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Analysis of Nutritional Value and Consumers Behavior of Milkfish (*Chanos* sp.) Aquaculture Product with Packaging Modification in MSMEs Sukolilo, Surabaya

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Abstract

Analysis of nutritional value and consumer behavior are important aspects of increasing the selling value of new products. Improvements in packaging and nutritional value information are one way to improve the branding and increase the selling value of the product, especially during the Covid-19 pandemic. Therefore, this study aims to analyze the nutritional value and consumer behavior of otak-otak and presto milkfish products processed from one of the MSMEs in Surabaya. The method used is the nutritional value analysis of the processed product by MSMEs in the laboratory and consumer behavior analysis by distributing questionnaires to 50 respondents with various educational backgrounds. The results of the nutritional value analysis of the two products for presto milkfish are 61% water content, 7.64% ash content, 6% fat content, and 8.79% protein content. Meanwhile, otak-otak milkfish contain 58.20% water content, 3.12% ash content, 13.42% fat content, and 7.69% protein content. Consumers' behavior analysis shows that consumers choose products that use attractive packaging equipped with secondary and primary packaging with vacuum technology compared to mica packaging for milkfish presto products or banana leaves for otak-otak products. The influence of packaging usage will also affect the products' value added and shelf life. Furthermore, 94% of respondents prefer to engage in online shopping by considering the nutritional value presented in packaging. Therefore, the sales rate of fisheries diversification products has a broader marketing potential using online platforms than direct market sales. This will also affect the MSMEs' turnover and profit if they continue to be accompanied by digital sales.

INTRODUCTION

Milkfish is one of the fish consumption commodities that is acknowledged by local society because of its relatively affordable price, higher

protein content, and lower fat and cholesterol content (Murtidjo, 2002). The increase in milkfish consumption could be realized by diversification to products, ready-to-eat or ready to cook. In Surabaya, milkfish processed products have a favorably high consumption trend which is very profitable for producers (Indriastuti *et al*., 2018). In addition, there are several Micro, Small, and Medium Enterprises (MSMEs) related to milkfish processing found in Surabaya. One of them is MSMEs Ayah Olala, which processes milkfish into presto milkfish and otak-otak milkfish. Packaging modification and marketing reach expansion are necessary to increase consumer attractiveness to milkfish processed products.

Vacuum packaging is a packaging type that can be applied effectively to processed products, especially fisheries commodities. Vacuum packaging provides hermetic conditions with total oxygen absence by removing the air in the packaging. The presence of oxygen in the packaging can decrease the quality of the product because oxygen triggers the growth of microorganisms and chemical reactions, mainly oxidation (Astawan *et al*., 2015). According to Purnamayati *et al*. (2018), the provision of vacuum packaging on presto milkfish and otak-otak milkfish can maintain the quality of the product and extend its shelf life. Subsequently, the risk of product damage could be drastically constrained during storage, and the product optimally ready for market.

According to Wibowo *et al*. (2015), marketing is the most important aspect of business management development. Due to the increasingly fierce competition of the business today, MSMEs must be able to increase effectiveness and attract customers. One medium that can be utilized for product marketing is social media and e-commerce platforms. Social media is widely used as a medium or tool to conduct marketing communications. Unlike traditional media, which is only able to implement one-way communication, social media can implement two-way communication or more. Using social media as a marketing communication tool is expected to expand product marketing reach (Moriansyah, 2015).

Similarly, e-commerce platforms are more varied with a broad market coverage to be used as an option to increase the effectiveness of product sales. The use of e-commerce is more efficient because it provides easy access to transactions, reduces costs, and shortens transaction time conventionally (Maulana *et al*., 2015). However, even though social media or platforms are very promising in the marketing and branding process, if they are not supported by good packaging, this will undoubtedly create a bad image of the product. Therefore, this study aims to see the acceptance of consumer behavior by modifying the packaging of milkfish-based products produced by MSMEs.

METHODOLOGY

Place and Time

The research was conducted in June-August 2021 and took place at the Laboratory of Chemistry, Faculty of Fisheries and Marine, Universitas Airlangga, Surabaya. Processing of milkfish products was carried out at MSMEs UMKM Ayah Olala, Sukolilo, Surabaya.

Research Materials

The materials used in this research were presto milkfish and otak-otak milkfish from MSME Ayah Olala, Surabaya. Analysis of nutritional value was carried out on products, including protein content (Kjeldahl method), fat content (Soxhlet method), moisture content (oven method), ash content (furnace method), and carbohydrates content (by different). Chemical materials used for complete nutritional value analysis were Kjehdal tablets, HgO, N_2SO_4, distilled water, NaOH-$Na_2S_2O_3$, H_3BO_3, HCl, hexane solvent, and silica gel. Whereas, the tools used for nutritional

value analysis were analytical scales, Kjeldahl flask, Erlenmeyer flasks, volumetric pipettes, pipette filler, destructor, acid cabinet, distillation sets, burettes, stative, clamps, dropping pipettes, volumetric flasks, mortar, spatula, filter paper, Soxhlet, ovens, desiccators, scales, weighing bottles, porcelain cup, and furnaces.

Research Design

This research method consists of data collection for product analysis in the laboratory, questionnaires, observation, and interviews with the owner of MSMEs Ayah Olala, Surabaya. All data were then analyzed descriptively to describe consumer behavior toward milkfish products.

Work Procedure

This research consists of three steps. Firstly, the production of products based on milkfish raw materials. This product consists of presto and otak-otak milkfish or bandeng presto and otak bandeng in Bahasa. Milkfish presto was conducted by washing a raw material, soaking it with spices, and cooking in a high-pressure pan. Meanwhile, the production of otak-otak was done by cleaning and removing the organs of raw materials, separating the meat from the skin, grinding the meat, mixing the meat and spices, putting the dough back into the skin, and steaming it. Steaming was carried out for 1 hour at 90 °C or until cooked. Secondly, nutritional value analysis was conducted to determine proximate content in products such as protein, fat, carbohydrates, and ash. Lastly, questionnaires to potential consumers were analyzed to see consumer behavior and acceptance of packaging modifications. This step was conducted by distributing the questionnaires to 50 respondents. In addition, social media accounts were also created for products to reach broader marketing.

Data Analysis

The data were obtained from the analysis descriptively. The data are used to view consumer behavior on milkfish-based products with new packaging designs.

RESULTS AND DISCUSSION

The raw materials for this milkfish processing product are aquaculture commodities. Product diversification is carried out to increase the milkfish value-added, as it is further processed into presto milkfish and otak-otak milkfish. The product is packaged with vacuum packaging as primary packaging and cardboard packaging to increase attractiveness and shelf life. The product was further analyzed by looking at consumer acceptance of the packaging modified product.

Nutritional Value Analysis of Processed Products of Aquaculture Milkfish

Nutritional value is important information for consumers that describes foods' nutrients and total calories. The results of this nutritional value analysis were further utilized as a reference by consumers to see the number of daily nutritional adequacy. Malnutrition in a person will cause health problems, while excess nutrition can cause poisoning. The results of the nutritional value analysis of presto milkfish and otak-otak milkfish can be seen in Table 1.

Table 1. Proximate test results of presto milkfish.

Test Parameters	Presto Milkfish (%)	Otak-otak Milkfish (%)	Testing Methods
Water Content	61.01	58.20	SNI 2354.2-2015
Ash Content	7.64	3.12	SNI 2354.1-2010
Fat Content	6.00	13.42	SNI 01-2354.3-2006
Protein Content	8.79	7.69	SNI 01-2354.4-2006

The moisture content of the two products above showed the relationship to the texture and strength of the product's shelf life as the higher the water content value. Therefore, reducing moisture content in the packaging process aims to increase the security of food so that they can withstand chemical and microbiological damage (Normilawati *et al*., 2019). At the same time, the ash level analysis was carried out to determine the quantity of mineral content in presto milkfish products and milkfish brains. If the mineral content in the product is high, the ash level will be high as well (Pratiwi and Nuryanti, 2017).

Fat content is generally inversely proportional to the water content of each product produced; this is because fat is hydrophobic or cannot bind water. The higher water content of presto milkfish products and otak-otak milkfish causes lower content of fat (Sunardi *et al*., 2018).

Protein is a macronutrient in processed fisheries products that is easily denatured by heating so that it can cause solubility properties in water to be lost (Andarwulan *et al*., 2011). Therefore, the protein levels of processed products are very susceptible to decrease compared to the initial content. This is no exception to the process of processing presto and otak-otak milkfish which causes a small part of the protein to be lost together with water that comes from fish meat during the heating and cooking process (Rizaldy, 2019).

MSME's Problem Analysis

MSME Ayah Olala focuses on processing processed fish products such as presto milkfish and otak-otak milkfish. Mrs. Nafsiah established this MSME in 2011, located in Sukolilo, Surabaya City, East Java Province. This MSME operates every day with the help of four people with an average daily production reaching 30 kg of presto milkfish and otak-otak milkfish. Meanwhile, during the Covid-19 pandemic, up to 75% of total production was decreased. The observation related to packaging methods and processes was carried out before mentoring to analyze MSME's problems. The analysis results are used as an evaluation material to determine external targets for overcoming these problems. The analysis results of MSME's problems can be seen in Table 2.

Table 2. Analysis of MSME Ayah Olala's problems.

Aspects	Problems	External Targets
Packaging	1. Products after processing are directly packaged using plastic mica packaging so that it looks unattractive 2. Less attractive packaging design 3. Not using vacuum packaging	1. Introducing the use of primary packaging using vacuum plastic and secondary packaging using cardboard to improve product appearance 2. Creating a more informative secondary packaging cardboard design 3. Providing a vacuum sealer tool to make the product more durable
Marketing	Done conventionally and still limited to Surabaya area and its surroundings	Creating social media and e-commerce platforms (Shopee and Tokopedia) to expand market reach

Consumer Behavior Analysis in Increasing Selling Value Diversification of Aquaculture Milkfish Products

The consumer behavior analysis process was carried out based on a questionnaire test involving 50 respondents from various educational backgrounds, such as academics, students, and the public. The results show that most of the respondents like consuming processed fish products, indicated by as many as 17 respondents consuming processed fish products more than once a week, 18 respondents once a week, 10

respondents twice a month, and at least five respondents less than once a month.

This shows that processed fish products are still in great demand by consumers because of their relatively affordable prices and good nutritional content. In addition, the survey also shows that most consumers choose to make online purchases through digital platforms, with 94% of respondents, and 6% choose to shop directly (offline) (Figure 1). The survey results show that market opportunities in online sales are more likely to be developed for processed fishery products.

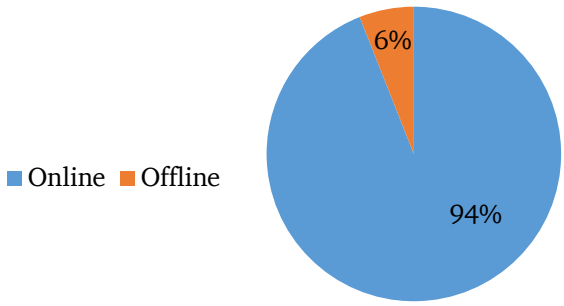

Figure 1. Consumer acceptance in the process of selling milkfish products (*Chanos* sp.).

The consumer favorability toward fisheries processed products is leanly affected by how easily the seller provides the information availability. Technological advances have induced various methods of purchasing products that are not only convenient but a direct product offering between sellers and buyers to get benefits between parties (Muna, 2019). The online transactions method began to be glimpsed because of the flexibility in the process. Ease of payment, delivery courier services, and various discount promotions become more valuable for this indirect transaction method. Therefore, when consumers get many advantages and conveniences when making online transactions, consumer interest in shopping is even greater (Aditama and Purwaningsih, 2014). This is per what is seen in Figure 1, where most respondents prefer to use the method of purchasing processed fish products online (94%) rather than offline (6%).

Social media and e-commerce platforms have become part of Indonesian society in the era of technological advancement. Social media is not only used as a medium of communicating remotely within a global reach but is also known for its function as Integrated Marketing Communication (IMC). IMC is a concept that is generally used to convey the message of the promotion mix, such as advertising, sales promotion, personal sales, public relations and publicity, and direct selling (Fantini *et al.*, 2021). Various social media platforms can now be freely accessed and registered so MSMEs owners can consider them as the main choice to expand their market network. This also applies to e-commerce platforms that are easily accessible with some special offers related to discounts and unpaid courier services that can be used to lure more consumers.

The assortment of social media and e-commerce platforms can be used optimally by MSMEs to reach consumer targets widely and even personally. Hence, the seller needs to adjust their specific market segmentation. Market segmentation is acknowledged as analyzing consumer preferences and tendencies toward one or more specific types of e-commerce platforms. From the results of surveys from respondents, several types of e-commerce platforms are recommended. Among respondents, 36% recommended the Shopee platform, 30% of respondents chose Tokopedia, 6%

recommended Lazada, 16% recommended Gojek/Grab, and 12% chose Instagram/WA as a recommended media for buying and selling activities, as stated in Figure 2.

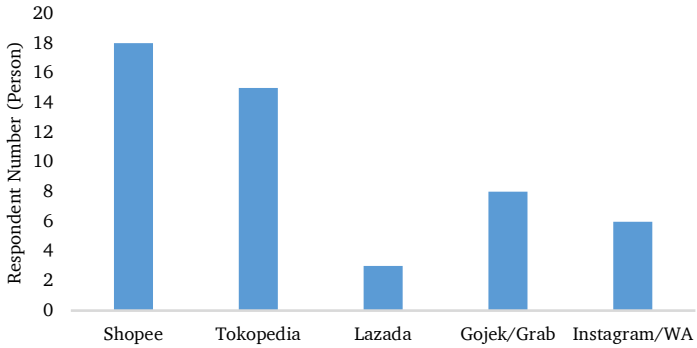

Figure 2. Recommendations for online platform product sales.

The consumer behavior evaluated in the study is the acceptance of the important issues of processing fishery products and fish products. The results of the analysis in Figure 3A showed that the reason consumers consume processed foods as much as 72% is because it is easy to consume, have a longer shelf life (20%) and high nutrition values (4%), cheap (2%) and does not require reprocessing (2%). As for Figure 3B, the survey results show that consumer acceptance of processed products reaches 90%. This shows that the market share of fish processing is very high. This is an opportunity for developing fishery products as one of the livelihoods of the Indonesian people in general. In addition, fish processing SMEs can improve their welfare by processing or diversifying them into ready-to-cook and ready-to-eat products.

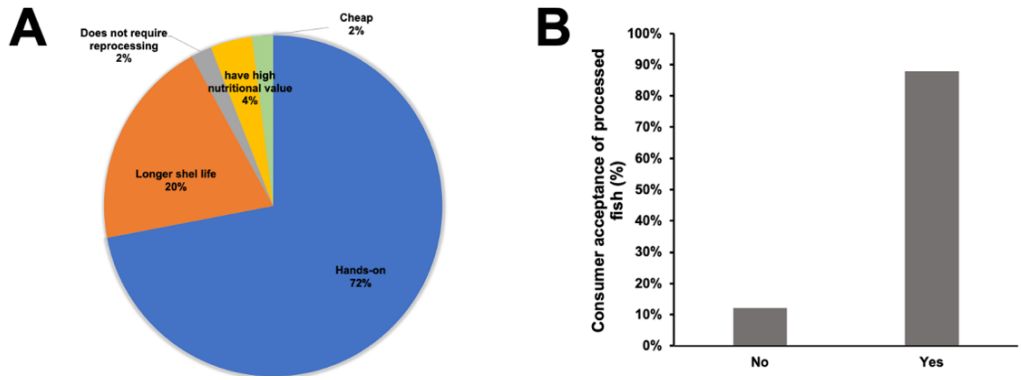

Figure 3. Consumer preferences in purchasing processed fish products; A: the reason behind processed fish product consumption; B: processed fish product consumer acceptance level.

The selection of online sales systems by MSMEs owners must be adjusted by assessing several aspects, including product shelf life. Fisheries products are easily spoiled, so appropriate processing and packaging methods are needed. Packaging can prevent food spoilage by blocking the oxygen occurrence and air that contains many contaminants (Mulyawan *et al.*, 2019). There are various food packaging materials, with the most being used being plastic. Yanti *et al.* (2008) stated that packaging with plastics in the form of polyethylene (PE) and polypropylene (PP) could reduce water content, maintain protein levels, lower pH values, and suppress total bacterial colonies. The survey results shown in

Figure 4 explain that most consumers choose products with attractive packaging. Vacuum packaging is an effective type of packaging for increasing attractiveness and maintaining the product's shelf life. This is because the plastic packaging can remove air from the package before sealing. The vacuum packaging is usually combined with a type of plastic packaging. The plastic package has advantages such as being strong, flexible, malleable, and difficult to penetrate water and air. Hence, it can further maintain quality and extend the product's shelf life.

The survey results in Figure 5 showed that, with packaging improvements, price changes are expected and reasonable (42%) for both presto and otak-otak milkfish products. This showed that modification with more attractive packaging does not significantly affect consumer behavior in terms of the product price increase.

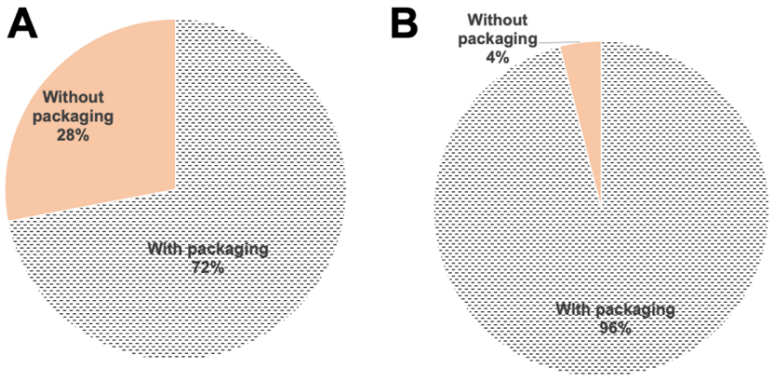

Figure 4. Product packaging preferences: A. otak-otak milkfish; B. presto milkfish.

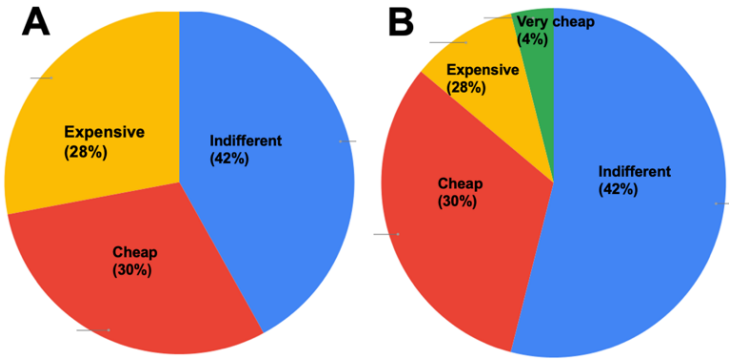

Figure 5. Product price preferences after packaging; A. otak-otak milkfish; B. presto milkfish.

Consumer behavior in fisheries products marketing is evaluated by distributing questionnaires. Some of the concerns in the questionnaire are related to added value products for raw materials with low economic value, consumer acceptance of new diversification products, and the type of product development demanded by consumers.

The analysis results in Figure 6 regarding the evaluation of consumer behavior toward the development of fish products show that the respondents stated that it was very important (38%) and important (50%) and others stated that it was slightly important and not important. Meanwhile, in the evaluation of the acceptance of new products, 98 respondents agreed. The survey results also show that consumers represented by respondents received various types of product diversification reaching 50% of the total with products of interest such as ready to eat, frozen and baked products. This is in line with the Climate Adapt Report (2019) which states that product

diversification from aquaculture and fisheries must adapt in response to the challenges and opportunities posed by climate change. In this context, actions can be taken to improve consumers' perception of fishery products with sustainable brands by packaging and diversifying products to meet standards and adapt to consumer behavior.

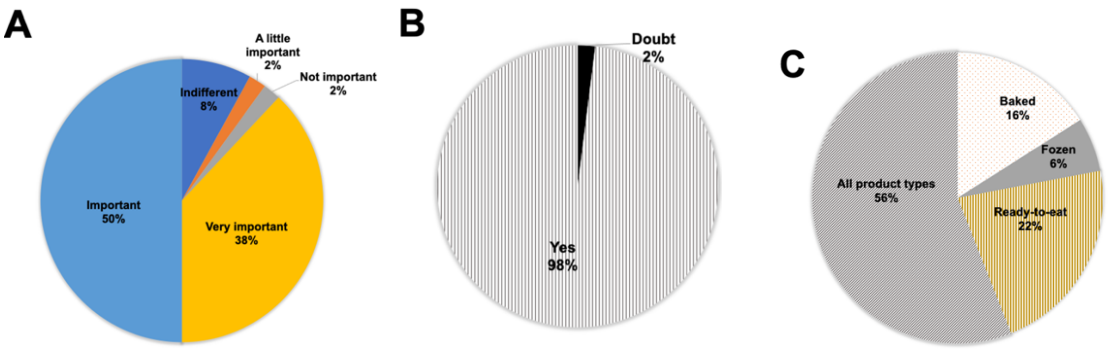

Figure 6. Consumer preferences; A. Value added increase of non-economical fish; B. Consumer acceptance of new processed products; C. Type of product development.

CONCLUSION

Product diversification and value-added increase of fisheries products are important for fisheries sector development. The increase of value-added product through the packaging process has been shown to increase consumer interest in choosing products, with acceptance of 94% for presto milkfish and 72% for otak-otak milkfish. Consumers mostly choose online purchases (94%). This shows that when the marketing process can predict and project what consumers need, it will ease MSMEs to market their products and increase aquaculture product utilization.

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