

# MUSSEL PROCESSING



**AATMANIRBHAR BHARAT**  
**PM Formalisation of Micro Food Processing**  
**Enterprises (PM FME Scheme)**

- Mussels - candidate species - good growth, abundant in natural fishery, highly adaptable and have simple culture technique
- Bio filters - purify the ecosystem besides providing nutritional security
- Globally bivalves are recognised as a source of inexpensive protein of high nutritional value
- Also rich source of lipids, carbohydrates, minerals and other bioactives



*Perna viridis* (Green mussel): a wider distribution along the east and west coasts of India, including the Andaman Islands

*Perna indica* (Brown mussel): restricted to the southwest coast of India



# PRODUCTION AND MARKET POTENTIAL

- Global production of marine bivalves - more than 15 million tonnes per year
- About 14% of the total marine production in the world
- Mussel contribution - 13% of bivalve production
- The total production dependent on the market demand and the system production capacity
- Culinary preference of the customers for mussel - explores the potential for its processing and marketing in various value added forms

# MUSSEL PROCESSING

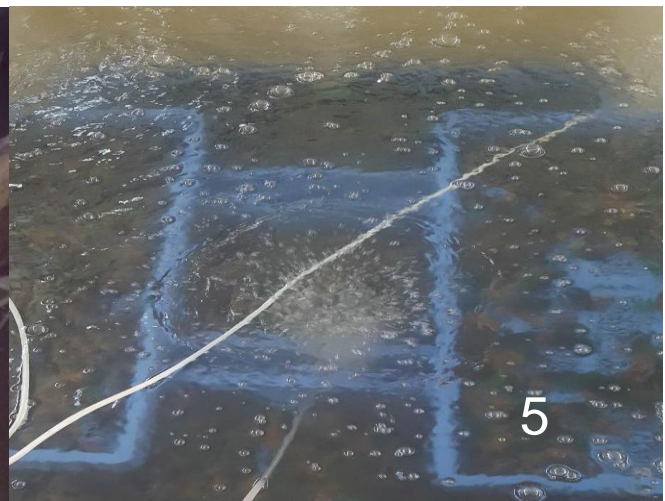
## Cleaning of Mussels



Mussels are thoroughly cleaned using high pressure jet spray to mechanically remove the dirt from shell surface

# DEPURATION PROCESS

- Depuration - cleaning process where the animal is rendered free of bacterial load and contaminants
- Storing the live organisms in clear and clean seawater for a continuous period of 24 - 48 hours, whereby the intestines are flushed out
- The organisms can be stored in large containers or tanks, which ensure a circulation of fresh, filtered seawater
- No feed or nutrient is given during that period



# DEPURATION PROCESS

- The process may be continuous or discontinuous
- In continuous process, 10-20% of the water in the purification tank is renewed with filtered seawater
- In discontinuous process, the rate of water exchange may be 2-3 times in a day
- Effective in reducing the bacterial load of the mussel meat by 90%



# SHUCKING

- Removal of meat from shell is done directly by mechanical means, by steaming or dipping in boiling water
- Thermal treatments like steaming/boiling eases the shucking operation



# TRADITIONAL MUSSEL PROCESSING





# GRADING OF MUSSELS

- The mussels are graded based on their sizes viz., 40/60, 60/80 etc.
  - Indicating total number per weight (pound/kilograms)



# MUSSEL MEAT - NUTRITIONAL ASPECTS

- Rich source of nutrients
- Substantial quantity of glycogen - characteristic sweetish flavour

Components	Value (%)
Moisture	78 - 80
Protein	11 - 13
Fat	2 - 3
Ash	3.5 - 4
Glycogen	5 - 10

# VALUE ADDED PRODUCTS FROM MUSSEL

- Value added products increases the convenience as well as storage stability
- Thorough assessment of raw material sources, process standardization or innovations in packaging can address product safety and quality- enhancement of commercialization
- Adding primary value - simple as putting them in a fixed weight pack, or selling them 'pot ready' to highly advanced techniques like RTE products

# LIVE SHELL ON MUSSEL

Cleaned and depurated mussels are sold as a value added live shell-on mussel

## SHELL ON HALF MUSSEL

Cleaned, depurated and split mussels are sold as a value added shell-on half mussel



## MUSSEL MEAT

- Meat from depurated mussel can be shucked in fresh condition or after boiling or steaming.
- Further processing of the mussel meat is done after blanching in 5% salt solution for 5 minutes



# CHILLED MUSSEL PRODUCTS

Fresh mussels, depurated, cleaned and chill stored in ice - organoleptically acceptable for one week

# FROZEN MUSSELS

Fresh frozen mussels (-20°C) - acceptable for upto 10 months



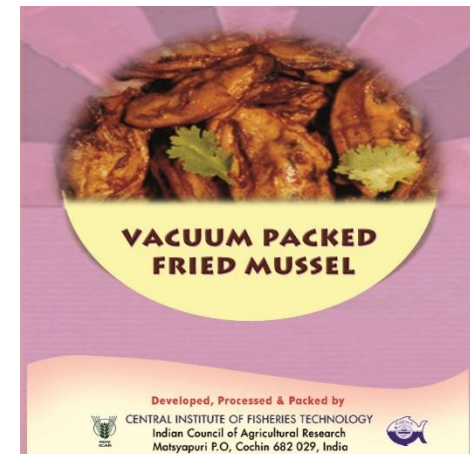
# DRIED MUSSEL

- Preservation by reducing the water activity
- Mussels are cleaned, depurated, shucked, washed and blanched in 5% brine for 5 minutes
- Further dehydrated - sun dried or artificially dried to a moisture level of 10-15%
- The shelf life of dried mussel is about 6 months



# FRIED MUSSEL

- Mussels are fried to convert into RTE products
- Shelf stability improved by combination with vacuum packing - reduced oxidation
- Different spice combination - based on consumer preference



# CONDIMENT INCORPORATED MUSSEL





# SMOKED MUSSEL

- Smoking improves the flavour and succulence of the product
- Depurated mussels are shucked, washed and blanched in 5% brine for 5 minutes
- Dried to a moisture level of 40-45%
- Dried meat is smoked at 70 °C for 30 minutes
- Further product dried to 10% moisture
- Product shelf life is about 6 months



# BATTERED AND BREADED MUSSEL

- Battered & breaded products also known as coated products/enrobed products
- Coating with batter and breadcrumbs increases the bulk of the product - reducing the cost element
- Various products - coated mussel meat, mussel balls, mussel cutlets - popular



# Arikkadukka - Spicy stuffed mussel based product - ethnic product - Malabar region of Kerala



# MUSSEL PICKLE

- Pickling is a very popular traditional practice
- Depurated and shucked mussel meat is blanched in 3% brine for 5 minutes
- Addition of spices , condiments and and acetic acid aids in preservation
- Proper storage in glass containers/food grade polyethylene pouches - shelf life of minimum six months



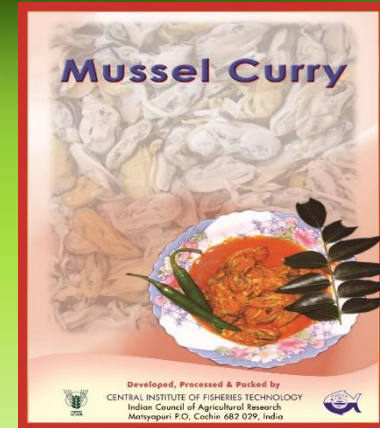
# MUSSEL MARINADES

- Marination is ideal for preserving mussel meat for 2-3 months
- Depurated and shucked mussel meat is blanched in 3% brine for 5 minutes
- This cooked meat is packed in glass jars containing a solution of 3% salt and 3% acetic acid.
- The meat can be used for making mussel curry/pickle / etc.



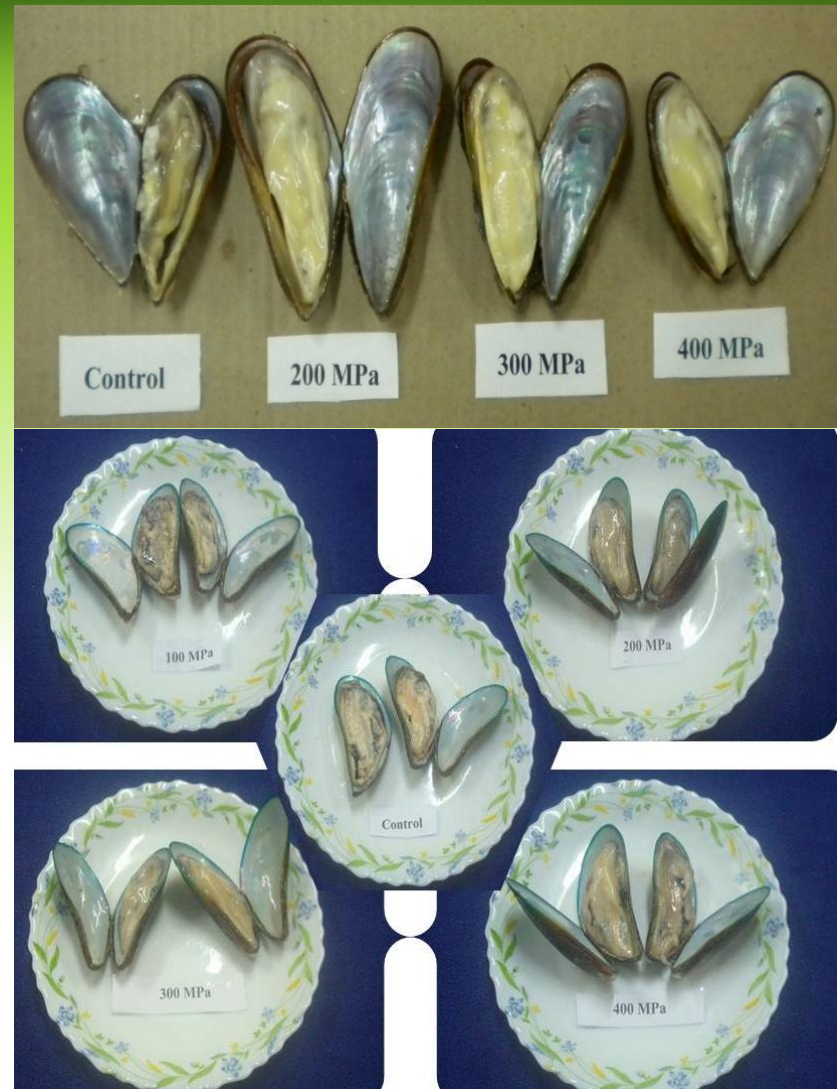
# RTE MUSSEL PRODUCTS

- ❑ Thermally processed products: Depurated, shucked and blanched mussel meat are packed in cans/retort pouches, exhausted, seamed/sealed and heat processed at standardized time/temperature
- ❑ Different Products
  - Canned mussel meat in medium - oil, sauce, brine etc.
  - Mussels in curry packs
  - Other convenience products - Mussel biriyani - thermoformed trays



# HIGH PRESSURE PROCESSED MUSSEL

- Shucking of meat
- Significantly effective meat removal than traditional methods
- Maintains the size and shape of meat
- Retains the nutritional quality
- Makes food safe for eat in raw condition by reducing the organic load
- Extension of shelf life of mussel meat during subsequent chill storage



# MUSSEL CHUTNEY POWDER

- A delicacy and used as a side dish
- About 20% of the base material is mussel powder.
- Mixed with other fried and powdered ingredients
- Dehydrated product with a shelf life of one year
- Stability enhanced by advanced packaging like vacuum packaging





# MUSSEL PROTEIN POWDER

- Mussel - rich source of protein
- Colourless protein powder with a protein content of 35-40%
- As an ingredient for the formulation of protein based food supplements



- Mussels have a huge market potential on account of its nutritional as well as bioactive properties
- A wide range of mussel based value added products can be developed to cater the ever rising demand of seafood customers

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