

Development Of Novel Processed Tilapia Products For The Group Of Female Fish Farmers In The Village Of Ranu Klakah Lumajang

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Abstract

Floating fish cages are utilized in fish farming systems using public water bodies such as lakes and seas, with tilapia being a widely cultivated fish in Indonesia due to its economic and nutritional value. Ranu Klakah, a volcanic lake in East Java, is explored as a site for tilapia cultivation. Upwelling, the process of nutrient-rich deep water rising to the surface due to wind-induced currents, is examined for its effects on water quality and fish productivity. The activity focuses on the impact of upwelling on tilapia, including reduced water quality, scarcity of natural fish food, physiological stress, disease susceptibility, and decreased fish production. To address the challenges posed by upwelling, it suggests processing tilapia into value-added products, like fish nuggets and skin chips, to enhance market value. Community service activities involving training for making these processed fish products are described, aiming to empower women in the fish farming sector and improve family income. We conclude with insights into the potential benefits of these activities and their positive impact on the local community.

Keywords: *Tilapia, Ranu Klakah, Fish Nugget, Skin chips, women empowerment.*

INTRODUCTION

Floating fish cage of tilapia in Ranu Klakah and upwelling are interesting topics to discuss. Floating fish cage or floating net cage is a fish farming system that utilizes public waters such as lakes, reservoirs, or the sea. Tilapia is one type of fish that is widely cultivated in Indonesia because it has high economic and nutritional value. Ranu klakah is a volcanic lake located in Lumajang Regency, East Java. The lake has an area of about 80 km² and a maximum depth of 27 meters. Upwelling is a natural phenomenon that occurs when cold water from the lower layers rises to the surface replacing warm water pushed by the wind. Upwelling can affect water quality and fisheries productivity in a body of water [1].

Upwelling is a phenomenon in which nutrient-rich water masses from the seafloor are carried to the surface by the wind. This phenomenon can cause tilapia fish to lose because water quality decreases, natural fish food becomes scarce and tilapia fish experience physiological disorders so that they are stressed, susceptible to disease and end in fish death. As a result of these factors, tilapia production can decline. This is of course detrimental to fish farmers who depend on

meeting their needs in the floating fish cage business. The initial sign of upwelling can be seen from the water that turns cloudy and brownish in color. This is caused by an increase in sediment and organic matter carried by the upwelling water mass. This triggers a decrease in appetite in the fish and the fish becomes limp. Before the fish suffer further physiological disorders, fish farmers generally harvest tilapia. However, the price of fish is not as high as during normal conditions. This is of course detrimental to fish farmers.

One solution to market tilapia is to process tilapia into various ready-to-eat food products that can be stored at a higher price. The community service activity carried out was to provide training to the wife of the Tilapia Fish Farmer Group around Ranu Klakah in PKK group, with the aim of providing skills to make healthy and nutritious processed fish, to increase family income and at the same time provide information and knowledge about the importance of consuming healthy fish-based foods.

Fish nuggets and skin chips are two types of processed fish food that are quite popular in Indonesia. Fish nuggets have a savory and crunchy taste, while skin chips have a savory and crunchy

taste. Both types of food have the potential to be developed as processed fish products that have high added value. Protein in the fish body is the highest content compound after water. Protein plays an important role in body structure and function, such as growth and reproduction. The results of research [2] show that 100 grams of tilapia has a protein content of 16.79 g, carbohydrate content of 0.32 g, fat content of 0.18 g, calcium content of 4.782 mg, phosphorus content of 610 mg, and iron content of 0.835 mg. The protein content of tilapia skin by dry weight is higher than the protein content of tuna skin [3] and snakehead fish skin [4], but lower than the protein content of catfish skin [5]. The high protein content of tilapia skin makes it a potential raw material for collagen protein hydrolysates that function to counteract free radicals.

MATERIAL AND METHOD

The activity was held in Ranu Klakah Village, Klakah District, Lumajang Regency on July 19, 2023. This activity was attended by the entire service team in the Doktor Mengabdi (DM) program of Universitas Brawijaya, the resource person for training in making processed products was Mrs. Puspita Eka Sari, S.Pi from SMKN Grati Pasuruan. The target participants of this activity were the wives of the KJA Cultivator Group who were members of the PKK as many as 20 people. In addition, this activity also involved Brawijaya University students for the KKN program.

The method of implementing community service activities is through counseling and training. This counseling is a way to convey knowledge to members about the benefits, nutritional content, and potential of tilapia. Training on making tilapia nuggets and skin chips is intended to increase the selling value of tilapia from raw materials to processed products. In addition, the shape of the product and packaging is one of the consumer attractions that will affect the selling value. The training materials on the technique of making processed tilapia fish are a) Materials and equipment needed; b) How to make nuggets and fish skin chips c) How to fry nuggets and fish skin chips. Partners directly practiced making tilapia nuggets and skin chips themselves. In general, the materials needed are tilapia fish, flour, tapioca, eggs, panir flour, cooking oil, garlic, pepper, nutmeg, salt, mushroom broth, chili powder, chili sauce, tomato sauce. While the tools needed are knives, cutting boards, blenders, choppers, baking

pan, steamer, wok set, basin container, and mica/plastic packaging.

RESULT AND DISCUSSION

The DM program was opened by the Head of the Klakah sub-district as well as providing support to the DM team and the community to be able to take advantage of this activity to improve entrepreneurial skills and opportunities. This service activity received a very good response. Participants enthusiastically participated in the counseling and training that was held (Figure 1-3). This enthusiasm can be seen from the activeness of the participants in asking the extension workers and following the stages of the training.



Figure 1. Counseling on nutritional value of Tilapia

Women's empowerment in the economic sector is one of the indicators of increased welfare. When women become educated, have property rights, and are free to work outside the home and have independent income, this is a sign that household welfare is increasing. More than that, women also have a big share in poverty reduction activities through community and group empowerment. One proof is that women improve the welfare of their families by carrying out productive household business activities (Susanti & Susilowati, 2016).

Making salted tilapia nuggets through the application of science and technology is expected to be used as one of the efforts to manage fish resources by the Ranu Klakah PKK women partners by introducing training activities for making tilapia nuggets and tilapia skin chips.

Tilapia nutrition counseling materials and preparations are one of the important topics to be conveyed to the public, especially tilapia cultivators. Tilapia is a type of fish that is widely cultivated in Indonesia because it has high economic and nutritional value. Tilapia contains various important nutrients for the body, such as protein, fat, vitamins, minerals, and omega-3 fatty acids. Consumption of tilapia can help prevent

stunting, which is a condition in which a child's growth is stunted due to malnutrition.



Figure 2. Hands-on practice making fish nugget and skin chips



Figure 3. Students involvements in the DM activity

Healthy and nutritious processed tilapia can be made in various ways, such as baked, boiled, fried or steamed. Healthy and nutritious processed tilapia must pay attention to several things, such as:

1. Using natural spices that are low in salt, sugar and preservatives.
2. Using quality cooking oil and not excessive.
3. Avoid using flour, bread or panir flour as a coating for fish.
4. Adding fresh vegetables as a complement to the dish.

Fish skin chips are a processed product from fish skin waste that has a high collagen content. Collagen is a protein that plays a role in maintaining healthy skin, hair, nails, joints and

bones. Fish skin chips also have good nutritional values, such as protein, fat, vitamins and minerals. The training materials for fish skin chips can include several things, including:

- Introduction to fish skin chips, their benefits and business prospects.
- Selection of quality fish skin raw materials, such as tuna, tilapia, catfish or milkfish skin.
- Cleaning and processing fish skin into ready-to-eat ingredients, such as by boiling, drying, or frying.
- Preparation of flour batter used to coat the fish skin before frying. Flour batter can be made using wheat flour, tapioca flour, rice flour, or sago flour. Flour batter can also be added with spices such as salt, sugar, pepper, garlic powder, or flavoring.
- Fry the fish skin that has been coated with flour batter until brownish yellow and crispy. Frying can be done using cooking oil that is clean and has no fishy odor. Frying must also pay attention to the temperature of the oil which is not too hot or too cold for optimal results.
- Storage and packaging of deep-fried fish skin chips. Storage and packaging should be done in a hygienic and safe manner. Fish skin chips should be stored in a dry and cool place. Packaging should use materials that are airtight and not easily torn. Packaging can also be equipped with a label that includes the product name, production date, expiry date, ingredient composition, nutritional value, and producer contact.

Fish skin chips have a fairly high protein content, which is about 10 grams per 100 grams. Protein is an important nutrient for the growth and development of the body. In addition, fish skin chips also contain fat, carbohydrates, fiber, calcium, phosphorus, magnesium, iron, zinc, and vitamin K.

Processing fish nuggets aims to process fish without reducing and can maximize the value of fish protein. Fish is a good source of animal protein for the body, as it contains omega-3 fatty acids which are beneficial for the prevention of heart disease and brain development. Fish also has a low fat content, making it suitable for a low-calorie diet. Nugget is a form of processed meat product made from ground meat that is molded in the form of four square pieces and coated with seasoned flour (battered and braded). Nugget is consumed after deep fat frying process. Nuggets are made from ground beef that is seasoned,

mixed with a binder, then molded into a certain shape, steamed, cut, and coated with flour adhesive (batter) and breaded (breading). The nuggets are half-cooked and frozen to maintain their quality during storage. Nuggets are a form of ready-to-eat frozen food product, which is a product that has been heated until half cooked (precooked), and then frozen. This ready-to-eat frozen product only requires 1 minute of frying time at 150° C. The texture of the nuggets depends on the original material [6].

In processing tilapia, it is important to pay attention to aspects of food safety. This is to ensure that processed tilapia products are safe for consumption by the public.

Making tilapia nuggets can be used as an effort to manage fish resources by Ranu Klakah PKK mothers by introducing training activities for making tilapia nuggets and tilapia skin chips. Therefore, the DM program can increase the knowledge, understanding, and awareness of PKK mothers/household partners. In addition to training PKK partners to foster an entrepreneurial spirit, such as selling processed food products in the form of processed fish products to the surrounding community. So that it is hoped that PKK members can create independent businesses and create new jobs in the field of entrepreneurship.

The head of the PKK and its members gave very enthusiastic, positive responses and helped carry out this training activity such as providing good facilities and infrastructure. b. PKK partners as participants in PKM activities totaled 20 people. PKK partners have high interest and motivation to receive training on making tilapia fish skin nuggets and chips. Through this PKM activity, it is hoped that PKK partners and housewives in Ranu Klakah Village will be able to include fish prices during upwelling, improve family welfare and also obtain alternative sources of income through independent businesses making fish nuggets and fish skin chips. Overall, the DM program is a valuable initiative that has the potential to make a significant impact on the lives of PKK partners in Ranu Klakah Village.

IMPACT OF ACTIVITIES

The DM program was a success in increasing the knowledge, understanding, and awareness of PKK partners about tilapia nutrition and processing. The program also fostered an entrepreneurial spirit among PKK partners, and it is hoped that they will be able to create independent businesses

and create new jobs in the field of entrepreneurship.

CONCLUSION

The DM program can be improved by providing more training on food safety and quality control. Additionally, the program could partner with local businesses to help PKK partners market their products. Some additional suggestions such as provide more opportunities for PKK partners to network with each other and share ideas and mentorship program to help PKK partners who are just starting their own businesses.

ACKNOWLEDGEMENT

Thank you to the Institute for Research and Community Service, Universitas Brawijaya for giving us the opportunity and support to carry out community service activities and write this article through grant Doktor Mengabdikan No.615.2/UN10.C20/2023.

We also thank the Head of Ranu Klakah Village, the Head of the PKK of Ranu Klakah Village, and all members of the PKK of Ranu Klakah Village who have welcomed and supported our activities very well.

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