A Mini-Review of Fresh Fishery Products Handling Technology: After Being Caught Up to The Traders in The Market

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ABSTRACT

Fresh fishery products are a highly perishable food commodity and even faster than other animal meats. Therefore, to meet the needs of consumers who always expect fresh fish, fish handling needs to be done so that it can reach the hands of consumers or processing plants in a fresh state. A good technology for handling fishery products is to use a cold chain system and prioritize sanitation and hygiene considering that Indonesian waters are tropical waters which are good places for the growth of spoilage microbes. Handling of fresh fish consists of handling starting from fish caught on board, handling at the fish landing site (fish auction place), handling during transportation and distribution as well as handling at traders in the market. Things that must be considered in post-catch handling are handling while still at sea (on the ship) and handling after the fish has landed. The perfection of handling fresh fish plays an important role. Good or bad handling will determine the quality of fish as food or raw materials for further processing.

Keyword: *Fish handling, Fresh fish, Cold chain, Fish quality*

1. INTRODUCTION

Fish is one source of biological wealth that has benefits in the health sector because fish has a high nutritional content and can provide economic benefits with a high selling value. The main nutritional content of fish is protein and essential fatty acids which are very useful for human health. Thus fish is a source of food that is needed by the human body so that it must always be available to meet human needs.

But besides that, fish also has a weakness, namely fish is a highly perishable food and is even faster than other animal meats. Therefore, to meet the needs of consumers who always expect fresh fish, fish handling needs to be done so that it can reach the hands of consumers or processing plants in a fresh or near fresh state.

Currently, fish handling is not only aimed at maintaining the freshness of the fish, but also to diversify the form of presentation, increase the income of fishermen or fish farmers and increase the shelf life of fish so that it can be provided when needed. Good handling is to use a cold chain system and prioritize sanitation and hygiene considering that Indonesian waters are tropical waters which are good places for the growth of spoilage microbe.

The rate of fish spoilage after catching and harvesting is strongly influenced by fishing and harvesting techniques, the biological conditions of the fish, as well as on-board handling and storage techniques. Therefore, as soon as fish are caught or harvested, they must be preserved by refrigeration or freezing as soon as possible. The principle of refrigeration is to cool the fish as quickly as possible to the lowest possible temperature, but not to freeze. In general,

refrigeration does not prevent complete spoilage, but the colder the temperature of the fish, the greater the decrease in bacterial and enzyme activity. Thus, through cooling the bacteriological and biochemical processes in fish are only delayed, not stopped [1].

The medium used to cool fish can be in the form of liquid, solid, or gas. Cooling of fish can be done using refrigeration, ice, slurry ice (liquid ice), and chilled sea water. The easiest way to preserve fish by refrigeration is to use ice as a preservative, both for preservation on board and after landing, namely at auction, during distribution and when marketed. Storage of fresh fish using ice or other refrigeration systems has a limited ability to keep fish fresh, usually 10–14 days [2].

1. FRESH FISH HANDLING TECHNOLOGY

Fresh fish or wet fish is fish that has not been or is not preserved with anything except that it is simply cooled with ice [3]. Fresh Fish Handling Technology is a way or human effort to maintain the freshness of fish to keep it fresh when it reaches the consumer [4]. The understanding of the above is how to keep the quality and fish remain good by means of treatment that is careful, careful, fast and always done in cold conditions or situations (cold chain). This cold atmosphere in handling fishery products is the desire of every consumer (including companies) and so that it can be implemented by everyone (especially fishermen) who will process fishery products, from the time the fish is caught until before the fish is processed or preserved.

Handling fresh fish aims to maintain the freshness of fish for as long as possible. Or at least the condition of the fish is still quite fresh when it reaches consumers' hands. So after the fish is caught and transported to the boat, it must be handled as quickly as possible with good and careful. And so on, until the fish is stored frozen (in cold storage) or processed or directly cooked into dishes at the dinner table [5]. Because fishery products come from the sea, two things that must be considered in post-catch handling are handling while still at sea (on the ship) and handling after the fish has landed [4]. Handling of wet fish should begin as soon as the fish are removed from the water where they live, with low temperature treatment and attention to hygiene and health factors.

In the fishing industry, the perfection of handling (handling) fresh fish plays an important role. Good or bad handling will determine the quality of fish as food or raw materials for further processing. If the handling is bad, the fish will quickly be damaged or rotten so that it cannot be used again.

2. HANDLING OF FISHERY PRODUCTS ON SHIP

In every fishing operation, the caught fish must be treated as well as possible, because this treatment is the first step that will determine the quality of the fish in subsequent processes. Fish handling on board must be equipped with adequate facilities for handling fish on board, which include insulated hatches, fish coolers and washers, plastic baskets, seawater pumps, tarpaulins, crane pulleys, knives and other necessary equipment.

The need for ice brought into the sea must also be taken into account before carrying out fishing activities. The stock of ice brought into the sea must be calculated based on the number of catches, air temperature, capacity, size and condition of the hold and the estimated duration of fishing operations per trip. The total amount of ice required based on ice to maintain temperature, ice to cool fish from water temperature, and ice as a reserve is about 10% of the total amount of ice required. Good ice is made from water that has been chlorinated or otherwise treated to reduce the number of bacteria in it as much as possible. Then to avoid the ice melting quickly, salt (NaCl) can be added.

The steps that need to be taken in handling fish on board are as follows:

a) Sorting and washing
The deck of the fishing boat and any equipment used must be cleaned before the fish are loaded onto it. After the fish reach the deck, clean all the dirt that has been caught. Then the fish are washed by spraying sea water until all small impurities such as mud, seaweed and animals that are not used are separated from the fish. Then sorted by type, size and quality. The results of the sorting of fish are placed in different containers based on the type.

b) Weeding

Weeding is separating or removing the entrails and gills from the fish body. With the loss of the source of the spoilage bacteria, the freshness of the fish can be maintained longer. The incisions made during weeding should be as short as possible so as not to damage the shape of the fish. All remnants of blood in large fish must be cleaned, including the lymph glands that are attached under the spine. The contents of the stomach and gills that have been removed should be disposed of far away, so as not to contaminate the fish that have not been weeded or that have been weeded.

Weeding fish is determined, among other things, by body size. Small fish do not need to be weeded because they are easily damaged. It is different with large fish, whose skin (especially the abdominal wall) is relatively strong. Weeding is also not done if the catch is a lot.

Weeding needs to be done or not depending on the purpose of fish utilization and/or market demand. If it will be packaged in cans or processed into fillets, then the fish does not need to be weeded. Likewise, if it will be sold in the market as whole fresh fish.

c) Washing

After sorting by type and size, the fish should be washed as quickly as possible. Washing should use clean sea water. Where equipment is possible (as in factory ships, washed in cold water), the cold chain principle should be applied immediately. The fish that have been weeded are washed clean. Because the remaining mucus, stomach contents and other impurities that are still attached need to be removed.

During work, fish should be protected as much as possible from the sun or rain, for example by installing a tent that has been prepared as equipment from the ship. If the fish accumulate too much, while weeding, can be covered with a wet tarpaulin. If the means allow the fish waiting for such handling can be stored in a bath filled with seawater cooled by ice or by a refrigerated machine. The deck should be thoroughly washed with seawater spray after the work is completed and before the next catch is boarded.

d) Storage in hold

Weeded and washed fish, or small fish that have been washed, are carefully placed in the fish hold. Transporting fish into the hold must not be thrown or poured from above so as to injure the fish.

In the hold, the fish are mixed with ice and arranged in a predetermined manner. Before being used, the ice blocks are first broken down by pounding them in a crate or ice crusher, into small pieces. The smaller the pieces the better, as the ice will have more contact with the fish so the fish will cool faster.

The amount of ice mixed with fish depends on several circumstances. In determining the amount of ice to be carried in a fishing operation, the following points need to be considered: the estimated number of fish caught and cooled, the weather and ship shaking, the state of isolation of the hold, and the planned duration of the fishing operation. Arranging fish in the hold can be done in three ways, namely by bulking, shelving, and boxing.

3. Handling of Fishery Products on Land

Handling of fish on land, starting from unloading at the port or subsequent auctions, also plays an important role in maintaining the fresh quality of fish. Fishery products are generally landed at fish ports or fish auction places (TPI). As with work on a ship, the handling of fishery products at TPI or fish ports must also receive great attention. Here fishery products still have to be maintained freshness by way of testing. There are currently no refrigeration units to cool storage rooms or auction places in TPI-TPI, so testing is the only way that can be done.

The steps that need to be considered in unloading fish at fish landing sites are as follows:

- Dismantling is carried out carefully and as far as possible not using a shovel or fork to avoid cuts/bruises on the fish's body.

- Separate the ice from the fish for easy weighing. After the fish is weighed, it must be immediately die again.
- Containers should be made of materials that are easy to clean, such as aluminum, stainless steel. Hard but not easily shattered plastic, or light, strong, easy-to-clean wooden crates (approximately 25-30 kg).
- Do not expose fish to direct sunlight, and always add ice if long waiting times during auction, transport, or processing. If it is too long, it should be stored in a cold room (chilling room). Even if stored in a cold

room, fish must remain on ice, because the cold room only serves to slow down the melting of the ice. Therefore, to maintain the cold chain principle, ice must always be available, wherever fish are caught and landed.

The cleanliness of the floor at the TPI must receive the main attention in post-catch handling works, because a dirty floor will very easily transmit microbes to fishery products. Therefore, the washing of the TPI floor must be carried out before the fishery products are landed from boats or ships.

Usually the fishery products landed at the TPI have undergone sorting by type, size or other treatments since they were still on board. Thus, when fishery products are landed, it remains only to hold an auction or sale. The fish are placed in plastic baskets filled with fish that are iced to avoid a rapid rise in temperature. Auctions are held in the morning or in the afternoon. Auctions during the day are rare and should be avoided because the temperature during the day is high enough so that damage to fish can be avoided.

4. HANDLING DURING TRANSPORT AND DISTRIBUTION

During transport and distribution, the temperature of the fish should be kept low, the bottom of the container should be coated with fine ice and then a layer of fish sprinkled with ice should be placed on top. Above and below the pile of fish boxes should be given a thicker layer of ice. Under good conditions, the conveyance compartment should be isolated and fish stored with ice inside. Fresh fish is cooled to near 0^{o}C. As soon as the fish must be surrounded by fairly fine crushed ice, the room temperature must be observed.
The use of cooling media must be considered so that it does not run out while on the move. If this happens, it will speed up the decay process. Cooling media for transportation of fishery products are:

- Ice Cube
- Dry ice
- Mechanical cooling or air refrigeration
- Combination of ice and mechanical cooling
- Liquid CO2 and liquid nitrogen

The requirements for the transport container are:

- must be well insulated
- the material must be a good insulator (plastic, styrofoam, fiber)
- combination of cardboard + styrofoam + plastic for export purposes
- the container must be made of lightweight, strong, easy to clean and transport materials. Often there is too much or too little ice, so sometimes the fish on the bottom gets bruised.

5. HANDLING OF FISHERY PRODUCTS AT TRADERS

The implementation of post-catch handling of fishery products at fish traders is very dependent on the facilities available or owned by them and the knowledge of the traders. Only big traders and those who have adequate knowledge can carry out post-catch handling of fishery products that are sold properly. So far, there have not been many special houses equipped with refrigeration equipment for the sale of fishery products. Most fishery products are still sold in markets in a long space. These buildings are generally not equipped with cooling facilities. Tables for selling fishery products are generally made of cement and covered with white porcelain tiles. In that place, fishery products are spread over with ice. The sellers often douse them with cold water, meaning that the fishery products are always fresh and the mucus can be lost.

Containers of strong plastic or glass fiber (glass fiber) are often also used. In such containers the fish are placed and given ice. Crabs, crabs and clams are not spread that way but are placed in a basket. In general, crabs and shellfish are sold alive. The legs and claws of the crab or crab are attached to the body and then tied with a rope so they don't go anywhere and are not dangerous because these animals can pinch with their strong claws. Each type of fishery product is generally grouped and placed separately from other types of fishery products.

At the request of the buyer, it is not uncommon for the seller to make preparations in the form of removing the scales and entrails of the fish, removing the fins, cutting off the head and tail and dividing the fish into several

pieces, making cuts, removing the shrimp heads, and washing them. However, not many fishery products are sold already in a prepared state because sales in such conditions have a high risk because the fish quickly become damaged without any equipment to maintain their freshness. Traders who have a cold place or room generally only sell frozen fish products.

6. CONCLUSION

Fish is one of the food ingredients that are familiar to the people of Indonesia. These foodstuffs are a relatively inexpensive source of protein, but some of them have high economic value for export. One of the weaknesses of fish as food is that it rots easily after being caught and dies. Therefore, it needs to be handled properly so that it remains in a condition suitable for consumption by consumers. Handling fresh fish aims to maintain the freshness of the fish for as long as possible. Or at least the condition of the fish is still quite fresh when it reaches consumers' hands. So after the fish is caught and transported to the boat, it must be handled as quickly as possible with good and careful. Fresh fish handling technology consists of onboard handling (sorting and washing, weeding, washing and storage in hold), onshore handling, and handling at traders. Good handling is to use a cold chain system and prioritize sanitation and hygiene considering that Indonesian waters are tropical waters which are good places for the growth of spoilage microbes.

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