High pressure pasteurization of fish to prolong their freshness

Identification

Key words
High pressure, pasteurization, fish, herring, salmon, red mullet, hake, mackerel, haddock, tuna, in-pack processing

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Completed by
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How does it work?

Primary objective
Cold pasteurization of fish to extend their shelf life.

Working principle
High pressure processing is a novel technology for preservation of food. It can extend the shelf life of fresh fish. Under normal refrigerated storage conditions, the shelf life of fish products is limited by enzymatic and microbiological spoilage. Both enzymes and microorganisms can be inactivated by high pressure processing.

Images

Additional effects
• Color changes: lightness and yellowness values increase with pressure, redness decreases with pressure [6]
• Textural modification: hardness of samples increase with pressure [6]
Pressures higher than 400 MPa can change significantly the color and texture of fish meat. The meat can have the appearance of cooked muscle [5].

Important process parameters
pressure, temperature, time, length of storage, used packaging material
Example: the microbiological shelf life of HP treated fish can be extended; e.g. for fresh herring and fresh haddock by about 9 days/4°C [1]; cooked salmon by about 6 days/4°C [3], red mullet by about 3 days/4°C [4], hake about 7 days/2-3°C [5], smoked mackerel about twice longer/4°C [2] compared to untreated fish. For all fishes were used pressure higher or equal to 200 MPa, maximally 330 MPa for 3 - 15 minute.

Important product parameters
pH, aw, protein, lipid, salt or sugar content

What can it be used for?

Products
herring, salmon, red mullet, hake, mackerel, haddock

Operations
Pasteurization

Solutions for short comings
Rapid and gentle pasteurization that doesn’t change the quality.
What can it NOT be used for?

Products -
Operations not ready for sterilization.
Other limitations batch process, equipments need a high investment and are expensive.
Risks or hazards Pressure resistance of target microorganisms (spores) different from heat resistant.

Implementation

Maturity High pressure pasteurisation is already used in food industry (benefits: return on investment, growth, minimal processing). New equipments with lower costs and higher production rates are being developed, meaning that new applications are being developed and are economically feasible.

Modularity /Implementation This technology can be included in production line (batch system). More at High pressure processing.

Consumer aspects High pressure processing

Legal aspects
- EU: No novel food approval required, no declaration or labelling required. Decision is let on the member states.(SKLM 6.12.2004)
- Code of Conduct for Responsible Fisheries (FAO -1995) and the Code of Conduct for the European Aquaculture (FEAP - 2000)
- Seafood and fish safety is a quality pre-requisite, assured by law with the aim of the consumers' health protection, throughout both horizontal (Dir. 43/93/EEC, Reg. CE 466/2001, 2375/2001, 178/2002) and vertical (Reg. CE 2377/90, Dir. 91/67/EEC, 492/91/EEC, 493/91/EEC) regulations
- Codex Alimentarius(vol.9 Codex Standard for Fish and fishery products, 1999)

Environmental aspects Energy efficient

Facilities that might be interesting for you

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<td>HP FRIP unit</td>
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Further Information

Institutes Wageningen UR - FBR, IRTA, DIL, TU Berlin, DiFRES, Agri-Food & Biosciences Institute
Companies Hiperbaric, Motivatit Seafoods, Avure, Uhde-HPT, APA Processing
References


Source: