

**High Pressure Processing (HPP)** is a **non-thermal antimicrobial** process able to retain dairy products freshness and kill spoiling and pathogenic micro-flora, improving importantly shelf-life of the product.

Dairy products, already in their final flexible package, are placed into a high pressure vessel and subjected to a high level of hydrostatic pressure (isostatic pressure transmitted by water). **Shape and integrity remains unchanged because pressure is identical on every part of the product.**

HPP is an all-natural, clean, environmentally friendly technology. HPP machines only require electricity and water, which is recycled. **Yogurts, probiotics, cheese, dairy spreads, sandwich fillings, milk**, are only some examples of products that can be HPP. The process is suitable for bottles, cups, pouches, trays...

## DAIRY SPREADS, SANDWICH FILLINGS AND DRESSINGS >

Cream cheese, dairy dressings and spreads may be HPP in order to enhance their shelf-life, destroying pathogens and spoiling flora while keeping sensorial and nutritional quality to its highest degree.

Ingredients taste and emulsion properties are totally respected in a safer and fresh, sandwich filling or dressed salad. This application is also successful in mayonnaise based products.



## < COLOSTRUM BEVERAGES

Colostrum is the first milk produced by mammals after giving birth and it's provided to the newborn in the first days of life to protect and support their immune system. HPP is the best option to preserve and respect the functionality of thermosensitive bioactive components present in colostrum such as immunoglobulins, lactoferrin and growth factors.

## CHEESE >

High pressure processing of cheese inactivates pathogenic and spoilage microorganisms and can enhance the maturation. This is an interesting application as non-thermal antimicrobial process of cheese. Moreover innovative textures can be developed.



## < EXTENDED SHELF-LIFE YOGURTS

High pressure processing takes advantage of the specific barosensitivity of each microorganism specie. A post packaging HPP of yogurt brings the following benefits:

- Inactivation of yeast and molds: up to 3 months conservation.
- Reduction of *Lactobacillus* metabolic activity: no post acidification.
- Inactivation of spoiling bacteria: only probiotic strains survive.

## PROBIOTIC DAIRY PRODUCTS

A consumer-friendly range of beverages can be made by simply adding the probiotic culture ingredient directly into dairy beverages. HPP enhances shelf-life of these products, at the same time increasing their quality and keeping taste unchanged. Current application space for probiotic beverages is constrained to fermented drinks. HPP enables low pH probiotic beverages: new beverage formats (eg. juices, direct acidified drinks), no fermentation, no culture management, fresh taste and food safety.



## < MILK

Processing milk at 5000 bar/500 MPa/72,000 psi shelf life of 10 days at 10 °C is achieved, similar to thermally pasteurized milk. Furthermore HPP milk may improve the texture of products made with it: set yogurts made with milk processed at 6000 bar/600 MPa/87,000 psi have a more rigid gel; Curd properties of cheese can be modified.

ELIMINATION OF MICRO-ORGANISMS

High pressure, between 4000 bar / 400 MPa / 58,000 psi and 6000 bar / 600 MPa / 87,000 psi from 1 to 5 minutes, reduces several logs of spoiling micro-organisms (yeasts, molds, lactic acid bacteria, psycrotrophic bacteria) and pathogens (*E.coli*, *Listeria*, *Salmonella*, *Cryptosporidium*...) in dairy products.

Probiotic bacteria in 10% MRS (pH4.4)

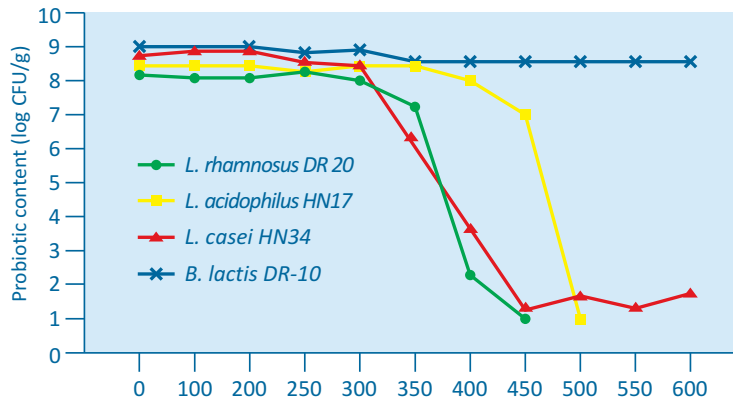


Figure: Probiotics resistance to HPP. Source: Fonterra

INNOVATION AND NPD

New, functional, never seen before products can be developed with the help of HPP. The technology respects the functional properties of the fresh product, being a great tool for the development of new value added propositions.



In partnership with Fonterra Cooperative Group, leading dairy ingredient multinational who has developed and patented various HPP applications for dairy, Hiperbaric is exploiting the opportunities that high pressure processing technology offers for yoghurts and functional dairy products.

HPP ADVANTAGES

- Post packaging / bottling non thermal antimicrobial process: ➤ Safety products.
- Effective eliminating spoilage and pathogenic micro-organisms: ➤ Protect the brand.
- No impact on sensory, nutritional and functional properties: ➤ Develop organic or functional foods.
- Increases shelf-life maintaining product freshness: ➤ Market expansion.

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