

## REVIEW ARTICLE; UTILIZATION OF FISH BONES FOR FOOD

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### ABSTRACT

The purpose of this article is to review the manufacture of products made from fish bones and their product markets in Indonesia. Fish bones can be used as various processed foods such as crackers, biscuits, butter cookies, and floss. In the making it begins with the process of strengthening fish bones first. Marketing of fish bone products is done in e-commerce (Shopee, Tokopedia), social media (instagram) and also distributed to stores, supermarkets, and others. The price of each processed fish bone is sold at an affordable price starting from Rp. 8,499,- up to Rp.30,000,-/ packaging.

**Keywords:** *Market, product, floss, biscuit, butter cookies.*

### BACKGROUND

Fish bones are wastes that have the most calcium content in the fish's body and contain living cells and intracellular matrix in the form of mineral salts, such as calcium phosphate, calcium carbonate and magnesium phosphate (Gobinathan et al. 2009). These mineral salts have the potential to improve the nutrition of food products (Trilaksani et al. 2006). Fish bones that are high in calcium can be used as a food source of calcium that is easily affordable by the community and can be used as an alternative diet to prevent diseases due to calcium deficiency (Permitasari 2013).

Utilization of fish bones that will be used as food raw materials through the process of processing into flour. Fish bone strengthening aims to increase the absorption of calcium intake and easy to consume (Pratama et al. 2014). Applications of the utilization of fish bone waste in the form of food products have been reported by several researchers. Such as, the utilization of fish bones bandeng (*Chanos chanos*) in the manufacture of roasted doughnuts (Bakhtiar 2019), the utilization of tuna fish bones (*Thunnus* sp.) in the manufacture of sticks (Lestari and Dwiyanita 2016), the utilization of cakalang fish bones (*Katsuwonus pelamis*) in increasing the nutritional value of biscuits (Daeng 2019), and the manufacture of butter cookies from belida fish bones (*Chitala lopis*) (Diachanty 2021). Therefore, the purpose of this article is to review the manufacture of products made from fish bones and their product markets in Indonesia.

## **THE PROSES OF MAKING FISH BONE MEAL**

The stages of the process of making fish bone meal using the alkaline method (Kusumawati and Salty 2017). Starting with cleaning fish bones from dirt that is still attached to running water. Fish bones are put in boiling water and boiled at 80°C for 30 minutes to make it easier to clean fish bones from the rest of the meat, blood, and fat that still sticks. Then clean and drain. The next fish bone in presto for 3 hours aims to remove fat found in the bones, denaturation of proteins, and strengthen fish bones so as to facilitate the process of thickening.

The next stage, the boiling process as much as 4 times for 30 minutes. Followed by the process of base extract NaOH 1.5 N or the process of soaking fish bones at a temperature of 60°C for 2 hours. This process aims to eliminate proteins. Fish bones are washed on a filter cloth, rinse with running water to neutralize the pH of the fish bones. The process of drying fish bones coated with aluminum foil is then placed on a tray. Drying is done at 65°C for 48 hours using the oven. Dried fish bones are mashed using a blender and smoked using a 50-mesh sieve so as to produce a smooth flour.

Fish bones that are already in the form of flour can be added in various processed foods such as crackers, biscuits, and butter cookies. The manufacturing process is as follows.

### **Making Crackers**

Based on Putra et al. (2015), the steps of making fish bone crackers namely tapioca flour are heated then add fish bone meal. Put 1 g garlic, 30 ml water and 3 ml salt,

stirring until rinsed marked with a non-stick, shiny-looking dough. After that, steam the dough for 30 minutes. Then, refrigerate in a refrigerator for the next 18 hours sliced to a thickness of 3 mm. Sunbathe in the sun for 3 days then fry the crackers with two frying pans. The first fryer at 120°C - 140°C for 25 - 60 seconds and the second fryer at 180°C - 200°C for 10 - 30 seconds.

### **Making Biscuits**

The process of making biscuits refers to research conducted by Daeng (2019). In the early stages, mix the ingredients (margarine, butter, baking powder, milk, and refined sugar) and stir for about 10 minutes. After that, add the wheat flour, yeast and fish bone meal and stir evenly. Water with refined sugar is mixed until dissolved then put into the dough while stirring until slippery. Next, the dough is done watering for 30 minutes to produce an elastic dough expands. The dough is separated to form sheets and fillers in the contents on some sheets. The dough is printed using a uniform mold. Biscuits are produced with 3 stages of multilevel roasting, namely (1) 200°C temperature for 3 minutes to dry the biscuits, (2) 150°C for 5 minutes to ripen the biscuits and (3) 100°C for 7 minutes to color the biscuits.

### **Making Butter cookies**

The process of making butter cookies refers to research conducted diachanty et al. (2021). Dry ingredients in the form of wheat flour, cornstarch and powdered milk, sifted using a 100 mesh size to obtain a uniform size. Next, the butter, butter, eggs, and refined sugar are beaten using a mixer until homogeneous and thick. Dough that has been homogeneous and dry ingredients (wheat flour, cornstarch and powdered milk) are mixed in one container. Add fish bone meal as much as 6% of the weight of the flour used and stir until rinsed. The dough is then printed and in the oven until cooked at 160°C for 20 minutes.

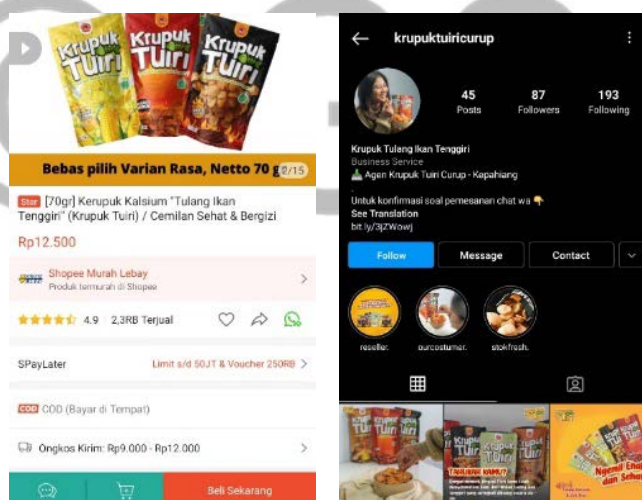
### **The Proses of Making Fish Bone Floss**

The manufacture of fish bone floss based on Iskandar et al. (2016), fish bones that have been collected, washed clean using water. Then the restoration is done with the comparison of fish bones and water 1:3. Put ingredients such as 10 bay leaves, 8 sheets of orange leaves, and 6 lemongrass stems that have been previously defiled. The suspension is carried out for 1 hour, then drain. Then the process of smoothing with a grinding machine.

After that, the manufacture of spices is done in a separate container. Clean and puree garlic 5%, shallots 6%, galangal 5%, and coriander 3%. Add 4% salt, 15% sugar, and 3% tamarind water. Mix the seasoning and mashed fish bones into the coconut milk and homogenize for 10 minutes for the seasoning to infuse. Next, the frying process in the oil as much as 500 mL for 60 minutes. During frying, stir continuously to produce evenly cooked floss and seasoning can permeate well. Fish bones floss then carried out the process of drying the oil using a spinner.

## MARKET OF PRODUCTS MADE FROM FISH BONE MEAL IN INDONESIA

The market in Indonesia regarding processed food from bones is still lacking. Due to the lack of public understanding of the benefits of the fish bones themselves. But not inferior to other processed, processed products from fish bones are packed with contemporary models and of course interesting to increase production with the development of the times and market segmentation. Marketing the product is done on e-commerce (Shopee, Tokopedia), and social media (instagram). To expand marketing is also distributed to stores, supermarkets, and others.



**Figure 1.** Product Marketing

Source: [https://shopee.co.id/oleh\\_olehkhasbengkulu](https://shopee.co.id/oleh_olehkhasbengkulu); <https://instagram.com/krupuktuiricurup>

## PRICE AND MARKET SEGMENT

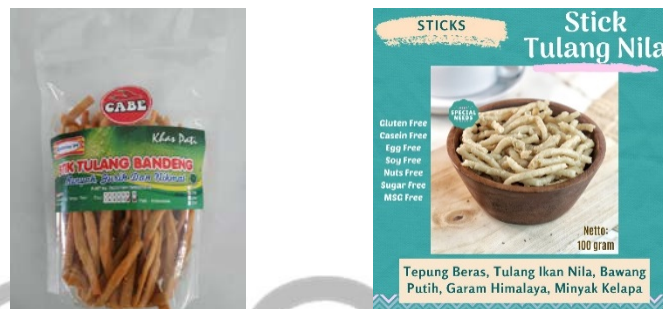
The price for each food product from fish bones depends on the type of fish used as well as the type of product made. The price offered is also very affordable and can be consumed by all circles ranging from children, teenagers, adults, to the elderly.



**Figure 2.** Fish bone crackers

Source : [https://shopee.co.id/oleh\\_olehkhasbengkulu](https://shopee.co.id/oleh_olehkhasbengkulu); <https://www.tokopedia.com/rekomendasi>;  
<https://www.tokopedia.com/toko-masbro99>

For mackerel bone crackers sold at a price of Rp.12,500,-/70 gr, tuna bone crackers Rp.15,000,- and catfish bone crackers Rp.8,499,-/33 gr.



**Figure 3.** Fish bone sticks

Source: <https://www.tokopedia.com/rindang-84>;  
<https://shopee.co.id/ummubebek>

Price of bandeng fish bone stick for Rp.16,000,-/150 gr and tilapia bone stick for Rp.30,000,-/100 gr.



**Figure 4.** (1) Fish bone floss, (2) Fish bone cookies

Source: <https://shopee.co.id/Abon-Kalsium-Tulang-Ikan-Bandeng-Khas-Gresik>;  
<https://bogor.tribunnews.com>

Bandeng fish bone floss are sold at a price of Rp.21,900,-/100 gr. The selling price of fish bone cookies is Rp.17.000,- for buyers and Rp.16,000,- for resellers. While stingray bone cookies are sold each packaging weighing 125 gr is Rp.16,350,-.

## CONCLUSION

Fish bones can be used as various processed foods such as biscuit crackers, butter cookies, and floss. In the making, it begins with the process of strengthening fish bones first. Marketing of fish bone products is done in e-commerce (Shopee, Tokopedia) or social media (instagram) and also distributed to stores, supermarkets, and others. The price of each processed fish bone is sold at an affordable price starting from Rp. 11,800,- up to Rp 30,000.- /packaging.

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