

## THE COMPARISON BETWEEN TOTAL NUMBER OF MICROBES BEFORE AND AFTER PROCESSED ON FOGGY PROCESSED FISH IN THE DISTRICT HAMADI SOUTH JAYAPURA IN 2016

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### ABSTRACT

**Introduction:** Processed fish smokehouse is one of the popular consumer processed products both in Indonesia and abroad as a distinctive flavor and a pleasant aroma. According to the Food and Drug Supervisory Agency (BPOM) in 2014 there have been 43 cases of food poisoning incidents in various parts of Indonesia, one of the incidence of food poisoning caused by food. The process of fumigation in Indonesia is still done traditionally using simple equipment, but it is less attention to the sanitary and hygienic aspects so as to have an impact on health and the environment. The purpose of this research is to know the total number of microbes before and after processed in smoked fish.

**Methodology:** This study was descriptive quantitative. Examination of total plate count method Total Plate Count (TPC). Population in this research is totally 12 fish processing place and sample in this research is 5 place of processing fish of foggy with fish sample counted 10 fish sample.

**Results:** The results of laboratory tests on samples of the fish before it is processed in curing processed fish examined, obtained 5 samples (100%) were eligible (2 samples each  $1.8 \times 10^4$  colonies / g and  $1.2 \times 10^4$  colonies / g and the remainder is 0 colonies / g) and the results of the examination of samples of fish after the fish processing fumigation examined, obtained one sample (20%), which have a total number of bacteria that is  $15 \times 10^6$  colonies / g Or do not qualify, so it is not safe for consumption. The comparison the total number of bacteria on processed fish curing examined, obtained two samples of fish increases number of bacteria that is on the sample 2 (0 colonies / g to  $1 \times 10^5$  colonies / g) and sample 3 ( $1.2 \times 10^4$  colony / g to  $15 \times 10^6$  colonies / g), 1 sample decreased number of bacteria that sample 1 ( $1.8 \times 10^4$  colonies / g to  $3.3 \times 10^3$  colony / g), and 2 samples that do not have Total number of germs both before and after processed.

**Keywords:** microbial, total number of germs, foggy processed fish

### PRELIMINARY

Processed fog fish is one of the refined products that are favored by consumers both in Indonesia and abroad because of its distinctive taste and aroma of a specific savory. The process of fumigation in Indonesia is still done traditionally using simple equipment. In addition, less attention to aspects of sanitation and hygiene so as to have an impact on health and the environment. The weaknesses caused by traditional fumigation include less attractive (partially charred), temperature control is difficult and air pollution occurs (Swastawati, 2011).

Diseases transmitted through food may cause mild disease and severe even fatal results have not been good of them caused by the application of food hygiene and environmental sanitation. The magnitude of the health outlook is unknown because only a small percentage of cases are reported to health services and much less investigated. The cases reported in developed countries are estimated at only 5 to 10% whereas in many developing countries reliable quantitative data are generally very limited. The incidence of foodborne disease in Indonesia is seen by the high *thypus* infectious diseases such as cholera, dysentery, and so on. Of the 90% of cases of food poisoning caused by microbes (Hartono, 2006).

In 2014 the Food and Drug Supervisory Agency (BPOM) informed 43 cases of food poisoning incidents in various parts of Indonesia. One incident of food poisoning caused by food poisoning as much as 15 incidents of poisoning with the number of victims 468 people and there are 1 person died and 1 incidence of poisoning due to food catering / catering with the number of victims 748 people. While in District Tangerang in 2007 there has been an increase in cases of diarrheal diseases of 3.63 per 1000 inhabitants (Data Bank Kemenkes, 2015).

Based on preliminary survey, there are 12 processing places of processed fish cultivation in Hamadi District of Jayapura Selatan with 60 workers. Each processing site consists of 5 workers with different tasks. The processing is done from 6 am to 3 pm and the fumigating is done simply. There are 3 stages of processing fish processed fumigation that is done first stage of cleaning, the process of cleaning the fish itself is done by 2 to 3 workers depending on whether or not the fish is processed. The second stage is the process of fogging, for the process of fumigation done by one worker, in the process seen the handler does not pay attention to personal hygiene, such as not using a head cover, do not use apron, and nails still dirty hands. After the process of pangasapan done, the final stages of packaging and ready for sale.

According to WHO (2005) foodborne disease is one of the most common health problems found in modern times. Diseases caused by foodborne *pathogens* from bacterial contamination such as bacteria *coliform* (*Escherichia coli*, *Enterobacter aerogenes*), *Shigella spp*, *Salmonella spp*, and *Vibrio cholerae*. Contamination of microorganisms in the food resulting from not practicing personal *hygiene* such as washing hands properly, wash cooking tools and wear aprons (Arisman, 2009).

## RESEARCH METHODS

This type of research is descriptive quantitative. Descriptive research is a study conducted to determine the value of independent variables, either one or more variables without making a comparison, or connecting between variables one with another variable (Sugiyono, 2010). The population in this research is the entire place of fish processing of fogging in Hamadi District of South Jayapura as much as 12 processing places of frozen fish processing and samples in this

research is 5 processing place of fog processed fish with samples of fog fish as many as 10 fish samples. Selection of processing plant is selected based on the consideration being produced at the time of the research. The existence of some places that do not perform production activities because the fish that became raw materials for processing fish curing is difficult to obtain due to bad weather and this scarcity makes fish prices become expensive.

The total number of bacteria in fish samples done by examination of total plate count method whereby *Total Plate Count* (TPC). This method of examination is intended to show the number of microbes contained in a product by calculating the bacterial colonies inflicted on the agar medium (SNI 2897: 2008). Examination of fish samples conducted at the Health Laboratory Office of the Province of Papua. This study uses univariate analysis because it only explains or describes the characteristics of the research variables ie total number of germs before being processed and the total number of germs after processed in smoked fish process then compared with SNI 7388: 2009 about maximum limit of microbial contamination in food.

## RESULTS AND DISCUSSION

Processed fog fish is fish without seasoning or salt smoked by using embers in order to make fish more durable, resistant and to give the color, texture and smell typical of fish. The fish used is yellow tail fish. This method can be found in various regions, but the amount is not as much as the product of marinating or drying. Smoking can delay the process of deteriorating fish quality, but in the not-too-distant future, unlike salted fish or dried fish. The purpose of fumigation in fish there are three things. First, process the fish to be ready for direct consumption. Second, give a distinctive taste to be more preferred by consumers. Third, provide lasting power by heating, drying and chemical reaction with the smoked fish meat tissue during the curing process takes place (Sulistijowati, 2011)

Results of laboratory tests on samples of the fish before it is processed in curing processed fish examined, obtained 5 samples (100%) had a total of balustrades germ  $<5 \times 10^5$  colonies / g or still qualify where two samples each of  $1.8 \times 10^4$  colony / G and  $1.2 \times 10^4$  colonies / g and the remainder is 0 colonies / g.

Not a lot of contaminants in raw fish due to raw food or raw materials used are fresh fish. Fish caught by fishermen distributed to this fish auction directly purchased by the owner of fish processing business for fumigation production process. Based on SNI 01-2729.2-2006 fresh fish raw material selection is fundamental to produce good food. The quality of good food raw materials can be seen through the physical characteristics and quality in terms of shape, color, freshness, smell and others. Forms of fresh fish comes from unpolluted waters, stored in a container using the center ice with a temperature of raw materials up to 5 °C for fresh raw materials and -18 °C for the raw material is frozen, and stored in sanitary and hygienic.

Each processing site consists of 5 workers with different tasks, 2 people clean fish, 1 person smoked fish and 2 people who sell. As for the process of fish processing done from 6 am to 3 pm. There are 3 places of sales distributors in Pasar traditional Jayapura, Cigombong Kotaraja Market and Sentani Market. On The processed Fish that will be smoked first sorted according to the type, size and quality of freshness. Furthermore, it should be cleaned of dirt that can contaminate the product, by washing with clean water and weeded (removed from the entrails and gills). After washing with fresh water, then carried out the drying stage is to remove some water before the process of fogging. This drying process greatly determines the compactness or elasticity of the smoke product.

Test results for samples processed fish after fish on curing examined, obtained one sample (20%) who had a total of balustrades germ that is  $15 \times 10^6$  colonies / g or does not qualify, so it is not safe for consumption. The high rate of microbial contamination in fumigation products because the fumigation process is generally still simple or traditional, they use a fumed wood cedar for curing fish. The traditional fumigation techniques using simple equipment, without any consideration to maintain the quality of fish as raw material with sanitary and hygiene standards are very low. This spurred the presence of bacteria contaminated into smoked fish products. In the process of fumigation of risks that arise can be caused because the fish that have been completed in the smoke placed in a place that is not closed or less hygienic. Usually processed fish that is so placed in a basket or a dish that is not closed. Thus the growth of infected flies / insects microorganisms can easily occur.

Food processing is the process of changing the shape of raw materials into ready to eat. Good food processing is that following the rules of the principles of hygiene and sanitation. All food processing activities should be done in a way protected from direct contact with the body. Protection of direct contact with food is made by using plastic gloves and food clamps (Arisman, 2009). Similarly, the principle of food storage which aims to prevent the growth and development of bacteria in food, preserve food and prevent food spoilage, and prevent the emergence of pests in the food. Things to consider in the storage of finished food are:

1. Protected from dust, hazardous chemicals, insects, rodents, and other animals
2. Perishable foods stored in hot temperatures (65.5 °C or more) or stored in cold temperatures about 4 °C or less
3. Perishable food to be used in a long time (more than 6 hours) should be stored in a temperature of -5 °C to -1 °C
4. To prevent bacterial growth in food usahakanlah always be at a temperature where bacteria do not grow that is 10 °C or above 60 °C.
5. Food and beverages served must be clean and safe for health or cover food and drink must be clean and do not contaminate food.

Food safety according to Law No. 7 of 1996 on Food is a condition and effort needed to prevent food from possible biological, chemical, and other contaminants that may interfere with, harm, harm human health. Unsafe food can cause *foodborne* illness called *diseases*, the symptoms of diseases caused by consuming food containing the substance or substances toxic or pathogenic organisms. Diseases transmitted through food (*foodborne disease*), usually are toxic and infectious diseases caused by agents that enter the body through consumption of contaminated food. Sometimes the disease is referred to as "food poisoning" (*food poisoning*), although this term is not appropriate. Food-borne diseases include a range of diseases that are chemically and biologically aetiological, including cholera and diarrhea, as well as some parasitic diseases (Motarjemi et al, 2006)

The comparison the total number of bacteria on processed fish curing examined, obtained two samples of fish increases number of bacteria that is on the sample 2 (0 colonies / g to  $1 \times 10^5$  colonies / g) and sample 3 ( $1.2 \times 10^4$  colony / g

to  $15 \times 10^6$  colonies / g), 1 sample decreased number of bacteria that sample 1 ( $1.8 \times 10^4$  colonies / g to  $3.3 \times 10^3$  colony / g), and 2 samples that do not have Total number of germs both before and after processed. Sample numbers 2 and 3 show an increase in the number of germs before being processed and after being processed, this is because there are many vectors such as mice that roam around the production of processed fish curing. The place of production also looks unkempt and lots of piles of wood and garbage scattered so it fits into a nest for mice.

The distribution of processed fish-processing fumigation in Hamadi Market Jayapura by using *taxi*, fish that have been cooked just put in a basket placed holes that look dull and above just covered with newspapers. In addition, at the time of serving in the fish market placed on the table just like that without clear plastic. Market conditions when it rained and seen a lot of garbage and spit betel scattered near the sale of this thing that can cause cross contamination from waste to fish processing curing.

The last process of the principles of food sanitation *hygiene* is the presentation of the food or food assessment. In the presentation of food should be required place of presentation, presentation equipment, and the presenter. Food is served in a clean place, air circulation may take place, equipment is used cleanly, and the person serving the food must be dressed clean, using headgear, and the presenter's hands should not be in direct contact

with the food served (Slamet, 2004). The requirements for the presentation of good food are as follows:

1. How to serve food should avoid pollution
2. Equipment used to serve food must be kept clean
3. The finished food served should be contained and touched with clean equipment
4. Processed foods served in warm placed on food warmers facility with a minimum temperature of  $60^{\circ}\text{C}$
5. The presentation is done by the behavior of a healthy and clean clothes
6. The presentation of food must meet the following requirements:
  - a. On a clean table
  - b. Table where the food is served should be covered up with white fabric or colored plastic lid interesting unless made of formica table, tablecloth absolutely not there.

Eating safe in fulfilling the needs of human life when processing and serving is essential. Handling of food that is less even not good can cause illness, disability and even death. Food handlers have the duty and responsibility in preparing and serving food to others. Consumer protection, corporate and self-management can be done by studying and implementing safe food handling (Health Minister, 2003).

Table 1: Results of Total Germ Measures Inspected on Processed Fumes Before Processed in Hamadi Sub-District.

| Maximum Threshold Limit Microbial Contamination ( $5 \times 10^5$ colonies / g) | amount   | %          |
|---|----------|------------|
| Not Eligible (TMS)  | 0        | 0          |
| Eligible (MS)   | 5        | 100        |
| <b>Total</b>  | <b>5</b> | <b>100</b> |

Source: Primary data 2016

Table 2: Results of Total Germ Measures Inspected on Processed Fumes Treated in Hamadi Sub-District.

| Maximum Threshold Limit Microbial Contamination ( $5 \times 10^5$ colonies / g) | amount   | %          |
|---|----------|------------|
| Not Eligible (TMS)  | 1        | 20         |
| Eligible (MS)   | 4        | 80         |
| <b>Total</b>  | <b>5</b> | <b>100</b> |

Source: Primary data 2016

Table 3: Table Results Comparison of Total Germs on Processed Fumes Before and After Processing in Hamadi Sub-District

| Sample | Before            | After             |
|--------|-------------------|-------------------|
|        | (Colony / g)      | (Colony / g)      |
| 1      | $1.8 \times 10^4$ | $3.3 \times 10^3$ |
| 2      | 0                 | $1 \times 10^5$   |
| 3      | $1.2 \times 10^4$ | $15 \times 10^6$  |
| 4      | 0                 | 0                 |
| 5      | 0                 | 0                 |

Limit:  $5 \times 10^5$  colonies / g (ISO 7388: 2009)

## CONCLUSION

1. Results of laboratory tests on samples of the fish before it is processed in curing processed fish examined, obtained 5 samples (100%) had a total number of bacteria  $< 5 \times 10^5$  colonies / g or qualify (two samples each of  $1.8 \times 10^4$  colony / G and  $1.2 \times 10^4$  colonies / g and the remainder is 0 colonies / g).
2. Test results for samples processed fish after fish on curing examined, obtained one sample (20%) yang has a total number of bacteria that is  $15 \times 10^6$  colonies / g or does not qualify, so it is not safe for consumption.
3. The comparison the total number of bacteria on processed fish curing examined, obtained two samples of fish increases number of bacteria that is on the sample 2 (0 colonies / g to  $1 \times 10^5$  colonies / g) and sample 3 ( $1.2 \times 10^4$  colony / g to  $15 \times 10^6$  colonies / g), 1 sample decreased number of bacteria that sample 1 ( $1.8 \times 10^4$  colonies / g to  $3.3 \times 10^3$  colony / g), and 2 samples that do not have total number of bacteria both before and after processing.

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