46.5	19	31	45	16	31.50
	Plain Flour	27.5	22.5	19.5	31.5	21	24.40
	Mocaf + Plain Flour	26	58.5	49.5	23.5	63	44.10
Statistical Test	*P*-Value	0.002	0.304	0.100	0.030	0.283	

and gluten gluten-free is suitable for individuals with celiac disease and those sensitive to gluten (Geisser & Angadi, 2012) (Ludvigsson, et al., 2012). Gluten is a structural protein component from wheat grains, rye, and barley, the basis for flour and wheat derivate food consumed across the globe (Sapone et al., 2011). Thus, treatment and a gluten-free diet will minimize symptoms of celiac disease, boost the health of people with celiac disease, and eliminate the severity of and complication caused by the disease (Oktadiana et al., 2017).

Studies have proved that cutting down processed food containing gluten can improve the health of people sensitive to gluten and this is an opportunity for making use of gluten-free mocaf. The finding of this study also showed that 75% of the consumers like food items made from mocaf, particularly cookies, fried mushroom, and seasoning flour made from mocaf.

5. Conclusion

Based on the findings of this study, it can be concluded that every food item has different product characteristics and these characteristics influence customer's preference toward the food item. The result of nonparametric analysis, Wilcoxon sign rank test, on the four food items reveal that there is a significant difference in sensory attributes of the products. Taste and texture are two sensory attributes of food customers pay attention and customers like food items made from mocaf because of their taste and texture. 75% of customers like steamed brownies, cookies, fried mushrooms, and seasoning flour made from mocaf. Awareness of healthy food also influences consumer's perception of buying food made from mocaf. Consumers decide to buy products made from mocaf mainly because these products use local flour and are gluten-free.

The agro-industrial sector should encourage people to create a tastier and healthier food, one that is gluten-free and uses local flour to enhance its competitive advantage.

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