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Good Harvest and Post-Harvest Handling Practices for Farmed Fish

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Introduction

Fisheries and aquaculture is one of the fastest expanding food sectors and plays a crucial role in delivering food, nutrition and employment all over the world. Fish and fish products contribute to nearly 17% of global animal protein intake. India is the second largest fish producer in the world, contributing to 8% of the global fish production. Fish is a rapidly perishable food product and hence, good handling practices are essentially required to maintain the quality and safety of fish during storage, transportation and marketing. Microbial growth is the major reason for fish quality loss and proper handling practices are necessary to control the growth of bacteria and contamination of pathogens. Post- harvest handling refers to the activities carried out after the fish is captured from waterbodies till it reaches the consumers. The basic requirements for good harvesting and handling practices to be followed by the fishermen and fish handling personnel to ensure the safety and quality of farmed fishes are detailed below.

Good harvesting practices

Good harvest practices have a role in deciding the quality of farmed fishes as the post-mortem changes depend on the stress encountered by the fish during harvesting. Stress encountered by the fish during harvesting and post mortem quality is linearly related. Fishes which undergone more stress during harvesting spoils faster compared to other fishes. The aim of implementing good harvest practices is to get the fish out of water in good condition.

- Harvesting should be done at a time when temperature is the lowest.
- The personnel involved in harvesting should be healthy and free from infectious diseases.



- Gears and accessories such as nets, bags, pumps, baskets, tubs, bins, and boxes should be designed to ensure minimum physical damage and contamination to the fish during harvesting.
- Harvesting should be done as quickly as possible with minimum stress to the animals.
- In case of live fish marketing, fish should be starved before harvesting to reduce the risk of mortality during transportation.
- Prevent the entry of pet animals to the aquaculture farm site at the time of harvesting to avoid fecal contamination.
- For harvesting farmed fishes, Seines, nets and traps should be carefully selected to ensure minimum damage during harvesting

Good handling practices

Fish and fish products intended for human consumption should be handled properly to prevent contamination and spoilage till it reaches the end user. Poor handling practices damages the fish and speed up the spoilage process. Implementing good handling practices helps to reduce microbial growth and delay spoilage.

- All fish handling surfaces should be made of non-toxic, smooth materials to minimize the build-up of slime, blood, scales etc. from the harvested fish to reduce the risk of microbial contamination.
- Handling areas should not have sharp corners and projections to avoid physical damage to the fish.
- In aquaculture site, the harvested fish should not be dropped on to muddy floor or hardy surfaces to prevent contamination and physical damages, respectively.
- Fish should be washed well with potable water to remove dirt and other foreign matter if any, immediately after harvesting.
- Fish should be kept away from objectionable substances such as grease, fuel oil, drainage, bilge water, smoke, and other solid or semi-solid to prevent contamination.
- Bruised, damaged and decomposed fish shall be separated from the catch during sorting.





- In case of farmed fish, care should be taken to avoid contamination with mud, debris and filth from the pond or production site.
- Fish should not be exposed to sunlight for a longer duration as it causes dehydration and accelerate spoilage.
- The utensils and equipment should not buildup residues and act as a source of contamination
- Separate containers made of water-resistant materials and provided with a fitted lid shall be arranged for collecting waste and offal.
- Adequate lighting should be provided to all working areas during night harvesting.

Chilling and storage

The ambient temperature of tropical country like India favours the growth of bacteria. Hence, the harvested fish should be chilled immediately after harvesting to delay the microbial growth and spoilage. Time and temperature control are the most effective tool to ensure fish safety.

- Store the harvested fish in ice or chilled slurryas early as possible to bring down the temperature as close to 0°C avoid bacterial spoilage.
- Fish and ice should be tightly packed in the container in shallow layers (1:1 fish to ice ratio) to avoid free space which otherwise cause faster melting of ice.
- Clean and chemical-free ice made from potable water should be used and it should be protected from contamination.
- Fish harvested at different time should be stored separately as they are in different stages of spoilage.
- Use of crushed ice with sharp edges must be avoided as it causes physical damage to the fish.
- The containers used for storage should be designed to provide adequate drainage and should ensure proper cleaning and disinfection to avoid contamination.



- The melted ice should be drained and replaced with fresh ice as and when required to maintain the temperature during storage
- The boxes used for storage should not be over filled or stacked too deep as it exert pressure on to the fish.

Hygiene and sanitation

Hygiene and sanitation requirements are two among the prerequisites established to provide a safe, wholesome fish product to consumers. High standards of hygiene and sanitation are recommended to avoid the incidence of hazards, thereby assuring the confidence of consumer to buy seafood as a safe food.

- Do not use dirty water, unclean containers and machineries for fish handling.
- The cleaning personnel should be trained in using special cleaning tools/ chemicals as they should be aware of the significance of contamination and hazards.
- Adequate cleaning and sanitation of harvesting accessories, fish handling surfaces, utensils, etc. should be ensured to prevent contamination from external sources.
- Use of clean water and ice meeting BIS standards is always recommended for fish handling.

Personnel hygiene

- No person who is suffering from, or who is a carrier of, any communicable disease or has an infected wound or open lesion should be engaged in preparation, handling or transportation.
- Adequate and appropriate protective clothing, headcoverings and footwear should be worn if necessary.
- A high degree of personal cleanliness should be maintained by the personnel involved in handling and should take all necessary precautions to prevent contamination.
- Fish handling personnel should strictly avoid the objectionable practices such as smoking, spitting, chewing, sneezing or coughing to prevent contamination.



• Before starting their work, the fish handlers should shower, wear clean clothes or uniforms, face mask, head cover, gloves etc. wherever necessary.

Conclusion

A high level of care is required while handling harvested fish as it is highly perishable compared to any other food commodities. Implementing good post-harvest handling practices is essential to keep the fish safe and in good condition till it reaches the consumers. Once the fish is harvested, handling practices have remarkable influence on the quality and safety of the product. Proper fish handling practices should be strictly followed at all stages after harvesting to meet the consumer's expectations

Suggested Readings

Text book of Fish Processing Technology (Ed. K. Gopakumar), ICAR, NewDelhi. pp. 38-83.

Huss, H. H., 1995. Quality and quality changes in fresh fish. In: H.H. Huss (Ed), *FAO fisheries technical paper No.* 348. FAO, Rome, Italy.

Huss, H. H., Dalsgaard, D., Hansen, L., Ladefoged, H. and Pedersen, Z. L., 1974. The influence of hygiene in catch handling on the storage life of iced cod and plaice. *J. Food Sci. Tech.*, 9: 213-221.