



## ADVANTAGES OF CANNED PACKAGING ON FISHERY PRODUCTS

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### Keyword

Moisture Content, Ash Content, pH Value, Canning.

### ABSTRACT

Indonesia as a maritime country should be able to further develop the fisheries sector. Fish is a perishable food source, so it needs to be processed quickly and accurately currently, canned fish products have been widely circulated in the free market, including those found in supermarkets and traditional markets. Not only home industries have produced canned fish, but also large industries. The existence of canned fish began to be known to the public, although not widely. Therefore, a literature review is needed regarding the potential and advantages of canned packaging in fishery products. The results of this literature review are expected to present further experimental research related to the use of canned packaging in fishery products that have a better impact on fishery products and consumers. The results of the review article that has been done show that fishery products that can be packaged in cans according to several previous studies include milkfish, African catfish fillet, tuna, sardines, skipjack tuna, gray tuna, lemuru fish, and tembang fish. In canned fish products, the pH value is influenced by many factors, a decrease in the pH value occurs in smoked Dumbo Catfish Fillet from 6.80 to 5.47, then Chela Fish from 6.8 to 5.9, in tuna fish from 5.97 to 5.91. Then the water content of milkfish is 59.41% and canned sardines is 10.25% and ash content is 2.46%.

### INTRODUCTION

Indonesia as a maritime country should be able to further develop the fisheries sector. Fish is a perishable food source, so it needs to be processed quickly and accurately. If the handling method is wrong, it is impossible to produce good quality fishery products as well as the processing must be done properly so that they are durable and their nutrients are not reduced (Kartika, 2010). This can be seen from the government's efforts to tighten regulations on the quality of fishery product processing. These efforts aim to maintain food safety and protection for consumers (Mangunsong, 2000). Efforts to develop fisheries in Indonesia start from the utilization of fishery products based on their type to be processed into specific products. In the canning unit, getting a good quality final product is influenced by several factors, including raw material factors, sanitation, and hygiene of the processing environment, production process, work speed, cooking time, packaging, and sterilization time (Widodo, 2001).

Food preservation techniques that can be applied and widely used are preservation at high temperatures, for example, canning sardines. Canning is one way to save food, especially fish and other fishery products, from spoilage. In this canning, the shelf life of preserved fish is much better than other methods of preservation. However, in this case, more intensive handling is needed and supported by fully automatic equipment. This is because, in the canning process, fish or other fishery products are put in a tightly closed container so that air and harmful microorganisms that come from outside cannot enter. Canning is one way of preserving food that involves a thermal process or commonly referred to as a sterilization process that aims to kill pathogenic and spoilage microbes. Canning products are hermetically packaged so that they are safe, nutritious, and stable to be stored at room temperature (Lewis, 2006).

Food canning is commercially sterile, which means that canned food is free from microorganisms that can grow at normal temperatures during the storage and marketing process, and pay attention to the nutritional content of the canned fish products produced. According to Pandit (2004), fish is also one of the foodstuffs that contain various kinds of substances, in addition to the generally cheaper price and the higher protein content of fish compared to other animal products such as beef and chicken, because fish meat has a shorter protein fiber than fish. beef or chicken protein fiber. The types are also very diverse and have several advantages, including containing omega 3 and omega 6 as well as complete amino acid composition. The principle of fish processing is basically to protect fish from spoilage and damage. In addition, to extend the durability and diversify processed fishery products. Canning is a form of processing and preserving fish in a modern way, which is hermetically packaged and then sterilized. Foodstuffs are hermetically packaged in a container, either cans, glass, or aluminum. Hermetic packaging can mean that the closure is very tight, so it cannot be penetrated by air, water, oxidation damage, or changes in taste (Adawyah, 2008).

Currently, canned fish products have been widely circulated in the free market, including those found in supermarkets and traditional markets. Not only home industries have produced canned fish, but also large industries. The existence of canned fish began to be known to the public, although not widely. Therefore, a literature review is needed regarding the potential and advantages of canned packaging in fishery products. The results of this literature review are expected to present further experimental research related to the use of canned packaging in fishery products that have a better impact on fishery products and consumers.

**Method**

The article review method used is the literature review method. This method examines, summarizes, and interprets all problem findings on a research topic and answers research questions that have been previously determined. The literature review is carried out through electronic-based journals, namely database ProQuest, scholar, science direct, and Ebsco. The articles used are by the keywords, namely the potential of canned packaging on fishery products.

**Discussion**

Fishery product commodities that can be packaged in cans according to several previous studies are milkfish (Maskur, 2018), African catfish fillet (Murda et al., 2016), Tuna (Irianto and Akbarsyah, 2007; Tangke et al., 2020), Sardines (Agustin et al., 2011), Skipjack tuna (Jumadi et al., 2017), Gray tuna (Zhafirah & Sipahutar, 2021), Lemuru fish (Vatria, 2006), Tembang fish (Husma et al. al., 2019).

Table 1. Fishery Products Packaged by Cans

<b>Canned packaging on fishery products</b>
Milkfish (Maskur, 2018)
African catfish fillet (Murda et al., 2016)
Tuna (Irianto dan Akbarsyah, 2007)
Sardines (Agustin et al., 2011)
SkipjackTuna (Jumadi et al., 2017)
Gray Tuna (Zhafirah & Sipahutar, 2021)
Lemuru (Vatria, 2006)
Tembang (Husma et al., 2019)

**Water Content in Canned Fish Products**

In research (Maskur, 2018) the results of the water content test on canned milkfish ranged from 59.41% - 62.81%. The highest water content value was at the treatment time of 90 minutes and a temperature of 110 o C, which was

62.81% and the lowest was at a treatment time of 75 minutes and a temperature of 120 °C, which was 59.41 %. From the value of the water content produced, the higher the sterilization temperature, the higher the decrease in water content. Hassabala et al., (2009) in Saraswati (2013) stated that the water content in foodstuffs experienced shrinkage after the cooking process using high temperatures. The high or low decrease in the nutritional content of a food ingredient due to cooking depends on the type of food, the temperature used, and the length of the cooking process (Sundari, Almasyuri, & Lamid, 2015).

Meanwhile, in the study (Refilda et al., 2020) with sardines (*Sardinella* sp.) using cans, the lowest water content was 10.25%. Then the highest water content is 18.38%. The high water content in canned food can be caused by hermetic packaging errors (Ahmad, 2014). If there is high water content, it will accelerate microbial growth in canned fish samples (Anggraeini et al, 2013). The high water content in canned fish also affects the expiration date of the product because packaged products cannot receive sensory information from the expiration date, thus affecting the shelf life of canned products (Winarno et al, 1980).

### **Ash Content in Canned Fish Products**

Ash is an organic substance leftover from the combustion of organic material, in this case, the influence of high temperature leaves high minerals so that the ash content increases. Susanto and Saneto (1994) stated that the water content of dried foodstuffs will experience a higher decrease and cause concentration of the remaining ingredients, one of which is minerals. Ash content is the amount of inorganic residue resulting from ashing / glowing a product. Ash is an organic substance leftover from the combustion of organic material. The ash content and composition depend on the type of material and the method of ashing. Ash content has something to do with the minerals of a material. Minerals contained in a material can be of two kinds, namely organic salts and inorganic salts. Included in organic salts are salts of malic acid, oxalate, acetate, pectate. Results of the study (Maskur, 2018) with the commodity canned fish show that the lowest ash content at 75-minute treatment and sterilization temperature 110 °C, which is 2.46%.

### **pH Value in Canned Fish Products**

The pH value is one of the criteria that determine the quality of fresh fish. There are two categories of fish pH values, namely pH 7 which is included in fish that have undergone a change in freshness to decay (Metusalach, Kasmianti, & Jaya 2014). The pH test results on fresh tuna in this study were 5.97. According to the research results of Metusalach et al. (2014), the pH value of 5.61-6.39 indicates that the fish is still of good quality. In research (Murda et al., 2016) using fishery products in the form of fresh and processed smoked African catfish fillets, shows that fresh products have a pH of 6.80, close to neutral pH, while processed products have a pH that tends to be acidic, namely pH 5.47. (fried smoke) and pH 5.73 (oven smoke). Changes in pH tend to be acidic in smoking because liquid smoke has an acidic pH (pH 4.00). Previous research by Kaba et al. (2013) on smoking roa fish showed pH-5.16. The results obtained are following Krisen's (2015) research on processed white snapper products which decreased the pH value of 6.50 to pH 6.30 after the smoking process.

Then in the {Formatting Citation} study using Canned Tuna, the pH value of canned tuna as a whole ranged from 5.85 to 6.02 with an average value of 5.91. The pH value of canned tuna obtained is in the pH range of canned tuna reported by Elshehawy and Farag (2019), which is 5.6-5.82. However, the average pH value of canned tuna in the study (Anwar et al., 2021) of 5.91 experienced a slight decrease when compared to the pH of fresh tuna 5.97.

The decrease in the pH value of canned fish compared to the pH of the raw materials was also reported by several previous studies. In the results of Murda, Husni, Budhiyanti, and Herwati (2016) research, it was found that a decrease in the pH value of smoked African catfish seasoned in cans was caused by the heating process using liquid smoke. The liquid smoke is used at a low pH < 4.0. Bawinto, Mongi, and Kaseger (2015) explain that changes in the pH value of a product can be influenced by factors of storage time and composition of canned products. In addition, different lengths of sterilization time can also cause differences in the pH value of the product. The use of high sterilization temperatures has also been reported to cause a decrease in the pH value (Jannah, Handayani, Dipokusumo, & Werdiningsih, 2018). Research by Reza et al. (2015) reported a decrease in the pH of chela fish after canning to 5.9 from the pH value of fresh fish of 6.8. Several research results also reported an increase in the pH of canned fish (Lahamy & Mohamed, 2020), so it can be concluded that changes in the pH value of fish after canning are influenced by many factors.

Table 2 Analysis of pH, water content, and ash content in fishery

Fishery Products	pH before canning	pH in the can	Water content	Ash Level
Processed product of Spiced Smoked African Catfish Fillet (Fried Smoke) Packaged in Cans (Murda et al., 2016)	6,80	5,47	-	-
Processed Products of Spiced Smoked African Catfish Fillet (Oven Smoke) Packaged in Cans (Murda et al., 2016)	6,80	5,73	-	-
Tuna (Anwar et al., 2021)	5,97	5,91 (Average)	-	-
Chela Fish (Reza et al. 2015)	6,8	5,9	59,41%	-
Canned Milkfish (Maskur, 2018)	-	-	-	-
Canned Sardines (Refilda et al., 2020)	-	-	10,25%	2,46%

## Conclusion

From the results of the review articles that have been carried out, it shows that fishery product commodities that can be packaged in cans according to several previous studies include milkfish, African catfish fillet, tuna, sardines, skipjack tuna, gray tuna, lemuru fish, and Fish Song. In canned fish products, the pH value is influenced by many factors, a decrease in the pH value occurs in smoked Dumbo Catfish Fillet from 6.80 to 5.47, then Chela Fish from 6.8 to 5.9, in tuna fish from 5.97 to 5.91. Then the water content of milkfish is 59.41% and canned sardines is 10.25% and ash content is 2.46%.

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