

High Hydrostatic Pressure

In High Hydrostatic Pressure (HHP) treatment, some packaged food is placed in a pressure vessel and subjected to water pressures from 100 to 900 MPa.

This technology decontaminates food products and increases their shelf life. However the colour of fresh beef meat is significantly changed through this process, making the technology appropriate for foodservice where a bright red color of the fresh meat is not important.

Demonstrated by:



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High Hydrostatic Pressure

The High Hydrostatic Pressure (HHP)

treatment is an **athermic decontamination process** which consists in subjecting packaged food to water pressures from 100 to 900 MPa.



This technology has been demonstrated in the framework of the ProSafeBeef project (FOOD-CT-2006-36241, Integrated Project in FP6) on 9th September 2008 at the IRTA-CENTA, Monells, Spain.

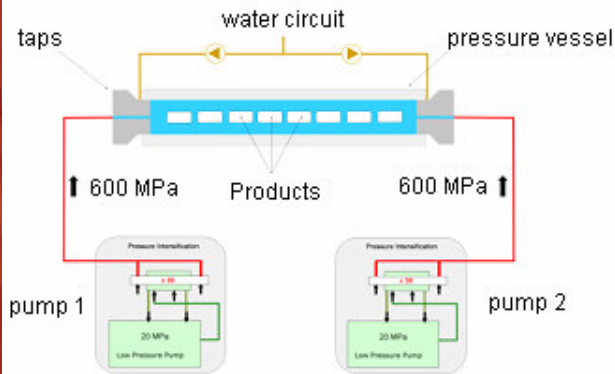
The following information was provided by IRTA-CENTA.

Process

The High Hydrostatic Pressure (HHP) treatment consists in decontaminating food by placing it in a pressure vessel and subjecting it to water pressures from 100 to 900 MPa. The pressure applied is isostatically transmitted inside the pressure vessel.

The treatment can also be considered as non-thermal as the heat transfer is only 3°C for each 100 MPa.

Diagram of an industrial HHP equipment with two pumps



Economic data

Model	Productivity (a)	Costs (b)
Wave 6000/55	170 Kg/h	0.19 €/Kg
Wave 6000/150	425 Kg/h	0.14 €/Kg
Wave 6000/300	850 Kg/h	0.11 €/Kg
Wave 6000/420	2 000 Kg/h	0.05 €/Kg

(a) Filled at 50% volume and processed 3 minutes at 600 MPa

(b) Calculated for 5 years depreciation, production 280 days/year, 16 h/day

Benefits

Ecologically friendly:

- Very low use of energy
- No residues: uses only tap water

Safe:

- Reduction of the risks associated with the presence and growth of pathogens
- No danger for workers

Shelf life extending:

- Athermic decontamination
- Significant reduction of the sensorial risks associated to the presence and growth of alteration micro-organisms

Consumer satisfying:

- Fully accepted process
- Once cooked, same texture, flavour, colour as non pressurized meat

Practical:

- Adapted to sanitize products where heat processing is inappropriate

Main negative effects

Concerning the colour:

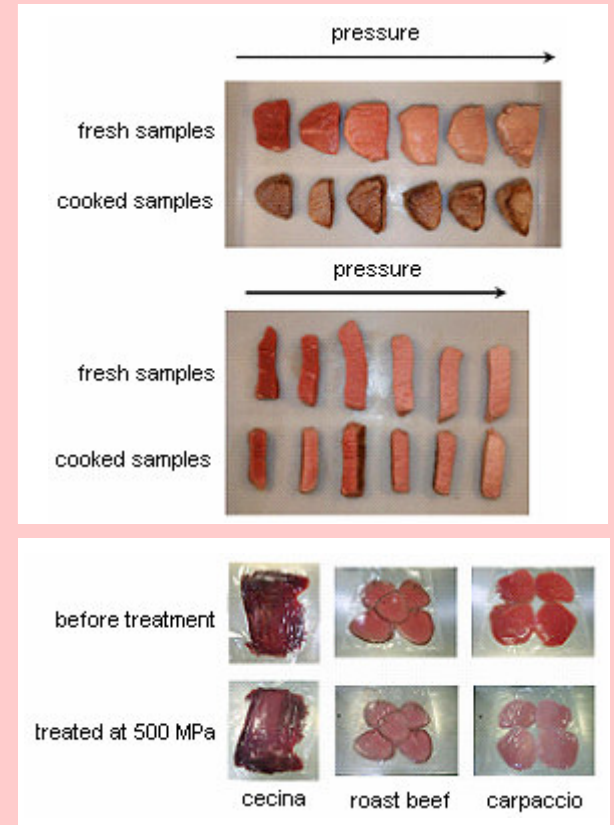
- In fresh or marinated meat: loss of the red colour because of a globin denaturing

Concerning the composition:

- Partial proteins denaturing in products in cases where they have not been previously modified : heating, drying, fermentation ...



Results



Products that can be HHP processed

- Solid food, mainly vacuum packed
 - Dry-cured or cooked meat products
 - Cheeses
 - Fish, seafood, marinated products
 - Ready to eat meals, sauces
 - Fruits, marmalades/jams
 - Vegetables
- Liquid food, in flexible packaging
 - Dairy products
 - Fruit juices
 - Nutraceutical formulations