WELCOME TO OUR PRESENTATION

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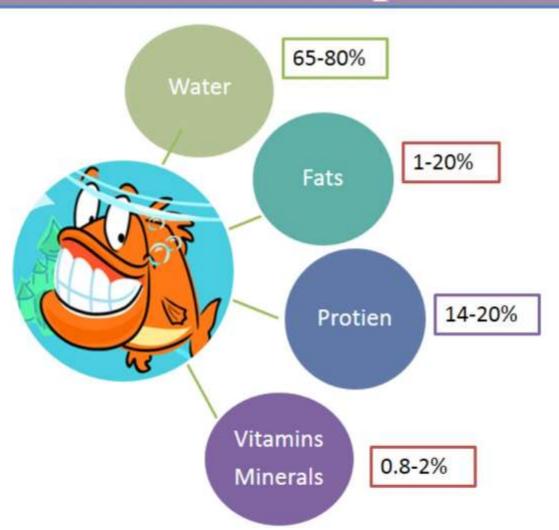
NOAKHALI SCIENCE AND TECHNOLOGY UNIVERSITY



INTRODUCTION

- Fish is found abundantly in all natural waters.
- It is a valuable source of food and has been used by man from antiquity.
- Fish is a valuable source of high quality protein, minerals and vitamins.
- Oily fish are rich in omega-3 polyunsaturated fatty acids.

Composition



Fish is Highgly perishable due to:

- High moisture content .
- Avialability of nutrients for the growth of micro organisms.
- 3. Ambient temperature.

Microbial Contamination of Fish:

Fish contamination refers to fishes that are spoiled or tainted. Attack on fish by undesirable microorganisms (Bacteria, Yeast, Mold, Fungi, Virus or their toxins and byproducts) from external sources is called microbial contamination of fish.



TYPES OF MICROBIAL CONTAMINANTS:

- Bacteria: Gram-positive and Gram-negative bacteria.
 - Commensal bacteria.
 - ·Pathogenic bacteria.
- Virus: Sub cellular biological objects with a size of 20-200 nm.

 They exist with and without envelopes.
- Prions: Infectious protein particle. Smallest pathogen below 5 nm in size.
- Different Fungi, yeasts and protozoa.

CONTAMINATING MICROORGANISMS OF FISH:



Surface of fish contains Bacteria of the Genera:



Pseudomonas



Acinetobacter



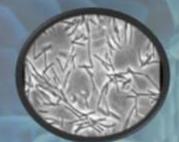
Moraxella



Alcaligenes



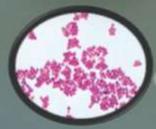
Micrococcus



Flavobacterium



Corynebacterium



Sarcina



Vibrio



Bacillus



Fresh water Bacteria Genera of fish:

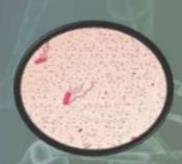


Aeromonas





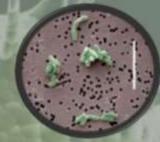
Steptococucus



Alcaligenes



Lactobacillus



Brevibacterium



Intestinal Bacterial Genera of fish:



Alcaligenes



Pseudomonas



Flavobacterium



Bacillus



♦ Source of contamination **♦**



FROM WATER:

Fresh waters fish carry fresh water bacteria.

Northern waters carry mostly psychrophiles bacteria.

Tropical waters carry more mesophiles bacteria.

DENSITY MICROBES IN SURFACE SLIME:

The slime that covers the outer surface of fish has been found to contain bacteria.



FROM INTESTINE:

Both salt water and fresh water fish contain bacteria in the intestine.

AT THE TIME OF CATCHING:

The numbers of microorganisms on the skin of the fish can be influenced by the method of catching.



FROM EQUIPMENT:

Boats, catching net, boxes, fish house and fishers may be contaminated with bacteria and may transport into the fish during cleaning.



During transporting, contaminated fish may contaminate fresh fish.



CONTAMINATION OF FISH IN FISH PROCESSING INDUSTRY:

Contamination may occur from-



Fish processing instruments. Fish collecting ship.



fish processing table.



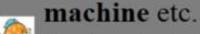
The polluted environment of that



processing industry.



Auxiliary gutting device (Used to clean fish and their Gut), Filleting



Contaminated ice may contaminate fish

at the time of freezing.

Microbial contaminants may come laborer. If they are not neat & from clean.





Fig: Processing of Tuna Fish.

SPOILAGE OF FISH:

- Food spoilage can be considered as any change that renders the product unacceptable for human consumption.
- Spoilage of fish starts upon death due to-
 - autoxidation (oxidation of unsaturated lipids)
 - reactions caused by activities of the fish's own enzymes
 - metabolic activities of microorganisms.

TYPES OF FISH SPOILAGE

Microbial spoilage

Physiological spoilage

Biochemical spoilage







CAUSES OF SPOILAGE

The following factors contribute to spoilage of fish:



High moisture content.



High fat content.



High protein content.



Weak muscle tissue.



Ambient temperature.



Unhygienic handling.



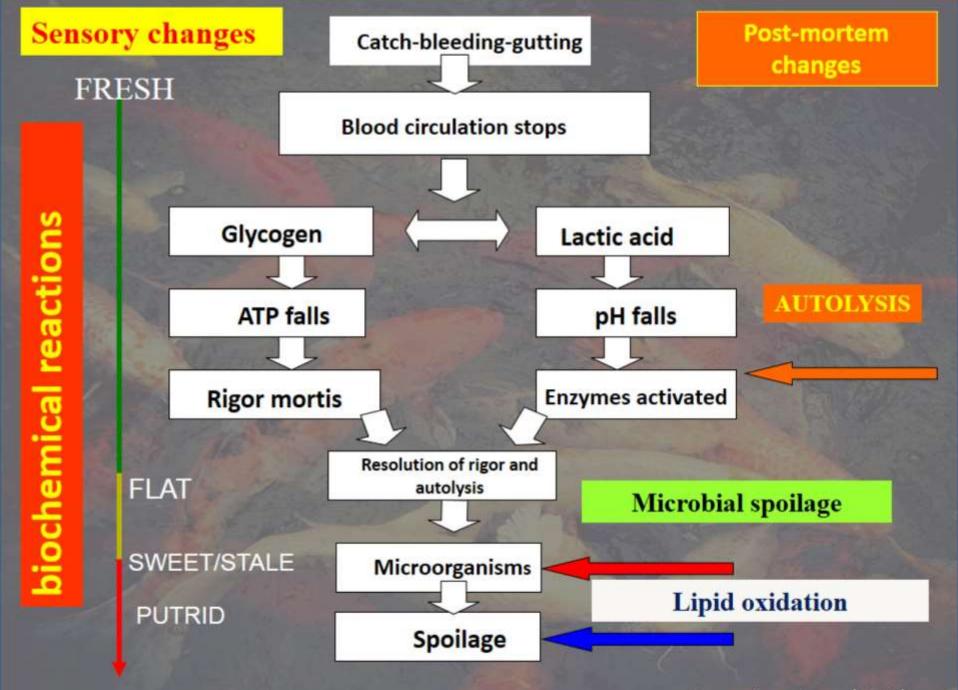
The spoilage process
starts immediately after
the death of fish. The
process involves three
stages:

Rigor mortis





Putrefaction.



Source from, Huss (1995)

Factors influencing kind and rate of spoilage:



- The kind of fish.
- The condition of the fish when caught.
- The kind and extent of contamination of the fish with bacteria.
- Temperature: 0° to -1° C
- Use of an antibiotic ice or dip.

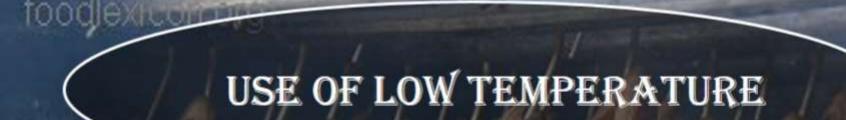






- Fish should be consumed fresh or should be properly preserved so that it's palatability and nutritive value are not seriously impaired.
- Improved methods of preservation, diet has become more varied and better balanced.





For the effective preservation, very low temperature to the tune of -40°c and maintained at -23°c approved.

This way, fish stays in food condition for about 6 – 7 months.



- Chilling is an obtained by covering the fish with layers of ice.
- Chilling is effective for short term preservation such as is needed to transport landed fish to nearby markets or to canning factories etc.
- Chilling can't prevent spoilage altogether but in general the colder the fish the greater the reduction in bacterial in enzyme activity.

FREEZING

- This is more effective than chilling.
- Freezing is achieved either by using a mixture of ice and salt or refrigeration.
- The recommended level at which the temperature of the fish has to be brought down is -30° C and the interior part of the fish has to be -20° C.
- To prevent rancidity, the frozen fish is subject to glazing with water or it is wrapped in a cover of moisture proof wax paper.

DRYING >

- Drying is the process in which moisture is removed by exposure to natural air current as humidity is regulated by climatic condition.
- Very small and thin fish can be dried straight away in the sun if they are brought in early enough in the morning (and if, of course, the sun is shining!).
- If these conditions are not fulfilled the fish must be put for one night in brine, or dry salted.



- This is a simple method of preservation, for consumption either directly after curing or within 12 hours.
- Re-smoking and roasting can keep the product in good condition for a further 12 hours.
- Salted fish can also be smoked by this method, but this is used mostly for immediate consumption or in order to bring the produce in smoked form to a nearby market.



- Salt is the preservative agent used to lengthen the shelf life of fish and fishery products.
- This is used in almost all methods of preservation except in icing, refrigeration and freezing.
- There many different kinds of salt, some being better than others for fish curing.
- A distinction must be made between the two chief techniques of salting: wet salting and dry salting.



- This is a very effective method though costly.
- Product is very good and retains much of flavor.
- Fish is cleaned and then cut to proper boneless pieces in filleting plants.
- The pieces are then brined or pickled to improve taste.
- Preliminary cooking is then carried out.
- Cooked pieces are then put in cans.
- Final cooking combines sterilization with steam and high

