



# Effect of Mango Puree (*Mangifera Indica L*) and Pineapple Puree (*Ananas Comosus (L.) Merr*) Balance on the Characteristics of Fruit Leather Produced

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## Abstract

Fruit leather is one type of food that can be used as an alternative to processed food made from fruits. Some of the fruits that can be processed into fruit leather are harum manis mango and pineapple. The purpose of the study is to find out the right balance between mango and pineapple so as to produce fruit leather with good characteristics. The research was carried out at the Chemical Laboratory and Food Processing Laboratory, Faculty of Agriculture, Ma'soem University in the second week of June to the second week of August 2022. The method used in this study is a Randomized Block Design (RAK) method which consisted of 6 treatments and each was repeated 4 times. The treatment is Mango: Pineapple A (0:100), B (20:80), C (40:60), D (60:40), E (80:20), F (100:0). The analysis in this study includes chemical tests and organoleptic tests. Chemical tests consist of analysis of water content and total dissolved solids while organoleptic tests are carried out on the level of preference for color, taste, aroma, and texture. The results showed that the balance of mango and pineapple puree had a significant effect on water content, total dissolved solids, and level of preference for fruit leather texture. Meanwhile, the level of preference for the color, taste and aroma of fruit leather was not significantly different. The organoleptic D (60:40) balance produced the best level of taste and aroma preference.

**Keywords:** Fruit leather, Harum Manis Mango, Pineapple, Characteristics.

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## 1. Introduction

According to the Badan Pusat Statistik (BPS, 2021), the national production of national fruits is what dominates fruit production at the national level, including mangoes 11.66% and pineapples 9.85%. In addition to the high amount of production at the national level, several types of fruits such as mangoes and pineapples are also very popular in West Java. In 2020 it was recorded that mango production in West Java was 442,587 tons or around 15.27% of the total national mango production. In the same year, West Java pineapple production amounted to 250,942 tons or 10.25% of the total national production (BPS, 2021). Based on this data, West Java contributes quite a lot to the production of national fruits, especially mangoes and pineapples.

Mango (*Mangifera indica L*) is one of the fruit commodities that has high economic value and is rich in vitamins and fiber, also has the potential to be developed. Mango production centers in West Java are in Indramayu, Cirebon, Kuningan, Sumedang, and Majalengka (Directorate of Fruit & Floriculture, 2021). Especially harum manis mango is one of the local varieties in West Java that has distinctive properties with a red-orange skin color, attractive yellow fruit flesh and has a distinctive taste and aroma. In addition to sweet fragrant mangoes, pineapple (*Ananas Comosus (L.) Merr*) is a very popular fruit in West Java. In the household industry and large-scale food industry, pineapple is the raw material for the manufacture of food products such as dodol, wajit or various kinds of cakes. According to the Kemenko UKM (Ministry of Cooperatives and MSMEs, 2021) Subang Regency is the largest pineapple producing area in West Java, and more than 90% of its production is intended for export. The harvest period of pineapple fruit is almost all year round, so pineapple fruit is very easy to find in Subang Regency.

In an effort to diversify food, mango and pineapple fruits can be processed into fruit leather. These processed food diversification products can extend the shelf life of fruits, increase the added value of fruit products and can be used as a source of income that has good prospects. This fruit leather is in the form of a thin sheet as well as the skin

of the fruit with a plastic and chewy texture, it tastes sweet but still has the characteristic taste of the fruit used. Fruit leather is in the form of thin sheets, with a thickness of 2-3 mm, moisture content of 10-15%, which has a distinctive consistency and taste according to the type of fruit used (Puspasari et al., 2005).

Along with the life of Indonesian people who want practicality in modern life, the existence of fruit leather can act as a healthy and practical snack product, and can be used as a substitute for jam as a filling for bread. Each type of fruit has its own characteristics so that when combined with other fruits it will produce distinctive fruit leather characteristics. Therefore, the author is interested in knowing the characteristics of fruit leather produced from the combination of mango and pineapple.

## 2. Literature Review

In general, the manufacture of fruit leather goes through several stages, namely:

### 1. Fruit washing

Fruits before processing need to be washed beforehand. Washing is aimed at removing adhering dirt (soil), residues of fungicides or insecticides and obtaining a good appearance. Washing can be done using water and then brushed. This washing is done so that the fruits can be consumed properly.

### 2. Stripping

Stripping of the skin of the fruit is carried out in order to take the flesh of the fruit.

### 3. Cutting

Cut the flesh of the fruit into small pieces to facilitate the moment of crushing.

### 4. Destruction

In making fruit leather the fruit or vegetable used must be crushed until the fruit becomes a puree (Raab and Oehler, 2000). Weighing the pulp of the fruit according to the required amount.

### 5. Addition of other materials

Because the expected criteria of fruit leather are its attractive color, slightly clayey and compact texture, and has good plasticity so that it can be rolled (not easily broken), so to produce fruit leather with these criteria, the mixing stage of all ingredients such as fruit pulp, vegetable pulp, gum, acid and the addition of sugar must be carried out as an application of product preservation.

### 6. Mixing

Fruits that are good for making fruit leather are fruits or vegetables that have a high fiber content. Fruit leather can be made from one type of fruit or a mixture of several types of fruits.

### 7. Cooking

Cooking is carried out at a temperature of 70°C-80°C for 3-5 minutes. The purpose of this ripening is to inactivate microorganisms capable of causing damage to normal storage conditions.

### 8. Layer formation

The formation of the layer is carried out by molding porridge, namely fruit pulp is poured into a baking sheet that has been plasticized / baking paper so that it does not stick then a thin sheet is formed with a thickness of 2-3 mm, moisture content of 10-15%.

### 9. Drying

Drying is carried out until a sufficiently low moisture content is obtained by evaporating most of the water in the material. The drying method is carried out using a blower oven.

### 10. Cutting Fruit Leather as needed.

### 3. Materials and Methods

#### 3.1. Materials

##### 3.1.1 Ingredients

The main raw materials used in this main research experiment are sweet fragrant mango fruit, subang pineapple fruit, 140 grams of sucrose.

##### 3.1.2 Trial Tools

The tools used in this main research experiment are analytical scales, blenders, basins, pots, stirrers, knives, cutting boards, spoons, baking paper, spatulas, 30 x 30 baking sheets and stoves. The analysis equipment is drip pipettes, spatulas, petri dishes, measuring flasks, beakers, cups, trays, stationery, and label paper, ovens, hand refractometers.

#### 3.2 Methods

This research was carried out at the Food Processing Laboratory of the Faculty of Agriculture, Ma'soem University. The study has been carried out the second week of June to the second week of August 2022. The main raw materials used in this research experiment were harum manis mango fruit, Subang pineapple fruit, 140 grams of sucrose.

The tools used in this research experiment are analytical scales, blenders, basins, pots, stirrers, knives, cutting boards, spoons, baking paper, spatulas, baking sheets measuring 30 x 30 and stoves. The analysis equipment is drip pipettes, spatulas, petri dishes, measuring flasks, beakers, cups, trays, stationery, and label paper, ovens, hand refractometers.

The method used in this study was the Group Randomized Design (RAK) experimental method, there were six groups and each treatment was repeated four times. The treatment in the Table 1.

**Table 1:** Mango Puree and Pineapple Puree Balance

Treatment Notation	Mango: Pineapple
A	0: 100
B	20: 80
C	40: 60
D	60: 40
E	80: 20
F	100: 0

To determine the effect of the balance of mango puree and pineapple puree on the characteristics of the fruit leather produced, in this study, observations were made on chemical properties and organoleptic properties. Chemical analysis includes moisture content, total dissolved solids. For organoleptic testing, observations were made on the color, aroma, taste and texture of Fruit Leather produced using 15 panelists.

### 4. Results and Discussion

#### 4.1 Moisture Content

The results of statistical analysis show that the balance of mango puree and pineapple puree shows a markedly different influence on the moisture content of Fruit Leather, this can be seen in the following Table 2.

**Table 2:** Effect of Balance of Mango Puree and Pineapple Puree on the Moisture Content of Fruit Leather Produced

Treatment	Average Value	Notation
A = 40%	8.19	a
B = 45%	7.71	b
C = 50%	7.10	c
D = 55%	6.55	d
E = 60%	6.20	d
F = 65%	6.11	e

Description: The average value followed by different letters shows a difference of 5 % according to Duncan's multiple spacing test.

From the table above, it shows that treatment D is not significantly different from treatment E, but has a significantly different influence on treatment A, B, C and F. Moisture content of different mango and pineapple balances shows significant results where the highest average moisture content is obtained in treatment A with a mango balance of 0: pineapple 100, while for the average the lowest moisture content is obtained at treatment F with a mango balance of 100: pineapple 0. These results show that the moisture content will decrease as the less pineapple puree ratio is used and vice versa the water content will increase along with the increasing ratio of pineapple puree used. This is due to the higher moisture content of pineapple than that of mango. Pineapple moisture content is 88.9 grams while mango is 86.6 grams, the nutritional composition of food is calculated per100 grams (Directorate of Fruit & Floriculture, 2021).

Based on SNI Fruit Leather which refers to dry sweets, the moisture content produced has met the maximum required limit of a maximum of 25% (Indonesian National Standard, 1996).

#### 4.2 Total Dissolved Solids Contents

The results of statistical analysis show that the balance of mango puree and pineapple puree shows a markedly different influence on the total dissolved solids of Fruit Leather, this can be seen in the following Table 3.

**Table 3:** Effect of Mango Puree and Pineapple Puree Balance on Total Dissolved Solids Fruit Leather Produced

Treatment	Average Value	Notation
A = 40%	62.50	a
B = 45%	63.48	b
C = 50%	64.80	c
D = 55%	65.45	d
E = 60%	65.93	d
F = 65%	66.60	e

Description: The average value followed by different letters shows a difference of 5 % according to Duncan's multiple spacing test.

From the average results obtained by each treatment, it shows that, the total dissolved solids will decrease as the less mango puree ratio is used and vice versa, the total dissolved solids will increase along with the increasing ratio of mango puree used. This is due to the sugar content in mango which is 10-12% (Pracaya, 2004), while the sugar content of pineapple is 2% (Barus & Syukri, 2008). The total dissolved solids indicate the content of the dissolved materials in the solution. The components contained in the fruit consist of water-soluble components, such as glucose, fructose sucrose, and water-soluble protein (pectin).

Based on SNI Fruit Leather which refers to the TSS dried sweets produced, it has met the minimum required limit of at least 40% (Indonesian National Standard, 1996).

#### 4.3 Color Favorability Level

The results of statistical analysis based on the level of preference for the color of fruit leather can be seen in the following Table 4.

**Table 4:** Effect of Mango Puree and Pineapple Puree Balance on the Color Favorability Level of Fruit Leather Produced

Treatment	Average Level	Notation
A = 40%	3.68	a
B = 45%	3.75	a
C = 50%	3.82	a
D = 55%	3.97	a
E = 60%	3.90	a

<b>F = 65%</b>	3.90	a
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Description: The average value followed by different letters shows a difference of 5 % according to Duncan's multiple spacing test.

From the table above, it shows that the balance of mango and pineapple puree shows the absence of a markedly different influence on the degree of liking for the color of the resulting fruit leather. From the results obtained, the average value is 4 (likes). This shows the panelists' interest in the same color of fruit leather. This can be seen in the image below where each treatment produces almost the same color, namely a turbid yellow color.



**Figure 1:** Fruit Leather Product

Color is a very important component to determine the quality or degree of acceptance of a food ingredient. The determination of the quality of a food ingredient generally depends on color because the color appears first (Winarno, 2004).

In organoleptic testing of the color of fruit leather, it was shown that the panelists liked fruit leather the most with the highest average value, namely in the F treatment with a mango balance of 100 and pineapple 0. As for the lowest value, it is in treatment A with a mango balance of 0 and pineapple 100. The color produced from fruit leather dominates the turbid yellow color obtained from mango and pineapple puree. Each different balance has a different level of color level.

#### 4.4 Taste Favorability Level

The results of statistical analysis based on the level of preference for the taste of fruit leather can be seen in the following Table 5.

**Table 5:** Effect of Mango Puree balance and Pineapple Puree on the Taste Favorability Level for the Fruit Leather Produced

Treatment	Average Level	Notation
<b>A = 40%</b>	4.30	a
<b>B = 45%</b>	4.10	a
<b>C = 50%</b>	4.13	a
<b>D = 55%</b>	4.78	a
<b>E = 60%</b>	4.50	a
<b>F = 65%</b>	4.43	a

Description: The average value followed by different letters shows a difference of 5 % according to Duncan's multiple spacing test.

From the table above, it shows that the balance of mango and pineapple puree shows the absence of a markedly different influence on taste favorability level of the fruit leather produced. Here, it can be seen that the panelists' acceptance of the taste of fruit leather has an average value of 4 (likes). This shows that the combination of sweet and sour flavors of mango puree, pineapple and sugar provides a taste that is acceptable to the panelists.

Taste is a sensory attribute that cannot be separated from the overall taste of food products. The enjoyment of the taste of a food product is impossible to obtain without the taste in it. Everyone has the lowest concentration limit on a taste so that it can still be felt (threshold). Taste is influenced by several factors, namely chemical factors,

temperature, concentration, and interaction with other taste components. If the chemical compounds contained in food ingredients are different, the taste produced will also be different.

Organoleptic testing of the taste of fruit leather showed that the panelists liked fruit leather the most with the highest average value, namely in the D treatment with a mango balance of 60 and pineapple 40. As for the lowest value, it is in treatment B with a mango balance of 20 and pineapple of 80. Taste is a factor that affects the acceptance of food products. If the color and aroma components are good but consumers do not like the taste then consumers will not accept the food product.

#### 4.5 Aroma Favorability Level

The results of statistical analysis based on the aroma favorability level of fruit leather can be seen in the following Table 6.

**Table 6:** Effect of Mango Puree and Pineapple Puree Balance on the Aroma Favorability Level for the Fruit Leather

Aroma Produced		
Treatment	Average Value	Notation
<b>A = 40%</b>	3.38	a
<b>B = 45%</b>	4.05	a
<b>C = 50%</b>	4.11	a
<b>D = 55%</b>	4.80	a
<b>E = 60%</b>	4.66	a
<b>F = 65%</b>	4.56	a

Description: The average value followed by different letters shows a difference of 5 % according to Duncan's multiple spacing test.

From the table above, it shows that the balance of mango and pineapple puree shows the absence of a markedly different influence on the aroma favorability level of fruit leather produced. Here, it can be seen that the panelists' acceptance of the taste of fruit leather has an average value of 4 (likes).

Aroma is a measured odor so that it usually causes different opinions in assessing the quality of the aroma. Differences of opinion are caused because everyone has differences in smell, although they can distinguish scents but everyone has different preferences.

Organoleptic testing of the aroma of fruit leather showed that the panelists liked fruit leather the most with the highest average value, namely in the D treatment with a mango balance of 60 and pineapple 40.

#### 4.6 Texture Favorability Level

The results of statistical analysis based on the texture favorability level of fruit leather can be seen in the following Table 7.

**Table 7:** Effect of Mango Puree and Pineapple Puree Balance on the Texture Favorability Level of Fruit Leather Produced

Treatment	Average Value	Notation
<b>A = 40%</b>	3.38	a
<b>B = 45%</b>	4.03	b
<b>C = 50%</b>	4.33	c
<b>D = 55%</b>	4.50	d
<b>E = 60%</b>	4.65	e
<b>F = 65%</b>	4.70	e

Description: The average value followed by different letters shows a difference of 5 % according to Duncan's multiple spacing test.

Based on the table above, it shows that the balance of different mango and pineapple purees has a significantly different influence on the texture favorability level of the fruit leather produced. From the table above, it shows that treatment E is not significantly different from treatment F, but has a significantly different influence on treatment A, B, C and D.

Organoleptic testing of the texture of fruit leather showed that the panelists liked fruit leather the most with the highest average value, namely in the F treatment with a mango balance of 100 and pineapple 0. As for the lowest value, it is in treatment A with a mango balance of 0 and pineapple 100.

The good texture of fruit leather can be seen from the elasticity or not of the product. One of the factors that affect the texture of fruit leather is the degree of maturity of the fruit. The fruit used as a fruit leather product does not have to be too ripe because if it is too ripe, the texture of the fruit will be mushy. Fruits that are less old or still unripe will produce fruit leather products that are less sweet and hard so they are less elastic.

## 5 Conclusion

Based on the results of the study, it can be concluded that the fruit leather with the best characteristics is produced from the balance of mango puree and pineapple puree 60:40 based on the panelist's level of preference for taste and aroma.

## Acknowledgments

We would like to thank the Ministry of Education, Culture, Research and Technology of the Republic of Indonesia, and the Ma'soem University for providing this journal.

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