



HPP FREQUENTLY ASKED QUESTIONS

Common questions about High Pressure Processing (HPP).

UNIVERSAL PURE – HPP FAQ'S

Question	Response
How does HPP work?	Products (often in their final package) are placed in the HPP vessel. Tap water is pumped into the vessel and held at very high pressures for anywhere from one to five minutes. The pressure inactivates illness-causing vegetative bacteria and spoilage organisms without negatively impacting the nutritional value of the food.
How many people does it take working on the HPP line?	Typically five to 10 people are working on the HPP line loading/unloading the product, completing value-added steps e.g. applying labels, kitting product, sleeving the package and packing off the product.
How much is 87,000 psi (600 Mpa)?	This pressure is about five times greater than the pressure exerted at the deepest part of the ocean.
How is a package leaker detected?	Typically, a very small amount of water goes into the package rather than food coming out of the package unless there is a total package failure. If there is post HPP inspection at boxing, leaker packages can often be detected and removed.
Is HPP effective all the way through my product?	Yes, HPP is equally effective both on the surface and all the way through the product.
Is HPP effective on molds? Spores?	Yes, on fungi mold. No, on bacterial spores e.g. Bacillus cereus, Clostridium botulinum.
Can raw meat be HPP'd?	Yes, HPP can offer both improvement in food safety and shelf life extension for raw/fresh meats. There may be some denaturing of the raw protein depending on HPP pressure and hold time.
What do you mean when you say "inactivates" bacteria?	HPP inactivates foodborne pathogens by interrupting their cellular function of the bacteria, the cells fail to recover and die off.

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What are the benefits of using HPP?

HPP delivers benefits for the food producer, retailer and the consumer. HPP improves food safety. Longer product shelf life reduces food waste for the manufacturer and all the way through the distribution chain to the consumer. The food appearance, texture and taste remains fresher for a longer time. Cleaner label products can be introduced with more natural/better flavors and with lower sodium.

What are the benefits of HPP vs Retort?

As HPP is a cold pasteurization technology and doesn't negatively impact the product's taste and nutritional content in comparison to heat preservation methods.

What do you mean when you say HPP is a "log reduction"

Microbiologist measure the number of bacteria using colony forming units (CFU's). The higher the pressure and longer the hold time the greater reduction of CFU's. Log reduction is a math term (logarithmic scale) meaning one log is 10, two log is 100, three log is 1000, etc.

What food categories is HPP most effective?

HPP is most effective on products with high water activity (Aw) i.e. free water. This includes RTE meats and meals, salsa, guacamole, premium juices, smoothies, wet (spoonable) salads, fresh ground poultry, lobsters, oysters, mussels, raw pet food, etc.

What happens to shelf life once I open the package?

It depends on a number of factors including storage temperature and the environment. It is generally accepted that a HPP'd product will initially have reduced levels of bacteria and fungi than non-HPP'd products assuming the storage conditions are the same.

What is it that generates 87,000 psi (600 Mpa) pressure?

An electric motor powered intensifier pump, similar to the pumps used in the waterjet industry



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How do you protect against failures?

Process or package? From a HPP process perspective, all the product flows in one direction through the HPP system. There are process controls monitoring that the cycle pressure and hold time are reached before the product is allowed to exit the system. From a package perspective, the packages must be airtight/hermetically sealed. HPP is a good leak detector if there are packaging issues.

How does HPP aid in food safety?

From a food safety perspective, HPP addresses the most common food pathogens concerns: E. coli O157:H7, salmonella, Listeria monocytogenes and Campylobacter and Vibrio spp. In seafood.

How does HPP aid in shelf life?

A huge benefit to food processors and their customers is the increased product shelf life HPP delivers. SL is increased because HPP impacts the product spoilage organisms e.g. fungi (mold & yeast) and bacteria that cause spoilage. It is common to realize a 2X or more increase in SL without the use of bacteriocins and chemical preservatives. The added SL allows the processors to reduce production changeovers, ship full truckloads and reach larger geographical markets - all potentially benefiting their bottom line.

How does HPP work without harming the product?

HPP uses isostatic pressure, a fancy word for equal pressure from all sides. Let's use the analogy of a grape in a plastic bottle filled with water. If you squeeze the bottle, the water inside the bottle is pressurized exerting pressure on the grape equally from all sides.

What do you mean when you say hermetically sealed?

A seal which, for all practical purposes, is considered airtight.



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Do I need to use a special package for HPP?	Most often not. The package needs to be airtight and one or more surfaces flexible to accommodate the volume changes during HPP. Films with barrier properties are often used to take advantage of the longer shelf life available with HPP.
Can you incorporate HPP in my HACCP plan?	Absolutely and many companies are using HPP in their HACCP plans today.
Do I need to reference HPP on my product label?	Current regulatory guidelines do not require food manufacturers to list HPP on their labels. Some companies choose to include HPP (or variations) on their product labels as a marketing tool to promote the benefits of HPP to their customers.
Does HPP heat my product and why or why not?	Adiabatic/compression temperature increases during pressurization, then decreases during decompression due to the Le Chatlier Principle. The temperature increase varies due to compressibility and specific heat of the food. For water, the temperature change is 3C per 100 Mpa i.e. 18C at 600 Mpa.
Does HPP impact my product shelf life and why?	Yes, HPP will typically extend product shelf life by 2X or more. HPP addresses vegetative bacteria and fungi(mold and yeast), the primary organisms limiting shelf life.
Does HPP stop enzymes?	It depends - some enzymes e.g. PPO & PME are minimally affected by HPP..
Does HPP work on cut fruit?	Perhaps, but HPP will tend to compress the fruit pieces together. HPP works better if the fruit is in some type of matrix.
Does HPP work on frozen products?	No, the product needs to be tempered above 32F prior to HPP.
Does my product need to be refrigerated after HPP?	Yes, because HPP inactivates the vegetative bacteria and fungi (mold and yeast) but is not effective against bacteria spores.

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Can I freeze my product post HPP and stop the shelf life clock until thawed?	Yes, most often freezing a product post HPP will slow/stop microbial growth and further extend shelf life.
Can I use paper labels on my product package?	Typically no. Mylar or other label materials not affected by water are better choices.
Is HPP considered: Natural? Organic? Kosher? Vegan?	Yes, HPP can be used for natural, organic, Kosher and vegan products.
Can you HPP in-shell eggs?	No, in-shell eggs will crack during the HPP process.
Can you HPP my IQF vegetables/fruit?	HPP is not typically a good technology for IQF products for two reasons: products need to be above freezing and HPP will compress the individual vegetable/fruit pieces together.
What are challenges processors face when considering HPP?	The greatest challenge is that HPP is a batch process. Many production facilities have difficulty integrating a batch process into their current online operations. Finding space in tight production facilities is another challenge. One has to consider space required for the HPP equipment, for product staging and conveyors and equipment maintenance.
Can you HPP my product that has air inside the package?	Yes, many products with air inside the package are being HPP'd. It is typically a good idea to minimize the air inside the package to increase the throughput and cycle time of the HPP vessel.
Can you HPP pasta?	Yes, although the appearance of the pasta may look 'compressed'.
How critical is time between food production/packaging and the HPP process?	In general, it is best to minimize the time to maintain optimal product freshness. With RTE meats, it is recommend the products are HPP'd within five days of production. With premium juice products, we recommend HPP occurs with 24 hours of production.

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How do regulatory agencies view HPP?

Both USDA/FSIS & FDA recognize HPP as an effective food safety technology. In the case of USDA/FSIS, HPP is often incorporated in the food producer's HACCP plan. HPP users need to validate their own application's effectiveness as part of their HACCP program. Note: Letter of No Objection for RTE meats

Does HPP work on whole fresh fruit?

Results with apples, strawberries and many other whole fruits have not been satisfactory due to trapped air pockets within the fruit. Maintaining packaging integrity during the HPP process also becomes an issue if the fruit is firm.

How can I maximize my product shelf life?

Using the appropriate pressure and hold is important. For most products, minimizing head space and using a package with good barrier properties will maximize product shelf life.

Does FDA recognize HPP as an acceptable pasteurization method for 5-log reduction requirement with juices?

Yes.

How do I go about getting a validation study done?

UNL, Virginia Tech, Ohio State, IIT and numerous other research organizations. The HPP equipment manufacturers offer challenge study services too.

Do I need to use a special package for HPP?

Most often not. The package needs to be airtight and one or more surfaces flexible to accommodate the volume changes during HPP. Films with barrier properties are often used to take advantage of the longer shelf life available with HPP.

How does HPP impact vitamin and bioactive components of my product?

HPP will have little to no negative affect on vitamins and bioactive compounds

Can I HPP my juice which is in a Tetra Pak carton?

Packages containing paperboard are not good candidates for HPP.



MORE QUESTIONS?

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