



Some Problems Commonly Associated with Canned Fishery Products.



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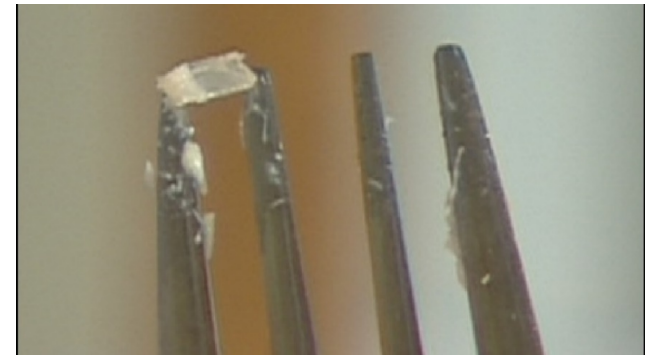
Struvite Formation

Associated with:

- **Canned marine products** such as brine packed shrimp, crab or tuna which shows the presence of some **glass-like crystals**, particularly when the temperature of storage is low.

Cause:

- Due to the formation of a chemical compound magnesium ammonium phosphate hexahydrate ($\text{MgNH}_4\text{PO}_4 \cdot 6\text{H}_2\text{O}$) called "**struvite**".



Struvite Formation

Mechanism:

- Magnesium comes from salt or sea water that combines with ammonia generated from the fish muscle protein during heat processing & phosphate in the fish to form struvite and the product gradually crystallises particularly when the cans are cooled at a very slow rate after processing.
- Struvite is a **harmless, colourless, odourless, transparent chemical**.
- It has a **glass-like structure** and considered **objectionable** in the product.

Struvite Formation



Sulphide Blackening

Associated with:

- Canned shrimp, lobster, crab etc.

Causes:

- Due to the formation of iron sulphide which is black in color.



Sulphide Blackening

Mechanism:

- Fish cans are coated with a **sulphur-resistant lacquer**.
- Any scratch on lacquers coating during handling exposes tin & trimethylamine present in marine fish will dissolve the tin which exposes iron.
- The sulphur-containing constituents released during thermal processing will react with iron producing **iron sulphide** which is black in color.



Sulphide Blackening

Preventive Measure:

- Uniform lacquering of the can and its careful handling avoiding any possible occurrence of exposed iron, maintenance of proper acidity, use of parchment lining etc. can control the occurrence of this phenomenon.



Curd & Adhesion

Associated with:

- Canned Salmon

Causes:

- Due to the formation of “Curd”
- Use of raw fish which is not very fresh, and also inadequate brining or pre-cooking are responsible for formation of curd in the can.

Curd & Adhesion

- Mechanism-
 - Curd is a **brine soluble protein** that exudes and coagulates.
 - Curd is **precipitated protein** often found on top of canned fish like **salmon** which is generally canned without pre-cooking.
 - Curd may adhere to the can surface and the **lacquer may even get peeled off** when the curd is removed.



Curd & Adhesion

Preventive Measure:

- Curd formation can be **prevented by cold blanching** the fish in 10-15 per cent brine for 20-30 minutes followed by washing.



Blue Discoloration

Associated with:

- Canned Crabmeat.

Causes:

- Due to the formation of **copper sulphide** which is **blue in color**.



Blue Discoloration

Mechanism:

- The copper in haemocyanin in the crab haemolymphs reacts with sulphur compound liberated during thermal processing producing blue copper sulphide.
- Meat of legs, claws etc. shows high incidence of blueing.
- This phenomenon becomes evident when the copper in the meat is above 2 mg per cent (wet weight).

Blue Discoloration



Preventive measure:

- Bleeding the meat to reduced copper below the critical level.
- 'Low temperature and fractional heating'.
- Blood proteins in the crab coagulate at 69-70°C whereas meat proteins coagulate at 59-60°C. Thus, if the crab carcasses are heated to 59-60°C, the meat protein coagulated but the uncoagulated blood can run out thus bringing down the level of copper.
- Using a parchment lining inside the can, use of a chelating agent in the brine and maintenance of proper acidity can control discoloration in the meat.

Honeycombing

Associated with:

- Observed in canned tuna meat processed from stale raw material.

Mechanism:

- During steaming the volume of **meat contracts** due to removal of water and coagulation of protein.
- During thermal processing water from inner parts evaporated & escape as gas or bubbles through the soft, not yet coagulated parts the gelatinous parts swell like soap bubbles which solidify after cooling & exhibit honey combed appearance.



Softening in Shrimp

Associated with:

- Canned shrimp.

Causes:

- Due to **decomposition** of the protein to soluble non-protein components which usually occurs in the raw material when freshness declines.

Softening in Shrimp

Preventive measure:

- Use fresh raw material should be used for processing and high level of sanitation should be maintained in the cannery.



Mush

Associated with:

- Canned Pilchards

Causes:

- Due to a flabby condition met with in some species of pilchards caught at the end of its spawning season.



Mush

Mechanism:

- By the invasion of the parasite protozoan *Chloromyxum spp.* which decomposes the fish meat during storage such that it becomes entirely soft during canning.



Retort-Burn

Associated with:

- Canned shell fish like clam, mussel or oyster.

Causes:

- Due to inadequate filling medium.

Retort-Burn

Mechanism:

- Develop when the filling medium is not sufficient to cover the solid food & the top is left dry.

Preventive measure:

- Use sufficient filling medium to cover the solids in the can.

Thank You