

HIGH PRESSURE PROCESSING (HPP) is a **non-thermal, antimicrobial process** ideal for meat products. HPP is an all-natural, clean, environmentally friendly technology which only requires electricity and water, which is recycled.

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

Ready-to-eat (RTE) meat such as **sliced ham, turkey, chicken cuts, or even whole pieces of cured ham**, are only some examples of a wide range of meat products that can be processed by HPP. HPP is a viable step to **extend shelf-life while maintaining freshness, higher sensorial qualities and improving food safety.** The process is suitable for both vacuum-packed and modified atmosphere packaging (MAP).

SLICED & DICED COOKED PRODUCTS >

HPP as a non-thermal, post-packaging antimicrobial treatment, approved by the United States Department of Agriculture (USDA) Food Safety and Inspection Service (FSIS). HPP is the safest alternative to thermal post-lethality treatments and provides a 'natural' alternative to use of chemical antimicrobials. HPP delivers a significant shelf-life extension, keeps the fresh taste, maintains the nutritional values, and is not restricted by the product shape, size, weight or volume of the product. Therefore, HPP is suitable for whole, sliced, stripped & diced meat products. Presently, some of the most successful commercial HPP applications are sliced or diced cooked meat products which have **clean labels**, without sacrificing food safety or shelf-life.



< DRY CURED PRODUCTS

HPP is the best option for eliminating *Listeria* contamination in dry cured products. The non-thermal process keeps the original uncooked taste and color of these traditional products, permitting export to the most legislation exigent countries like the USA and Japan. HPP allows the launch of shelf-stable sliced cured meat products by the control of fermentative microflora. Moreover, HPP now provides the opportunity to increase product sales by not having to be refrigerated. Sliced cured products can now accompany other types of shelf-stable products, which can remain at room temperature to be enjoyed during outdoor holidays...

RAW MEATS >

HPP controls microbial safety in raw or marinated meats. Shelf-life is increased, maintaining all the freshness of natural flavoring ingredients.



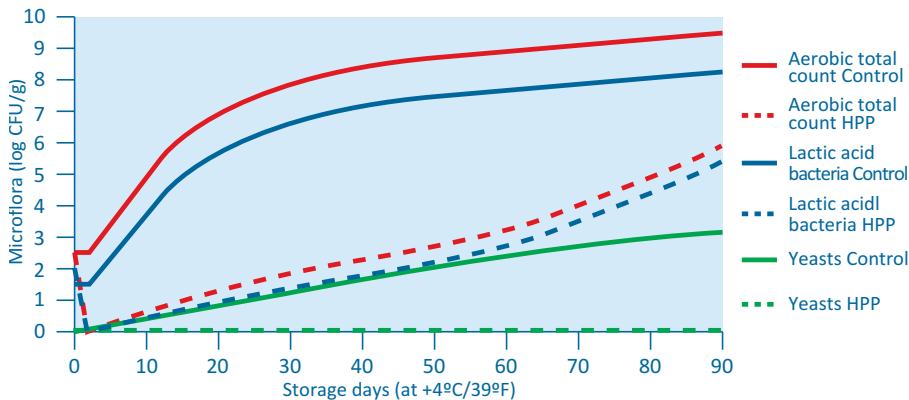
READY-TO-EAT MEALS

With HPP, the ability for new product development of convenient, meat-based RTE meals with a longer shelf-life and higher sensorial qualities can be launched. Pressure can uniformly treat all of the different ingredients of the meal (meat, carbohydrate, vegetables) at the same time, keeping the freshness of a homemade freshly cooked meal.

ELIMINATION OF MICRO-ORGANISMS

High pressure, between 500 and 600 MPa/ 72,500 and 87,000 psi, from 1 to 5 minutes, reduces several log of spoiling micro-organisms (lactic acid bacteria, yeast, molds, psychotrophic bacteria) and pathogens (*Listeria*, *E.coli*, *Salmonella*) in meat products.

Evolution of different microflora of vacuum-packed sliced hams control or processed during 5 min at 590 MPa / 85,500 psi



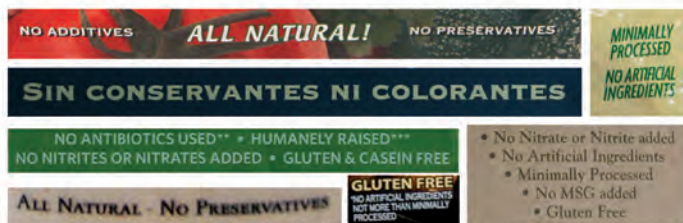
SHELF-LIFE INCREASE >

Shelf-life is generally multiplied by 2 or 3 times. In addition to microbial shelf-life increase, sensorial quality is maintained much longer due to micro-organism destruction: no acidic taste due to lactic acid bacteria, no off-odor given by coliform multiplication. **HPP meat products stay fresh much longer.**



< CLEAN LABEL

One of the main trends which has made HPP successful, is the development of **natural, clean label, healthier, preservative-free products**. HPP as a post-packaging, lethality intervention which allows for the removal of artificial ingredients from product formulation, and reduction in salt levels, while withstanding changes in flavor or water retention capacity.



HIPERBARIC CUSTOMERS INNOVATE THROUGH PRESSURE TO

- Secure meat products.
- Protect their brand.
- Expand markets.
- Create clean labels.
- New products development.

HPP ADVANTAGES

- Post packaging process avoiding any recontamination.
- Effective in eliminating pathogenic micro-organisms.
- No impact on sensory properties of processed meats.
- Increases shelf-life maintaining product freshness.
- No need for chemicals or preservatives.

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