IDENTIFICATION OF FORMALDEHYDE CONTENT IN CAPTURE FISHERIES PRODUCT IN TRADITIONAL MARKET

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ABSTRACT

Fishery products are easy to get a quality degradation process, therefore many producers are trying to preserve these fishery products. However, there are still many manufacturers that use preservatives that are harmful to health, including formalin. The purpose of this study was to identify the formaldehyde content in capture fishery products sold in traditional markets in Tasikmalaya, West Java, Indonesia. The method used is a survey and analyzed descriptively. Sampling used purposive sampling method with 14 types of capture fishery products. Samples were tested with the formaldehyde Rapid Test Kit brand Labtest Reagent to identify the possible presence of formaldehyde. The test results showed that capture fisheries products containing formaldehyde were Rhizoprionodon acutus and Stolephorus sp. Formaldehyde content in Rhizoprionodon acutus fish is 60 ppm and Stolephorus sp fish contains more than 100 ppm.

Keyword : - *capture fisheries, fisheries product, formaldehyde, traditional market*

1. INTRODUCTION

Capture fisheries products are very popular with the public because they taste more delicious than freshwater fisheries. However, like other fishery products, capture fishery products are also easy to decay. Spoilage in fish is caused by microbial activity found in all layers of fish meat, especially on the gills, stomach contents and mucus [1].

Producers and traders try to preserve fishery products by using preservatives. Preservatives chosen are those that have low prices and are effective, because they can affect production costs. But without paying attention to safety for the health of consumers. One of the dangerous preservatives used by fishery product manufacturers is formaldehyde. The use of formaldehyde is usually given to processed fish products, especially capture fishery products because they rot faster than aquaculture or freshwater fishery products. In general, traders who use formaldehyde are traders who sell in traditional markets, because traditional markets lack supervision from related parties. The reason for the producers to use formaldehyde is that it lasts longer and is relatively cheaper than using ice or salt.

Formaldehyde is not intended and even prohibited its use in food ingredients, but there are still food manufacturers who use formaldehyde as a preservative in food ingredients. Some examples of foodstuffs that are generally given formaldehyde are meatballs, noodles, tofu and fish. The Food and Drug Supervisory Agency stated that fish ranks first as a food ingredient with a lot of formaldehyde content, which is 66% of the 786 samples, followed by noodles by 57%. Tofu and meatballs in the next order are 16% and 15% [1].

The reasons producers and traders use formaldehyde in capture fisheries products are economic reasons. With the addition of formalin to their products, they are more durable because formaldehyde can kill spoilage microbes in fish [2]. Formaldehyde is naturally formed in marine fish and crustaceans. Formaldehyde is formed from the reduction reaction of the enzyme trymethylamine oxide to formaldehyde and diethylamine [3].

According to the International Program on Chemical Safety (IPCS), the safe threshold for formaldehyde in the body is 1 mg per liter. When formaldehyde enters the body beyond the specified threshold, it can cause disturbances to the body's organ systems. The consequences can be seen in the short or long term[2]. Short-term use of formalin can cause irritation and burning in the mouth, chest or stomach pain, diarrhea and nausea. When consumed in the long term can cause damage to the digestive organs and can even cause death [4]. The purpose of this study was to identify the formalin content in capture fishery products sold in traditional markets.

2. MATERIALS AND METHOD

2.1 Materials and Tools

The materials used in this study were capture fishery products that were sampled to be tested for formaldehyde content, originating from traditional markets in Tasikmalaya, West Java, filter paper, aquabidest. Capture fisheries products that were sampled consisted of 14 types, namely *Dussumieria accuta*, Boiled squid, *Rhizoprionodon acutus, Stolephorus* sp, *Salted Cynoglosus lingua, Selaroides Leptolepis,* Salted *Stophhorus insularis, Leiognathus elonganthus, Leiognathus elonganthus, Brachygobius doriae, Barbonymus schwanenfeldii, Stokphorus commersonii,* Salted *Arius thalassinus* (Jambal Roti), Salted *Rastreliger* sp (Peda), *Oxyeleotris marmorata.*

The tools used in the research includes Formalin kit with Paint code. No. 110036.0001 Merckoquant Formaldehyde, beaker glass, test tube, erlenmeyer, funnel, blender jar, knife and scissors.

2.2 Method

The research method used in this research is the survey method. Sampling using purposive sampling method, namely the technique of determining the sample by considering certain criteria [5]. The parameter observed was the formalin content in each sample of capture fishery products.

Sampling of capture fisheries products in the field is in three traditional markets in Tasikmalaya. From the three markets, 14 types of capture fishery products were obtained. Sample handling is fish product samples taken from each market. After the sample was obtained, the sample was wrapped in zip lock plastic and stored in a cool box with ice. The samples were then transported and tested at the Fishery Products Processing Laboratory, Universitas Padjadjaran for testing the formalin content.

2.3 Test Procedure

Samples were cut and chopped into small sizes using a knife and then crushed using a mortar. Samples were taken as much as 2 grams and put into a glass beaker, then added 20 ml of distilled water. After dissolving then filtered with Whatman paper with a pore size of 0.45 microns. Furthermore, 5 ml of the filtrate was taken to be tested for formaldehyde content.

Testing the formaldehyde content using colorimetric principles using a formaldehyde kit with the paint code. No. 110036.0001 Merckoquant Formaldehyde. This type of formaldehyde kit consists of 100 test strips and 1 bottle of formaldehyde reagent with a measuring range from 0 to 100 mg/l formaldehyde.

The principle of colorimetric testing is to observe the color change of the indicator dipped into the sample that has been given formaldehyde Fo-1 reagent. The indicator will react and change color from yellow to pink. The darker the color, the higher the formaldehyde content.

2.4 Data Analysis

The data from formaldehyde test were analyzed descriptively with reference to the Regulation of the Indonesian Minister of Health no. 033 of 2012 concerning Food Additives whose use is prohibited, especially formaldehyde.

3. RESULT AND DISCUSSION

The sample test in this study used a qualitative method using a formalin kit with the paint code. No. 110036.0001 Merckoquant Formaldehyde by observing the color change of the sample that was given the reagent.

The indicator will react and change color from yellow to pink. According to [6] formaldehyde test kit uses the principle of forming a red-purple complex from the reaction of formaldehyde with 4-amino-3-hydrazino-5-mercapto-1,2.4-triazole. Formaldehyde qualitative test samples that have been examined, there will be a color change in the sample. The results of testing the formaldehyde content of capture fishery products obtained from traditional markets are presented in Table 1.

Table -1: Results of Formalin Testing on Capture Fishery Products

No	Sample Name	Test Results	Formaldehyde Content (ppm)
1	*Dussumieria accuta*	Negative	-
2	Boiled squid	Negative	-
3	*Rhizoprionodon acutus*	Positive	60
4	*Stolephorus* sp	Positive	>100
5	*Salted Cynoglosus lingua*	Negative	-
6	*Selaroides leptolepis*	Negative	-
7	Salted *Stophhorus insularis*	Negative	-
8	*Leiognathus elonganthus*	Negative	-
9	*Brachygobius doriae*	Negative	-
10	*Barbonymus schwanenfeldii*	Negative	-
11	*Stokphorus commersonii*	Negative	-
12	Salted *Arius thalassinus* (Jambal Roti)	Negative	-
13	Salted *Rastreliger* sp (Peda)	Negative	-
14	*Oxyeleotris marmorata*	Negative	-

Based on the tests that have been carried out on 14 samples, 2 of the 14 samples were positive for formaldehyde. The positive sample were *Rhizoprionodon acutus* dan *Stolephorus* sp. This is evidenced by the filtrate from *Rhizoprionodon acutus* changing the indicator to purple, while the filtrate from *Stolephorus* sp. become brown. In other samples, the filtrate changes the indicator to a pink color which indicates the absence of formaldehyde content in the product.

The use of formalin in fishery products is carried out because formalin is effective in killing bacteria, fungi and viruses that cause fish to rot quickly so that fish can survive for a long time even though they are stored at room temperature [7]. *Rhizoprionodon acutus* and *Stolephorus* sp. included in fishery products that have high economic value, but like fishery products in general *Rhizoprionodon acutus* and *Stolephorus* sp. not durable. Formaldehyde is given so that producers do not suffer losses.

The mechanism of formalin as a preservative is the interaction between formaldehyde and protein which causes degradation or damage to the amino acid groups of fish proteins so as to produce a texture that is not brittle or rough and hard [8]. Formaldehyde has the ability to preserve food because the aldehyde group which is easy to react with protein forms imine compounds, thus, when protein foods are immersed in formalin, the aldehyde and formaldehyde groups will bind to protein elements. The bound protein cannot be used by spoilage bacteria, so food with formaldehyde will last longer [9].

Spoilage in fishery products can occur in a short time if the fish are left at room temperature. Spoilage in fish is generally caused by bacteria. Fish has a fairly high water content, which is 80%. The high water content is a breeding ground for spoilage bacteria. Fish also have a pH that is close to neutral and meat is easily autolyzed, making it a breeding ground for bacteria [10]. Decomposing bacteria in fish comes from the fish's own body such as the stomach, gills and scales, but bacteria can also come from outside such as during processing and storage [11].

Fish that was given formaldehyde had differences with fish that were not given. Fish that was given formaldehyde had a bright flesh color, the texture of the meat was a bit hard, the fish characteristic smell disappeared and it did not rot even though it was stored at room temperature for a long time. Formaldehyde in fish cannot be removed, but its content can be reduced by boiling the fish for 30 minutes [7].

Although the use of formalin in food has been prohibited by the Regulation of the Minister of Health Number 033 of 2012 concerning Food Additives, but there are still producers who sell salted fish containing formalin. This is because formalin is one of the antimicrobial compounds that can kill bacteria or fungi [12].

Capture fisheries products identified for their formalin content contained salted fish products from several types of marine fish. The texture of salted fish that contains formalin will be hard and not easily brittle so that it can extend the shelf life, this is due to the low water content of salted fish. The low water content in salted fish is because salted fish meat is dominated by formalin solution. Based on [13] the percentage of water content of salted fish that was given formalin had a lower value than salted fish without formalin, namely 0.08% while salted fish without formalin was 1.8%. The water content of salted fish according to the national standard [14] the maximum water content of dry salted fish is 40%, and [15] said that salted fish which is usually circulated in traditional markets water content ranges from 15-25%. The difference in the value of the water content of salted fish without formalin and salted fish that was given formalin, is due to formalin salted fish having interactions involving formaldehyde compounds with water, which causes low water content values in formalin salted fish.

4. CONCLUSIONS

Based on the results of testing the formaldehyde content in capture fishery products originating from traditional markets, it can be concluded that of the 14 types of fish samples that were positive for formalin were *Rhizoprionodon acutus* with a content of 60 ppm and *Stolephorus* sp. contains more than 100 ppm. The government and related parties have banned the use of formalin in food, but in reality there are still producers who use formaldehyde as a preservative in capture fishery products.

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