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Innovating With Pedada Fruit Spread: Pedada Spread Macarons As A Modern Food Product With Economic Value

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ABSTRACT

The utilization of local resources as raw materials for food innovation is one of the strategic steps in creating products that are not only unique but also have economic value and sustainability. This research and development focuses on the production of macarons filled with pedada fruit jam (Sonneratia caseolaris), a fruit native to mangrove ecosystems that is rich in antioxidants but has yet to be widely utilized in modern culinary industries. The production process is facilitated and supported by the Sumatran Elephant Foundation (Yagasu), with activities conducted at the Yagasu office. The innovation results show that pedada jam macarons not only have a distinctive flavor that is well-received by consumers but also open new economic opportunities, particularly for communities around mangrove areas. This product can serve as an example of culinary innovation, environmental conservation, and the strengthening of local economies based on regional biological potential.

1. INTRODUCTION

Indonesia is a country rich in biodiversity, especially in its waters. Mangrove ecosystems are one of the natural resources that play a very important role in maintaining coastal environmental balance. The ecological functions of mangroves include protecting coastlines from erosion, acting as a buffer against saltwater intrusion, serving as a breeding ground and feeding

area for various marine species, and effectively absorbing carbon to mitigate climate change. However, beyond their ecological functions, mangroves also hold significant economic potential if utilized wisely and sustainably, particularly through the use of byproducts derived from the mangrove vegetation itself.

Various types of mangroves, especially their fruits, can be used as raw materials for processed foods, which are currently experiencing rapid growth. To meet this demand, efforts to manage mangroves and their environment must be implemented immediately so that the processing of these food ingredients can continue to develop and serve as a source of food (Rajis et al., 2017). One type of mangrove with economic value is Sonneratia caseolaris, commonly known as pedada fruit. This fruit grows abundantly in mangrove areas, but unfortunately its utilization remains very limited. In most coastal areas of Indonesia, the pedada fruit is only consumed traditionally or even left to rot due to a lack of knowledge and processing technology. However, the pedada fruit has a unique sour-sweet taste, high vitamin C content, and significant potential to be processed into various value-added food products.

One form of innovation that can be developed is processing pedada fruit into jam. Pedada fruit jam is a product that not only has a unique flavor and promising nutritional content but can also serve as a raw material for the production of other processed products such as cookies, pies, and macarons. Thus, processing pedada fruit into jam not only extends the shelf life of the fruit but also opens up opportunities for the home industry to create a variety of creative products that can be marketed more widely, both locally and nationally.

This innovation process is facilitated and supported by the Sumatran Elephant Foundation (Yagasu), an organization active in environmental conservation, green economic development, and community empowerment in coastal areas and mangrove forests. The processing of macaron jam is carried out directly at the Yagasu office, which provides facilities, guidance, and technical support to ensure that the products produced are not only of high quality but also reflect the spirit of sustainability.

Through this collaboration, the innovation of pedada jam macarons has become more than just a culinary product; it is a tangible form of synergy between creativity, nature conservation, and strengthening the local economy. This initiative is expected to introduce the potential of pedada fruit as an alternative food source while also encouraging awareness of the importance of mangrove ecosystem conservation.

2. LITERATURE REVIEW

Pedada Fruit

The pedada fruit sounds very unfamiliar to most people, but it has many benefits. The pedada fruit, commonly known as the rib fruit or Sonneratia caseolaris in Latin, is a type of fruit that grows in coastal areas of Indonesia, especially in areas with mangrove ecosystems. Generally, this fruit falls and scatters around the tree because it is not utilized properly. The pedada fruit is highly prone to spoilage due to its high water content, which reaches 84.76% (by weight) (Manalu 2011). This fruit has a round shape with a rough skin, its base is covered by flower petals, and it is dark brown in color. The inner part contains seeds with high commercial value. The pedada fruit has a sour taste and a distinctive aroma. Generally, the pedada fruit (Sonneratia caseolaris) can be utilized as a food source (Septiadi, 2010) because it has several advantages, including being non-toxic and edible raw, and has been used for various medicinal purposes such as treating bruises and sprains (Septiadi, 2010) in (Yumna Nurhanita Hafidzah, 2023)

The flesh of the pedada fruit has a high nutritional content. The nutritional content per 100g of fresh pedada fruit includes carbohydrates 77.5%, protein 9.21%, fat 4.81%, vitamin A 11.21 (RE), vitamin B5 5.04 mg, vitamin B7 7.65 mg, and vitamin C 56.74 mg (Manalu, 2011), as well as a water content of 67.8% and ash content of 1.17% (Ramadani et al., 2019). The pedada fruit is one of the plants with potential as an antioxidant; this plant contains alkaloids, flavonoids, glycosides, saponins, and phenols (Avenido and Serrano, 2012).

Macaron

Macarons are a sweet French treat made from egg whites, powdered sugar, caster sugar, almond flour, and food coloring. Macarons were first known in Italy and brought to France by Catherine de Medici in the 16th century. However, the modern version of the macaron, consisting of two shells with a filling in between, gained popularity in France in the early 20th century thanks to the renowned pastry shop Ladurée.

Macarons are essentially cookies made from meringue. These cookies do not contain baking soda or baking powder, and rise during baking due to the steam released from the beaten egg whites. Macarons have a flat base, a ruffled edge around the base known as the “foot,” and a smooth, glossy top (Fig. 1). The texture of the shell should be light and airy with a slight chewy texture, but not hard. A cross-section should reveal a smooth, elastic structure without any noticeable air pockets between the surface and the rest of the shell. The

standard size of a macaron shell is approximately 3.00–5.00 centimeters in diameter and 0.75–1.00 centimeters in height.

These small French macarons are not only delicious, but also packed with healthy ingredients. For starters, macarons are made with almond flour, which is high in protein and low in carbohydrates. This makes them the perfect snack for people trying to follow a low-carb diet. In addition, almond flour is also a good source of vitamin E, magnesium, and potassium. All these nutrients are important for maintaining a healthy immune system. Another health benefit of macarons is that they are naturally gluten-free, making them ideal for those with celiac disease or gluten sensitivity. Lastly, macarons are made with egg whites, which are a good source of protein and low in calories, making them an excellent choice for those watching their weight (Fitri Yupita, 2024).

Macarons as a Modern Food Product

Macarons are a classic French pastry that has recently gained popularity among urban Indonesians. Typically, macarons are filled with chocolate ganache, imported fruit jam, or flavored cream. By using pedada fruit jam as a filling for macarons, not only is a unique and innovative product created, but there is also a cross-cultural collaboration between European cuisine and Indonesia's natural resources. The distinctive tangy flavor of pedada fruit, which is refreshing, perfectly complements the sweetness and soft texture of the macaron, creating an unusual yet harmonious flavor combination. This makes the pedada macaron not just a food item but also a new experience that stimulates the palate and educates consumers about the potential of Indonesia's local food ingredients.

Furthermore, the combination of modern international products such as macarons with local ingredients from the Indonesian coast shows that local foods are not always synonymous with traditional products, but can also be processed and presented in an elegant, contemporary, and export-worthy form. This can increase the competitiveness of local products in the global market, especially if developed through a strong branding approach, attractive packaging, and smart marketing strategies.

3. METHODS

Location of PKM-K Production The production of “MACEDA (Macaroni Selai Buah Pedada)” is carried out at the Sumatran Elephant Foundation. This production is handled directly by the team and assisted by the Comdev team.

A. Tools and Materials

The tools and materials that must be prepared in advance are:

Tools :

1. Gas Stove
2. Gas cylinder
3. Oven
4. Mixer
5. Plastick Bowl
6. Plastic Gloves
7. Spoon
8. Spatula
9. Bowl
10. Baking Pan
11. Stainless Steel Container
12. Baking Paper
13. Oven Gloves
14. Macaron Mold
15. Dishclote

Material :

1. Almond Flour
2. Eggs
3. Sugar
4. Powdered Sugar
5. Food Coloring

6. Pedada Fruit Jam

B. Manufacturing Process

The first stage involves purchasing raw materials and equipment used in the manufacturing process. The processing of materials into finished products will be carried out entirely by our team with the assistance of Yagasu staff.

The manufacturing process involves the following stages:

- First, separate the egg whites from the yolks and place them in a bowl

Figure 3.1 Separate the egg whites

- Add 4 tablespoons of sugar to the egg whites, then boil water and warm the bowl over the water until the sugar dissolves.

Figure 3.2 Warming Up

- Sift the almond flour and powdered sugar, then set aside.

- Beat the egg whites with a mixer on low speed, then increase the speed until the mixture is foamy, stiff, and shiny (from soft peaks to stiff peaks).

Figure 3.3 dough mixer

- Add food coloring if desired, stirring gently to mix evenly.
- Add the almond flour + powdered sugar mixture to the meringue batter. Mix using the folding technique (not regular mixing).

Figure 3.4 mixing the dough

Figure 3.5 food coloring

- This process is called macaronage. Stir until the dough falls from the spatula in ribbons (lava-like flow).
- Put into a piping bag. Pipe onto a baking sheet lined with parchment paper/silicone mat, forming 3–4 cm rounds.

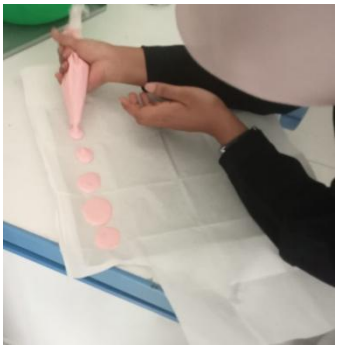

Figure 3.6 putting the dough

- Tap the baking sheet to remove any air bubbles
- Let stand for 30–60 minutes at room temperature until the surface is dry (can be touched without sticking).
- Bake at 140–150˚C for 15–18 minutes (depending on the oven). Make sure that “feet” (macaron feet) appear.

4. RESULTS AND DISCUSSION

Macarons are a type of modern French pastry known for their flat, round shape, bright colors, and distinctive texture: crispy on the outside, soft and chewy on the inside. In this innovation, macarons are modified by using pedada fruit jam (Sonneratia caseolaris) as the main filling. The pedada fruit, which grows naturally in coastal mangrove forests, has a fresh, tangy flavor and a distinctive aroma. The use of this fruit in macaron fillings creates a new flavor combination that is not only appealing from a culinary perspective but also highlights the potential of local Indonesian food ingredients.

Inovation Process

a. Making Mcaron Shells

The process of creating this innovation involves two main stages:

Macaron dough is made using the French meringue technique, which involves beating egg whites with sugar until stiff, then mixing in a mixture of almond flour and powdered sugar. Synthetic food coloring can be added to enhance the appearance of the product. The shells are baked at 140–150˚C for approximately 15–18 minutes until evenly cooked.

b. Making Pedada Fruit Jam

Ripe pedada fruit is selected, washed thoroughly, steamed, and blended until smooth. Sugar and a little water are added to the fruit mixture. The mixture is heated over low heat until it thickens and reaches the consistency of jam. Additional coloring is used.

Organoleptic and Sensory Results

Although laboratory testing of nutritional content has not yet been conducted, visual and organoleptic observations of the pedada jam macaron product show several advantages:

a. Appearance

The macaron shell is bright in color, with a smooth and shiny surface, and has the characteristic macaron “foot.” The pedada jam has a reddish-brown color that contrasts with the shell, enhancing the product's visual appeal.

b. Texture

The shell has a texture that meets standards: crispy on the outside, soft and chewy on the inside. The pedada jam has a soft texture, is not watery, and is not too sticky, so it does not damage the macaron's structure when consumed.

Figure 4.1 Macaron

c. Texture and Aroma

The sweet taste of the macaron shell blends with the fresh sour taste of pedada jam, creating a refreshing balance of flavors that is not cloying. The distinctive aroma of pedada fruit gives this product a strong local character, distinguishing it from conventional macarons.

Potential For Innovation in an Environmental and Social Context

a. Utilization of Local Fruit

Pedada fruit is a natural product of the mangrove ecosystem that has not been widely utilized. This innovation adds value to local fruits that are generally not widely traded. With growing interest in cuisine based on local wisdom, pedada jam macarons have the potential to become a signature coastal souvenir or a flagship UMKM product.

b. Positive Impact on Conservation

The economic utilization of mangrove fruits can encourage mangrove forest conservation, as communities have an economic incentive to preserve the habitat. This aligns with the principles of sustainable development and community-based conservation.

c. Economic Potential

This product has the potential to be marketed as a modern healthy snack based on local ingredients. With the right branding strategy, for example, promoting the theme of “mangrove cuisine,” pedada jam macarons can enter the market segment.

Challenges and Limitations

Limited Shelf Life: Since no synthetic preservatives are used, pedada jam has a limited shelf life (approximately 1–2 weeks in the refrigerator). This poses a challenge for mass production.No Nutritional Testing: While it is generally known that pedada fruit contains vitamin C, antioxidants, and phenolic compounds, the exact content of these nutrients has not been measured in this product. Future laboratory testing is required to support health claims.Seasonal Availability of Raw Materials: Pedada fruit is not always available throughout the year, so a sustainable supply strategy is needed if the product is to be developed commercially.

Further Development

To increase the value and sustainability of this innovation, the following development steps can be taken. Laboratory testing of the nutritional content and bioactive compounds in pedada fruit and the final product. Standardization of the production process and exploration of natural preservation methods to extend shelf life. Educational promotion of the

importance of mangrove conservation through this product, so that consumers also participate in conservation.

5. CONCLUSION

The innovation of fruit jam macarons is a creative innovation that combines modern cuisine with the untapped potential of local coastal resources. The pedada fruit, a natural product of the mangrove ecosystem, offers nutritional value and a strong, distinctive flavor. When presented in the form of popular French-style macaron pastries, this product is not only unique in taste but also has high value in the culinary market.

Despite challenges such as limited awareness of the pedada fruit, quality testing requirements, and product legalization processes, market opportunities for sales remain wide open. Current consumer trends show high interest in local, healthy, and innovative products. With the right development approach, from laboratory testing, market education, to branding strategies, pedada fruit jam macarons have the potential to become a flagship product that is not only competitive but also strengthens Indonesia's local food identity.

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