



Meat Products

HIGH PRESSURE PROCESSING (HPP) is a non-thermal pasteurization process ideal for meat products

Sliced, diced, or entire meat products are introduced 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.** HPP is an all natural, clean, environmentally friendly technology. HPP machines only require electricity and water, which is recycled.

Sliced ham, turkey or chicken cuts, ready-to-eat products, whole pieces of cured ham, these are only some examples of a wide range of meat products that can be processed by HPP, the viable step to **extend shelf-life keeping freshness, maintaining 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 pasteurization, approved by the Food Safety and Inspection Service (FSIS) in USA, is the safest alternative for sliced meat products. It provides a significant shelf life extension, keeps fresh taste, maintaining nutritional values and with no size or volume effect: it is suitable for whole, sliced, stripped & diced meat products.

Some of the most successful commercial HPP applications nowadays are sliced or diced cooked meat products with **clean labels**, without sacrificing food safety or shelf life.



Ready to eat meals

With HPP new, convenient, meat-based ready to eat meals with a longer shelf-life and higher sensorial qualities can be launched. Pressure can pasteurize the different parts of the meal (meat, carbohydrate, vegetables) at the same time, keeping the freshness of a home made freshly cooked meal.



Marinated meats

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



Dry cured products

HPP is the best option for securing dry cured products from *Listeria* contamination. The non-thermal process keeps the original uncooked taste and colour of these traditional products, permitting exports to the most legislation exigent countries like USA and Japan.

Moreover HPP allows to launch shelf-stable sliced cured meat products by the control of fermentative microflora. It gives the opportunity to increase product sales, being outside of chilled linear. Sliced cured products can now accompany other types of shelf-stable products, be stored at room temperature during outdoor holidays...

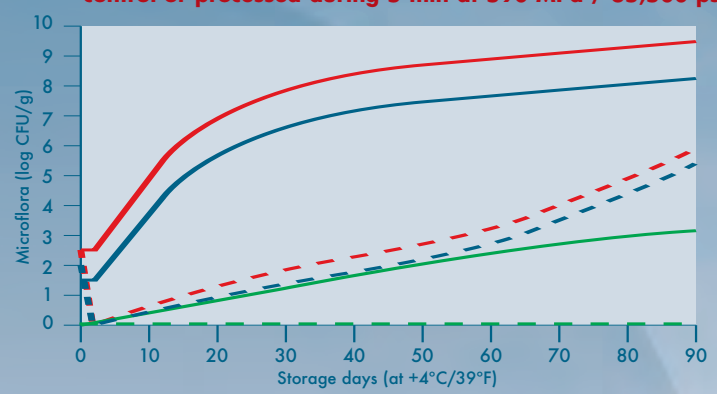


Effects and Benefits

Elimination of micro-organisms

High pressure, between 500 and 600 MPa / 72,500 and 87,000 psi, from 1 to 5 minutes, reduces several logs of spoiling micro-organisms (lactic acid bacteria, yeast, moulds, psychrotrophic 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 any case, more than microbial shelf-life, sensorial quality is maintained much longer due to micro-organism destruction: no acidic taste due to lactic acid bacteria, no off-odour given by coliform multiplication. **HPP meat products stay fresh much longer.**

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.

Clean label

One of the main trends that is making HPP successful is the development of **natural, clean label, healthier, preservative-free products**. HPP as a post-packaging lethality intervention allows artificial ingredients removal from product formulation, and reductions in salt levels.

NC Hyperbaric customers innovate through pressure to:

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

Some examples of HPP products in the market

Product type	Product	Country	Pathogens control	Shelf-life increase	Clean label	Export	Shelf-stable
Cooked meat	Sliced ham & turkey	Spain	✓	✓			
	Pork and poultry cuts, small sausages	Spain	✓	✓		✓	
	Spicy chicken and beef strips	USA	✓	✓			
	Thick sliced ham, chicken and turkey products	Spain	✓	✓			
	Nitrate-free cooked pork products	Japan	✓	✓	✓		
	Natural, minimally processed cooked sliced meat	USA	✓	✓	✓		
	Roasted chicken: whole birds, breasts and drumsticks	USA	✓	✓	✓		
	Sliced chicken and turkey	USA	✓	✓	✓		
	Chicken sausages	USA	✓	✓	✓		
	Sliced turkey and strips of chicken (MAP)	USA	✓	✓	✓		
Cured product	Prosciutto whole and sliced	USA	✓				
	Parma ham (Prosciutto), salami and pancetta	Italy	✓			✓	
	Smoked German ham: whole, sliced and diced (MAP)	Germany	✓			✓	
	Prosciutto whole and sliced	Canada	✓			✓	
	Whole and sliced Serrano ham, salami, chorizo	Spain	✓			✓	✓
Ready-to-eat meals	RTE complete meals: meat, carbs and vegetables	Canada	✓	✓			
	Duck deli products	Spain	✓	✓			
	Organic pet food	USA	✓	✓	✓		
Marinated meat	Uncooked marinated chicken and turkey meat	Spain	✓	✓			