



## Evaluation of Histamine Levels in Smoked Fish Product in South Sulawesi

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**Abstract :** Histamine is a derivative composition of the histidine amino acid that is widely found in scombroid fish such as skipjack, tuna and mackerel tuna. Skipjack and tuna are fisheries commodities that are often used as raw material for smoked fish in several districts in South Sulawesi. This study aims to evaluate the level of histamine in smoked fish products in South Sulawesi. Smoked fish samples were immediately taken from processors in Bulukumba, Bone and Sinjai districts using the Purposive Sampling method. Analysis of histamine levels was carried out at the Laboratory of the Application Center for Fisheries Product Quality South Sulawesi used spectrophotometry based on SNI 2354.10: 2009. The results determined the value of histamine levels of smoked fish products in South Sulawesi as required by SNI 2725: 2013 which was 3.00-7.32 mg / kg.

**Keywords :** histamine, smoked fish, skipjack, tuna, South Sulawesi.

### Introduction<sup>[1]</sup>

Histamine is a compound derived from the histidine amino acid that is commonly found in fish. Histamine is not dangerous if consumed in low amounts, which is 8 mg/100 g of fish. This poisoning will usually arise because of the high levels of histamine found in the fish we consume. Histamine poisoning will be dangerous if someone consumes fish with a 50 mg/100 g histamine content of fish. Histamine is found in scombroid fish such as skipjack, tuna and mackerel tuna. Rawles *et al.* (1995) in Hattu, *et al.* (2015)<sup>[6]</sup> wrote that in some types of fish, especially from the scombroidae family that has red meat, damaged by bacterial and enzyme activity which can produce a poison called scombrotoxin. The toxic compound is histamine.

Fish smoking is a method of fish preserving/processing using smoke from the burning of wood charcoal or coconut shell, coir, sawdust or rice husk. In the smoke contained compounds that have preserving properties, such as phenol compounds, formaldehyde and others (Anonymous, 2011) *in* (Mareta and Awami, 2011)<sup>[7]</sup>. Curing aims to avoid spoilage and maintain the nutritional value of fish. Curing also aims to add flavor and color and act as an antibacterial and antioxidant (Adawiyah, 2008) *in* (Hasanah and Suyatna, 2015)<sup>[5]</sup>. Mauliyani (2000) *in* Mareta and Awami (2011)<sup>[7]</sup> also explains that fish fuming is carried out with the aim of: 1). To preserve fish (mostly done in countries that have not or are currently developing by utilizing natural materials in the form of abundant and inexpensive wood), 2). To give a distinctive taste and aroma.

Several studies that have been conducted on the histamine levels of smoked fish products include the study of histamine levels of smoked tuna (*Auxis thazard*) smoked with acetic acid<sup>[3]</sup>, quality characteristics of skipjack tuna (*Katsuwonus pelamis*) using liquid smoke<sup>[4]</sup>, study of histamine content of fresh and smoked skipjack tuna (*Katsuwonus pelamis*) in fish processing centers in Ambon City<sup>[10]</sup> (Radjawane, *et al.*, 2016), a qualitative histamine test using a histakit kit on jambal catfish (*Pangasius djambal*) during cold storage<sup>[8]</sup>, quality and food safety of smoked fish products in Bulukumba Regency, South Sulawesi Province<sup>[1]</sup>. Nevertheless, there is still lack of information on the histamine content of smoked fish products in South Sulawesi. Based on this, the researchers conducted a study of the levels of histamine in smoked fish products produced in South Sulawesi.

## Methods of Research

This research was conducted in May-June 2019. Sampling of smoked fish was carried out using the *Purposive Sampling* method in Bulukumba, Bone and Sinjai districts of South Sulawesi Province. Analysis of histamine levels was conducted at the Laboratory of Application of Product Quality for Fisheries Products in South Sulawesi using spectrophotometry based on SNI 2354.10: 2009

The procedure for testing histamine levels is as follows:

1. The sample is blended until homogeneous, then weighed as much as  $10 \pm 0.1$  grams in a 250 ml beaker glass and added to 50 ml of methanol.
2. The closed sample is heated in a water bath for 15 minutes at 60 °C and cooled at room temperature.
3. The sample is poured into a 100 ml measuring flask and correct to the mark with methanol. After that, filtering is done using filter paper and the filtrate is collected in a sample bottle. The filtrate can be stored in the refrigerator.
4. Glass wool that has been given aquades put in a resin column as high as 1.5 cm. Neutral resin in the water medium is inserted into the resin column as high as 8 cm with a volume of water above the resin as high as 1 cm.
5. A 50 ml measuring flask containing 5 ml 1 N HCl is placed under the resin column to accommodate the elution of the sample passed to the resin column. 1 ml sample filtrate was pipetted into the resin column, the resin column faucet was in the open position and the results of the elution were allowed to drip and then collected in a 50 ml measuring flask.
6. Aquades are added when the liquid level is 1 cm above the resin and the liquid is left eluted. The procedure is repeated until the elution results in the exact flask measuring 50 ml. Elution results can be stored in the refrigerator.
7. Three 50 ml test tubes are prepared for sample, standard, and blank. Sample filtrate, standard working solution, and 0.1 N HCl blank were piped 5 ml each. 10 ml of 0.1 N HCl were added to the test tube and stirred; 3 ml of NaOH 1 N and stirred, then allowed to stand for 5 minutes; 1 ml of OMO 0.1 then stirred and allowed to stand for 4 minutes; 3 ml of H<sub>3</sub>PO<sub>4</sub> 3,57 N and stirred.

Research data were processed using the SPSS 20 computer program for windows. The results are presented in tabular form and described.

## Results

Results of the analysis of histamine levels in smoked fish produced in South Sulawesi can be seen in Table 1.

**Table 1. Average Histamine Levels of Smoked Fish Produced in South Sulawesi**

Number	Sample	Histamine Levels (mg/kg)
1.	Smoked Skipjack (Bulukumba)	5.05
2.	Smoked Tuna (Bulukumba)	7.32
3.	Smoked Tuna (Bone)	3.00
4.	Smoked Skipjack (Bone)	4.35
5.	Smoked Tuna (Sinjai)	5.65
6.	Smoked Skipjack (Sinjai)	7.05

## Discussion

Histamine is a compound derived from the amino acid histidine that is commonly found in fish. This amino acid is one of the ten essential amino acids needed by children and babies but is not an essential amino acid for adults. Histamine is not dangerous if consumed in low amounts, which is 8 mg/100 g of fish. This poisoning will usually arise because of the high levels of histamine found in the fish we consume. Histamine poisoning will be dangerous if someone consumes fish with a 50 mg/100 g histamine content of fish. While the histamine content of 20 mg/100 g of fish, occurs due to the handling of fish that are not hygienic<sup>[4]</sup>. Histamine is formed from the results of free histidine decarboxylation which is widely found in the body of fish, especially fish species from the Scombroidae family<sup>[2]</sup>. Histamine is found in scombroid fish such as skipjack, tuna and tuna. Rawles *et al.* (1995) in Hattu, *et al.* (2015)<sup>[6]</sup> wrote that in some types of fish, especially from the scombroidae family that has red meat, damage by bacterial and enzyme activity can produce a poison called scombrotoksin. The toxic compound is histamine.

From Table 1, it can be seen that the average range of histamine levels of smoked fish produced in South Sulawesi from 3.00 - 7.32 mg/kg. This value is still in accordance with the requirements of SNI 2725: 2013 (*National Standardization Agency*, 2013)<sup>[9]</sup>, that the histamine content of smoked fish with the maximum heat smoking method is 100 mg/kg. Histamine levels in smoked fish products in Bulukumba and Sinjai districts are higher than those produced in Bone District, this is closely related to the quality and process of handling the raw materials used. Amir, *et al* (2018)<sup>[1]</sup> found that the histamine content of smoked fish produced in the district (Bulukumba) with the same type of raw material was 17.55-29.23mg / kg. The research results of Hadinoto, *et al.* (2016)<sup>[4]</sup>, showing histamine levels of smoked skipjack 42.32 mg / kg, Radjawane *et al.*, (2016)<sup>[10]</sup> smoked skipjack in Ambon traditionally processed containing histamine 7,657 - 19,751 mg/g, Sulistijowati and Mile (2014)<sup>[11]</sup>, showing that the average histamine content of skipjack smoked fish taken from several smoked fish processing units in Gorontalo Regency was 59.89-89.71 mg/kg.

## Conclusion

Based on the results obtained, it was concluded that the value of histamine levels of smoked fish products in South Sulawesi was in accordance with SNI 2725: 2013, which was 3.00-7.32 mg / kg.

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