



# THERMAL PROCESSING OF FISHERY PRODUCTS



# Canning methods for Fish and Shell fish



- Methods vary depending on type of raw material
- Main differences – preliminary blanching and filling medium
- Pre-processing requirements also vary depending on raw material
- Shrimp – hot blanched in boiling brine
- Sardine and mackerel – cold blanched in brine followed by steam cooking
- Tuna – preliminary steam cooking under pressure
- Bivalves - depuration



- OTS SR 4 $\frac{1}{2}$  oz (310x203) cans used
- Net weight 210g
- Filling weight – sufficient to yield declared drained weight – statutorily fixed as a % of net water capacity of can

# Sardine



- Generally canned in oil, brine, sauce
- Natural pack
- *Sardinella longiceps* – only species used for canning
- Highly fatty fish – properly iced until processing
- Raw fish – should not be ice stored for > 2 days



- Preprocessing – washing – scaling, heading, removing fins and tails and eviscerating
- Natural pack :  
Whole sardine – heading, gutting – washing and brining – filling in cans – exhausting and seaming – heat processing – cooling – labelling and packing – storage
- Cold blanching in 15% NaCl and 1% citric acid for 15 min
- Filled in tall cans (301x409)
- Water exuded from fish during heat processing itself acts as medium
- Heat processing - 121°C for 45 min- 1 hr depending on pack size



- Canning in oil/brine/sauce:

Whole sardine – heading and gutting – washing and brining- filling in cans – precooking in steam – filling with medium – exhausting and seaming – heat processing – cooling – labelling and packing – storage

- Cold blanching – 15% brine for 15 minutes
- Pre-cooking – essential to avoid formation of oil- water emulsion or dilution of medium during heat processing – excess water drained off
- Medium – added hot
- Heat processing – 121°C for 45-60 min depending on can size

# Tuna



- Light meat and white meat varieties - used for canning
- Black meat usually not used
- Skipjack – common

Whole tuna – thawing, if frozen (eviscerating and cleaning, if fresh)– cooking in steam – cooling – dressing – size cutting – packing in cans – addition of brine ( addition of solid salt – addition of hot oil ) – exhausting and seaming – washing – heat processing – cooling – labelling and packing - storage



- Fresh, fresh iced or frozen tuna used
- Break off head – remove fins – peel off skin – split fish dorso ventrally – remove bones and dark red meat lying along lateral line
- Size cutting into pieces
- Steam cooking – 115 °C until surface of central bone in the thickest part attains 90-92 °C - 1-2 hrs (2-3 kg) to 6-7 hrs (45 kg up)





- Cooling cooked fish – in cold room for 12-24 hrs depending on size – firms up meat and facilitates further easy handling
- Canning in oil – sprinkle solid salt @ 2-2.5% on surface of meat – add hot oil
- Canning in brine – add hot brine
- Heat processing at 121 °C for 50-60 min

# Shrimp



- Wet pack – canned in brine - popular
- Dry pack
- Penaeid shrimps
  
- Whole shrimp – peeling and deveining – cleaning and waste removal – blanching and surface drying – filling in cans – addition of brine – exhausting – seaming – heat processing – cooling – labelling and packing - storage



- Shrimp spoils rapidly at ambient tropical temperature – iced immediately after catch and delivered to cannery
- Immediate washing – separation from ice
- Discoloured and broken/bruised pieces sorted out
- Well iced through out the process
- Blanching – 8-10 min in hot boiling 6-8% brine
- Filling medium – 2 % hot brine with 0.1% citric acid
- Heat processing – 121°C for 15 min

# Crab Meat



- Actively live mud crab – *Scylla serrata*
- Meat quality poor in sluggish and dead crabs

Live crab – removing claws, legs, carapace, gills – splitting carapace into 2 sections – keep in ice-cold running water – blanching in hot brine – cooling in ice-cold water – picking the meat – inspection for shell pieces – packing in cans – adding brine – exhausting and seaming – washing – heat processing – cooling – labelling and packing - storage



- Canned crab meat – blue discolouration during heat processing and storage – due to formation of copper sulphide (Cu from haemocyanin + sulphides from meat during heating)
- Thorough bleeding of meat in ice-cold running water– reduces level of Cu
- Claw meat, leg meat, joints of shoulder meat – high incidence of blue discolouration due to poor blood circulation - thorough bleeding after breaking joints – followed by brining – meat picking – cutting off meat at joints – removing epidermis – packing along with body meat (as required)



- Hot blanching in 5% boiling brine until meat becomes firm for 10-15 min
- Filling in cans with a parchment lining inside
- Medium – hot brine – 2% with 0.1% citric acid and 0.5% EDTA
- Heat processing at 121 °C for 15-30 min

# Bivalves



- Oyster/mussel meat
- Filter feeders – stomach contains sand and other gritty matter – harbour high bacterial load including pathogens
- Depuration
- Live depurated animals – used for canning
- Oyster – *Crassostrea madrasensis*
- Mussel – *Perna viridis* and *Perna indica*
- Collected from natural habitat or cultured



Whole oyster/mussel – depuration – heating in vat – shucking  
meat – blanching and surface drying – grading – inspection –  
filling in cans – addition of medium – exhausting and seaming  
– washing – heat processing – cooling – labelling and packing  
– storage

- Live depurated animals – cleaned under a spray of water
- Heated in open vats until they open up
- Hot blanching – boiling 5% brine for 5 min
- Surface drying – keeping on mesh topped table under air blast
  
- Heat processing at 121 °C for 15-30 min