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# Analysis Of Organoleptic And Coliform Value In Fresh Mackerel (*Rastrelliger* Sp.) Fish In Tpi Sorong City

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**Abstract.** Fish is one of the fishery food ingredients needed by humans because in fish meat there are compounds that are needed by the body which consists of protein, fat, carbohydrates, vitamins and mineral salts. The purpose of the study was to determine the quality of fresh mackerel (*Rastrelliger* sp.) based on organoleptic test results, and to determine the content of fresh mackerel (*Rastrelliger* sp.) *Coliform* at the auction place of Sorong city castle bridge fish. The research method that has been used are experimental method using a complete randomized design analysis, and descriptive method that describes the *Coliform* bacteria in fresh fish products. Organoleptic quality value of eye condition, gill condition, texture, meat, smell mackerel at TPI Sorong city showed an influence on the storage time given. While the total coliform estimation test results on sample A, sample B, sample C, sample D and sample E in the first 3 hours and 6 hours following treatment showed that the highest total coliform was 11 MPN/g index and the lowest was 2.4 MPN/g. The conclusion of organoleptic quality of fresh mackerel in the Sorong city TPI of the 5 samples showed an influence on the quality of the eye, gill, texture, fish meat and smell on the time treatment given at the  $\alpha 95\%$  confidence level. While the total coliform in the first 3 hours of the 5 samples there are 4 samples (Samples A, B, C, and D) have total coliform bacteria not exceeding the maximum SNI limit.

## 1. Introduction

Mackerel (*Rastrelliger* sp.) Is one of the important commodities of the Indonesian fisheries sector. The results of the people's fisheries in the city of Sorong, West Papua Province at this time, especially Mackerel amounted to 221.27 Tons [1]. Sorong City is a city that has a fairly high consumption of fish meat. The high



level of fish consumption in Sorong City is because it has a long coastline and has the facilities and infrastructure to market fish.

Fish is one of the fishery food ingredients needed by humans because in fish meat there are protein compounds, fats, carbohydrates, vitamins and mineral salts that are needed by the body. However, the high water content in the body of the fish causes the body of the fish to be a suitable medium for bacterial growth while fish meat has few tendons, so the decomposition process due to bacterial activity is faster than that of livestock or other animals [2]. Spoilage causes the quality of the fish is reduced and not suitable for consumption.

One of the factors that affect the decline in the quality of the fish being marketed is time, the longer the time the faster the fish experiences the process of quality degradation. Ideally the ratio between ice and fish marketed during the sales process, which is 1: 1 means 1 kg of ice for 1 kg of fish so that the temperature of the fish can be maintained [3].

Based on the background that has been described there is no information regarding the quality of fish marketed in Sorong City. So that this research is considered important to be carried out with the aim to find out the organoleptic quality of fish and total *Coliform* in fresh mackerel at the central fish selling location, precisely at TPI Jembatan Puri, Sorong city.

## 2. Methods

The research was conducted in August-October 2019 in the Laboratory of the Faculty of Fisheries, University of Muhammadiyah Sorong. The research method that has been used is the experimental method and descriptive method. The experimental method was carried out by organoleptic test referring to [4] and using a complete randomized design analysis, while the descriptive method was to describe the results of Coliform bacteria in fresh fish products, with estimator and confirmatory tests. The research sample was taken at the castle bridge auction in Sorong City, West Papua. Samples were taken at random as many as five different points. Bacterial growth media that have been used in the coliform test are Lactose broth (LB) media, and Eosin Methylene Blue Agar (EMBA) media.

## 3. Results and Discussion

The value of organoleptic quality of fresh mackerel in Sorong city TPI from the 5 samples showed an influence on the quality of the eye condition to the quality of the smell state on the time treatment given (table 1).

**Table 1.** Organoleptic results of mackerel in TPI Sorong city

| NO | Organoleptic type   | Value   |                       | Effect |    |
|----|---------------------|---------|-----------------------|--------|----|
|    |                     | F Count | F table $\alpha$ 0.05 | Yes    | No |
| 1  | Eye condition       | 6.1     | 2.06                  | √      |    |
| 2  | Gill situation      | 4.5     | 2.12                  | √      |    |
| 3  | Texture             | 7       | 2.05                  | √      |    |
| 4  | Fish meat situation | 6.5     | 2.05                  | √      |    |
| 5  | Smell               | 6       | 2.08                  | √      |    |

Organoleptic quality values of the five best eye conditions in the first 3 hours are sample B and sample E, whereas after 6 hours the best is sample E. Furthermore, the best gill condition in the first 3 hours is sample C, whereas after 6 hours is samples B and C. Then for the best sample texture conditions the first 3 hours are samples A and B, while the next 6 hours are the best samples A (Figure 1).

The best organoleptic quality value of fish meat from the five samples in the first 3 hours and after 6 hours is sample A and sample E, while the best smell state in the first 3 hours is sample C, sample D, and sample E whereas after 6 hours all samples showed the same smell value (Figure 2).

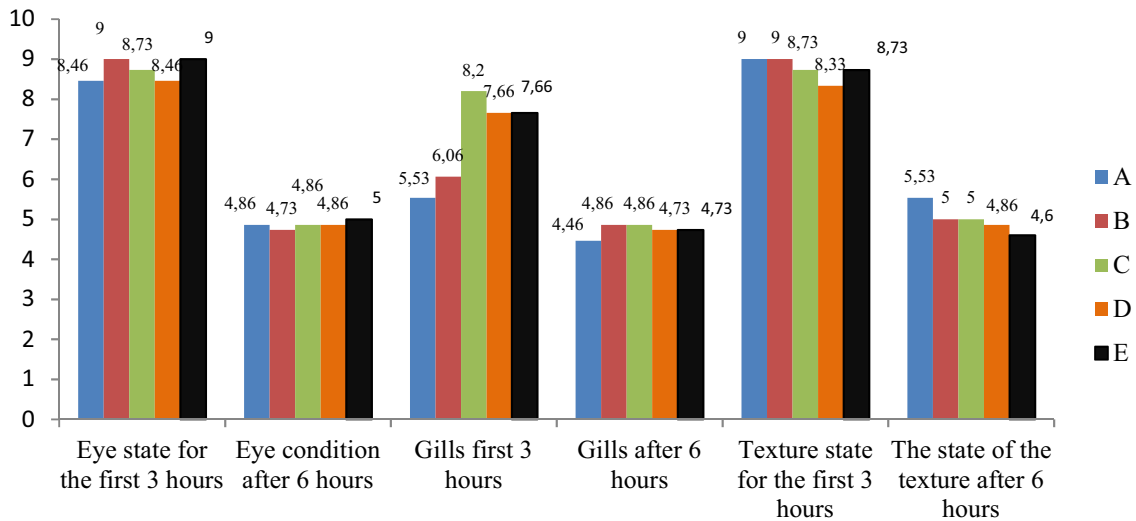


Figure 1. Differences in organoleptic values of eye condition, gills, and texture between sample A, sample B, sample C, sample D, and sample E

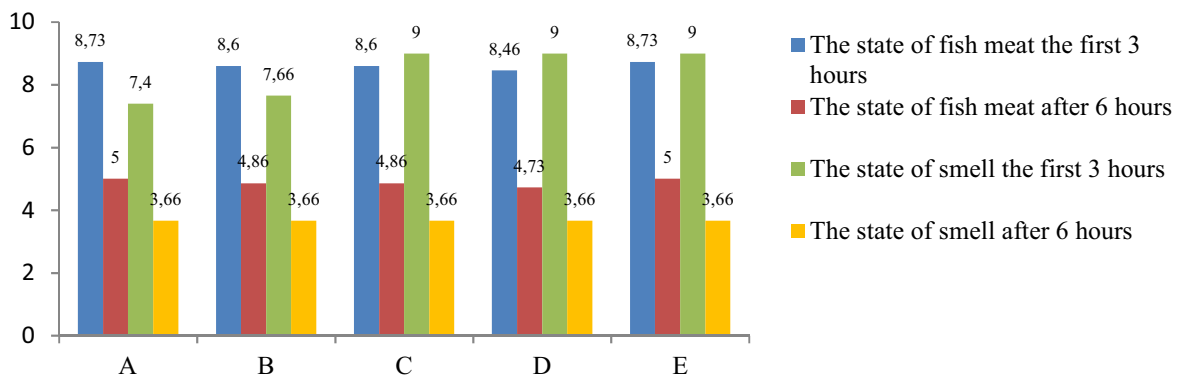


Figure 2. Differences in organoleptic values of fish meat, and smell between sample A, sample B, sample C, sample D, and sample E

The results of the total coliform estimator test on sample A, sample B, sample C, sample D and sample E in the first 3 hours and the next 6 hours showed the highest total coliform was 11 MPN/g index and the lowest was 2.4 MPN/g (Table 2), other than that from the results of the reinforcement test it was stated that the isolate was positive as a *Coliform* group (Table 2).

**Table 2.** Results of observations of total *Coliform* estimator test on fresh mackerel in Sorong city TPI

| No | Sample | Type of observation            |                                | Confirmed test<br>(Metallic green colony) |
|----|--------|--------------------------------|--------------------------------|---|
|    |        | First 3 hours<br>(Index MPN/g) | After 6 hours<br>(Index MPN/g) |   |
| 1  | A      | 2.4                            | 11                             | √   |
| 2  | B      | 2.4                            | 11                             | √   |
| 3  | C      | 2.4                            | 11                             | √   |
| 4  | D      | 2.4                            | 11                             | √   |
| 5  | E      | 4.6                            | 11                             | √   |

Based on the results of research on the quality of organoleptic values on the state of fresh mackerel in TPI Sorong city, it shows the value of F count = 6.1 > F table  $\alpha 0.05 = 2.06$ , so there is enough evidence to state that the time treatment given to the duration of fresh bloated fish has an effect on the fresh bloated eye at  $\alpha 95\%$  confidence level.

Furthermore, the organoleptic quality value of fresh mackerel gills in TPI Sorong city has a value of F arithmetic = 4.5 > F table  $\alpha 0.05 = 2.12$ , so that enough evidence to state that the treatment time given to the storage time of fresh bloated fish influences the fresh gloated fish gill state at the  $\alpha 95\%$  confidence level.

Then the organoleptic quality value of fresh mackerel texture in TPI Sorong city has a value of F count = 7 > F table  $\alpha 0.05 = 2.05$ , so that enough evidence to state that the treatment time given to the duration of storage of fresh mackerel affects the texture of fresh mackerel at the level  $\alpha 95\%$  confidence.

This is also the case with the organoleptic quality value of the state of fresh mackerel meat in the Sorong city TPI which has a calculated F value = 6.5 > F table  $\alpha 0.05 = 2.05$ , so there is enough evidence to state that the time treatment given to the duration of storage of fresh mackerel influences the state of fish flesh fresh bloating at  $\alpha 95\%$  confidence level.

Finally, to observe the organoleptic quality value of smell from fresh mackerel in Sorong city TPI has a calculated F value = 6 > F table  $\alpha 0.05 = 2.08$ , so that enough evidence to state that the time treatment given to the long storage of fresh mackerel affects the smell of mackerel fresh at  $\alpha 95\%$  confidence level.

Meanwhile, based on observations of total coliforms in sample A, sample B, sample C, sample D, and sample E, which showed an increase in the total number of coliforms from observations of isolation results from the first 3 hours and the results of the next 6 hours of isolation, respectively experienced an increase in total coliform from at least 2.4 MPN/g to 11 MPN/g (Table 2). Based on the increase in the total number of coliforms, it shows that the growth of bacterial colonies in mackerel over time, is in accordance with the principle of the bacterial growth phase. Besides that, the results of observations after the reinforcement test using selective media showed that the bacteria were coliform bacteria because their ability to grow on EMBA media was indicated by the bacterial colonies being metallic green (Table 2).

The total coliform of fresh mackerel to the isolation results of the first 3 hours in sample A, sample B, sample C, and sample D each showed the magnitude of *E. coli* index 2.4 MPN/g which is still below the maximum SNI number, while sample D the number of *E. coli* index is 4.6 MPN/g which indicates that the index value exceeds the maximum SNI limit.

Whereas the total *Coliform* of fresh mackerel against the results of isolation for the next 6 hours in sample A, sample B, sample C, sample D, and sample E of *E. coli* index values each have a value of 11 MPN/g indicating that the total coliform exceeds the limit the maximum SNI, according to Indonesian national standards, the number of MPN *Escherichia coli* <3 / g in fresh fish [5].

The factor causing the increase in the *E. coli* index number is because the sample was given time treatment before isolation, for the results of the isolation of the first 3 hour sample only from the 5 samples only the E sample passed the maximum SNI limit, while for the results of the isolation of the next 6 hour sample from 5 samples showed the *E. coli* index exceeding the maximum limit. This is due to the occurrence

of cell division or bacterial cell growth during the given time. In addition, the results of the organoleptic test analysis also showed that the treatment of time gave an effect on the value of organoleptic quality on the condition of the fish's eyes, the condition of the fish's gills, the texture of the fish, the condition of the fish's flesh, and the smell condition in the city of Sorong at a level of confidence of  $\alpha$  95%. In addition to the time factor is also influenced by temperature, the treatment that is given is using a room temperature of 25-28 0C. room temperature is the optimum temperature for the growth of *E. coli* bacteria.

Factors that influence the process of reducing fish freshness include temperature [6]. Temperature and time parameters have a relationship that causes the deterioration of fish quality. Fish whose sales will increasingly decline in organoleptic value due to undergoing the process of breaking down complex compounds into simple compounds by bacteria and uncontrolled enzyme activity that affects the physical condition of fish. The enzymes contained in fish produced by bacteria will remodel the parts of the fish resulting in changes in taste, smell, gills, mucus, and texture of fish meat [4].

The number of bacteria is affected by the time of sale. The longer the sale time, the organoleptic value will also decrease if the handling does not meet the standards [7]. Coliform bacteria are a group of bacteria that are used as indicators of the presence of dung populations and poor sanitary conditions [5]. Handling and good sanitation is very necessary to maintain the freshness of fish, the longer the fish are in the open air, the lower the freshness level [8]. Pathogenic bacteria can easily contaminate fish during storage and distribution and can cause disease for those who consume them [9]; [10]. *Escherichia coli*, *Salmonella* sp. and *Vibrio cholerae* is a pathogenic bacteria that is determined as a requirement for fresh fish food security in the Indonesian National Standard [5]; [11]; [12].

Coliform bacteria were found in quite a large amount in all study samples, namely 1100 MPN/MI or 11 MPN/g and this indicates the existence of contamination of *Coliform* bacteria in these waters. *Coliform* is a bacterial and heterogeneous group of gram-negative rods that are used as indicators pollution from animal or human feces and shows poor sanitary conditions [13]; [14]. *Coliform* groups include: *Escherichia coli*, *Edwardsiella*, *Citrobacter*, *Klebsiella*, *Enterobacter*, *Hafnia*, *Serratia*, *Proteus*, *Arizona*, *Providentia*, *Pseudomonas* and *Parakolon bacilli*. *Coliform* germ characteristics in general are: rod shape, gram negative, non motile or motile, have flagellum peritricus or not and have capsules or not [15].

#### 4. Conclusion

Based on research conducted on the analysis of organoleptic and coliform values in mackerel. Can be concluded. The value of organoleptic quality of fresh mackerel in Sorong city TPI from the five samples showed an influence on the quality of the eye condition to the quality of the smell state on the time treatment given at a 95% confidence level, while the total coliform in the first 3 hour treatment of the five samples contained 4 samples (Samples A, B, C, and D) have total coliform bacteria not exceeding the maximum SNI limit, so it can be concluded that they are fit for consumption while sample D has total coliform bacteria past the maximum SNI limit. Apart from that the results of isolation for the next 6 hours, from the 5 samples showed total coliform exceeded the maximum SNI.

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