High pressure pasteurization of marinated chicken meat

Identification

Key words
High pressure, poultry, marinade, pasteurization, in-pack processing

Latest version
2011/08/05

Completed by
FRIP

How does it work?

Primary objective
Cold pasteurization of marinated poultry meat to extend its shelf life

Working principle
High pressure processing is a novel technology for cold pasteurization of food. Under normal refrigerated storage conditions some problems can occur in marinated poultry meat. The spice in marinade can contain a high number of microorganisms and this can have a negative impact on the microbiological shelf life. High pressure processing allows extension of the shelf life by killing viable microorganisms. The use of high pressure treatment is ideal because it does not destroy the texture of the meat so much (as compared to thermal pasteurization) and keeps also the flavour of the marinade.

Additional effects
• textural modification (with pressure, rigidity and fibrillation of the meat increases [1])
• maintaining all the freshness of natural flavouring ingredients.
• it is also possible to adjust certain functional and quality properties of the meat as well, including texture, color and the possibility to immobilize water, just to name a few. The degree of influence can be controlled by using a specifically formulated marinade.

Important process parameters
Pressure, time, temperature, length of storage, storage temperature

Important product parameters
pH, carbonates, citrates

Examples: For marinated chicken breast meat, the shelf life was 20 days /4°C after a pressure 600MPa/5 minutes to inactivate CPM and coliform microorganisms [1]. Another article presents marinated poultry meat HP treated at 450MPa/3 minute and stored at 4 °C. The results of inactivation show a decreasing pressure tolerance in the series Lactobacillus, Arcobacter Carnobacterium, Bacillus cereus, Brochothrix thermosphacta, Listeria monocytogenes. Leuconostoc gelidum exhibited the highest pressure tolerance in meat. A protective effect of poultry meat was found for L. sakei and L. gelidum [2]. The composition of the marinade also has influence on protein structure changes. Addition of sodium carbonate shows a protection against denaturation of myofibrillar proteins and provides a maximum water-holding capacity. Caustic marinades allow a higher retention of product characteristics than low-pH marinades [2]. Microbial results of high hydrostatic pressure treatment on marinated turkey are presented in [3].
What can it be used for?

**Products**
- Marinated poultry meat

**Operations**
- Pasteurization

**Solutions for short comings**
- Rapid and gentle pasteurization of marinated chicken meat to prolong the shelf life of this semiproduct

What can it NOT be used for?

**Products**
- -

**Operations**
- no sterilisation possible under these conditions

**Other limitations**
- denaturation of proteins,
- batch process

**Risks or hazards**
- Pressure resistance of target strains different from heat resistance.
- Survival of spores

Implementation

**Maturity**
- High pressure pasteurisation is used in food industry. It is now being seen by the food industry as a serious option for a variety of products as it offers real benefits in retaining fresh taste and nutrition, reducing preservatives and maintaining or increasing existing shelf lives

**Modularity/Implementation**
- This technology can be included in the production line (batch system). It replaces e.g. radiation. More at High pressure processing.

**Consumer aspects**
- High pressure processing

**Legal aspects**
- EU: No novel food approval required, no declaration or labelling required. Decision power is layd down on the member states.

**Environmental aspects**
- Energy efficient

Facilities that might be interesting for you

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Further Information

Institutes
- FRIP, DIL, Univ Autonoma Barcelona

Companies
- Hiperbaric, Uhde-HPT, Avure, APA Processing

References
[1] Strohalm et al. (1999): Effect of high pressure on microbial population of chicken meat, internal research report, FRIP

Source: