SENSORY CHARACTERISTICS OF YOGHURT POWDER WITH THE ADDITION OF KECOMBRANG EXTRACT (*Etlingera elatior)*

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Abstract. Yogurt is fermented dairy products that play an important role in the balance of microflora in the human digestive system. The functional properties of yogurt can be improved by adding bioactive components from kecombrang extracts. One alternative to increase the shelf life of yoghurt without destroying its nutritional value is by producing ready-to-drink yoghurt powder. The powdering method utilized is foam mat drying. Foam mat drying offers the advantage of being an easily applicable drying method. The aim of this research is to determine the sensory characteristics of yoghurt powder with the addition of kecombrang. The experimental design used is a Completely Randomized Design (CRD) with factors kecombrang extract concentration and maltodextrin concentration. The results indicate that variations in kecombrang extract concentration and maltodextrin concentration significantly impact the sensory characteristics of yogurt powder.

Keywords: sensory characteristics, yoghurt powder, kecombrang extract

1. Introduction

People's need for food today is no longer just to meet a sense of satisfaction, but food must have functional properties by providing health effects on the body. Yogurt is a probiotic drink produced through the fermentation of lactose in milk and certain bacterial enzymes. Fermentation is one of the technologies of preservation and processing of milk, during fermentation organic acids will be formed that create a distinctive taste in yogurt. Yogurt is formed from good bacteria that are beneficial to health, such as Lactobacillus bulgaricus and *Streptococus thermopillus.* Basically, the work of two yogurt bacteria is to produce lactic acid which is important for its role to create a balance of intestinal microflora. The resulting acidity is able to inhibit disease-causing bacteria that are generally not resistant to acid. Fermentation is one of the technologies of preservation and processing of milk. During fermentation, organic acids will be formed that cause a distinctive taste in yogurt [1].

Kecombrang (*Etlingera elatior*) is one type of spice plant native to Indonesia. All parts of the kecombrang plant can be utilized, ranging from rhizomes, stems, leaves and flowers. The results of recent years show that the antioxidant and antibacterial activity of kecombrang has the potential to be developed as a functional food product. kecombrang has active compounds and antioxidant activity as functional foodstuffs. kecombrang flowers have strong antioxidant activity, making it good for functional foods [2]. Kecombrang (*Etlingera elatior*) is a spice plant native to Indonesia that has active compound properties and antioxidant activity so that it has the potential to be developed as a functional food ingredient. The addition of combrang flower

juice can be an alternative to improve taste, color, aroma and nutritional content, especially antioxidant content [3].

Yogurt powder is a product of fermented milk which is then further processed through a drying process. Drying can also reduce to an extent that the development of microorganisms and enzyme activities that can cause decay are inhibited or stopped. Spoilage occurs as a result of the absorption of enzymes contained in food by tiny bodies that grow and multiply with the help of water content media in the foodstuff. To overcome this, it is necessary to have a process of removing or reducing the water content contained in food so as to avoid spoilage or deterioration in the quality of foodstuffs. Yogurt that is in contact with hot air, then there is a mass transfer of water from yogurt drink to yogurt powder [4]. Processing yogurt drinks into yogurt powder is an alternative that can be used to provide healthy but still practical products. Instant drinks in powder form have the characteristics of being easily soluble in water, practical in serving and have a long shelf life because they have lower water activity (aw) which can prevent microbial growth [5].

Making instant drink powder can be done using tools with advanced technology such as freeze dryers and spray dryers, but these tools require expensive costs. One alternative method that can be used is the foam-mat drying method. Factors that affect the quality of instant drinks with foam-mat drying techniques include fillers and foamers. The addition of fillers aims to prevent heat damage, coat flavor components and increase total solids [6]. The purpose of adding maltodextrin in the foam mat drying method is to coat the flavor components, increase volume, speed up the drying process, increase total solids, and protect nutritional components due to heat [7].

2. Methods

2.1. Time and Place of Research

This research was carried out at the Agricultural Technology Laboratory of Jenderal Soedirman Purwokerto University in June-September 2023.

2.2. Nanoparticle Formulation of Ethanol Extract of B gymnorhiza leaves

The method used in this study was experimental and the experimental design used was Complete Randomized Design (RAL). The factors in this study were the concentration of kecombrang extract and the concentration of maltodextrin. Each treatment factor has the following comparison:

1. Proportion of kecombrang extract concentration based on total yogurt (v/v)K1 : 2,5%
   K2: 5%
   K3: 7,5%
   K4: 10%
2. Proportion of maltodextrin concentration based on
   total yogurt
   M1: 5%
   M2: 10%
   M3: 15%

2.3. Method

Making kecombrang yogurt powder starts from making kecombrang yogurt drink which refers to previous research and then continued with the process of turning kecombrang yogurt drink. The ingredients used include cow's milk, yogourtmet powder seeds and culture de yogourt, kecombrang flower extract, skim milk, HFS (high fructose syrup), egg whites and maltodextrin. The first step is made a working starter by adding 5 grams of yougmert

with 1000 ml of pasteurized milk at 75 ºC for 15 seconds which is then incubated for 8 hours at a temperature of 40-45 ºC. The next step is to make yogurt drinks by adding pasterized milk with a working starter of 5%, skim milk 8%, gum arabic 0.08%, and HFS 10%. Further incubated for 6 hours at a temperature of 43-45 ºC. After the yogurt drink is formed, kecombrang extract is added according to the treatment (2.5%, 5%, 7.5%, and 10%). In the final stage, yogurt washing is carried out using the foam mat drying method. The egg whites are beaten using a mixer for 4 minutes. Add 5% egg white and maltodextrin (5%, 10%, and 15%) to the yogurt drink and beat with a mixer for 2 minutes. Next, pour the dough into a baking sheet that has been coated with baking paper and dried into a cabinet dryer for 10 hours with a temperature of 50 ºC. After drying and forming thin sheets and the next process is to crush the sheets so that powder is obtained.

2.4. Data Analysis

The data obtained were analyzed by calculating the overall average of sensory quality scores. The treatment that gets the highest score is considered to have the sensory characteristics most preferred by the panelists.

3. Results And Discussion

Sensory tests are carried out to determine the assessment of the quality of a food product. Sensory characteristics of a food product, including taste, texture and aroma. Lactic acid formed during the fermentation process will cause a decrease in pH and give a sour taste to yogurt. The decrease in pH also causes yogurt to have a sour aroma. On the other hand, the use of maltodextrin as a filler aims to speed up the drying process, prevent damage to materials due to heat and increase the solubility and organoleptic characteristics of instant drinks [8]. The addition of maltodextrin is also needed to create a good quality instant powder drink [9]. The results of the analysis of the various effects of extract concentration treatment (K) with maltodextrin concentration (M) on the sensory analysis of yogurt are presented in Table 1 and Figure 1.

The results showed that variations in the concentration of kecombrang extract and maltodextrin concentration had a significant influence on the characteristics of the sensory properties of yogurt powder kecombrang extract. Based on Figure 1, the lowest sensory value was owned by yogurt samples with the addition of 10% kecombrang flower extract and 5% maltodextrin (K4M1), while the highest sensory value was owned by yogurt samples with the addition of 10% kecombrang flower extract and 15% maltodextrin (K4M3). The combination of K4M3 treatments obtained a taste value of 5 (very distinctive), an aroma value of 3 (somewhat distinctive), a color value of 4 (yellowish white), and an overall favorability value (overall) of 5 (very like).

Yogurt in general has a distinctive sour taste. The addition of 10% kecombrang flower extract is the best treatment by getting a taste value of 5 (very distinctive). The addition of kecombrang extract can reduce pH, this is because kecombrang extract contains organic acids and low pH. The higher the concentration of kecombrang flower extract added, the pH will decrease and cause the taste of yogurt to be more acidic.

Table 1. Sensory characteristics of yogurt powder kecombrang flower extract

Sample	Sensory characteristics			
	Taste	Aroma	Color	Overall
K1M1	3	2	5	4
K1M2	4	2	4	4
K1M3	3	3	3	3
K2M1	4	2	5	4
K2M2	4	2	4	4
K2M3	3	3	3	3
K3M1	3	3	4	4
K3M2	3	3	4	3
K3M3	4	4	3	5
K4M1	2	3	4	2
K4M2	4	3	4	5
K4M3	5	3	4	5
Control	4	4	5	4

K1MI (2,5% of kecombrang extract and 5% of maltodextrin); K1M2 (2,5% ofkecombrang extract and 10% of maltodextrin); K1M3 (2,5% of kecombrang extract and 15% of maltodextrin); K2MI (5% of kecombrang extract and 5% of maltodextrin); K2M2 (5% of kecombrang extract and 10% of maltodextrin); K2M3 (5% of kecombrang extract and 15% of maltodextrin); K3MI (7,5% of kecombrang extract and 5% of maltodextrin); K3M2 (7,5% of kecombrang extract and 10% of maltodextrin); K3M3 (7,5% of kecombrang extract and 15% of maltodextrin); K4MI (10% of kecombrang extract and 5% of maltodextrin); K4M2 (10% of kecombrang extract and10% of maltodextrin); K4M3 (10% of kecombrang extract and 15% of maltodextrin).

Taste

1. Very uncharacteristic
2. Not typical
3. Rather typical
4. Typical
5. Very typical

Color

1. Slightly brownish white
2. White
3. Slightly yellowish white
4. Yellowish white
5. Very yellowish white

Aroma

1. Very uncharacteristic
2. Not typical
3. Rather typical
4. Typical
5. Very typical

Overall

1. Very dislike
2. Do not like
3. Kinda like it
4. Like
5. Really like

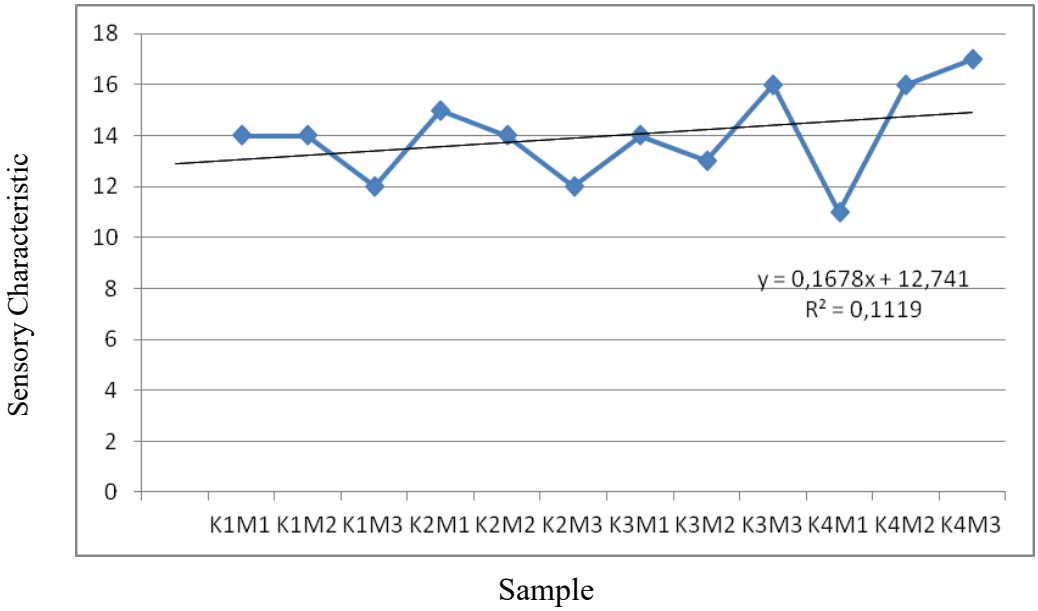

Figure 1. Sensory characteristics of yogurt powder kecombrang flower extract

According to [10], maltodextrin is used in the encapsulation process, to protect compounds that are sensitive to oxidation or heat, and maltodextrin can protect flavor stability during the drying process. Therefore, the higher the concentration of maltodextrin added, it will protect yogurt powder kecombrang extract from heat during the drying process. This is in line with research results that show the higher the concentration of maltodextrin added produces an aroma that is more the same as yogurt before the drying process or as expected.

The addition of maltodextrin also affects the color of the yogurt powder produced kecombrang extract. Along with the addition of maltodextrin concentration, the number of polysaccharide molecules from maltodextrin increases so that the color of the product becomes brighter [11]. This is in line with the results of research conducted, with the addition of maltodextrin which has a white color causing the yellow color of yogurt powder kecombrang extract to decrease.

4. Conclusion

The combination of kecombrang flower extract concentration treatment and maltodextrin concentration affect the sensory characteristics of combrang extract yogurt powder. The addition of 10% kecombrang extract and 15% maltodextrin gives the overall preferred sensory characteristics of yogurt powder kecombrang extract.

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