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RESEARCH ARTICLE

Effect of the Concentration of Added Sugar on Organoleptic Properties of Mangrove Syrup from *Sonneratia alba* fruit

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Abstract

Mangroves are ecosystems in coastal areas that economically have excellent benefits derived from wood, seeds, and fruit. The most frequently used mangrove fruit as a food source is *Sonneratia alba* fruit, and *Sonneratia alba* fruit can be used to produce mangrove syrup. This study aimed to determine the effect of sugar on the organoleptic properties of Mangrove syrup from *Sonneratia alba* fruit. The organoleptic test method used a hedonic test (preference test) using a rating scale of 1 (dislike very much), 2 (dislikes), 3 (neutral), 4 (likes), and 5 (preferences very much). The treatment P3 (*Sonneratia alba* 60%: Sugar 40%) was the most highly rated in the quality of taste, color, and aroma, while the most ordered texture quality by the panelists was treatment P2 (*Sonneratia alba* 40%: sugar 60%).

Keywords: Mangrove; *Sonneratia alba*; Organoleptic; Syrup

Introduction

Mangrove forest is a supporting ecosystem in coastal areas. Aside from having economic functions as a provider of firewood, medicines, and ecotourism sites, mangroves also have an ecological role as a place for spawning and nurturing aquatic biota, restraining coastal abrasion, absorbing waste, and providing nutrients—mangrove nutrients derived from mangrove litter. Mangrove litter could affect the level of organic content and mangrove fertility (Wintah et al., 2021a).

Among several types of mangroves, some species can produce fruit throughout the year, such as *Sonneratia caseolaris* and *Sonneratia alba*. Mangrove fruit is a food source commodity that contains carbohydrates, proteins, fats, and vitamins. Wintah et al. (2021b) stated that every 100 g of *Sonneratia alba* mangrove fruit syrup contains 1.20% protein, 0.20% fat, 3.50% carbohydrates, and 55.30% Vitamin C.

Mangroves are typical plants that grow in coastal areas and have numerous benefits. Mangrove fruit and propagules can be processed into a variety of food. In the harvest season, mangrove fruit will reach a significant level, and therefore, if not managed properly, it could become environmental waste. Mangrove fruit in various processed food and beverages can reduce ecological degradation (A'in et al., 2017).

Sonneratia alba and *Sonneratia caseolaris* are mangrove fruits that are often used to produce food and drinks. Ahmed et al. (2010) stated that *Sonneratia caseolaris* (pedada fruit) is often found along with sludgy beach areas with low salinity. Pedada fruit is non-toxic and can be consumed directly, has a round shape with a diameter of 6-8 cm, weighs 52-54 g, and has many seeds of around 800-1200. The end of the fruit is steamed. Flower petals cover the base part of the fruit. *Sonneratia caseolaris* fruit is green and has a distinctive aroma. Manalu (2011) stated that *Sonneratia* sp. has a composition of 73% seeds, 15% skin, and 12% petals. *Sonneratia* sp. fruit contains water content (bb) 84.76%, ash content (bk) 8.40%, fat content (bk) 4.82%, protein content (bk) 9.21%, and carbohydrate content (bk) 77.57%.

Sonneratia alba fruit can be processed into syrup. Matute et al. (2010) stated that syrup is a type of drink in the form of a dense liquid processed by fruit pulp that has been cooked and tends to have a sweet taste. The addition of sugar to the syrup can affect the organoleptic properties of the *Sonneratia alba* syrup.

Methods

The research method was a purposive interview, meaning that the research subjects as a source of data

were selected with specific considerations (Sugiyono, 2014). An organoleptic test of mangrove syrup was conducted to assess the organoleptic properties through sensory perception, including taste, color, aroma, and texture. The organoleptic test uses a hedonic rating (liking) using a rating scale of 1 (dislike very much), 2 (dislikes), 3 (neutral), 4 (likes), and 5 (preferences very much).

Results

Research with purposive interviews means that the research subjects were selected with specific considerations as a source of data (Sugiyono, 2014). An organoleptic test of adding various sugar levels to *Sonneratia alba* syrup was conducted to assess the acceptance of organoleptic properties of *Sonneratia alba* syrup through sensory perception, including taste, color, aroma, and texture. The organoleptic test used a hedonic rating test using a rating scale of 1 (dislike very much), 2 (dislikes), 3 (neutral), 4 (likes), and 5 (preferences very much). The results showed that the most popular treatment ranked by a panelist is P3 (Ratio of mangrove fruit and sugar 60:40). The average organoleptic preference for mangrove syrup can be seen in (Table 1).

Table 1. The Results of The Mangrove Chocolate Preference Ranking Test

No	Treatment	Parameter			
		Flavor	Color	Scent	Texture
1	P0	2,56	2,48	2,60	2,76
2	P1	3,24	3,48	3,60	3,60
3	P2	4,36	4,28	4,32	4,28
4	P3	4,92	4,68	4,72	4,76

Source: *Primary Data, 2021*
Treatments:
P0 = *Sonneratia alba* 0%: sugar 100%
P1 = *Sonneratia alba* 20%: sugar 80%
P2 = *Sonneratia alba* 40%: sugar 60%
P3= *Sonneratia alba* 60%: sugar 40%

Discussion

Taste Quality Rating

Taste is one of the organoleptic properties of a product, and preference highly determines consumer acceptance of food products. The added sugar level can influence the taste of a product. Human receptors can recognize food tastes in four kinds of taste, including salty, sour, sweet, and bitter (Winarno, 2008). The results of the organoleptic test of taste quality rating on the ratio of *Sonneratia alba* fruit and sugar to the syrup in treatment P0 were 2.56 (dislikes), treatment P1 was 3.24 (neutral), treatment P2 was 4.36 (likes), The treatment of P3 is 4.92 (very much like).

The taste quality rating test results showed that the panelists expressed the highest rating value of 4.92 (very like) in the P3 treatment with slightly sour and sweet syrup criteria. The syrup has a slightly acidic taste due to the composition of 40% of sugar and 60% of *Sonneratia alba*. Suprayatmi et al. (2015) reported that food taste comes from the material itself. The taste will be influenced by the other components added during the processing if exposed to a specific processing process. Putra et al. (2021) stated that *Sonneratia* sp. mangrove syrup has a sour taste, and some panelists prefer sour.

Color Quality Rating

Color has a significant meaning and role in a food product. Color also has an attractiveness to a product. Color can be a clear indicator of the quality level as an indication of the quality level of the food processing process and to detect any damage to a food or beverage product (Novitasari and Nurfadilah, 2020).

Color is the first sensory quality that the panelists can see and assess directly. The color of food will highly affect the quality preference of the food determined by the panelists. The result showed that the most favored color of the *Sonneratia alba* syrup is in treatment P3 compared to treatments P0, P1, and P2. Sample P3 indicated the highest quality rating score of 4.68 (like very much) with the formulation of 40% added sugar and 60% *Sonneratia alba* fruit. The panelists preferred adding 40% sugar because it generated the broken white color, which was selected compared to other treatments.

The *Sonneratia alba* syrup, with the addition of 40% sugar, generated a more attractive color. The natural broken white color was produced originally by *Sonneratia alba* fruit juice, with there is no addition of food coloring. The result of the color quality rating indicated that the panelists preferred this natural broken white color. Fitria (2021) states that color can affect panelists' preference for a product, and color can also provide attractiveness and improve food quality.

Aroma Quality Rating

The aroma can be recognized by the sense of smell in the form of vapor and becomes an attractive property in processing food and beverage products. The results of the organoleptic test of aroma on the ratio of *Sonneratia alba* and sugar to *Sonneratia alba* syrup in P0 treatment were 2.60 (dislike), P1 3.60 (neutral), P2 4.32 (liked), and P3 4.72 (like very much). The panelists highly favored the aroma quality rating of the syrup in the P3 treatment with the formulation of *Sonneratia alba* 60% and sugar 40%. This formulation was the

most concentrated extract of *Sonneratia alba*. Most panelits preferred Sonneratia alba's scent because the aroma of *Sonneratia alba* fruit with a high level of ripeness generated a refreshing fragrance.

Tarwendah (2017) stated that aroma is a volatile compound product that could enter the nasal cavity and can be responded to by the olfactory system. The aroma can also be influenced by the sugar component added, which can generate caramelization when heated in either an acidic or alkaline environment (Wulandari and Junita, 2020).

Texture Quality Rating

The texture is a property of product formation that can be perceived by the senses of taste and touch (Tarwendah, 2017). The surface expresses the product's physical form, and texture also affects the product's attractiveness to a person. The results of the organoleptic test of texture parameters on the ratio of *Sonneratia alba* and flour to mangrove syrup in treatment P0 was 2.84 (disliked), treatment P1 was 4.36 (liked), treatment P2 was 4.68 (enjoyed very much), Treatment P3, i.e., 3.72 (selected).

The texture of the *Sonneratia alba* syrup in this study was assessed based on the subjective assessment by panelists with a hedonic quality score of 1-5. The P2 treatment with a ratio of 40% *Sonneratia alba* and 60% sugar was highly favored by the panelists because the syrup in the P2 treatment had a thick texture category. The thickness of the syrup is influenced by the concentration of sugar added, the addition of a higher concentration of *Sonneratia alba* will reduce the viscosity of the syrup. Novitasari and Nurfadilah (2020) stated that thick syrup is determined by the ingredients used, namely sugar, water, and mango juice.

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Authors Contribution

The researcher has contributed to the preparation of the manuscript in the research process. Manuscript preparation starts with data collection, analysis, and manuscript editing.

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