

# MARINATED FISH PRODUCTS



**Hauzoukim**

- **MARINATION :**

- Marination is the process of soaking foods in a seasoned, often acidic, liquid before cooking.

- **MARINADES :**

- The 'marinade', must be either acidic with ingredients such as vinegar, lemon juice, or wine or enzymatic (pineapple, papaya etc.)
- Also often contains oils, herbs, and spices to further flavor the food items.



- **Fish marinade :**
- Fish/fish portions → treatment with edible acids, salts → put up in brine, sauce or oil.
- Salted or brine cured fish is called marinated fish.
- Extended shelf life & flavor.
- Acetic acid – produce tenderness of marinades.
- Commonly used to flavor foods and to tenderize tougher cuts of meat
- Affected by the action of some proteolytic enzymes, which cause partial breakdown of proteins & release some amino acids.
- Three basic ingredients used to marinate fish are :

- a combination of acids, oils and herbs & spices.
- marinated fish a delicacy in South–East Asian countries.
- **Species used for marinades :**
- Pelagic fatty fishes eg. Sardine, herring, pony fish, Indian mackerel, lizard fish, Croakers, shellfishes etc. are used.
- **Ingredients for fish marinades:**
- The acids can be lemon, vinegar, fruit juices, wine, cider, milk or Yogurt, Orange, pineapple etc.



- White wines are good -- they won't discolor the fish like red wines.
- The oil or fat -- olive oil, vegetable oil or peanut oil.
- seasonings obtained from herbs & spices make up the flavors
- Salt and pepper are the common
- Others include garlic, basil, thyme or bay leaves.
- **Characteristic features :**
- Quick & easy way to add extra
- flavor & moisture before cooking.



- Some add flavour to a bland tasting fish.
- tenderize the flesh of sea creatures. Eg. squid, octopus & cuttlefish.
- Treatment with acetic acid & salt -- In meats, the acid causes the tissue to break down, allowing more moisture to be absorbed and giving a juicier end product
- Further improvement in odour & flavor is by the addition of spices & covering liquids.
- **Health advisements:**
- [American Institute for Cancer Research](#) (AICR) recommends :

- Discarding used marinade applied to raw meats. such as red meat, fish, and chicken, may contain unhealthy substances or microorganisms which may enter the marinade
- These substances would neutralize in the cooking process, but use of leftover(un-cooked) marinade later as a sauce holds the risk.

- **Preservative action of marinades :**

- **Acetic acid :**

- ❖ Dvpmt. of putrefactive m.o. is delayed at 1-2% conc.

- ❖ Characteristic succulence & tenderness of fish flesh which favours action of some proteolytic enzymes.
- ❖ Proteolytic enzymes break the proteins down, release some free amino acids & impart characteristic flavor & taste.

- **Disadvantages :**

- Some m.o. like moulds & yeast can thrive in acid medium.
- Moulds decompose acetic acid, create a favorable atmosphere for putrefactive bacteria.





- Higher conc. Of acetic acid arrest autolytic reactions (action of proteolytic enzymes).
- **Salt :**
  - ❖ Extracts water out of fish tissue & cause proteins to coagulate allowing proteolysis to desired level.
  - ❖ Salt & acetic acid act mutually. Yeast grow rapidly in acetic acid medium, but stop growing at 14% salt conc. when pH is 2.5
  - Marinating fish is a method of low cost preservation
  - Classified among the semi-conserves as they have limited shelf life.

## • TYPES OF MARINADES:

✓ On the basis of process employed :

### ✓ (i) Cold marinades :

✓ Products processed in cold.

✓ Fish & other ingredients not

✓ subjected to any heat treatment

✓ at any stage in processing.

✓ Processing & storage at temp less than ambient.

✓ Processing fish at 10–12° C temp & pH 4.5



- Preparation of cold marinades :

- Raw material



- Washing

- (in 8–10% salt soln for an hr. to remove slime & harden meat)



- Dressing

- (removing head, gut, filleting or deboning)



- Pre-treatment → salt bath

- (placed in 3–5% salt for 30 min to remove traces of blood)



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- Addition of 0.5% acetic acid
  - (for desirable bleaching)



- Finishing bath (softening bath)
- (soln of acetic acid & salt. Strength fish to soln. 2.5% acetic acid & 1–7% salt)



- Pickling (at 10–12° C for 3–7 days)
- [carried out in wooden vats or barrels, open/closed]



- Packing (in glass jars)

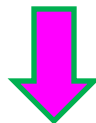
- Jars covered with 1-2% acetic acid & 2-4% salt.
- 2 imp. chemical process takes place in fish during finishing process are :
- **A)** Characteristic tenderness in marinades by acetic acid due to proteolysis induced by autolysis.
- Butter like taste by liberation of amino acids.
- **B)** Removal of water & coagulation of proteins by salt which inhibits hydrolysis.
- Development of aroma by microbial action.
- Increased conc. prevent spoilage.

- Acid & salt level if too high – m.o. cannot survive & characteristic flavor may not develop.
- Acid taste of cold marinates reduced by using citric or tartaric acid.
- To improve flavor-- acid-salt soln is flavored with spices. Eg. Pepper, clove, coriander, bay leaves. Slices of onions, carrot, celery serve as garnish.
- Spices advantageous as these are free of bacteria.
- Shelf life – several months at chilled temp & may be only a few weeks in tropical cond.

- **(ii) Cooked marinades :**
- Generally packed in jelly & called jellied product.
- Fish & fish pieces treated with edible oils & salt.
- Subjected to heat treatment.
- Combine effect of heat & acid in bleaching bath – preservative principle.
- Low pH prevent growth of harmful bacteria. Eg. *Clostridium botulinum*.

- **Preparation :**

- Raw material



- Dressing





Salting (as for cold marinades)



Draining

(draining off brine & fish spread on perforated trays)



Bleaching bath

(immersing in 1–2.5% acetic acid & 6–8% salt at 85° C  
for 10–15 min)



Rinsing

(free of adhering fat & protein foam)



Packing (glass, porcelain, lacquered cans)



- During bleaching bath fish suffers wt loss of about 10–20% by removing water.
- This will dilute bleach. So, must be renewed.
- Conc. Of acetic acid should be about 2% & salt 3%.
- Generally 4–5% gelatin is considered appropriate for jellied brine.
- Temp should not exceed 70° C as gelatin is heat sensitive.
- Spices & saccharine can be added.
- Gellied brine is cooled to 4° C before packing.
- Shelf life – six months.

- **(iii) Fried marinades :**

- Fish after pre-treatment is baked or boiled in oil with or without breading.
- Covered with acetic acid or sauce.
- Higher temp of frying kills most bacteria in fish.

- **Preparation :**

- Raw material



- Dressing



- Salting

- (as per cold marinades but backbone is retained)



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- Draining



- Breading

- (equal parts of wheat & rye flour & kept for 1 hr.)



- Frying

- (5-12 min in oil at 160-180° C)



- Cooling



- Packing (in cans)

- Covered with brine (3–5% salt & 3.5% acetic acid)
- Use of malt vinegar or vinegar with spices is recommended.
- Ratio of fish to covering oil is 2:1.
- Shelf life may be upto one year if stored at 0–8 °C.

- **SPOILAGE IN MARINATED FISH :**

- **(i) Physical spoilage :**

- Pack of marinades if stored below 0° C, contents will freeze.
- Water expands on freezing, so may damage glass jar or tin can.
- Cooked marinades – str. of jelly will be damaged by ice crystals.
- Heat damage occurs if cans are filled when too cold & product stored at warm temp.
- Swelling of cans if cooked marinades are sealed in cans before swelling of can is completed.

- **(ii) Chemical spoilage :**
- Caused by action of acetic acid on metal cans.
- If cans are badly lacquered, due to corrosive action of acid on metal H<sub>2</sub> gas liberated, cause cans to swell
- Imparts metallic taste to product
- – unacceptable.
- **(iii) Biological spoilage :**
- Simple flipping to hard swell &
- even bursting of cans
- **Two categories of spoilage :**
- Microbial degradation of proteins in fish.



- Fermentation of added sugar or sugar containing additives.
- Results in production of CO<sub>2</sub> gas & degradation of product quality.
- Distinction between chemical & biological spoilage :
- by gas production, bacteriological & chemical investigation & Organoleptic evaluation.
  
- **Principal cause of spoilage --**
- Homo-fermentative lactic acid bacteria in cold marinades.
- Proteolytic bacteria in cooked marinades.

- Slime formers in fried marinades.
- So, good grade RM, strict hygiene with sanitation in premises, processing schedule including utensils , equipments to be maintained.
- **Shelf life of marinated fish :**
- Varies from 1-2 days to weeks depending on type of process, pH, preservatives used & storage temp.
- Spiced & dry cured marinades – short shelf life.
- Brine cured fish remain stable for months.



- **Other types of marinated fish :**

- **Ceviche :**

- Marinating fish or shellfish with orange juice, lime juice or tartaric acid in water.

- Skinless fillet → diced into 10–15

- cm cubes → Mixed with onion &

- garlic → seasoned with salt.

- Shelf life – 5 days in tropical temp.

- **Esca beche :**

- Fish pieces → fried & marinated in vinegar → garlic, ginger, pepper & sugar may be added.



- **Paksiw :**

- Raw fish → boiled with coconut,
- vinegar, salt & sugar → water
- added → mixture re-boiled .
- Shelf life – several days.

- **Barbecue fish marinade :**

- Fish fillet → brushed with
- marinade (oil, lemon juice, spices etc) → 2 hrs in fridge → cooking

