

# Formaldehyde Test and pH of Julung Julung Fish (*Hemiramphus brasilirnsis*) Smoke in Traditional Markets Gorontalo City

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**Abstract**— The results of processed julung - julung fish (*Hemiramphus sp*) immediately in Gorontalo are called sagela. Formaldehyde, better known as formaldehyde, is one of the additives that can be consumed but will be used by people as preservatives for food. The purpose of this study was to determine the formaldehyde content and pH of julung - julung fish as soon as possible in 6 traditional markets in Gorontalo City. This research uses purposive sampling method. Based on the results of research that has been done with qualitative tests using formaldehyde test kits, it is found that formaldehyde is not displayed on 18 samples of julung-julung fish taken from the daily and weekly markets sold in Gorontalo City. The pH value of julung - julung fish which is marketed in Gorontalo City is still included in the criteria agreed below. 7. Place julung - julung fish as soon as possible to be marketed in Gorontalo City which is suitable for consumption and is sold with good quality.

**Keywords**— *Julung Julung fish, smoke, formalin, pH*

## I. INTRODUCTION

The population of Julung julung fish is widely distributed along the Tomini bay and the Maluku sea, according to [1]. The reel is classified as a type of pelagic fish that live in coastal waters generally scattered in eastern Indonesian waters and has a high salt content. Julung julung fish is not only famous in Gorontalo, but the majority of Sulawesi and Maluku residents have always known it. In Gorontalo Province, there are some people smoked sagela fish, namely. Pasalae Village, Gentuma Raya District, North Gorontalo Regency; 2. Bangga Village, Paguyaman Pantai District, Boalemo Regency and; 3. Desa Pentadu Barat, Tilamuta District, Boalemo Regency. In general, sagela fish in Gorontalo Province is produced on a small scale and is still classified as a home industry with traditional equipment [2].

Fish is a food ingredient that is consumed by many people aside from being an export commodity. Fish is known as a commodity that has a high nutritional value but is easy to rot because it contains high protein with free amino acids that are used for microorganisms, ammonia production, biogenic amines, organic acids, ketones and sulfur components [3]. Julung-julung fish can be found in the North Sea of Sulawesi Island to the Maluku Islands. Julung julung fish commonly called by the people of Ternate, North Maluku

are Galafea Fish. Julung Julung (*Hemiramphidae Tribe*) has a characteristic that is an important clue, namely the lower jaw tapers forward, longer than the jaw provided. In Nature, this is a prey for sharks, Todak fish, and also Mackerel fish. The processed fish in Gorontalo is commonly called sagela or gepe fish.

Sagela is a processed fish has become a superior local specialty product of Gorontalo, so that the demand for smoked fish is quite high. In Pasalae Village, there are 4 (four) UKM that conduct fumigation of julunh-julung fish (sagela). The need for a raw materials for each is 200-300 kg per one-time production with an average production capacity of 200-300 barrels of sagela fish per day fo each smoker. The total production capacity of smoked sagela fish in Passale Villlage is around 30.000 barrels [2]. The economic potential possessed has not yet had the effect of increasing income for fisherman and roa smoke processors. One weakness is that the management patterns is still on a traditional scale from upstream to downstream. So it is necessary to apply the industrialization strategy with the concept of the blue economy so that businnes sustainability can be maintained.

Formaldehyde or formalin is widely used by people in food because of its use as a bacteriostatic substance in production and formaldehyde is added to food to maintain its characteristics. Formalin in the regulation of the Minister of Health RI No. 722 / Menes / per / IX / 88 is a food additive that is prohibited from being added to food because it has negative effects on human health. Formaldehyde and its derivatives are also found in other consumer products to protect products from damage caused by microorganism contamination. According to [4], if tofu is immersed in a 2% formalin solution for 3 minutes it can extend its shelf life at room temperature for 4-5 days. Whereas tofu control only lasts 1-2 days by immersing it in water. Food added with formalin makes food more durable and has a more attractive appearance. Therefore it needs to be investigated for the presence of formaldehyde content.

## II. METHOD

### A. Time and Place of Research

Time this research was carried out for 2 (two) months, from March to April 2018. Formalin and pH testing was carried out at the Fishery Product Quality Control and Testing Center (BPPMHP) Gorontalo Province. The samples used were obtained from 6 traditional markets, namely the Liluwo market, the Kampong Bugis market, the Sunday market, the Moodu market, the afternoon market and the central market in Gorontalo City.

### B. Research Tools and Materials

The tools used in this study are packaging plastics, label paper, beaker glass, stirrers, stoves, test tubes, and Erlenmeyer. For pH measurement, they are pH meter, homogenizer, beaker, label paper. The ingredients used for pH measurement are pH 7 buffer solution, distilled water, and litmus paper. Media Potato Dextrose Agar (PDA), Plastic cling wrap. The material used in this study was Roa or Julun julung (*Hemiramphus Sp*) Smoke fish obtained from several traditional markets. The chemical used is chromic acid [5].

### C. Research stages

Roa fish samples were taken from the Liluwo market, the Kampong Bugis market, the Sunday market, the Moodu market, the afternoon market and the central market in Gorontalo City, as many as 18 samples were prepared which were purchased from 3 traders in each Market. Then the sample preparation process is carried out ie the sample is packaged in a clean and dry plastic wrap (clip wrap), after which the sample container is labeled Market A, B, C, D, E, and Market F. The sample is filled into Styrofoam so that contamination does not occur surrounding conditions during the trip to the Laboratory (BPPMHP) for testing Formalin levels and pH.

### D. Sample Analysis

The identification of the presence of formaldehyde in salted fish is done qualitatively. There is also a qualitative test that is weighing as much as 5 grams, put distilled water in beaker glass as much as 50 ml, then bring to a boil. Enter the tested material into the Erlenmeyer, then soak it with boiling distilled water, enter the *chromatophenic* acid, then stir. Products containing formalin are shown by changing the color of water from clear to pink to purple. The more purple means the higher formalin. In the above treatment has not yielded a positive test, put the pan back on the stove, boil the new *aquades*, put the glass that contains a mixture of products, old distilled water, and chromatic acid into the pan. Boiling time for 20 minutes is calculated since the new boiling *aquades*.

The test kit used in this study uses Formalin Test kit Merk with a test accuracy of up to 0.01 ppm. The working principle of the Formalin Test Kit is that formaldehyde reacts with 4 amino-3-hydrazino-5-mercapto-1, 2, 4 triazole to form a purple tetrazine, the concentration of formaldehyde is known through semiquantitative measurements with the results of the visual comparison of colors with a color on a scale color card.

pH Test Procedure for Smoke (*Hemiramphus sp*) fish, ie fish samples were taken as samples taken in the market with a total of 18 samples. After that, the initial recording of all types of Roa fish is taken at traders around the market. Samples are packaged in clean, dry plastic containers. Containers are labeled which include the name of the sample, time of collection, identification number (sample code), type of fish and the location of the sampling market. The containers are packaged in such a way that during the transport process they are protected from the effects of impact or weather for further inspection in the laboratory. Samples are taken from the portion of

meat to taste and mashed, 10 g for pH testing. The pH test can be carried out using a pH meter, and colorimetry.

### E. Data analysis

The data obtained were analyzed descriptively by describing and explaining qualitative observations and measurements.

## III. RESULTS

### A. Formalin in Fish Roa (*Hemiramphus b*) Smoke

Good food is food that does not contain harmful substances contained in these foods. The use of food additives such as formalin should not be added to food. The food needed is healthy and safe food. The formalin test results can be seen in table 1.

Table 1. Quantitative Test Results on the Formalin Content

Kind of Sample	Sample Code	Test Result	Test Method
Roa fish ( <i>Hemiramphus Brasilirnsis</i> )	Seller I Lilowu	Negative	Test Kit
	Seller II Lilowu	Negative	Test Kit
	Seller III Lilowu	Negative	Test Kit
	Seller I B. Village	Negative	Test Kit
	Sellerr II B. Village	Negative	Test Kit
	Seller III B. Village	Negative	Test Kit
	Seller I S. Market	Negative	Test Kit
	Seller II S. Market	Negative	Test Kit
	Seller III S. Market	Negative	Test Kit
	Seller I M. Market	Negative	Test Kit
	Seller II M. Market	Negative	Test Kit
	Seller III M. Market	Negative	Test Kit
	Seller I A. Market	Negative	Test Kit
	Seller II A. Market	Negative	Test Kit
	Seller III A. Market	Negative	Test Kit
	Seller I C. Market	Negative	Test Kit
	Seller II C. Market	Negative	Test Kit
	Seller III C. Market	Negative	Test Kit

Information: (B : Bugis village, S : Sundaymarket, M : Moodu market, A : Afternoonmarket, C : Central Market)

The results of the Qualitative Roa Test on formalin from 18 samples of Roa fish circulating and sold in the Gorontalo City market can be seen in Table 1. The results of this study indicate that all smoked Roa fish samples sold in the traditional Gorontalo negative city market contain Formalin. Smoked Roa fish samples were obtained from the daily market and the weekly market circulating in Gorontalo City.

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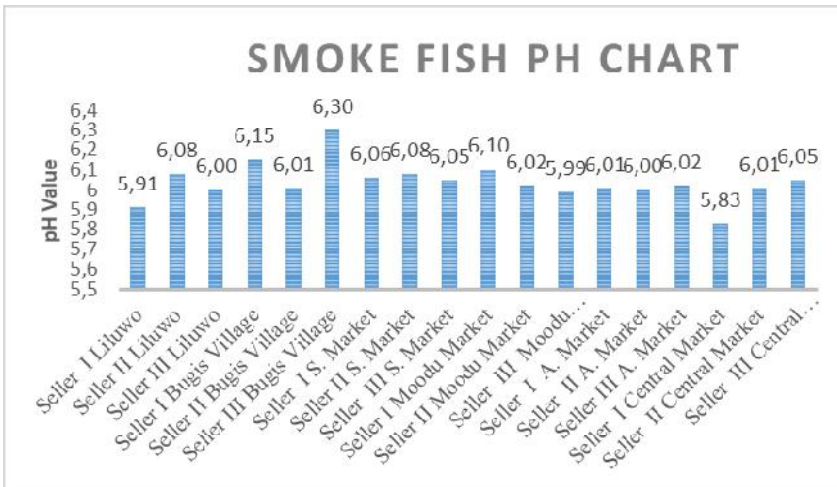
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### B. pH in Smoked Roa

That is because of the emergence of basic compounds such as ammonia, trimethylamine, and other volatile compounds. Live fish has a pH value of 7.0 and after death, the pH value decreases. From the 3rd hour to the 15th hour the pH value has decreased and is in rigor condition. Deterioration of fish quality occurs at 16 to 24 hours in post rigor conditions [6]. The results of the pH test on smoked roa can be seen in Figure.

Figure 1. Graph of the pH value of Smoked Squatters



The pH test results on the Roa Smoked fish showed that all samples had a low pH which is below 7. The highest pH value was found to be a Roa fish seller namely pH 6.30 in the Bugis Village market where the source of Roa fish originated from Luwuk Regency. While the lowest pH of Roa tilapia is obtained from Roa fish from sellers found in Gorontalo City Central Market with a pH value of 5.83.

## IV. DISCUSSION

### A. Formalin in Fish Roa (*Hemiramphus b*) Smoke

Based on quantitative tests using the KIT test, the samples proved to not contain formaldehyde seen that there was no change in the color of the test sample if the samples contained formaldehyde the samples would change color from clear to purple. Formalin is a toxic and dangerous material for human health. If the womb is high in the body, it reacts chemically with almost all substances in the cell thereby suppressing cell function and causing cell death which causes poisoning in the body. Also, high levels of formaldehyde in the body cause gastric irritation, allergies, carcinogens that cause cancer [7].

Formalin is a chemical solution consisting of the HCHO molecule, which is used as an antiseptic to eliminate odors and is used as a fumigation material (vapor) that has a sharp odor that can cause animals to suffocate. In formaldehyde households, it is used as a disinfectant for the home, as a floor cleaning solution. Formalin is a food additive that is prohibited from being added to food because it has a negative effect on human health. Today many food producers want to profit but do not want to lose money by adding food additives that are prohibited from being added to food so that the food they produce is more durable and has a more attractive appearance.

Based on the results of laboratory tests conducted at Gorontalo BBMHP, it was found that all smoked roa fish samples from 6 markets in Gorontalo city by colorimetric method did not contain formaldehyde (negative). [8] said that the tests carried out using the colorimetric method by looking at the colors caused by litmus paper (litmus paper) is the simplest method. If litmus paper is purple, then the sample tested contains formaldehyde, while the sample does not contain clear formalin.

### B. pH in Smoked Roa

High water content can also affect high pH levels. This is because high humidity is a place for the development of spoilage bacteria that remodel proteins so that it causes a deterioration in the quality of fish. Smoked fish is a traditional way of preserving, which uses wood or charcoal as a source of smoke that functions as a natural preservative.

Decomposition of protein will produce TVB compounds, TMA, etc., if the freshness of fish decreases, the volatile nitrogen content will increase. The pattern of protein breakdown in sea fish is different from land fish. Amines will produce ammonia, while marine fish will produce Dimethylamine and trimethylamine. For fish with a high freshness level, the analysis conducted was dimethylamine, while trimethylamine for fish with a low freshness level.

Antimicrobial compounds found in wood smoke such as various kinds of aldehydes, alcohols, ketones, acids and so on. Smoke can also improve the appearance of fish because the surface of the fish becomes shiny. Good quality smoked fish have golden yellow or brownish yellow characteristics such as shiny copper, fresh-smelling distinctive smoked fish, hard or chewy meat, tight skin, strong odor or aroma of smoked fish (a pleasant and arousing odor of smoke). While smoked fish that have low quality show the characteristics of soft, dull, damaged, slimy, or airy, odorless (deviant) odor, salt crystals, blood, black spots or other impurities [9]

The pH value is an indicator of smoked fish quality, which can affect protein, phenol, formaldehyde, and organic acid levels. The difference in pH occurs due to the level of activity of lactic acid bacteria and the amount of organic acids in smoked fish [10].

## V. CONCLUSION

Based on the results of research that has been conducted with qualitative tests using formaldehyde test kits on the content of formaldehyde, it can be concluded that 18 samples of smoked fish julung smoke taken from 6 traditional markets in Gorontalo City negatively contain formalin. The pH value of fish samples ranged from 5-7 which means the fish are still categorized as having good quality.

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