GSJ: Volume 8, Issue 3, March 2020, Online: ISSN 2320-9186
www.globalscientificjournal.com

# Identification of Formaldehyde Content on Salted Fish in Pangandaran Regency

Ai Sinta Mustika [1], Iis Rostini[2], Yayat Dhahiyat[2] , Rusky Intan Pratama[2]
*[1)]Student at the Faculty of Fisheries and Marine Sciences, Universitas Padjadjaran, Indonesia*
*[2)]Lecture at the Faculty of Fisheries and Marine Sciences, Universitas Padjadjaran, Indonesia*
*Jl. Raya Jatinangor KM. 21 Sumedang*
*Correspondence e-mail: sintamustika01@gmail.com*

## ABSTRACT

This research aims to determine the content of formalin on salted fishes sold in several markets in Pangandaran Regency. The research was conducted from November to December 2019 at the Fishery Product Processing Laboratory of Padjadjaran University. The method used is the survey method and analyzed using the Cochran test with the Chi-Square test and descriptively. The purposive sampling method was used to take samples of salted fish types which included Jambal Roti, Salted Squid, salted anchovy, and Peda salted fish. Samples were tested with formalin Rapid Test Kit made by Labtest Reagent brand, to identify the positive or negative formalin contained in salted fish that sold at several markets in Pangandaran Regency. The samples used were taken from the Kalipucang Regional Government Market, Pananjung Regional Government Market, Cikembulan Market, Parigi Regional Government Market and Cijulang Market. The Cochran test results have shown that the markets which sell salted fish that contained formalin, was not significantly different. Based on the results Salted fish indicated by formalin were include jambal roti, salted squid, anchovies, and salted Peda fish. Positive Peda fish contains 65% formalin and 35% negative contains formaldehyde. The test results show that the level of circulation of formalin salted fish is still high in several markets in Pangandaran Regency.

Keywords: salted fish, formalin, market, pangandaran

# INTRODUCTION

Food processing is an effort to extend the shelf life of a product such as fish processing using salt. This process aims to reduce the water content of the fish so that the activation of substances and microorganisms that destroy or enzymes which can cause deterioration of the fish quality will be inhibited or stoped (Afrianto and Liviawaty 1989). Salted fish is a processed fish product that is preserved using salt and popular as a side dish. Nearly 65% of fishery products are still processed and preserved using salt. Salted fish is included in nine important basic ingredients for people's lives (Afrianto and Liviawaty 1989). This Fish processing method is still classified as a traditional processing method because it does not require advanced equipment and only need salt for the salting process (Seto 2011).

Traditional processing such as the salting process generally done by traders on small/medium scale home industries. The characteristics of traditional processing are, lack of knowledge and skills because it obtained by only passed down from generation to generation, low levels of sanitation and hygiene, generally very low funded because of the environment condition, equipment used is very simple, and product marketing is only limited to the local market (Suyanti 2017).

Salted fish in processing matter, the safety of a product is something that needs attention. Based on Law No. 7 of 1996 concerning food. Food safety is the condition and effort needed to prevent food from possible biological, chemical and other contaminants that can disturb, harm and endanger humans being.

Pangandaran is one of the salted fish production centers. The process of drying fish by the maker is still very simple. Such a process is very vulnerable to potentially cause a pathogenic impact on salted fish products. This has encouraged salted fish maker to use various methods to prevent it, such as using a dangerous additive, namely formaldehyde (Rinto et al. 2009).

Formalin is a commercial solution with a concentration of 10% - 40% of formaldehyde. The actual use of formalin is not for food, but as an antiseptic, germicide, and non-food preservative. It use as a food additive has been banned by the government, this is stated in the Regulation of the Minister of Health of the Republic of Indonesia No.33 of 2012. The use of formalin in the processing of salted fish is usually done before the drying process to dry quickly and not infested by flies (Yuliani et al. 2011).

The use of formalin is also intended to extend the shelf life because formalin is a versatile antimicrobial compound that can kill bacteria, fungi and even viruses (Rahman 2014). The impact of consuming formalin can only be felt a few years later. Formalin that enters the body will cause poisoning with symptoms such as acute abdominal pain accompanied by vomiting, bloody diarrhea, and nervous system depression and circulatory disorders (Abdullah 2013).

Pangandaran has 23 markets including the Kalipucang Regional Government Market, Parigi Regional Government Market, Cikembulan Market, Cijulang Market, and Pananjung Market. These markets sell various types of salted fish such as jambal roti, salted squid, salted fish, and salted anchovies. According to research results, Suharna et al. (2006) stated that in general, the standard quality and salted fish products especially jambal roti in Pangandaran organoleptically have met the quality standards according to SNI, but the level of product safety is still in doubt, and the level of application of the basic feasibility program in salted fish processing in Pangandaran is still low.

# METHOD OF RESEARCH

## Place and Time of Research

### Tools and Materials

Tools and materials used in the research are as follows:

- Analytical Scales, used to weigh salted fish samples to the nearest 0.1 g.
- Beaker glass, used as a container for mixing and measuring the volume of the research sample solution, with a size of 250 ml.
- Spoon, used to stir and lower the sample.
- Mortar, used to refine the sample.
- Measuring cup, used to measure the amount of liquid in the sample, with a size of 10 ml.
- Filter paper, used to filter salted fish sample solutions, with a pore size of 0.45 microns.
- Test tube, used as a container for carrying out chemical reactions.
- Plastic Ziplock, used as a wrapper for salted squid, anchovies, anchovies and jambal roti.
- Salted fish Jambal roti, salted squid, salted fish and salted anchovies taken from several markets in Pangandaran.
- Formalin Rapid Test kits are used to detect formaldehyde content in salted fish.

**Methode**

The research method carried out in this research is a survey method and analyzed using the Cochran test with the Chi-Square test to see whether there is formaldehyde content in salted fish sold in several markets in Pangandaran. Sampling uses a purposive sampling method, namely the technique of determining the sample by considering certain criteria (Sugiyono 2015). The market criteria in Pangandaran are used to take samples, which are widely used by the general public to meet their needs and there are many salted fish traders in the market so that they are suitable as a place for research sampling.

## DATA ANALYSIS

Market data and fish species identified in formalin were analyzed using the Cochran test with the Chi-Square test (Sugiono 2015). The Cochran test is used on data and nominal size scales or information in two separate forms, for example, 'positive' and 'negative' information. This test is to determine the relationship between several variables (Durianto et al. 2001). The formula used in the Cochran test analysis is as follows:

$$Q = \frac{(k-1)\left[k\sum_{j=1}^{k} G_j{}^2 - \left(\sum_{j=1}^{k} G_j\right)^2\right]}{k\sum_{i=1}^{N} L_i - \sum_{i=1}^{N} L_i{}^2}$$

Description:
Q = Cochran Test Statistics
K = Number of Variables
Gj = Number of Positive Samples
Li = Number of Positive Sample Lines

Formalin test results were analyzed descriptively by referring to Minister of Health Regulation No. 033 of 2012 concerning Food Additives (BTP) which are prohibited from using them, especially formalin.



## RESULTS AND DISCUSSION

**Formalin Qualitative Test on Salted Fish**

Qualitative analysis is an analysis that deals with the identification of an unknown substance or mixture. The basis for the identification or recognition of elements lies in their chemical or physical properties. The simplest traits used for recognition are those that can be directly observed. For example, the color of a compound or the results of a reaction with a particular reaction can be used as a basis for recognition (Chadijah 2012).

Examination of samples in this study uses a qualitative method using formalin *Rapid Test Kit* brand by observing the change in color of the sample solution reacted with reagent A and reagent B, if there is a change in the color of the solution to purple, it can be said that the sample solution contains positive formalin. Chemical reactions that occur between the reagents with samples containing formalin will produce complex compounds that are purple tetrazine and water. According to Tatri Atmadja and Rusli (2016), *the test kit* formalin uses the principle of forming a red-purple complex compound from the formaldehyde reaction with 4-amino-3-hydrazino-5- mercapto-1,2,4-triazole.

**Qualitative Test Results for Formalin in Salted Fish in Several Markets in Pangandaran**

This research is to identify the formaldehyde content in salted fish with the number of test samples 20. Salted fish tested included salted bread jambal, salted squid, anchovies, and anchovies. Samples were taken from each market, namely Kalipucang Local Government Market, Pananjung Regional Government Market, Cikembulan Market, Cijulang Market, and Parigi Regional Government Market which were tested using formalin *Rapid Test Kit* brand *Labstest Reagent.* The inspection was carried out at the Padjadjaran University Fisheries Processing Laboratory for Formalin in salted fish sold in several Pangandaran 2019 markets, the following results were obtained (Table 1).

Table 1. Results of the sample test on Salted Fish in Pangandaran

| Market | Samples | Formalin | |
|---|---|---|---|
| | | Positive | Negative |
| Kalipucang | Jambal roti | Positive | |
| | Salted Squid | | Negative |
| | Salted Fish Peda | Positive | |
| | Anchovy Salted Fish | Positive | |
| Pananjung | Jambal roti | Positive | |
| | Salted Squid | | Negative |
| | Peda Salted Fish | | Negative |
| | Anchovy Salted Fish | Positive | |
| Cikembulan | Jambal roti | Positive | |
| | Salted squid | Positive | |
| | Salted Fish Peda | Positive | Negative |
| | Anchovy Salted Fish | | |
| Parigi | Jambal roti | Positive | |
| | Salted Squid | Positive | |
| | Peda Salted Fish | Positive | |
| | Anchovy Salted Fish | Positive | |
| Cijulang | Jambal roti | Positive | Negative |
| | Salted Squid | | |
| | Peda Salted Fish | | Negative |
| | Anchovy Salted Fish | | Negative |

**Content Test Result Formalin by Location Market**

**Table 2**. Results Test Cochran content of Formaldehyde by Location Market

| No. | type Salted Fish | Market | | | | | Li | $Li^2$ |
|---|---|---|---|---|---|---|---|---|
| | | Government of Kalipucang | Government of Pananjung | Cikembulan Market | Government of Parigi | Cijulang Market | | |
| 1 | Fish Jambal roti | 1 | 1 | 1 | | | 1-4 | 16 |
| 2 | Salted Squid | - | - | 1 | 1 | 1 | 3 | 9 |
| 3 | Salted Fish Peda | 1 | - | - | 1 | - | 2 | 4 |
| 4 | Anchovy Salted Fish | 1 | 1 | 1 | 1 | - | 4 | 16 |
| | Gj | 3 | 2 | 3 | 4 | 1 | 13 | 45 |
| | $Gj^2$ | 9 | 4 | 9 | 16 | 1 | - | - |

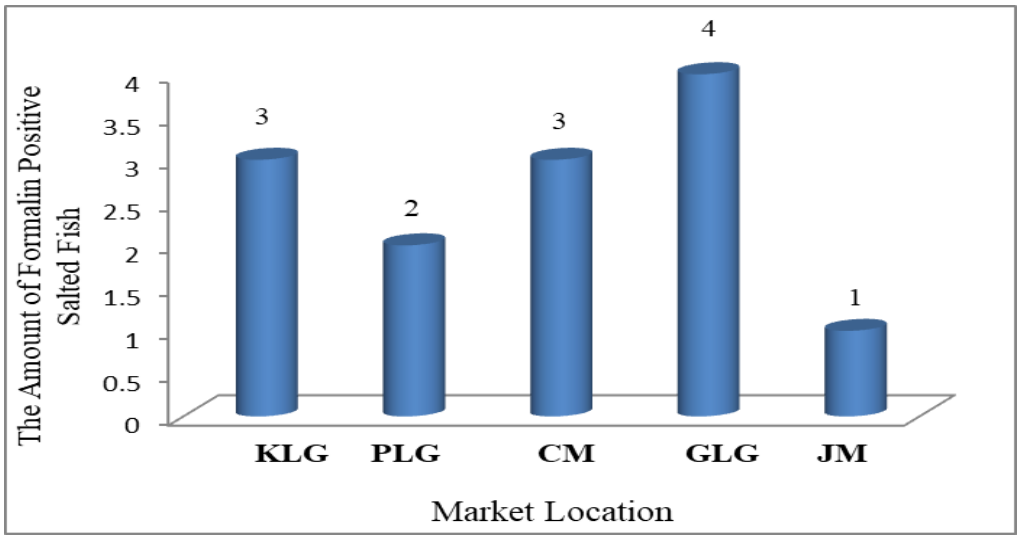

**Figure 1.** Market location with identified products Formalin applications are KLG (Kalipucang LOcal Government Market, PLG (Pananjung Local Government Market, CM (Cikembulan Market), GLG (Parigi Local Government Market), JM (Cijulang Market)

Based on the test results there are still several markets selling salted fish containing formalin. The markets that sell the most salted fish products containing formalin are the Parigi Regional Government Market consists of 4 samples, the Kalipucang Local Government Market and the Cikembulan market consists of 3 samples, the Pananjung Local Government Market consists of 2 samples, and the Parigi Market consists of 1 sample. According to Cochran Q test calculations the five markets sell salted fish which indicates formalin does not have a different number of samples (Table 2).

Although the use of formalin in food has been banned by Minister of Healt regulation No. 722 / Menkes / Per / IX / 1988 Regarding Food Additives there are still many traders selling salted fish containing formalin. The use of formaldehyde is believed to accelerate the drying process and make the physical appearance not easily damaged (Sri 2010). Also, the use of formalin by salted fish producers is quite easy, it only needs to be added during the process of soaking salted fish and can increase the yield of salted fish up to 75% (Rachmawati 2006).

**Formalin Content Test Results by Type of Salted Fish**

**Table 3.** Cochran Test Results Formalin Content by Type of Fish (n = 4)

| No | Market Location | Types of Salted | | | | | |
|---|---|---|---|---|---|---|---|
| | | Fish Jambal Roti | Salted Squid | Peda Fish Salted | Anchovies Fish Salted | Li | $Li^2$ |
| 1 | Pasar Pemda Kalipucang | 1 | - | 1 | 1 | 3 | 9 |
| 2 | Pananjung Local Government Market | 1 | - | - | 1 | 2 | 4 |
| 3 | Cikembulan Market | 1 | 1 | - | 1 | 3 | 9 |
| 4 | Parigi Local Government Market | 1 | 1 | 1 | 1 | 4 | 16 |
| 5 | Cijulang Market | - | 1 | - | - | 1 | 1 |
| | Gj | 4 | 3 | 2 | 4 | 13 | 39 |
| | $Gj^2$ | 16 | 9 | 4 | 16 | - | - |



Salted fish samples tested for formalin content are anchovies, salted squid, salted fish and salted anchovy. Salted fish is salted fish that is popular in the community. Each type of salted fish consisted of 5 samples. Based on the laboratory test results, the salted fish species were indicated to contain formalin, namely 4 fish jambal anchovies, 3 squid salted fish, 2 peda salted fish and 4 salted anchovies (Table 4). According to the Cochran Q test calculation, 4 types of salted fish sold in several markets in Pangandaran showed that the amount of salted fish that was formalin was not significantly different in each type (Table 3).

The Salted Fish species that contain positive and negative Formalin are presented in Table 4 with a percentage based on the number of each type of sample that is 5 samples and the number of Salted Fish identified are presented in Figure 2.

**Table 4**. Percentage of positive and negative containing Formalin

| types of Salted Fish | Positive | | Negative | | Total | |
|---|---|---|---|---|---|---|
| Salted Fish Types | Amount | % | Amount | % | Amount | % |
| Jambal roti | 4 | 20 | 1 | 5 | 5 | 25 |
| Salted Squid | 3 | 15 | 2 | 10 | 5 | 20 |
| Peda Salted Fish | 2 | 10 | 3 | 1 | 5 | 25 |
| Anchovy Salted Fish | 4 | 20 | 1 | 10 | 5 | 30 |
| **Total** | **13** | **65%** | **7** | **35%** | **20** | **100%** |

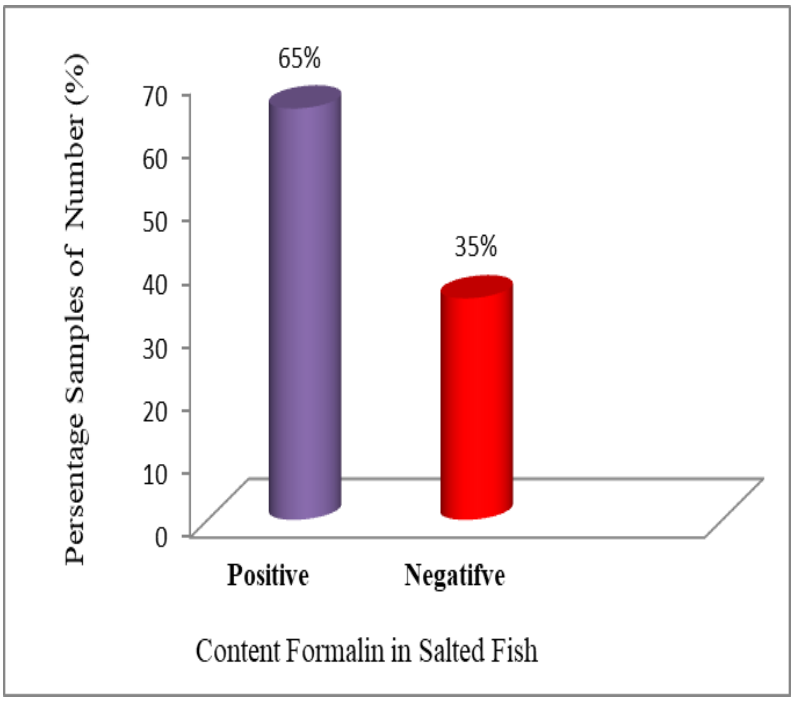


**Figure 2.** Number of Salted Fish Identified

Based on (Figure 2) obtained test results from 20 samples of salted fish obtained from several markets in Pangandaran, there were 13 samples (65%) containing formalin and 7 (35%) samples that did not contain formalin. The existence of dangerous preservatives such as formalin in salted fish is caused by several factors such as, traders' lack of understanding about the dangers of formalin and processing that has been passed down for generations. Also, traders use formalin as a preservative to seek greater profits and use by traders without regarding the health risks of buyers or consumers. Laboratory test results indicate the high levels of formalin salted fish circulation in the Pangandaran market. This formalin salted fish is also still often bought because of consumer ignorance and some buyers also want to get a durable product at a low price.

## CONCLUSION

Based on the results of the formaldehyde content identification at several markets in Pangandaran, it can be concluded that salted fish which are indicated in formaldehyde include bread jambal, salted squid, salted anchovies and peda salted fish positive containing 65% formalin and 35% negative containing formalin. The test results show the level of formalin salted fish circulation is still high in Pangandaran markets such as the Kalipucang Regional Government Market, Pananjung Regional Government Market, Cikembulan Market, Parigi Regional Government Market, and Cijulang Market.

## REFERENCE

[1] Afrianto, E., and E, Liviawaty. 1989. Fish Preservatives and Processing. Canisius Publisher. Jogjakarta
[2] Cahyadi, W. 2008. Analysis and Health Aspects of Food Additives. 2nd edition. Earth Literacy. Jakarta.
[3] Chadijah, S. 2012. Basics of Analytical Chemistry. UIN Press. Makassar.
[4] Durianto, D., Sugiarto., And T. Sijintik. 2001. Strategy to Conquer the Market through Equity Research and Brand Behavior. Gramedia Main Library. Jakarta.
[5] Nurkholidah, M., Ilza & Jose, C. (2012). Kandu Analysis) with Borax on Skewers of Meatballs in Primary School in Bangkinang District, Kampar Regency. Environmental Science Journal. 6 (2): 134-145.
[6] Permenkes. RI. 2012. Food Additives. Minister of Health of the Republic of Indonesia. Jakarta. 37 p

[7] Rinto, E., Arafah, S.B. Main. 2009. Food Safety Study (Formalin, Salt and Microbes) in Indralaya Production of Salted Sepat Fish. Journal of Human Development. 8 (2): 2-4.
[8] Salosa, Y. Y. 2013. Test of Formalin, Salt and Total Bacteria of Mackerel Salted Fish from Sarmi Regency, Papua Province. Journal of Fisheries Sciences. 2 (1): 10-15
[9] Seto, D. 2011. Salted Fish. Kanisius. Yogyakarta
[10] Sugiono, 2015. Nonparametric Statistics for Research. Alfabeta. Bandung.
[11] Suryanti., P. Heryadi., And C. A'in. 2017. Peforma Fish Performance (Typical Fish Kedung Malang Jepara) Post Implementation of Pehi_Ling Fish Drying Rack. Journal Info. 19 (1): 3-4
[12] Tatriatmadja, S. P., and T. R. Rusli. 2016. Formalin Test on Noodles Around Tarumanegara University. National Seminar on the Results of Application of Research and Community Service. 3 (1): 5-9
Winarno. 2004. Food Safety. M-Bri