

HIGH PRESSURE PROCESSING (HPP): INNOVATION FOR FOOD INDUSTRY

HIGH PRESSURE PROCESSING (HPP) is a non-thermal pasteurization method for food processing.

Food products are introduced to a high pressure vessel in their final flexible package, and subjected to a high level of hydrostatic pressure (isostatic pressure transmitted by water). Product shape and integrity remains unchanged.



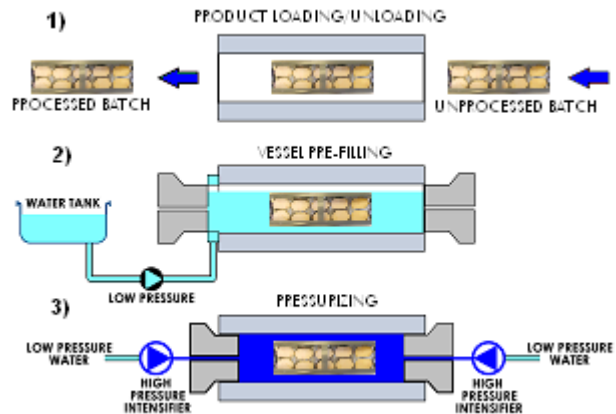
HPP is an all natural, clean, environmentally friendly technology.

NC HYPERBARIC: INDUSTRIALIZING HIGH PRESSURE

NC Hyperbaric designs, manufactures and markets industrial HPP equipments for the food industry. It is the European leader in High Pressure Industrial equipment.

NC Hyperbaric equipments are already operating in four continents (Europe, North America, Asia and Oceania) in meat, seafood, vegetable and dairy products processing plants.

- Horizontal design
- Different volumes & capacities
- Automatic in-line processing
- Safe, ergonomic and reliable
- Easy integration in production line
- Specially designed for food industry
- Clean, environmentally friendly



HPP MAKES THE DIFFERENCE

- Wide range of HPP processed products: meat products, fruit juices & smoothies, seafood, dairy products, RTE meals...
- Reduces drastically the overall microbiological contaminant flora and pathogens (*Listeria*, *E.coli*, *Salmonella*, etc): greater food safety
- Extends shelf life keeping sensorial and nutritional properties of products
- No need for additives and preservatives
- Innovative products can be launched
- Texture of food can be modified and the performance of current processes can be improved

A RANGE THAT MEETS ALL YOUR NEEDS



MODEL	Vessel Diameter (mm / inches)	Useful Volume (litres / Am. Gallons)	Production capacity*
Wave 6000/55	200 mm / 7.9"	55 l / 14.5 gal	170 Kg - 374lbs/h
Wave 6000/135	300 mm / 11.8"	135 l / 35.6 gal	400 Kg - 880lbs/h
Wave 6000/300	300 mm / 11.8"	300 l / 79.15 gal	850 Kg - 1870lbs/h
Wave 6000/300T	2 x 300 mm / 2 x 11.8"	600 l / 158.3 gal	2000 Kg - 4400lbs/h

*Calculations based on a 50% filling factor and a processing time of 3 min at 6,000 bar (87,000p.s.i.)

HPP IN SEAFOOD PRODUCTS

SAFETY, INNOVATION AND EXPORT DEVELOPMENT



HAND SHUCKED

HPP SHUCKED

HPP process destroys pathogenic bacteria such as *Vibrio*, *Listeria*, *E. Coli*, *Campylobacter* and *Salmonella* and reduces the risk of sanitary crisis.

Shelf life of raw and cooked seafood is greatly increased keeping their sensorial properties.

**Technical data regarding shelf life are for guidance only and depend on the product*

A wide range of seafood products can be processed by HPP: shellfish, ready-to-eat fish products, prawns, shrimps... It extends the shelf-life keeping freshness because it takes place at ambient or chilled temperature.

SHUCKING AND MEAT EXTRACTION

Shucking

Oysters or mussels can be opened without using knives with HPP.

Reduction of labour costs (no more hand shucking), and safety, productivity and product yield increase.

Meat extraction :

An easy shellfish extraction (lobsters, crabs...) can be done by using HPP without having heat treatment damages.

- Efficiency of process improves and yield extraction increase (from 25 % to 50 %).
- Microbial safety increases for reduction of handling
- New raw or frozen uncooked seafood products can be developed.



HPP SEAFOOD PRODUCTS IN THE MARKET

Country (year)	Product	Process	Packaging	Shelf-life	Achievements of high pressure and comments
USA (1999)	Oysters Sauce for oyster dish	200 to 350 MPa 1 to 2 min	No packaging, just a plastic band.	10 to 15 day (fresh oysters)	Opening of the shells (kept closed by a plastic band). Destruction of <i>Vibrio vulnificus</i> . Marketing of fresh and frozen opened oysters.
USA (2001)	Oysters	240 MPa 90 s	No, only elastic band around oyster		Opening of the shells (kept closed by an elastic band). Destruction of <i>Vibrio</i> .
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Canada (2004)	Seafood		No		Opening of the shells.
Spain (2004)	Ready-to-eat fishes : salmon, hake	500 MPa	Skin vacuum packed	2 months	Reconstituted sanitased sliced fish without colour and taste modifications. <i>Listeria</i> destruction. Increase of shelf-life and additives reduction. Ready to eat after 1,5 min in a microwaves.
Italy (2004)	Desalted cod	600 MPa	Vacuum packed		Shelf-life increase, sanitization.
S.Korea (2006)	Oysters	Indirect			Opening of shells, destruction of <i>Vibrio</i>