

Fruit & Vegetable Products

HIGH PRESSURE PROCESSING (HPP) is a non-thermal pasteurization process able to keep fresh attributes of fruit and vegetable products.

Freshly processed fruit and vegetable 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 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.

Puree, coulis & sauces

HPP is the alternative to heat processing for fruit & vegetable puree, coulis and sauces. It gets a significant shelf life extension, keeping fresh and home-made taste.

One of the most successful commercial HPP application nowadays is definitely preservative-free guacamole (avocado puree with spices) because the process maintains avocado flavour, texture and green colour without sacrificing food safety or shelf life (up to 6 weeks under chilled conditions).



Ready to eat vegetable meals

HPP controls microbial safety in ready-to eat cooked vegetable meals allowing to develop clean label products. Shelf-life is increased, maintaining all the freshness of natural flavouring ingredients.



Puree, coulis, sauces, juices, smoothies, chunks, slices, ready-to-eat products, these are only some examples of a wide range of fruit and vegetable products that can be processed by HPP.

Premium, natural and/or organic products maintain higher sensorial, functional and nutritional values while improving shelf life and food safety.

The process is suitable for bottles, cups, pouches, trays...



Juices and smoothies

HPP is the best option for keeping fresh flavour of juices and smoothies. This non-thermal process keeps original fruit/vegetable taste and colour, allowing the creation of the highest quality premium range. The real taste of freshly squeezed juice!



Chunks and slices

With HPP, new convenient pieces and slices with a longer shelflife and higher sensorial qualities can be launched. Pressure can pasteurize with the same efficiency fruit and vegetable halves.



Effects and Benefits

Elimination of micro-organisms

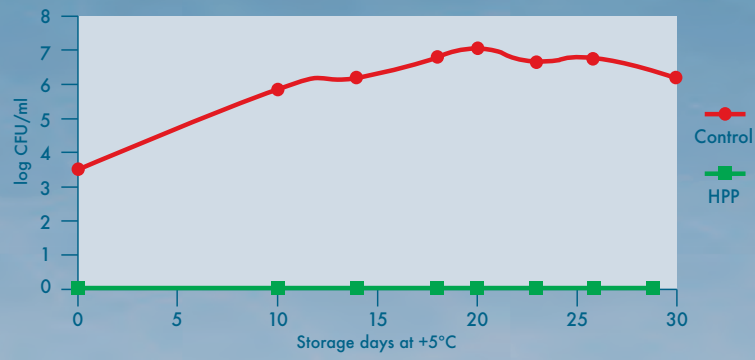
High pressure, between 400 MPa/ 58,000 psi and 600 MPa/ 87,000 psi from 1 to 5 minutes, reduces several logs of spoiling micro-organisms (yeasts, moulds, lactic acid bacteria, psychrotrophic bacteria) and pathogens (*E.coli*, *Listeria*, *Salmonella*, *Cryptosporidium*...) in fruit and vegetable products.



Shelf-life increase

Shelf-life is multiplied from 3 up to 10 times comparing with the same product without HPP, stored at same temperature. In any case, more than microbial shelf-life, sensorial quality is maintained much longer thanks to micro-organism destruction: no fermentative taste due to yeasts, moulds or lactic acid bacteria. **HPP products stay fresh much longer.**

Total microflora of orange juice control or pressure processed during 1 min at 500 MPa / 72,500 psi



Functional / Organic foods and beverages

One of the main trends that is making HPP successful is the development of natural, organic, preservative-free, and functional products. HPP as a non-thermal and delicate post-packaging lethality intervention, allows development of **healthier food: rich in vitamins, anti-oxidants and thermosensitive antimutagenic components**, bringing a higher level of functionality to new products.

HPP advantages

- Post packaging/bottling pasteurization process avoiding any recontamination: > **Secure products.**
- Effective in eliminating spoilage and pathogenic micro-organisms: > **Protect the brand.**
- No impact on sensory, nutritional and functional properties: > **Create organic or functional foods.**
- Increases shelf-life maintaining product freshness: > **Expand markets.**

Some examples of HPP products in the market

Product type	Product	Country	Pathogens control	Shelf-life increase	Preservative-free	Organic	Functional	Shelf-stable
Juices & smoothies	Citrus juices	France	✓	✓	✓			
	Apple, plum, strawberry, pear juices	Italy	✓	✓	✓			
	Juices and smoothies	Northern Ireland	✓	✓	✓			
	Orange juice and smoothies	Spain	✓	✓	✓			
	Organic apple juices	Portugal	✓	✓	✓	✓		
	Smoothies and organic orange juice	Australia	✓	✓	✓	✓		
	Broccoli & apple, carrot juices	Czech Republic	✓	✓	✓		✓	
	Pomegranate juice	Australia	✓	✓	✓		✓	
	Juices & superfood smoothie	USA	✓	✓	✓	✓	✓	
Purees, coulis & sauces	Avocado pulp & guacamole	Mexico	✓	✓	✓			
	Guacamole regular & organic	USA	✓	✓	✓	✓		
	Mexican style tomato sauces	USA	✓	✓	✓			
	Tofu & dressings	USA	✓	✓	✓	✓		
	Hummus and salsas	USA	✓	✓	✓	✓		
	Fruit puree & coulis	Australia	✓	✓	✓			
	Apple & strawberry jams	Italy	✓	✓	✓			
	Blended apple fruit purees	Canada	✓	✓	✓	✓		✓
Cuts & slices	Avocado halves	Mexico	✓	✓	✓			
	Chopped onions	USA	✓	✓	✓			
Ready-to eat meals	Cooked, mixed vegetable meals	Spain	✓	✓				
	Ready-to eat rice & blend of cereals	Japan	✓	✓	✓			✓