

SEAFOOD

Pressure Power

High pressure processing enables processors to extract meat from crustaceans easily while preventing cross contamination of food.

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High pressure processing (HPP) causes the adductor muscle of molluscs such as oysters to open, exposing the meat for easy extraction and resulting in over 50% increase in yields.

High pressure processing is a non-thermal process that subjects seafood under high hydrostatic pressure (which is transmitted by water) reaching up to 600MPa or 87,000 psi. This is the same effect as placing food 60km under sea level, if such depth exists. With such pressure working at temperatures from 5-10°C, a level of higienization in the product similar to thermal pasteurization is achieved. Known as cold pasteurization, the absence of heat in HPP helps to maintain nutritional and sensorial qualities. It can also be used to shuck mollusc and extract meat from crustaceans.

Machine talk

A manufacturer typically uses HPP equipment to process a product in a container, upon considering the size of the vessel or processing chamber. An automatic loading system transfers the container inside the vessel, which is subsequently moved horizontally until it is placed inside the yoke (the structure that supports the equipment). The ends of the vessel (plugs) are then closed and filled with water at low pressure.

Once the vessel is filled, high pressure intensifiers would pump more water into the chamber until the desired pressure is reached (up to 600 MPa or 87,000 psi). The pressure is maintained for a period of time (between several seconds and five minutes), after which it is discharged in two or three seconds. The plugs would open and the vessel would unload the processed batch onto the unloading line. The next batch is automatically loaded and ready to be processed in a new cycle.

High pressure processing does not affect vitamins and other bioactive components of food and components responsible for the aroma or flavor of food.



Using HPP, meat of crustaceans such as lobsters or king crabs will contract and detach from the shell, facilitating extraction with yields of almost 100%.



Benefits of HPP

High pressure modifies certain proteins and enzymes such as the cellular membranes of micro-organisms present in food, which alters the transportation and permeability of these molecules into inactivity. Vitamins and other bioactive components of food and components responsible for the aroma or flavor of products are however not affected by the use of high pressure processing. This is because a certain amount of pressure can be used to exclusively act on non-covalent bonds (those that maintain the three-dimensional structure of the membrane proteins and enzymes) and leave the covalent bonds (those present in food components and molecules that are responsible for its sensory properties) intact. Here are more benefits of HPP.

■ Pasteurization and extending shelf life

Processors can reduce several logs of spoiling micro-organisms (yeast, moulds, lactic acid bacteria, psychrotrophic bacteria) and pathogens (E.coli, Salmonella, Vibrio and Anisakis) present in seafood products using high pressure from 400-600MPa. This enables them to achieve:

- Product shelf life that is multiplied two to four times compared to the same product without HPP stored at the same temperature. The sensorial quality of a HPP-processed product is maintained for a longer period due to the absence of thermal treatment, micro-organism destruction and inhibition of amines formation.
- A post-packaging intervention to ensure food safety as the risk of cross contamination after a HPP process is avoided.

Processors can also achieve a clean/natural label due to an inactivation of micro-organisms and the impossibility of a posterior cross-contamination that remove additives or preservatives from food.



Mollusc shucking and higienization (vibrio inhibition included) can be performed together to achieve quality, safe, fresh tasting oysters with a longer shelf life.

■ Molluscs shucking

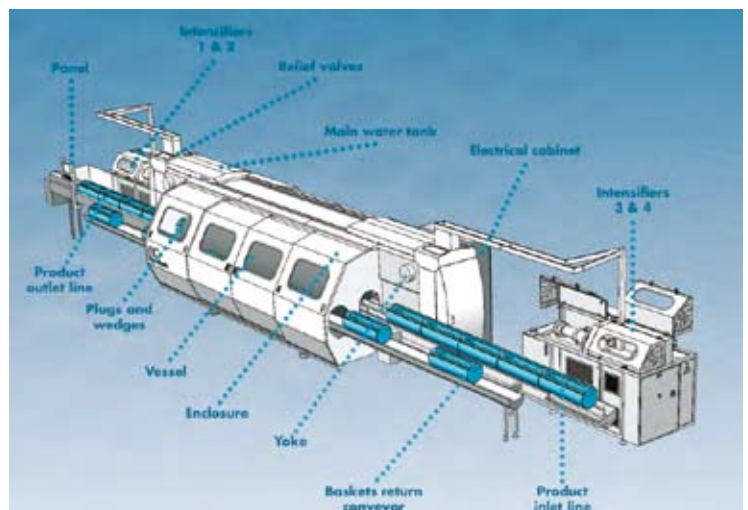
Processors can use HPP ranging from 200-350MPa to denaturize proteins from the adductor muscle of molluscs such as oysters and clams. Using HPP, the muscle, which is responsible for closing the shell, will not be able to contract and the oyster will open. This exposes the meat for easy extraction, resulting in over 50% increase in yields.

This application also avoids the sometimes risky handling of molluscs due to possible contamination and a potentially dangerous knife manipulation of opening the shells. This process is most commonly used in countries such as Australia, Canada, the US and Japan, where processors face difficulties in obtaining labor.

Mollusc shucking and higienization (vibrio inhibition included) can be performed together to achieve quality seafood products such as safe, fresh tasting oysters with a longer shelf life.

■ Crustaceans meat extraction

Using HPP, meat of crustaceans such as lobsters or king crabs will contract and detach from the shell, facilitating extraction with yields of almost 100%. The process also enables operators to work on smaller parts such as the legs or antennae of the crustacean where meat is difficult to obtain. As there is no need for cooking, the process enables the meat to retain its natural flavors and provide customers with a fresh product for cooking prior serving. ■



HPP is a non-thermal process that subjects seafood under high hydrostatic pressure (which is transmitted by water) reaching up to 600 MPa or 87,000 psi.

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