IDENTIFICATION OF FORMALIN CONTENT IN ANCHOVY SALTED FISH SOLD IN SEVERAL TRADITIONAL MARKETS IN BANDUNG CITY

Identifikasi Kandungan Formalin Pada Ikan Asin Teri Yang Dijual di Beberapa Pasar Tradisional Kota Bandung

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ABSTRACT

Formalin is one of the preservatives that are dangerous when added to food. However, its use is still widely carried out by irresponsible producers, one of which is in anchovies. This study aims to analyze the presence or absence of formalin content in anchovy salted fish sold in several traditional markets in Bandung. The formalin test method was carried out qualitatively and quantitatively using a nash reagent and a spectrophotometer UV-Vis. The results of research on anchovy salted fish samples from Gedebage Market, Caringin Market, Simpang Dago Market, and Kosambi Market found the presence of formalin in all samples with the highest content in anchovy samples obtained from Gedebage Market, which was 7,14 mg/l.

Keyword : Anchovy Salted Fish, Bandung City, Formaldehyde, Tradisional Market

ABSTRAK

Formalin merupakan salah satu bahan pengawet yang berbahaya apabila ditambahkan ke dalam makanan. Namun, penggunaannya masih banyak dilakukan oleh produsen tidak bertanggung jawab salah satunya pada ikan asin teri. Penelitian ini bertujuan untuk menganalisis ada tidaknya kandungan formalin pada ikan asin teri yang dijual di beberapa pasar tradisional Kota Bandung. Metode pengujian formalin dilakukan secara kualitatif dan kuantitatif menggunakan pereaksi nash dan spektrofotometer UV-Vis. Hasil penelitian sampel ikan asin teri dari Pasar Gedebage, Pasar Caringin, Pasar Simpang Dago, dan Pasar Kosambi ditemukan adanya formalin pada seluruh sampel dengan kandungan tertinggi ada pada sampel ikan teri yang diperoleh dari Pasar Gedebage, yaitu sebesar 7,14 mg/l.

Kata Kunci : Formalin, Ikan Asin Teri, Kota Bandung , Pasar Tradisional

INTRODUCTION

Anchovies are the fish most consumed by the public, because of their relative price affordable and easy obtained (Fadilah *et al.,* 2022). Anchovies are pelagic fish small and has

high nutritional content. Anchovies per 100 grams contain 77 kcal of energy, 16 grams of protein, 1 gram of fat, 500 mg of calcium, 500 mg of phosphorus, 1 gram of iron, 47 vitamin A, and 0.1 mg vitamin B (Aryati & Dharmayanti, 2014). Anchovies processed by salting lots in demand in Indonesia, almost 65% of total production processed become anchovies salty (Rambe *et al.,* 2022).

Salting is a method traditionally commonly used by fishermen and processors to preserve anchovies. The salting process can preserve fish because salt can kill bacteria that cause spoilage. Currently salting in Indonesia generally still uses traditional methods. The traditional salting process is almost part big not paying attention to sanitation and hygiene*,* as a result the product produced quickly experiences damage (Mobonggi *et al.,* 2014). This has caused some producers to use formalin in the salting process so that the fish has a longer shelf life (Astuti & Tebai, 2018). The use of formalin in the fish processing process is considered to be obtainable salted fish products that have color looks clean, not easy broken, texture hard, and odorless stings (Matondang *et al.,* 2015).

Formalin included compound chemicals that can be dangerous body man. Dewi (2019) stated, that the entry of formalin into the human body can cause digestive tract disorders such as severe pain accompanied by inflammation, necrosis of the gastric mucous membrane, and ulceration. On term long, formalin can cause cancer in humans (Suseno, 2021). Use of formalin in food has prohibited in Minister of Health Regulation no. 033 of 2012. There are not many prohibitions complied with or still There are manufacturers who violate and use formaldehyde as an ingredient preservatives, for one salted fish producer. Habibah (2013) in her research, report inform that 9 samples out of 41 samples of salted fish in 11 traditional markets in Semarang City were positive contains formaldehyde, one of them namely anchovies. Matondang *et al.* (2015) also reported in their research that salted fish bloat marketed in several traditional markets in Bandung City contains formaldehyde. Rambe *et al.* (2022), found formalin content in four anchovy samples obtained at the Amurang traditional market. Based on this matter, research regarding Formaldehyde content in salted fish anchovies in several traditional markets in Bandung City need to be carried out remember Lots salted fish trader anchovies in Bandung City.

RESEARCH METHODS
Time and place
The research was conducted in February 2024. Samples of salted fish as research material were obtained from Simpang Dago Market, Caringin Market, Kosambi Market and Gedebage Market. Formalin testing was carried out at the Biotechnology Laboratory, Faculty of Fisheries and Marine Sciences, Padjadjaran University.

Tools and materials
The tools used in the research were mortar and pestle, scales, measuring pipette, Erlenmeyer, water bath, hot plate stirrer, measuring cup, filter paper, UV-Vis spectrophotometer, micropipette, and dark glass bottles.

The research materials used were anchovy samples obtained from Simpang Dago Market, Caringin Market, Kosambi Market, and Gedebage Market, 37% formalin, ammonium acetate, glacial acetic acid, acetyl acetone, and distilled water.

Testing Procedure
Sample Preparation
All samples were cut into small pieces, then ground using a mortar and pestle. 5 grams of each sample was taken, put into an Erlenmeyer flask, then 50 ml *of distilled water was*

added. The sample solution was heated for 30 minutes at temperature 60 ± 2 °C. After heating, the sample is cooled and then filtered using filter paper.

Making Nash's Reagent

150 grams of ammonium acetate was dissolved in 700 ml of distilled water then 2 ml of acetyl acetone and 3 ml of glacial acetic acid were added. All reagents were mixed then distilled water was added until the solution volume was 1000 ml and then homogenized (Nash, 1953) .

Testing Formalin Qualitative

Formalin testing qualitative referring to (Yulianti & Safira, 2020) .
1. 5 ml of sample filtrate was taken and then put into a test tube.
2. 5 ml of Nash reagent was added then heated in a water bath at 40 ± 2 °C for 30 minutes and cooled.
3. Observe the changes in sample color that occur. Samples containing formalin will change color to yellow.

Testing Formalin Quantitative

The following are: procedure formalin testing quantitative.
1. 1 ml of 37% formalin solution was diluted in the flask measure 100 ml size with distilled water up to the limit mark to make formalin concentration 3700 ppm.
2. Solution a concentration of 3700 ppm was taken as much as 27 ml and diluted in a flask measure 100 ml size with distilled water up to the limit mark to make formalin concentration 1000 ppm.
3. The diluted formalin solution was made into a standard solution with concentrations of 0, 1, 3, 4, 7, 10, 13, and 15 ppm. Each concentration made as much as 10 ml with
4. solution for all concentrations 1 ml is put into a tube reaction and added reactor Nash as much as 5 ml.
5. The reaction tube was heated for 5 minutes at 60 ± 2 °C, then removed and cooled.
6. One of the cooled solutions was put into a cuvette amounting to $\pm$ 2.5 ml and its absorption was measured at a wavelength of $380 - 500$ nm to determine the maximum wavelength.
7. All standard solutions had their absorbance values measured at the maximum wavelength.
8. The value of the absorbance measurement of the standard solution will form a relationship in the linear regression equation in calculating formaldehyde levels in the sample.
9. 2.5 ml of the qualitative test sample solution that experienced a color change was put into a cuvette and its absorbance was measured at the maximum wavelength using a UV-Vis spectrophotometer.

Data analysis

Data from formalin testing were analyzed descriptively comparatively. Sugiyono (2016) states that comparative research is carried out to compare one or more different samples. In this research, the variables compared were the results of formalin identification in samples of salted anchovy fish from several traditional markets in Bandung City.

RESULTS

Formalin testing on anchovy was carried out qualitatively and quantitatively with two repetitions. The samples of salted anchovy fish in this research were obtained from four

traditional markets in Bandung City, namely Gedebage Market, Kosambi Market, Caringin Market, and Kosambi Market. Qualitative testing was carried out using Nash's reagent (Nash, 1953) . Qualitative formalin testing results are shown in Table 1.

Table 1 . Formalin Test Results on Salted Anchovy Fish Qualitative

Source	Test	
	I	II
Kosambi Market	Yellow	Yellow
Gedebage Market	Yellow	Yellow
Caringin Market	Yellow	Yellow
Simpang Dago Market	Yellow	Yellow

Identified samples positive contains formalin in the test in a way qualitative will experience change color become yellow after adding reactor nash . Experienced samples change color continued with testing in a way quantitative use UV-Vis spectrophotometer. Testing quantitative done to find out formalin levels in the sample (Yulianti & Safira, 2020) . Samples taken than 20% of anchovy traders salted for each market location and repeated two repetitions. Results of formalin testing quantitative shown in Table 2**.**

Table 2 . Formalin Test Results on Salted Anchovy Fish Quantitative

Source	Formalin Level (mg/l)		Average (mg/l)
	I	II	
Kosambi Market	2.17	2.19	2.18
Gedebage Market	7.16	7.11	7.14
Caringin Market	1.69	0.30	1.00
Simpang Dago Market	0.54	0.58	0.56

DISCUSSION

Results of formalin testing qualitative research on 4 samples of salted fish teri with two repetitions of testing positive results were obtained in all samples. This is indicated by the presence of change the color of the sample after it is added reactor Nash become color yellow (Nash, 1953) . Reaction between the formalin present in the sample and the reagent Nash form the compound 3,5-diacetyl-1,4-dihydrolutidine. This reaction causes color yellow in the sample (Werner *et al* ., 2022) . The more tall formalin content changes the color on the sample increases concentrated (Wati *et al.* , 2021) .

Results of formalin testing Quantitative data on all samples was obtained formalin levels range between 0.56 - 7.14 mg/l. Salted fish samples teri who has highest formalin content originate from Gedebage Market that is amounted to 7.14 mg/l, while the sample had lowest formalin content originate from Simpang Dago market, amounting to 0.56 mg/l.

Anchovy own quite high water content that is around $84.05 \pm 0.26\%$ (Fahmi, 2015) . Use of formalin in anchovies aims to reduce water content without having to do drying below ray sun for a long time during the process of making salted fish anchovy. The use of formalin is capable reducing the amount of salt content as well make texture of salted fish becomes drier, reduces water content as well increase salted fish yield. This is because the salting process in making salted fish can remove salt yield up to 40%, while salted fish with formalin added can increase yield up to 75% so it can provide bigger profits (Habibah, 2013) . Apart from that, giving formalin to salted fish can also provide better quality. Fish that use formalin have brighter colors and flesh own a chewier texture, as well free from growth mold. Formalin can

also be obtained at a cheap price as well easy obtained. This causes many producers to use formalin in making salted fish (Yulisa *et al.,* 2014)

Yuliana *et al.* (2011) in their research found that of the 47% of formalin users in salted fish, 22% of processors used formalin in the fish washing process and 25% in the salting process. Washing process is a place where there are many microbes rot so that use of formalin will inhibits the decay process caused by bacteria. In the salting process, the use of formalin can shorten the drying time so processors don't need to rely on light sun or hampered by change weather.

Formalin is material preservatives commonly used in products cleaner like fluid washer dishes and shampoo mobile. Formalin is also used in making carpet and candles as well as preservative corpse. Use of formalin in food has prohibited in Minister of Health Regulation no. 033 of 2012. This is because formalin is toxic if ingested by humans may even cause death. On high dosage formalin can cause damage to the channel digestion, poisoning, as well death nerves and cells body. Formalin is also carcinogenic or can cause the growth of cancer cells (Saputrayadi *et al.,* 2019) . Formalin salted fish can be seen based on its characteristics, namely flies not perched or not approaching when stored in the open, it has a clean color, and there is no distinctive smell of salted fish strong (Salim *et al.,* 2021).

CONCLUSION

Based on the results of qualitative and quantitative formalin testing on samples of salted anchovy fish from several traditional markets in Bandung City, it was found that all samples were positive for containing formalin with the highest formalin content of 7.14 mg/l from Gedebage Market.

ACKNOWLEDGEMENT

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