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Sensoric Quality of Kemantan Fruit Syrup With The Addition of Bay Leaf

Hilarius Jago Duda[1], Didin Syafruddin[1], F. Rahayu Esti Wahyuni[1] , Yakobus Bustami[1]*

1) *Biology Education Study Program, School of Teacher Training and Education of Persada Khatulistiwa, Jl. Pertamina-Sengkuang,* Sintang-Kalimantan Barat, Indonesia. Postal code: 78614.

**) Corresponding Author: hilariusjagod@yahoo.com*

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***Abstract*—Kemantan (Mangifera torquenda Kosterm) is a local fruit found in West Kalimantan which is rarely studied and is well known to many people. Kemantan is a genus with mango. Mango is one of the leading tropical fruits favored by people in the world. Mango is also famous for its content of multi vitamin, antioxidants, and many other nutritional content. Bay leaves (Eugenia polyantha) contain essential oils (citral, eugenol), tannins and flavonoids. Unfortunately, so far these two plants have only been consumed traditionally so they are boring and the rest is thrown away, therefore researchers want to use these plants to make fruit syrup. The research method was an experiment with a completely randomized design consisting of 1 treatment and 5 levels of bay leaf addition denoted by the letter (S). The materials used in this study for the manufacture of the product consisted of kemantan fruit, bay leaves, granulated sugar, CMC, and other. The steps: first, making bay leaf extract, second, making kemantan fruit syrup. Organoleptic test to provide an assessment of color, aroma, taste, texture, thickness, preference and overall with the rating format 5-1. Data analysis was carried out using the ANOVA method and the results were significantly different followed by the LSD test. The results showed that the best treatment for kemantan syrup products was S0 for color and aroma assessment. While the treatment for taste, thickness, texture, preference and overall assessment was S1. Kemantan syrup with the addition of bay leaves has a significant effect on texture parameters, very significant effect on color, taste, thickness, preference and overall and no significant effect on aroma.**

***Keywords*—bay leaf, kemantan, syrup fruit**

I. INTRODUCTION

Syrup is a liquid processed product that is consumed by most people as a thirst quenching drink. Syrup is an oral solution that contains high levels of sucrose or other sugars. Syrup contains at least 50% sucrose and usually 60 - 65%. According to [1], syrup can be made from the basic ingredients of fruit, leaves, seeds, roots and other parts of plants. At this time in making syrup mostly use natural sweeteners that we find everyday are granulated sugar and synthetic dyes. Sugar that has been consumed by the community is made from sugarcane.

Fruit syrup is a product made from thick sugar solution with a taste and aroma determined by the fresh fruit. Fresh fruit that is commonly used in making syrup is fruit that has an attractive color, strong aroma and distinctive taste [2]. The use of mangoes among the community is not optimal, on average mangoes are only used as desserts. Therefore, this study aims to add to the diversity of mango processing by making it into syrup, and adding bay leaves as a color addition to the syrup. As well as being a natural coloring agent, bay leaves also contain flavonoids which are beneficial to the human body, therefore the authors are interested in conducting this research. The use of syrup is not drunk immediately but must be diluted first because it has a high sugar content of 55-65% [3].

[4] revealed that the mango plant is an annual fruit plant in the form of a tree originating from India. This plant then spread to Southeast Asia including Malaysia and Indonesia. Mango plants come from the Anarcadiaceae family, genus Mangifera, species Mangifera indica. The genus of the Anacardiaceae family originating from Southeast Asia has recorded 62 species, 16 of which have edible fruit, but only Mangifera caesia, Jack., Mangifera foetida, Lous., Mangifera odorata, Grift., and Mangifera indica, L. which is commonly eaten. Among the four edible mango species, the most common type is Mangifera indica, L. Most of these mangoes have a strong aroma. The mango tree is a high-level plant whose trunk structure (habitus) belongs to the arboreus group, which is a woody plant that has a stem height of more than 5 m. Mango can reach 10-40 m high.

Mango fruit contains various kinds of nutrients that are beneficial to health. The content of antioxidants such as carotenoids (vitamin A) and vitamin C play a role in preventing cancer. Meanwhile, the content of potassium and vitamin C play a role in maintaining heart health. Phenol compounds such as ellagic acid, gelatonin, and mangiferin contained in mangoes can make a beneficial contribution to health [5]. Antioxidants function to prevent damage to cells and tissues of the body because in this case antioxidants act as free radical scavengers [6]. In the kemantan mango it self, there has been no research specifically on the fruit, both the

nutritional and organoleptic content of the kemantan fruit. Kemantan is of the same genus as mango (Mangifera indica L) which grows wild in the forests of Kalimantan as a local fruit/characteristic of Kalimantan, especially West Kalimantan. Apart from the initial observation data, this information is also disclosed by [7] in his research on plant diversity, where kemantan is a local fruit, which is a characteristic of fruit from Sintang, West Kalimantan. In making the kemantan syrup, bay leaf extract is added which can be a characteristic of the syrup.

Bay leaves contain dyes, tannins and essential oils which are antibacterial. The tannins contained are astringent. The benefits of leaves traditionally, bay leaves are used as a medicine for stomach ache. Bay leaves can also be used to stop excessive bowel movements. Bay trees can also be used to treat gout, stroke, high cholesterol, improve blood circulation, stomach ulcers, itching, and diabetes [8].

Bay leaves contain essential oils (citral, eugenol), tannins, metthylchavicol and flavonoids [8, 9]. Condensed bay leaf extract contains tannins, flavonoids with the main components fluoretin and quercitrin [10]. The methanol extract of bay leaf (Syzygium polyanthum (Wight) Walp) which was tested using the HPLC and LC-MS methods showed the presence of phenolic acid, gallic acid, and caffeic acid [11]. The bay leaf flavor extract produced from the steam distillation method using n-hexane solvent contains 26 compounds with the main compounds consisting of cis-4-decanal, octanal, α-pinene, farnesol, nerolidol, and decanal [12].

Several studies have shown that bay leaves have various medicinal properties. Bay leaf ethanol extract can reduce blood glucose levels [13]. Salam plant (Eugenia polyantha) is one of the plants that people often use for alternative medicine. The benefits of leaves traditionally, bay leaves are used as a medicine for stomach ache. Bay leaves can also be used to stop excessive defecation [8]. The results of the 2 different mean tests (t-test) showed that there was a decrease in uric acid levels between before and after being given bay leaf boiled water in gout sufferers, with a p value = 0.000 [14].

From the above background, the research problem can be formulated, namely: Kemantan fruit syrup (Mangifera torquenda Kosterm) with the addition of bay leaves (Eugenia Polyantha) is expected to improve the quality of the syrup in terms of color, taste, aroma, viscosity, texture, preference and overall. The concentration of adding bay leaves must also be right, so that the syrup can have better quality in terms of color, taste, aroma, viscosity, texture, preference and overall. Researchers hope that treatment with kemantan syrup (Mangifera torquenda Kosterm) with the addition of bay leaves can have an effect on organoleptic tests. Apart from that, the researchers wanted to see the relationship between the ingredients used in making syrup and the existing organoleptic data. With the aim of the research is first, to determine the quality of kemantan syrup (Mangifera torquenda Kosterm) with the addition of bay leaves (Eugenia polyantha) in terms of color, taste, aroma, texture thickness, preference and overall. Second, identify, describe and know the concentration of the addition of bay leaves which have better syrup quality in terms of color, taste, aroma, texture thickness, preference, and overall. Third, knowing the difference in the effect of the treatmen t made on the results of the syrup organoleptic test. Fourth, find out the relationship between the ingredients for making syrup and the panelist's comments or organoleptic results.

II. MATERIALS AND METHODS

A. Materials

The research tools used in the study were: stove, pot, basin, spoon, glass. The materials used in this study consist of; kemantan fruit, bay leaves, granulated sugar, CMC (PT. makmur jaya), citric acid (technical), water, distilled water, DPPH solution (1,1-diphenyl-2-pikrilhidrazil) (Sigma), Nelson Samogyi reagent (technical) and methanol (technical).

B. Research methods

The research method is an experiment with a research design using a completely randomized design (CRD) consisting of 1 treatment and 5 levels of addition of bay leaves denoted by the letter (S), namely: addition of 0% bay leaves (S0), addition of 5% bay leaves (S1), addition of 10% bay leaves (S2), addition of 15% bay leaves (S3), and addition of 20% bay leaves (S4). Each treatment was repeated 3 times to obtain 15 experimental units.

Treatment	Concentration of bay leaves in 100% kemantan				
	0% (S0)	5% (S1)	10% (S2)	15% (S3)	20% (S4)
U1	U1 S0	U1 S1	U1 S2	U1 S3	U1 S4
U2	U2 S0	U2 S1	U2 S2	U2 S3	U2 S4
U3	U3 S0	U3 S1	U3 S2	U3 S3	U3 S4

Fig. 2. Kemantan Fruit

C. Research Procedure

The stages of this research are as follows; First, Preparation of bay leaf extract, 2 g fresh bay leaves are sorted and washed and then crushed using a blender and added 500 ml of water then mashed, then filtered using a filter cloth. Second, Making kemantan syrup, kemantan is weighed 200 g, peeled and cut into small pieces then added 0%, 5%, 10%, 15% and 20% bay leaves then crushed using a blender, cooked and added 2 g CMC [15] , 2 g citric acid and 200 g sugar, then cooked at 80ºC for 30 minutes, filtered and allowed to stand for 3 minutes then the resulting syrup was put into a bottle.

D. Observational Variables

Organoleptic tests are carried out by sensory assessment or sensory assessment, this assessment is one of the oldest methods known in organoleptic assessment, panelists are allowed to taste the syrup that has been provided. Then the panelists gave an assessment of the color, aroma, taste, thickness, texture, preference and overall preference for the syrup with the rating format 5 = really like, 4 = like, 3 = rather

like, 2 = don't like, 1 = really don't like. With a total of 25 untrained panelists.

E. Data analysis

Data analysis was performed using SPSS 23 which includes descriptive and inferential statistics. Where is the ANOVA test to provide an indication of whether there is a difference between the averages of the entire treatment,but does not yet provide information about whether there is a difference between one treatment individual and another treatment individual. So it is continued with a follow-up test, namely the BNt Test (Smallest Significant Difference) or better known as the LSD (Least Significance Different) test as a reference in determining whether the average of the two treatments is statistically different or not. And continued with descriptive analysis to link the panelist comments from the organoleptic results with the ingredients for making syrup.

III. RESULTS AND DISCUSSION

A. Organoleptic Results

Organoleptic assessment is very widely used to assess quality in the food industry and other agricultural product industries. Sometimes these assessments can result in very thorough judgments. In some cases the assessment of the senses even exceeds the accuracy of the most sensitive tools [16]. According to [17], the complexity of a taste is produced by a variety of natural perception ns. Taste is influenced by three factors, namely smell, taste, and mouth stimulation (hot and cold). The first factor can be detected by the sense of smell and the last two factors can be detected by the sensory cells on the tongue. This research discusses the organoleptic kemantan syrup with the addition of bay leaf concentration. Syrups are oral solutions that contain high levels of sucrose or other sugars (simple syrups are syrups that are nearly saturated with sucrose). The sucrose content in the syrup is 55-64% [18]. *For papers with more than six authors:* Add author names horizontally, moving to a third row if needed for more than 8 authors.

TABLE I. SYRUP QUALITY REQUIREMENTS 3544 – 2013 [19]

No	Test Method	Unit	Condition
1	Circumstances		
	Aroma	-	Normal
	Flafor	-	Normal
2	Total Sugar (sucrose) (b/b)	%	Min 65%
3	Metal contamination		
	Lead (Pb)	mg/kg	Maks 1.0
	Cadmium (Cd)	mg/kg	Maks 0.2
	Tin (Sn)	mg/kg	Maks 40
	Mercury (Hg)	mg/kg	Maks 0,03
4	Arsenic contamination (As)	mg/kg	Maks 0.5
5	Microbial contamination		
	Total Plate Fig. s	Koloni/ml	Maks 5x102
	Coliform bacteria	APM/ml	Maks 20
	Escherichia coli	APM/ml	< 3
	Salmonella SP	-	25 ml
	Staphylococcus aureus	-	Ml
	Kapang and khamir	Koloni/ml	Maks 1 x 10 2

Recapitulation of the results of the analysis of variance (ANOVA) of kemantan syrup products with the addition of bay leaves on the organoleptic assessment which includes color, aroma, taste, thickness, preference, and over all as shown in Table 2.

TABLE II. RECAPITULATION OF THE ANALYSIS OF VARIANCE OF KEMANTAN SYRUP WITH THE ADDITION OF BAY LEAF EXTRACT ON ORGANOLEPTIC PROPERTIES WHICH INCLUDE COLOR, AROMA, TASTE, THICKNESS, TEXTURE, PREFERENCE, AND OVERALL.

Number	Observational Variables	Analysis of variance
1	Color organoleptic	*
2	Aroma organoleptic	tn
3	Flavor organoleptic	*
4	Viscosity organoleptic	*
5	Texture organoleptic	**
6	Favorite organoleptic	*
7	Overall organoleptic	*

remark: ** = significant p < 0,05
* = very significant p < 0,01
tn= not significant p > 0,05

Based on the analysis of variance in Table 2 it shows that the organoleptic assessment of color, taste, thickness, preference, and overall effect was very significant, texture had a significant effect while aroma had no significant effect on the kemantan syrup product with the addition of different bay leaves.

1) Color

Color is a visualization of a product that is immediately visible first compared to other variables. Color will directly affect the panelists' judgment. According to [20] visually the color factor will appear first and often determines the value of a product. The results of the calculation of the organoleptic test for color presented in Table 3 show that the highest score was in treatment S4 (addition of 20% bay leaf) and the lowest score was in treatment S0 (addition of 0% bay leaf). From these data it can be seen that the five treatments were significantly different from one another.

In the S4, S3, S2 treatments, the average score was above 3 which indicated that the panelists' preference for the color of the kemantan syrup with the addition of bay leaves was from a little to a lot of likes. The lowest preference score was found in treatment S0 (addition of 0% bay leaf) with an average value of 1.10 which means that the panelists' preference for the color of kemantan syrup with the addition of 0% bay leaf is dislike, so it can be said for the color aspect of the addition of bay leaves the more in the manufacture of mango syrup, the color will tend to be bright. The attractive color and appearance of food can arouse appetite, which is a special attraction for someone to taste the food [2].

According to [21] if sugar is heated continuously until the temperature exceeds its melting point, a caramelization process will occur. The formation of this caramel can improve the taste and color of food. [22] revealed that the color of syrup in general depends on the fruit used as raw material for making

syrup, fruit has certain color pigments, for example, green pigment chlorophyll, red pigment anthocyanin, and lycopene. Then the syrup made from fruit will have a color according to the raw materials used to make the syrup.

TABLE III. MEAN RESULTS OF THE PANELISTS' ASSESSMENT OF THE ORGANOLEPTIC OF KEMANTAN SYRUP WITH THE ADDITION OF BAY LEAVES.

No	Parameter	Treatment	Average	$LSD_{0,05}$
1	Color	S0 (Add bay leaf 0%)	1.10[a]	0,31
		S1 (Add bay leaf 5%)	2,13[b]	
		S2 (Add bay leaf 10%)	3,10[c]	
		S3 (Add bay leaf 15%)	4.05[d]	
		S4 (Add bay leaf 20%)	5,10[e]	
2	Aroma	S0 (Add bay leaf 0%)	3,55[a]	0,92
		S1 (Add bay leaf 5%)	3,28[a]	
		S2 (Add bay leaf 10%)	3,15[a]	
		S3 (Add bay leaf 15%)	2,82[a]	
		S4 (Add bay leaf 20%)	2,48[b]	
3	Flavor	S0 (Add bay leaf 0%)	3,51[a]	0,133
		S1 (Add bay leaf 5%)	3,64[b]	
		S2 (Add bay leaf 10%)	3,28[c]	
		S3 (Add bay leaf 15%)	3,06[d]	
		S4 (Add bay leaf 20%)	1,59[e]	
4	Viscosity	S0 (Add bay leaf 0%)	3,73[a]	0,111
		S1 (Add bay leaf 5%)	5,00[b]	
		S2 (Add bay leaf 10%)	2,70[c]	
		S3 (Add bay leaf 15%)	2,90[d]	
		S4 (Add bay leaf 20%)	2,29[e]	
5	Texture	S0 (Add bay leaf 0%)	3,60[a]	0,84
		S1 (Add bay leaf 5%)	4,26[b]	
		S2 (Add bay leaf 10%)	3,05[c]	
		S3 (Add bay leaf 15%)	2,57[d]	
		S4 (Add bay leaf 20%)	2,47[e]	
6	Favorite	S0 (Add bay leaf 0%)	4,06[a]	0,89
		S1 (Add bay leaf 5%)	4,34[b]	
		S2 (Add bay leaf 10%)	3,24[c]	
		S3 (Add bay leaf 15%)	2,36[d]	
		S4 (Add bay leaf 20%)	1,80[e]	
7	Overall	S0 (Add bay leaf 0%)	4,42[a]	0,193
		S1 (Add bay leaf 5%)	4,48[b]	
		S2 (Add bay leaf 10%)	3,28[c]	
		S3 (Add bay leaf 15%)	2,23[d]	

2) Aroma

Aroma is an important variable, because in general the consumer's taste for a product is determined by its aroma. The panelists' preference for the aroma produced in the various compositions of bay leaves (treatments S0, S1, S2 and S3) was not significantly different from one another and significantly different from S4. This means that too many bay leaves will affect the change in aroma. From these data it can be seen that the aroma is fresh, namely with an average above 3, namely for treatments S0, S1, and S2. Meanwhile, treatments S3 and S4 tended to have a less refreshing aroma or the mango aroma was lost.

Aroma is also called remote tasting by using the sense of smell. Humans can recognize the deliciousness of food that has not been seen just by smelling or smelling the food from a distance [23]. According to [24], that the aroma spread by food is a very strong attraction and is able to stimulate the sense of smell so as to arouse appetite. The emergence of food aroma is caused by the formation of volatile compounds as a result or reaction due to the work of enzymes or can also be formed without the help of enzyme reactions. Then the aroma component is closely related to the concentration of the aroma component in the vapor phase in the mouth. This concentration is also influenced by the volatile nature of the aroma itself. Another factor is the natural interaction between the aroma components and the nutritional components in these foods such as carbohydrates, proteins and fats as well as very relative consumer acceptance. According to [24, 25] the distinctive aroma felt by the sense of smell depends on the ingredients and ingredients added to the food.

3) Flavor

Based on the data in Table 3, it can be seen that the highest score of the panelist's assessment of the organoleptic taste of kemantan syrup with the addition of bay leaves was in treatment S1 (addition of 5% bay leaves) with an average value of 3.64 which was not significantly different from treatment S0 (addition of bay leaves 0%), S2 (addition of 10% bay leaf), S3 (addition of 15% bay leaf) and S4 (addition of 20% bay leaf), which means that the preference of the panelists for the taste of kemantan syrup with the addition of bay leaves is slightly like to like. The lowest preference score was found in treatment S4 (addition of 20% bay leaf) with an average value of 1.59, which means that the panelists' preference for the taste of kemantan syrup with the addition of 20% bay leaf is dislike.

Taste is a difficult organoleptic assessment attribute because it assesses specific characteristics for certain food products because taste is the main factor determining consumer acceptance of a product [17]. Taste assessment is done by using the human senses. The impression of taste occurs when a food ingredient is chewed in the mouth and then hydrolyzed by enzymes from saliva which for derivative compounds that give a certain taste when in contact with the tip of the taste buds on the papillae of the tongue [26]. The tongue is the most important tool for assessing a food ingredient. Taste is an important component in food quality control. Taste is also very relative, although taste can be used as a standard in assessing food quality. In general, food ingredients do not only consist of one taste, but a combination of various flavors in an integrated manner so as to create a complete taste [27].

The sweet taste of the syrup is influenced by the sugar content in the mango as well as the added sugar content. According to [28] the higher the concentration of added sugar, the higher the reducing sugar content obtained. The increase in reducing sugar content is due to the inverse process of sucrose into reducing sugar and this inversion process increases as the sucrose content increases, besides that during heating the process of hydrolysis of sucrose into reducing sugars (glucose and fructose) occurs. According to [29] that sugar functions as a sweetener, enhances sour taste and other tastes, besides that sugar can improve thickness. The increase in the sweetness of

the syrup is due to the fact that when heated the sugar will undergo hydrolysis to become invert sugar, invert sugar will determine the total sugar in the product where the higher the amount of invert sugar formed the total sugar will increase [30]. According to [28], taste is influenced by several factors, namely chemical compounds, temperature, concentration, and interactions with other flavor components. The flavor compounds in the product can provide stimulation to the recipient's senses when consuming it.

4) Viscosity

Based on the data in Table 3, it can be seen that the highest score of the panelist's assessment of the organoleptic thickness of kemantan syrup with the addition of bay leaves was in treatment S1 (addition of 5% bay leaves) with an average value of 5.00 which was significantly different from all other treatments, which meant that the panelist's preference for the thickness of kemantan syrup with the addition of 5% bay leaves was very like. From the average value for all treatments, they tended to like quite a bit to really like the values that were significantly different from one treatment to the other, but when the concentration of bay leaves tended to increase, the average value of the thickness of the syrup decreased.

Viscosity is a measure of fluid viscosity which states the size of the friction in the fluid. The greater the viscosity of a fluid, the more difficult it is for a fluid to flow and the more difficult it is for an object to move in the fluid [31]. The thickness of the syrup can also be affected by the use of CMC. CMC has a high ability to bind water through hydrogen bonds so that it will increase the viscosity of the solution, depending on the amount of CMC concentration added. The higher the CMC concentration level added, the more water will be bound so that the solution will be thicker [21]. In addition, the increase in syrup viscosity is caused by sugar having hydrophilic properties caused by the presence of hydroxyl groups in its molecular structure. The hydroxyl group will bind to water molecules through hydrogen bonds, this will reduce water activity and increase viscosity [32].

5) Texture

Based on the data in Table 3, it can be seen that the highest score of the panelist's assessment of the organoleptic texture of kemantan syrup with the addition of bay leaves was in treatment S1 (addition of 5% bay leaves) with an average value of 4.26 which was significantly different from the other treatments, which means that The panelist's preference for the texture of kemantan syrup with the addition of 5% bay leaf was like.

From the research data, it can be seen that between one treatment and another treatment was significantly different and for treatments S0, S1 and S2 tended to like to really like. For treatment S3 and S4, they tend to like it a little bit until they don't like it. The more bay leaves are added, the less attractive the texture will be.

6) Favorite

Based on the data in Table 3, it can be seen that the highest score of the panelist's assessment of the organoleptic texture of kemantan syrup with the addition of bay leaves was in treatment S1 (addition of 5% bay leaves) with an average value of 4.34 which was significantly different from other treatments, which meant that preference panelists on preference for kemantan syrup with the addition of 5% bay leaf, namely likes. From these data it can be seen that the addition of bay leaves S0, S1, and S2 is like. While the addition of more bay leaves such as treatments S3 and S4 tends to get results that are somewhat like to dislike. [33] stated that syrup is a traditional product in the form of a viscous liquid obtained from heating fruit pulp. Syrup is a drink that is quite liked by many people, because it is practical, tastes good, is refreshing, and is beneficial for the health of the body.

7) Overall

Based on the data in Table 3, it can be seen that the highest score of the panelist's assessment of the overall organoleptic kemantan syrup with the addition of bay leaves was in treatment S1 (addition of 5% bay leaves) with an average value of 4.48 which was significantly different from other treatments, which meant that preference panelists on the overall kemantan syrup with the addition of 5% bay leaf, namely likes. From these data it can be seen that on the addition of bay leaves S0, S1, and S2 are like to really like. While the addition of more bay leaves such as treatments S3 and S4 tends to get results that are somewhat like to dislike. Thus the addition of bay leaves to a concentration of 10% can affect the syrup yield. However, when the concentration increased to 20%, the panelists did not like the syrup.

The overall is an acceptance test as well as a preference test for the product as a whole, both in terms of taste, aroma and color [34]. The results of the study by [35] also revealed that overall, the level of panelists' preference for the organoleptic jamblang fruit syrup produced in this study ranged from normal to like.

B. Examine the corelation between the use of syrup-making ingredients with the panelist organoleptic results

Based on the panelists' comments on the organoletic questionnaire notes on kemantan fruit syrup with the addition of bay leaves, it can be seen that the panelists generally liked the syrup. In terms of syrup aroma, the panelists liked the dominant mango aroma and characterizes the former's aroma. Kemantan has a characteristic sweet taste with a little sourness, making it quite refreshing for the panelists. Because it contains a lot of sugar in kemantan, it gives the kemantan syrup a fairly good thickness and can also save the sugar used. The flesh of the kemantan fruit has veins so the texture is slightly chewy. The color of the kemantan flesh is quite interesting, namely yellowish green and this is quite interesting for the panelists. The former is in the same genus as mango (Mangifera indica, L) so it is expected to have the same quality as mangoes in general or more. As revealed by [36] that the nutritional value of mangoes in general per 100 g consists of 272 kJ energy (65 kcal), 17 g carbohydrates, 14.8 g sugar, 1.8 g dietary fiber, 0.27 g fat , protein 0.51 g, vitamin A equiv. 38 mg, beta-carotene 445 mg, thiamine (Vitamin B1) 0.058 mg, riboflavin (Vitamin B2) 0.057 mg, niacin (Vitamin B3) 0.584 mg, pantothenic acid (Vitamin B5) 0.160 mg, vitamin B6 0.134 mg, folate (Vitamin B9) 14 mg, vitamin C 27.7 mg, calcium 10 mg, iron 0.13 mg, magnesium 9 mg, phosphorus 11 mg, potassium 156 mg, and

zinc 0.04 mg. In addition, mango fruits provide energy, dietary fiber, carbohydrates, protein, fat and phenolic compounds [37]. The following is an example of a picture of kemantan fruit (Mangifera torquenda Kosterm).

A B

Note:

A= Kemantan fruit has not been peeled

B= Kemantan fruit after splitting

Fig. 2. Kemantan Fruit

The addition of bay leaves in the manufacture of the kemantan syrup can affect the quality of the kemantan syrup. One example is the organoleptic color. With the addition of bay leaves can affect the color of the syrup that is getting brighter. Because the bay leaf fresh green color. In addition, the addition of bay leaves can affect the taste of the syrup which is not so sweet so that the texture is not so thick. There are also many nutrients in bay leaves that are beneficial to human health, so the addition of bay leaves can affect the quality of the kemantan syrup. This is as expressed by [9] that the chemical content of bay leaves include flavonoids, tannins, essential oils, terpenes, triterpenoids, steroids, citral, saponins, and carbohydrates. Bay leaves also contain several vitamins, including vitamin C, vitamin A, vitamin E, thiamin, riboflavin, niacin, vitamin B6, vitamin B12, and folate. Some of the minerals in bay leaves are selenium, calcium, magnesium, zinc, sodium, potassium, iron, and phosphorus [38]. The following is a picture of a bay leaf.

Fig. 3. Bay Leaf

Apart from kemantan and bay leaves, the main ingredient for making the syrup is sugar. Sugar can give optimal sweetness to the syrup, so we can add sugar in making syrup according to the dosage. In addition, the addition of sugar can affect the viscosity of the syrup, as reve aled by [39] which states that the viscosity of tomarillo syrup increases with the higher concentration of added sugar, the addition of sugar can also affect taste, color, aroma, and syrup texture. Therefore we must add sugar according to the measure. According to [40] the concentration of sugar can reduce the total acidity of the soursop and beetroot mixture, but the total acidity of the syrup is usually affected by the natural acid content found in the type of fruit used. Sugar concentration affects the total value of sugar produced. The more concentration of sugar added, the total sugar will increase, because the existing sugar solution is a sugar solution consisting mostly of sucrose and some non-sucrose components, so that by adding sugar from outside, the sucrose portion will automatically increase, so that the value of total sugar in mango syrup is higher [18].

Apart from that, the other main ingredient in making the kemantan syrup is CMC. CMC is a stabilizer which is a type of hydrocolloid and has the ability to improve the texture of food products such as consistency, thickness, elasticity, gel strength, and functions as a stabilizer [2]. The addition of CMC aims to form a liquid that is stable and homogeneous, and does not precipitate during storage [22]. CMC also affects the thickness of the kemantan syrup. CMC is a polysaccharide and has polymer chains consisting of cellulose molecular units in the form of linear chains and has many glucose components, so that with increasing CMC it will increase total sugar [41] .

IV. CONCLUSION

Based on the results of the research that has been done, it can be concluded that the addition of bay leaves can affect the organoleptic properties of kemantan syrup. The results showed that the best treatment for kemantan syrup products was S4 (20% bay leaf addition) for color assessment. While the best treatment for aroma, taste, thickness, texture, preference and overall assessment was S1 (5% bay leaf addition). Kemantan syrup with the addition of bay leaves has a significant effect on texture parameters, a very significant effect on color, taste, thickness, preference and overall and has no significant effect on aroma. The results of the LSD follow-up test for the parameters of color, taste, texture, thickness, preference and overall were significantly different for each treatment, namely S0, S1, S2, S3 and S4. Meanwhile, the aroma parameters were not significantly different between treatments, except for treatment S4. From the research data as a whole it can be concluded that kemantan syrup with the addition of bay leaves has an effect on the organoleptic test. The panelists also commented that the ingredients for making the syrup had a positive impact on the color, taste, aroma, texture, thickness, liking and overall taste of the syrup.

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REFERENCES

[1] Santosa BAS, Sudaryono, Widowati S, Karakteristik ekstrudat beberapa varietas jagung dengan penambahan aquades. Jurnal Penelitian Pasca Panen Pertanian 3(2): 96 –104, 2006.

[2] Manurung W, Sarungallo ZL, Tethool EF, Susanti CME, Sinaga NI, Irbayanti DN, Latumahina RMM, Karakteristik fisikokimia dan organoleptik sirup campuran buah pandan tikar (Pandanus tectorius

Park.) dan nenas (Ananas comosus). Jurnal Aplikasi Teknologi Pangan 10(4): 133-139, 2021.

[3] Andrea M, Heuvel IVD, Brouns F, Fruits syrup: Sweet concetrated sources. The World of Food Ingredients 1(1): 44-46, 2016.

[4] Oktavianto Y, Sunaryo, Suryanto A, Karakterisasi tanaman mangga (Mangifera Indica L.) cantek, ireng, empok, jempol di Desa Tiron, Kecamatan Banyakan Kabupaten Kediri. Jurnal Produksi Tanaman 3(2): 91 – 97, 2015.

[5] Luqyana LZTM, Husni P, Aktivitas farmakologi tanaman mangga (Mangifera indica L.): review. Farmaka 17(2): 187-194, 2019.

[6] Sen S, Chakraborty RC, Sridharl YSR, Reddy, De B, Free radicals, antioxidant, diseases and phytomedicines: current status and future prospect. Inter. J. Pharmaceu. Sci.Rev and Res 3 (1): 91-100, 2010.

[7] Syukur M, Keanekaragaman jenis dan pemanfaatan buah buahan pada areal Tembawang Landau Buaya. PIPER 16 (31): 168-173, 2020.

[8] Harismah H, Chusniatun, Pemanfaatan daun salam (Eugenia polyantha) sebagai obat herbal dan rempah penyedap makanan. Warta LPM 19(2): 110-118, 2016.

[9] Ningtiyas IF, Ramadhian MR, Efektivitas ekstrak daun salam untuk menurunkan kadar asam urat pada penderita artritisgout. Majority 5(3): 105-110, 2016.

[10] Food and Drug Administration (FDA), Guidance for industry photosafety testing, pharmacology toxycology coordinating committee in the centre for drug evaluation and research (CDER) at the FDA. 2013.

[11] Har LW, Ismail IS, Antioxidant activity, total phenolic and total flavonoids of Syzygium polyanthum (Wight) Walp leaves. Int. J. Med. Arom. Plants 2 (2) : 219-228, 2012.

[12] Wartini NM, Senyawa penyusun ekstrak flavour daun salam (Eugenia polyantha Wight) hasil destilasi uap menggunakan pelarut n-heksana dan tanpa n-heksana. Agrotekno 15(2): 72-77, 2009.

[13] Studiawan H, Santosa MH, Uji aktivitas penurun kadar glukosa darah ekstrak daun Eugenia polyantha pada mencit yang diinduksi Aloksan. Media Kedokteran Hewan 21(2): 62-65, 2005.

[14] Andriani A, Chaidir, R, Pengaruh pemberian air rebusan daun salam (Syzygium Polyanthum) terhadap penurunan kadar asam urat. Jurnal Ipteks Terapan, Research of Applied Science and Education 1(12): 112-119, 2016.

[15] Kamal N, Pengaruh bahan aditif CMC (Carboxyl Methyl Cellulose) terhadap beberapa parameter pada larutan sukrosa. Jurnal Teknologi 17(1): 78 – 84, 2010.

[16] Susiwi, Jurnal penilaian organoleptik, (handout) FPMIPA Universitas Pendidikan Indonesia, 2009.

[17] Sirangelo TM, Sensory descriptive evaluation of food products: A review. Journal of Food Science and Nutritional Research 2(1): 354-363. DOI: 10.26502/jfsnr. 2642-11000034, 2019.

[18] Breemer R, Palijama S, Jambormias J, Karakteristik kimia dan organoleptik sirup gandaria dengan penambahan konsentrasi gula. AGRITEKNO: Jurnal Teknologi Pertanian 10 (1): 56-63, 2021.

[19] [BSN] Badan Standardisasi Nasional. SNI No. 3544, Syarat Mutu Sirup. Badan Standardisasi Nasional, Jakarta.2013.

[20] Agato and Apriyani, D, Pembuatan sirup nanas dengan metode blanching dan perendaman garam, Buletin LOUPE 15(1): 50-54, 2019.

[21] Sulistiawati F, Karakteristik sifat fisik dan organoleptik sirup asam (Tamarindus Indica Linn.) pada berbagai konsentrasi gula. Jurnal Ilmu Sosial dan Pendidikan 4(3): 522-526, 2020.

[22] Manoi F, Pengaruh konsentrasi karboksil metil selulosa (CMC) terhadap mutu sirup jambu mete. Bul. Littro 2 (17): 1-7, 2007.

[23] Nurwin FA, Dewi EN, Romadhon, Pengaruh penambahan tepung karagenan pada karakteristik bakso kerang darah (Anadara granosa). Jurnal Ilmu dan Teknologi Perikanan 1(1): 39-46, 2019.

[24] Fitri E, Harun N, Johan VS, Konsentrasi gula dan sari buah terhadap kualitas sirup belimbing wuluh (Averrhoa bilimbi L.). JOM Faperta UR 4(1): 1-13, 2017.

[25] Rachman HPS, Metode analisis harga pangan. Disampaikan pada apresiasiistem distribusi dan harga pangan oleh badan ketahanan pangan di pusat manajemen pengembangan SDM pertanian, Ciawi-Bogor 3 – 5 Juli 2005. Bogor: Pusat Analisis Sosial Ekonomi dan Kebijakan Pertanian.

[26] Winarno FG, Kimia Pangan dan gizi. Gramedia Pustaka Utama, Jakarta, 2004.

[27] Setiawati IH, Karakterisasi mutu fisika kimia gelatin kulit ikan kakap merah (Lutjanus sp) hasil proses perlakuan asam. Skripsi. Institut Pertanian Bogor. Bogor, 2011.

[28] Asmawati SH, Sunardi H, Ihromi S, Kajian persentase penambahan gula terhadap komponen mutu sirup buah naga merah, Jurnal Agrotek 5 (2): 97-105, 2018.

[29] Zaitoun M, Ghanem M, Harphoush S, Sugars: types and their functional properties in food and human health. International Journal of Public Health Research 6 (1): 93-99, 2018.

[30] Akal Cİ, Buran RA, Delialioğlu A, Yetişemiyen, The effect of different sugar ratio on the quality properties of milk jam. J Food 43: 865-875. DOI: 10.15237/gida.GD18067, 2018.

[31] Afrianti R, Yenti R, Meustika D, Uji aktivitas analgetik ekstrak etanol daun pepaya (Carica papaya L.) pada mencit putih jantan yang diinduksi asam asetat 1%. Sains Farmasi dan Klinis 1(1): 54-60. DOI:10.29208/jsfk. 2014.1 .1.12, 2014.

[32] Vaclavic VA, Christian. EW, Sugars, sweeteners, and confections. in: essentials of food science. Springer 279-295, 2014.

[33] Asrawaty, Noer H, Wahyudin, Karakteristik fisik kimia dan organoleptik sirup buah mangga pada penambahan gula yang berbeda. Jurnal Ilmu-Ilmu Pertanian 1(2): 1-8, 2017.

[34] Umam MF, Utamidan RE, Widowati, Kajian karakteristik minuman sinbiotik pisang kepok (Musa paradisiaca forma typical) dengan menggunakan starter Lactobacillus acidopillus IFO 13951 dan bifidobacterium longum ATCC 15707. Jurnal Teknosains Pangan 1(1): 3-11, 2012.

[35] Safriani N, Lubis YM, Sufrin DS, Kajian pembuatan sirup buah jamblang dengan variasi perbandingan air dan buah serta konsentrasi gula. Sagu 15 (1): 12-17, 2016.

[36] Novia C, Syaiful, Utomo D, Diversifikasi mangga off grade menjadi selai dan dodol. Jurnal Teknologi Pangan 6(2): 76-79, 2015.

[37] Tharanathan RN, Yashoda HM, & Prabha TN, Mango (Mangifera indica L.), The king of fruits – A review. Food Reviews International 22(1): 95–123, 2006.

[38] Yaacob MNBM, Megantara S, Artikel review: uji aktivitas dan efek farmakologi daun salam (Eugenia polyantha). Farmaka Suplemen 16 (3): 44-54, 2018.

[39] Pratama SBS, Wijana, Arie, Febriyanto, Studi pembuatan sirup tamarillo (kajian perbandingan buah dan konsentrasi gula). Jurnal Industria 1 (3): 180-193, 2013.

[40] Bastanta D, Karo-Karo T, Rusmarilin H, Pengaruh perbandingan sari sirsak dengan sari bit dan konsentrasi gula terhadap sirup sabit. Jurnal Rekayasa Pangan dan Pertanian 5(1): 102-108. DOI: 10.3 5891/TP.v11i1.1786, 2017.

[41] Fitriyaningtyas SI, dan Widyaningsih TD, Pengaruh penggunaan lesitin dan CMC terhadap sifat fisik, kimia, dan organoleptik margarin sari apel manalagi (Malus sylfertris Mill) tersuplementasi kacang tanah. Skripsi, Jurusan Teknologi Hasil Pertanian. FTP. Universitas Brawijaya Malang, 2015.