Identification of *Escherichia coli* and *Salmonella* on Fishery Product from Juanda Airport, East Java, Indonesia

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Abstract. Fishery products are foodstuffs that are prone to pathogenic microbial contamination which can cause food poisoning and disease in consumers. Therefore, fishery products need attention related to food safety. Pathogenic bacteria that often contaminate fishery products include *E. coli* and *Salmonella* which can cause disease in humans. This study aims to examine *E. coli* and *Salmonella* bacteria that contaminate fishery products that will be exported from Juanda Airport, East Java. The research method used was microscopic examination using conventional methods consisting of isolation and biochemical tests (for *E. coli* bacteria); prediction test, affirmation test and IMVIC test (for *Salmonella* bacteria). The results showed that fishery products consisting of Barramundi Skin On, Frozen Vannamei, Frozen Black Tiger Shrimp, Breaded Shrimp, Classic Frog Thighs, Skip Jack, Frozen Octopus, Frozen Mackarel, Frozen Sardine, and Frozen Squid were contaminated by bacteria that are not *E. coli* and *Salmonella* groups.

1. Introduction

Fishery products are food materials that are very susceptible for biological contamination including from bacterial and fungal. This process can caused from microbial activity and/or enzymatic reaction in the fish body. The microbial abundance in food materials can affected to the periods of fishery product deterioration. The microbial contamination have greatly impact to the production of fishery product and highly losses for producers [1].

Most of the contamination proses in fishery products caused by microbial pathogens that can impacted not only to food poisoning but also caused disease in human. Several disease that caused from food contamination including diarrhea, abdominal pain, nausea and vomiting. Therefore, the quality assurance from all production process was very important to be maintained from contamination process [2]. Food safety is one of critically factors in fishery product production. Therefore, several highly requirements must be ensured to produce high quality product and proper to export in other country [3]. One of the requirements that important in the fishery product production process is quarantine stage. Quarantine process was urgently needed to ensure the safety product and to prevent the human disease that caused from consumption of contaminate products [4]. According to [5], there were ten rejection cases of fishery export product to other country, consisting mesophyll aerobic and optional anaerobic microorganism in frozen fish fillet and frozen baby octopus, Coliform contamination in frozen octopus, *Listeria* contamination in frozen octopus, and *Salmonella* contamination in frozen octopus. The
objective of this study was to identify the *E.coli* and *Salmonella* contamination in fishery product in Juanda Airport, East Java before exported to the other countries.

2. Material and methods
This study was conducted from December 18, 2017 until January 18, 2018 at Fish Quarantine, Quality Control and Safety of Fisheries Product Class 1 Surabaya 1, East Java, Indonesia.

2.1 Sterilization
Sterilization process for equipment using wet sterilization in the autoclave (121°C, 1 atm) for 15 minutes and dried in oven (160°– 180°C) for 1-2 hours. Mediums/materials sterilization using boiling in hot plate, then wet sterilization using autoclave (121°C, 1 atm) for 15 minutes.

2.2 *E.coli* identification
Samples were weighed and homogenizing in BPB solution (1:9). Estimation test using LTB media in test tube with Durham tube. Positive reaction in LTB after incubation (cloudy medium, gas production in Durham tube) was reculture in EC Broth and counting the MPV (most probable value). Affirmation test of *E. coli* using L-EMB Agar, PCA and biochemically test (Indol test using TB medium, MR-VP test using MR-VP broth medium and citrate test using SCA medium). All step to identify *E. coli* refers to Indonesian standard method [6].

2.3 *Salmonella* identification
Samples were enriching using LB and TTB medium, then cultured in HE agar, XLD agar and BSA. Positive result was continued in biochemically test including TSIA test, LIA test, LD test, Indol test, MR-VP test and citrate test. The identification process of *Salmonella* based to to Indonesian standard method [7].

2.4 Data Analysis
Data from bacterial identification process was descriptively analysis using table.

3. Results and Discussion
3.1 Result
The identification test of *E. coli* and *Salmonella* in samples of fishery products (Table 1) showed that all samples were not contaminated with *E. coli* and *Salmonella* based from biochemically result (Table 2).

Table 1. Identification result of *E.coli* and *Salmonella* in fishery products

| No. | Type of Samples          | *E. coli* | *Salmonella* |
|-----|--------------------------|-----------|--------------|
| 1   | Barramundi Skin On       | < 3 APM/g | Negative     |
| 2   | Frozen Vannamei          | < 3 APM/g | Negative     |
| 3   | Frozen Shrimp Black Tiger| < 3 APM/g | Negative     |
| 4   | Breaded Shrimp           | < 3 APM/g | Negative     |
| 5   | Frog Leg Classic         | < 3 APM/g | Negative     |
| 6   | Skip Jack                | < 3 APM/g | Negative     |
| 7   | Frozen Octopus           | < 3 APM/g | Negative     |
| 8   | Frozen Mackarel          | < 3 APM/g | Negative     |
| 9   | Frozen Sardine           | < 3 APM/g | Negative     |
| 10  | Frozen Squid             | < 3 APM/g | Negative     |

Table 2. Biochemically result of *E.coli* and *Salmonella*

| No. | Result | Reaction | Reaction |
|-----|--------|----------|----------|
|     |        |          |          |
### Type of Test

| Type | Positive | Negative | E.coli | Salmonella |
|------|----------|----------|--------|------------|
| 1    | Indol    | Purple   | Yellow | Negative   | Negative   |
| 2    | MR       | Red      | Yellow | Positive   | Positive   |
| 3    | VP       | Red/pink | Yellow | Negative   | Negative   |
| 4    | Citrate  | Blue     | Green  | Negative   | Negative   |
| 5    | LIA      | Purple   | Yellow | Negative   | Positive   |
| 6    | TSIA     | Yellow   | Red    | Negative   | Positive   |
| 7    | LDB      | Purple   | Yellow | Negative   | Positive   |

#### 3.2 Discussion

*Escherichia coli* is the most widely used bacteria as an indicator of sanitation because of these bacteria are commensal bacteria in the digestive and are pathogens. Based on identification process to several fishery products refers to [6] showed that all sample were not contaminated with *E. coli* bacteria. The confirmation test displays a negative reaction in all biochemical tests. The maximum limit of *E. coli* contamination for fishery products [8] is no more than 3 APM/g. *E. coli* bacteria can cause several disease in humans including cholera and dysentery in children and adults [9]. *E. coli* is easily spread by contaminating water or other materials that directly contact. *E. coli* bacteria can also contaminate the equipment used during the production process, so contamination of *E. coli* bacteria in fishery products can occur due to poor sanitation [10].

*Salmonella* is one of the bacteria that often cause serious illness when it contaminates to food. In the identification of *Salmonella* bacteria referring to Indonesian standard method [7]. All samples tested were negative for *Salmonella* based on negative results in biochemical tests. Food products contaminated with *Salmonella* can cause salmonellosis which is indicated by gastroenteritis, enteritic fever, bacteraemia, and focal infection [11]. Fishery products can be contaminated with *Salmonella* bacteria by cross-contamination due to poor hygiene during processing. Transmission between people can also occur during infection. The increasing factors of *Salmonella* contamination also be caused by the presence of nutrients and environmental conditions that support their growth [12].

### 4. CONCLUSION

Based to the result we can conclude that all samples were not contaminated with *E. coli* and *Salmonella*, therefore the fishery product can export to other country and safely consumed by human.

### 5. REFERENCE

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