



FISH AND SEA FOOD PROCESSING: 30

FISH GRADING, CHILLING & FREEZING

□ TECH. OF MEAT, POULTRY , FISH AND SEAFOOD PRODUCTS:

(Module No. 30)

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Introduction:(Fish and Sea Foods)

- **Seafood** is any form of sea life regarded as food by humans.
- The harvesting of wild seafood is known as fishing and the cultivation and farming of seafood is known as aquaculture, mariculture, or in the case of fish, fish farming.
- Seafood prominently includes fish and shellfish. Shellfish include various species of mollusks, crustaceans, and echinoderms.
- Edible sea plants, such as some seaweed and microalgae, are widely eaten as seafood around the world, especially in Asia
- Seafood is an important source of protein in many diets around the world, especially in coastal areas.
- Products, such as fish oil and spirulina tablets are also extracted from Seafood.

Fish Products

Products

- Whole fish
- Drawn fish
- Dressed fish
- Pan dressed fish
- Filleted fish

Products

- Fish steaks
- Fish sticks
- Fish cakes
- Fish fingers

Fish Grading

- Grading is selectively harvesting fish so that only the best quality fish are brought.
- The practice is popular in situations under individual fishing quotas where only a limited number of fish are allowed to be harvested.
- Following the latter, but not the spirit of the law, fish are caught, and if not considered optimal in term of size and quality, thrown back into the ocean.
- The practice of high grading allows fishers to get high prices for their limited catch but is environmentally destructive because many of the fish returned to the water die.

Fish Grading objective

- Harvesting juvenile fish (Prior to adulthood), before stocking them in fattening ponds.
- Best quality Fish (Bright eyes) having higher yield of flesh.
- Separating faster- from slower-growing stock, for example male and female tilapias.
- Early life of predatory fish when the range of sizes becomes too large.
- Selecting predatory fish for a suitable size to use for controlling fry populations.
- Selecting fish of a suitable size for polyculture.

Chilling and Freezing

- ❑ Chilling is the process of cooling fish or fish products to a temperature approaching that of melting ice $0^{\circ}\text{C} - 5^{\circ}\text{C}$.
- ❑ Preservation techniques are needed to prevent fish spoilage and lengthen shelf life.
- ❑ Inhibit the activity of spoilage bacteria and the metabolic changes that result in the loss of fish quality.
- ❑ Spoilage bacteria are the specific bacteria that produce the unpleasant odors and flavors associated with spoiled fish.
- ❑ Fish normally host many bacteria that are not spoilage bacteria, and most of the bacteria present on spoiled fish played no role in the spoilage.
- ❑ To flourish, bacteria need the right temperature, sufficient water and oxygen, and surroundings that are not too acidic.

The Rate of Chilling

- The size, shape and thickness of fish
- The method of stowage
- Adequate mixing of ice, water and fish (in ice slurries)
- Adequate contact of ice/ cold air with the fish surface
- The size of the ice particles.

Advantages and Disadvantages

(chilling and freezing)

Chilling

Short-term storage (up to one month maximum for some species, only a few days for others)

Storage temperature 0 °C

Relatively cheap

Product resembles fresh fish

Relatively low-tech

Low skills required

Portable refrigeration

Freezing

Long-term storage (a year or more for some species)

Storage temperature well below zero, e.g. -18°C

Relatively costly

If poorly done can badly affect quality

Relatively high tech

High skills required

Generally static operations

Future Reading

- Hedges, N. and Nielsen, J. (2000). The selection and pre-treatment of Fish. In *Managing Frozen Foods*, edited by Kennedy, C.J., Chapter 6, pp. 95-110. Woodhead Pub. Limited, Cambridge.
- Simeonidou, S, A Govaris, and K Vareltzis. (1998). Quality assessment of seven mediterranean fish species during storage on ice. *Food Research Int.* 30(7), pp. 479-84.
- Azam, K, LM Mackie, and J Smith. 1990. Effect of stunning methods on the time of onset, duration and resolution of rigor in rainbow trout (*salmo gairdneri*) as measured by visual observation and analysis for lactic acid, nucleotide-degradation products and glycogen. In: *Chilling and freezing of new fish products. Science et Technique du Froid. Proceedings of the meeting of commission C2 1.1 .F.-I.I.R. Aberdeen*, pp. 351-358.