

## The effects of adding carrots and pineapples on fruit leather acceptance

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### Abstract

Fruit leather is dried sweet in the form of thin sheets with a thickness of about 2-3 mm and a moisture content of 10-25%. Moreover, fruit leather has a typical consistency and taste of fruit. Fruit leather is generally made of fruit. However, carrot pulp is still rarely used as an ingredient of fruit leather. This study aimed to determine the effects of adding carrots and pineapple pulp on the 30 panelists' acceptance in fruit peels with three formulas: F1 = 37.5% carrots pulp and 62.5% pineapples; F2 = 50% carrots pulp and 50% pineapples; and F3 = 62.5% carrots pulp and 37.5% pineapples. The organoleptic test revealed that the skin color of F1 and F2 fruits were preferred by most of the panelists while the skin color of F3 fruit was moderately preferred by the panelists. The taste of F1 fruit leather was preferred by most of the panelists, while the taste of F2 and F3 fruit leathers were moderately preferred by the panelists. Furthermore, the smell of the F1 fruit leather was moderately preferred by the panelists while those of F2 and F3 were preferred by most of the panelists. The fruit leather textures of F1 and F2 fruit leathers were preferred by most of the panelists while the texture of F3 fruit leather was moderately preferred by the panelists. To conclude, the addition of carrot and pineapple flesh significantly affected the colors of the fruit skin but not its taste, smell, and texture. This study recommends using a different drying medium, such as an oven to speed up the drying process.

**Keywords:** Acceptance, carrot pulp, fruit leather, organoleptic, pineapples

### Introduction

Indonesia is known as an agricultural country that produces various agricultural products, including fruits. The types of fruit include starfruits, guavas, oranges, pineapples, mangoes, soursops, jackfruits, etc. (Fachruddin L., 2002 in Yusilawati D, 2014). Carrot plants are quite famous in foreign countries because they are easily found and always grow regardless of the season (Lesmana M, 2002). In addition, many people have cultivated carrot plants, which grow in temperate-climate areas. This plant was discovered about 6,500 years ago and grew wildly in Central Asia and East Asia (Lesmana, M., 2002 in Sri Rahmadani 2015). Carrots are also a single-rooted plant in the form of a tuber. Carrot tubers are oval in shape and reddish-yellow in color because they contain very high carotene (Provitamin A). In addition, carrots contain vitamin B, vitamin C, protein, fat, and carbohydrates. These nutrients can reduce cholesterol and prevent heart attacks (Lesmana, M., 2002 in Sri Rahmadani 2015). During the harvest season, tropical fresh fruit products frequently have no value and eventually become useless due to rapid decay. One alternative to anticipate unmarketed production results due to low quality is processing mangoes into juice, dried candied, puree, and jam (Yuniarti, 2002). Pineapples (*Ananas cosmosus*) are a fruit plant in the form of a bush. Pineapples are originated from Brazil, South America. They were initially a garden plant and were massively planted on dry land in the archipelago (BAPPENAS,

2000). Pineapple production was 1,433,133 tons in 2008, 1,558,196 tons in 2009, 1,406,445 tons in 2010, 1,540,626 tons in 2011, and 1,275,490 tons in 2012; however, the production decreased by 1,145,806 tons in 2013 (Ministry of Agriculture, 2013 in Dwi Yulisawati, 2014).

Pineapples have a sweet to slightly sour taste so that people like this fruit. In addition, pineapples contain sufficiently complete nutrition (BAPPENAS, 2000), fiber with antioxidants (vitamins A and C), and efficacious phytochemicals to overcome premature aging, hemorrhoids, cancer, heart attacks, and stress deterrents (Khomsan, 2006).

Carrots and pineapples are perishable fruits. Therefore, their shelf life must be maintained, and post-harvest processing must protect their nutritional components and the economic values. Pineapples have been processed into many food preparations, such as sweets, pickles, and jams. Unlike pineapples, carrots pulp is still rarely used. Therefore, utilizing carrot pulp mixed with pineapple is necessarily conducted to create new food preparations and increase economic values and nutrients of carrots and pineapples. This idea can be done by processing carrots and pineapples into other products with a more durable shelf life, such as jam, jelly, and juice. One of the processed dregs of carrots and pineapples that have not been widely developed is fruit leather. Fruit leather is a chewy dry fruit with a distinctive fruity smell. The processed dreg uses fruit with high fiber and carbohydrates. Moreover, fruit leather is naturally fat free (Delden, 2011 in Dwi Yusilawati, 2014). Fruit leather usually uses several fruits, such as strawberries, guavas, pineapples, mangoes, pears, apples, oranges, tomatoes, cherries, and grapes. Fruit leather can be made using one or two combined types of fruit, such as bananas and strawberries or pears and apricots (Raab & Pehler, 2000 in Dwi Yusilawati, 2014). In connection with that and by considering the high nutritional content of each fruit, the researchers were interested in examining the effects of adding carrot and pineapple pulp to the acceptability of fruit leather.

## **Methods**

This research was conducted in Lheu Blang, Darul Imarah, Aceh Besar District in June 2020. The process was preparing the ingredients and processing the acceptance test of fruit leather, carrot, and pineapple pulp. The materials to make fruit leather were pineapples, carrots, sugar, citric acid, water, and carrageenan. Meanwhile, the tools to make fruit leather were a scale, blender, basin, knife, 500-ml measuring cup, baking pan, pan, tablespoon, stove, oven, and oil paper. The tools to conduct the organoleptic test of fruit leather were plastic plates, drinking water, fruit leather samples, pens, and assessment forms. This research was an experimental study to investigate the effects of adding carrot and pineapple pulp on fruit leather acceptance. This study employed a non-factorial completely randomized design (CRD), three treatments without repetition, and 30 untrained panelists. The untrained panelists were selected due to the large-scale social restriction policy to prevent the Covid-19. The treatments of this study were F1 = 37.5% carrots pulp and 62.5% pineapples; F2 = 50% carrots pulp and 50% pineapples; F3 = 62.5% carrots pulp and 37.5% pineapples. Meanwhile, the observed variables were organoleptic properties, such as tastes, colors, smell, and textures. The data were analyzed using variance or ANOVA. When the results showed a significant difference among the treatments, the results were then tested using Duncan's multiple tests to examine the statement of each treatment.

## **Result**

The organoleptic test of the effects of adding carrot and pineapple pulp on fruit leather acceptance was conducted using a hedonic scale to determine the acceptance levels of taste,

smell, color, and texture. The taste was assessed by tasting the sample. Meanwhile, the color was assessed by observing the sample. The smell was assessed by smelling the sample. Finally, the texture was assessed by massaging and chewing the sample. The results of the organoleptic fruit leather test with the parameters of colors, tastes, smell, and textures are as follows.

### Color

This study discovered that each treatment had different fruit leather colors. Fruit leather with the addition of 37.5% carrot pulp & 62.5% pineapples (F1) was pale orange. Fruit leather with the addition of 50% carrot pulp and 50% pineapples (F2) was light orange. Finally, fruit leather with the addition of 62.5% carrot pulp and 37.5% pineapples showed dark orange color.

Table 1. The average scores of the organoleptic test of fruit leather colors

Formulas	Color Scores	Categories
F1	3.67	Liked
F2	3.76	Liked
F3	3.03	Moderately liked

### Taste

This study discovered that the fruit leather of each treatment had similar tastes to fruit leather produced by adding sugar and acid from pineapple and citric acid. The tastes were sweet and sour. The results of the organoleptic test, based on Table 10, denoted that most panelists gave a favorable response to the taste of fruit leather added with 37.5% carrot pulp and 62.5% pineapple (F1). Meanwhile, most panelists somewhat liked the fruit leather taste added with 50% carrot pulp and pineapple 50% (F2) as well as carrot pulp 62.5% and pineapple 37.5% (F3).

The variety print analysis (ANOVA) showed that the addition of carrot and pineapple pulp to the acceptability of fruit leather was not significantly different due to  $F$  count  $(0.63) < F$  table  $(3.15)$  at  $= 0.05$ . As no real effect was found, the test was not continued to Duncan's test.

Table 2. The average scores of the organoleptic test of fruit leather taste with the addition of carrot and pineapple pulp

Formulas	Taste Scores	Categories
F1	3.64	Liked
F2	3.48	Liked
F3	3.42	Liked moderately

### Texture

The organoleptic tests presented that the average panelists gave favorable responses to the fruit leather texture added with 37.5% carrot and 62.5% pineapple pulp (F1) as well as 50% carrot pulp and 50% pineapple (F2). In contrast, the average panelist moderately liked the fruit leather texture with the addition of 62.5% carrot pulp and 37.5% pineapple (F3). Meanwhile, the results of the various print analysis (ANOVA) signified that the addition of carrot and pineapple pulp did not significantly affect the acceptability of fruit leather due to  $F$

count (0.77) < F table (3.15) at = 0.05. As no real effect was found, the test was not continued to Duncan's test.

Table 3. The average scores of the organoleptic test of fruit leather texture with the addition of carrot and pineapple pulp

Formulas	Texture Scores	Categories
F1	3.58	Liked
F2	3.61	Liked
F3	3.45	Liked moderately

This study revealed that the fruit leather of each treatment had similar textures to general fruit leather. These textures were chewy, thin, and adjustable to roll-up; they were the results of adding carrageenan. According to the panelists, the texture of fruit leather with the addition of 50 % carrot pulp and 50 % pineapples (F2) was the most preferable because they had the same composition ratio. In contrast, the texture with the addition of 62.5% carrot pulp and 37.5% pineapples (F3) was moderately preferred because the textures became more fibrous when using more carrot pulp. To conclude, the combination of fruit leather with the addition of 62.5% carrot pulp and 37.5% pineapple (F3) produced a coarser texture. This combination was the most preferred by the panelists.

### Smells

The results of organoleptic tests show that most of the panelists moderately liked the fruit leather smell with the addition of 37.5% carrot pulp and 62.5% pineapples (F1). Meanwhile, the smell of fruit leather with the addition of 50% carrot pulp and 50% pineapples (F2) as well as 62.5% carrot pulp and 37.5% pineapple (F3) were preferred by the panelists.

Table 4. The average scores of the organoleptic test of fruit leather smell with the addition of carrot and pineapple pulp

Formulas	Smell Scores	Categories
F1	3.45	Liked moderately
F2	3.61	Liked
F3	3.61	Liked

The Analysis of variety (ANOVA) showed that the addition of carrot and pineapple pulp on the fruit leather did not bring a significant difference because of the F count (0.93) < F table (3.15) at = 0.05. As no real influence was found, the process was not continued to Duncan's test. According to the panelists, the smell of fruit leather added with 37.5 carrot pulp and 62.5% pineapple (F1) had less-distinctive fruit smell so that they less favored this fruit leather. In contrast, the addition of 50% carrot pulp and 50% pineapples (F2) and the addition of 62.5% carrot pulp and 37.5% pineapples (F3) were preferred by the panelists.

### Discussion

Color is used as an indicator of determining the quality, freshness, or maturity of a product. In addition, color is an indicator of mixing or processing a product to explain if the product is evenly distributed (Winarno. 1992). Carrots refer to root crops that grow well in the highlands with cold climates. Adding carrot pulp can produce orange color because it

contains carotenoid pigments, namely yellow and orange pigments in fruits and vegetables (Fajriyati, 2011). The more carrots added, the darker the color will be.

Tasting a product involves the sense of taste, namely the tongue. The taste of food can be recognized and distinguished by the taste buds located on the papillae, the orange-red spots on the tongue (Winarno, 1992). The factor that influences a food taste is the compound content of food ingredients (Winarno, 1992). For example, a sweet taste is usually produced by the carbohydrate group, especially simple carbohydrates, such as sugar. Meanwhile, a salty taste is usually produced from salt content in the form of salt and sodium salt. A bitter taste results from tannin compounds, and a sour taste results from acidic compounds, such as citric acid. Finally, a savory taste results from the combination or effects of several flavors produced. The tastes produced in the fruit leather of each treatment were similar to the tastes of general fruit leather. These tastes were sweet and sour resulting from adding sugar and acid produced by pineapple and citric acid. Of the three formulations, the addition of 37.5% carrot pulp and 62.5% pineapples (F1) was strongly favored by the panelists with an average score of 3.64. In contrast, the addition of 62.5% carrot pulp and 37.5% pineapple (F3) was less preferred by the panelists. According to the panelists, fruit leather with the addition of more carrot pulp composition had less good or less desirable tastes. Therefore, it was more bitter than fruit leather with a little carrot pulp composition. Suojola (2000) deploys that the bitter taste of carrots is caused by terpenoids. In addition, the isocoumarin content in fresh carrots causes them to have an unpleasant smell and bitter taste. Consequently, consumers dislike them.

Food texture can be defined as a way to share componential and structural elements in the layout and combine these elements into micro and macrostructures. Textures greatly influence the image of food and are sometimes the most important compared to smell, tastes, and colors. Food textures can be evaluated using a mechanical test (an instrumental method) and a sensory analysis (deMan, 1997).

Smell is one of consumers' important considerations when choosing food. The food smell determines food delicacy. The smell received by the nose and brain is a mixture of four main smells: fragrance, sourness, rancidness, and charredness. The fruity smell is created by various volatile esters. The production of these smells will increase when a fruit approaches a climacteric period (Winarno, 1992).

## **Conclusion**

The organoleptic test discovered that most of the panelists preferred F1 and F2 fruit leather colors. In contrast, the panelists less preferred F3 fruit leather color. Moreover, the panelists gave a favorable response to the F1 fruit leather taste but a less favorable response to F2 and F3. Most of the panelists liked F1 and F2 fruit leather textures but less liked F3 fruit leather texture. Finally, the panelists preferred F1 fruit leather smell but less preferred F2 and F3 fruit leather smells. The addition of carrot and pineapple pulp on the acceptability of fruit leather significantly affected the colors of the fruit leather but insignificantly affected the tastes, textures, and smells of the fruit leather. This study suggests that further research can investigate different fruits and apply more efficient drying methods, for example using an oven.

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