High pressure-temperature meat sterilisation

HPT meat sterilisation

Identification

Key words
High-pressure, protein denaturation, inactivation, meat, sterilization, high pressure processing

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Completed by
FRIP

How does it work?

Primary objective
To prevent meat from overcooking with respect to protein denaturation and microbial contamination while stabilizing it. The quality of high pressure sterilised products is usually superior to conventionally heat sterilised products.

Working principle
Overcooking degrades product quality and wastes energy. To prevent heat-induced protein denaturation, high pressure conditions can be used while heating. The thermal denaturation is relatively pre-empted. It is known while using the high-pressure processing (HPP) at pressures higher than 200 MPa that a strong modification of meat colour and a reduction of water holding capacity. This technology could influence to some extent water holding capacity and colour modifications of beef. Concerning the quality of a meat sauce, while using the HPP, only limited damage of the physico-chemical characteristics were observed in comparison with only thermally processed meat. Going into detail it was shown that conditions of HPP have no effect on the rate of residual nitrite loss throughout the storage. A decreased of the concentration of some biogenic amines (tyramine, agmatine, and spermine) was proved while using HPP. High pressure sterilisation is a promising method for the production of ambient stable products with improved quality [1-9]

Images

Additional effects
Increased hardness of meat can take place with increasing pressure.

Important process parameters
The effect of 70°C for 10 minutes must be reached in the meat product centre while thermal processing.

Important product parameters
By choosing the appropriate process conditions, it is possible to completely inactivate both vegetative cells and microbial spores resulting in food products that are shelf stable.

What can it be used for?

Products
Meat, vegetable

Operations
Sterilisation, pasteurisation

Solutions for short comings
It restricts the flavour of overcooked meat, efficient from the microbial point of view, safe time and energy within the process.
What can it NOT be used for?

**Products**
Products not included in the line above “product”.

**Operations**
Not known yet.

**Other limitations**
The level of high-pressure and time interval used have to be considered due to the product characteristic.

**Risks or hazards**
The level of used high pressure influences the quality of processed products (colour, water activity, protein quality, product texture i.e.).

Implementation

**Maturity**
At pilot scale.

**Modularity/Implementation**
This technology can be inserted in an existing production line. Processing in-pack.

**Consumer aspects**
Not expected.

**Legal aspects**
Regulation No. 326/2001 Sb. (valid for the condition of the Czech Republic)
Europe: Novel Food Regulation
USA: PATS

**Environmental aspects**
Environmental friendly technology. Doesn’t need so much energy as thermal processing.

Facilities that might be interesting for you

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<td>HP FRIP unit</td>
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<td>HP Industrial scale IRTA</td>
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Further Information

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<td>Companies</td>
<td>Teagasc, CSIC - IATA</td>
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References


