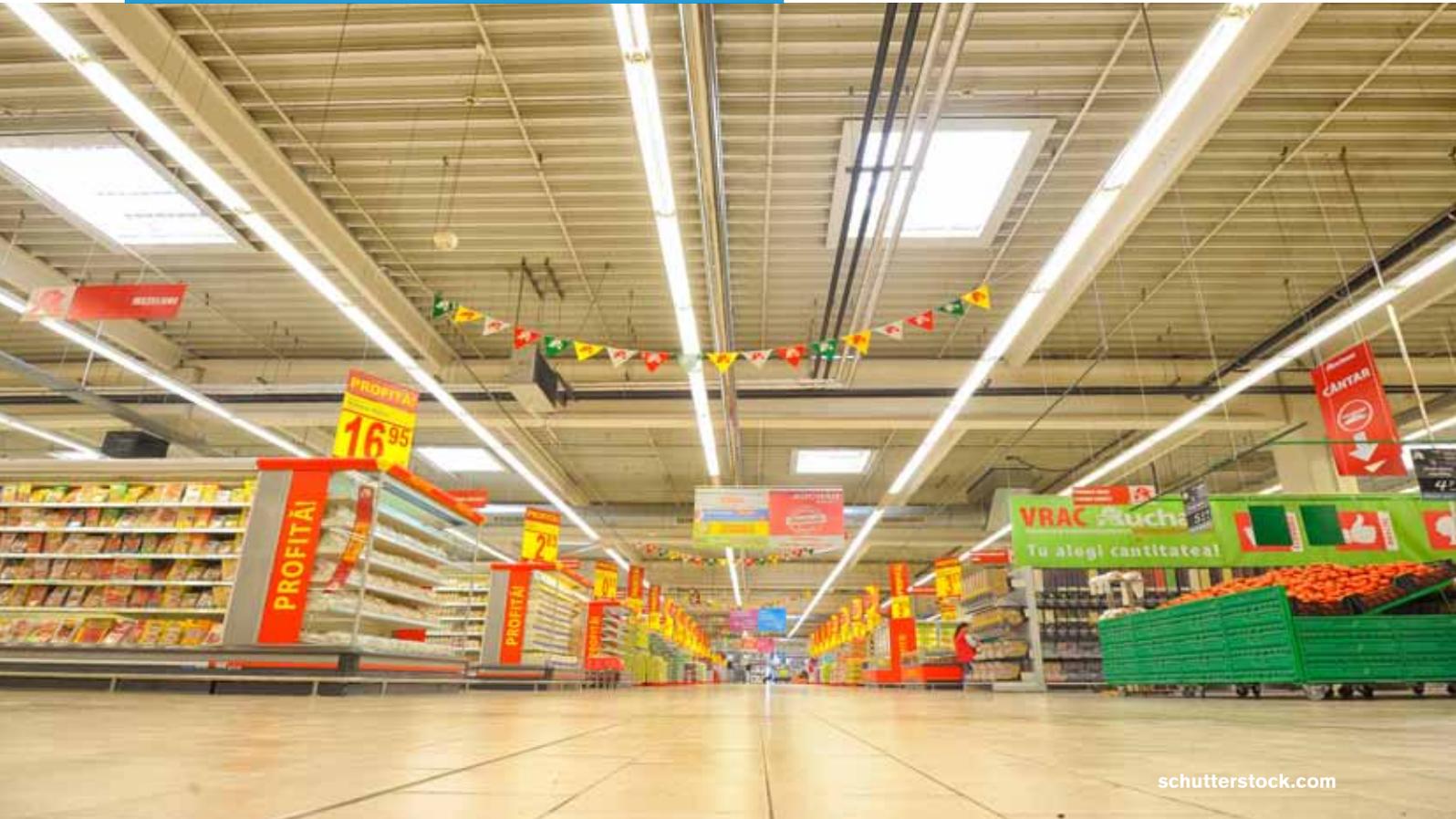


Avure High Pressure Processing



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Opportunities for Food Product Innovation Using HPP

If you have anything to do with the development or processing of food and beverage products, you've noticed a lot of news about technologies available to enhance and improve food safety and shelf life. Your consumers want fresh, healthy and preservative-free foods that are convenient but delicious. Retailers and foodservice wholesalers want to respond to these consumer demands, but need extended shelf life to reduce product spoilage. Creating products that meet these requirements - not to mention regulatory compliance - is truly a balancing act.





High Pressure Processing (HPP)

What's a food processor to do? There is a solution: High Pressure Processing (HPP). With a 25+ year track record, HPP offers food marketers and innovators the opportunity to ensure food safety and extend market reach with existing products, while enabling refrigerated, preservative-free products that traditionally were shelf stable through the application of heat or preservatives.

The use of HPP, a non-thermal post-package process, continues to rapidly increase in these categories:

- ✓ Pre-cooked and ready-to-eat sliced and whole meats
- ✓ Ready meals (MREs)
- ✓ Juices and beverages
- ✓ Dips and spreads
- ✓ Guacamole, hummus and salsa
- ✓ Dressings and soups
- ✓ Deli salads
- ✓ Seafood
- ✓ Pet food
- ✓ Baby food

HIGH PRESSURE PROCESSING or PASTEURIZATION (HPP) is cold pasteurization in pure water; it uses ultra-high pressure purified water to keep packaged food and beverages pathogen-free to stay fresh longer. At very high pressures bacteria such as *Listeria*, *E. coli*, and *Salmonella* are inactivated. It is an all-natural technique that preserves the vitamins, taste and texture of the food. HPP also extends the shelf life of foods which reduces waste.

What exactly is HPP and how does it work?

HPP machines surround packaged food and beverages with up to 87,000 psi (pounds per square inch), or 6000 bar (600 MPa) of cold water pressure. This amount of pressure is equivalent to stacking fifteen elephants, each weighing five tons, on top of a plastic bottle. Under this kind of pressure, harmful bacteria like *Listeria*, *E. coli* and *Salmonella* are crushed and cannot survive. Food safety is achieved without the use of chemical preservatives or high temperatures and with little or no changes in nutrition and taste.

Prior to pressurization, the packaged food is loaded into a basket, then loaded into a closed chamber, sealed and finally pressurized by pumping water into it. The duration of the pressurization phase is generally one to three minutes. The high hydrostatic pressure does not affect any of the structural components of the food itself (proteins, fibers, fats, etc.), nor does it affect the structural integrity of the package used, as the pressure is applied uniformly on the food and the package from all sides. The result is a safe, delicious, clean label food or beverage product with up to four times the shelf life.



The Foundation of HPP

Since 1990, scientists discovered that foods subjected to high hydrostatic pressure lasted longer before spoiling. Modern food science has extensively studied this effect and high pressure processing (HPP) is now a well-recognized method for microbial inactivation. HPP achieves food safety and extends shelf-life while providing consumers with nutritious, natural, flavorful food. HPP opens the door to previously unachievable quality, food safety and new market segments.

Applications for HPP

HPP can be used on most air-free, moisture containing products ranging from salsa, guacamole, hummus, juices, meats, dips, salad dressings, sauces, baby food, pet food, coconut water, cheese, smoothies, fruits, soups, wet salads. Foods such as marshmallows, bread and whole fruits are not suitable, but pasta and cut fruits in sauce will work with HPP.

Why HPP?

- 1. Food Safety**
Extreme Pressure Inactivates Pathogens
- 2. Fresh Taste**
Not Altered by Heat, Chemicals or Irradiation
- 3. Clean Label**
Aligns with Consumer Trends
- 4. Longer Shelf Life**
Drastically Reduces Spoilage
- 5. New market segments**
Develop new product categories in retail and food service



Where Can HPP Take Your Products?



Consumer Acceptance

HPP is creating a new standard for food safety, productivity and product quality. It is recognized as a food safety intervention technology by the FDA, USDA, Health Canada and other international agencies. HPP food and beverages are found in the refrigerated section of grocery, convenience and club stores, otherwise known as the healthy outer perimeter zone. HPP'd juices and smoothies may be marketed as "Cold Pressed". Deli meats and other foods will have "All-Natural" or "No Preservatives" on their labels.

High pressure processed foods will have a clean label without preservatives and added chemicals. Consumers are willing to pay more for these all natural, clean label foods.



Examples of how leading food manufacturers strategically leverage the benefits of HPP today to expand markets, create new products and extend the shelf life:

- ✓ A leading pre-sliced meat and salad processor in Greece increased food safety and extended shelf life for its line of packaged meats and now ships product to the Greek Islands where the cold chain may not be reliable.
- ✓ With all natural juice products, maintaining taste, freshness and nutrition, without preservatives, can only be achieved with HPP. Because of extended shelf life, a Dutch company is now able to export their fresh juice products internationally.
- ✓ A producer of packaged pre-sliced deli meats with major market share for both retail and food service in the USA uses HPP to extend its clean label lines of packaged sliced meats for consumers hungry for convenience. The company's food service lines leverage HPP to meet the strict safety compliance requirements for institutional and hospital use.
- ✓ Traditionally preserved baccala (dried salted codfish) is well-loved but inconvenient for consumer preparation. Using HPP after hydration and packaging, a gourmet convenience seafood product was created for consumers with the shelf life extension demanded by retailers. Sales of the product have increased not only in season but year-round.
- ✓ Using HPP, a southern California seafood processor recently launched a new line of refrigerated fresh fish immersed in sauce with a 30-day shelf life. Consumers get a delicious, nutritious, tastes like "home-cooked" meal.



"We tripled our business the first year we started with JBT Avure's HPP. Now in year four, we're on track to grow by 400%."

Morgan McArthur, director of commercialization for Hope Foods, maker of premium hummus and dips

Delivering on the Promise of HPP: From Concept to Commercialization

Implementing HPP is more than just installing equipment. Manufacturers and producers need the confidence that their product will retain its texture, flavor and appearance with high pressure. Before HPP becomes incorporated into a product processing strategy, objectives for that product must be defined. Is pathogen elimination a key objective? Is shelf life extension needed in order to enable innovation or to reach new geographic or demographic markets? How important is clean-label? Are consumer requirements of convenience and quality attainable with your product? And is your product even viable for high pressure processing?

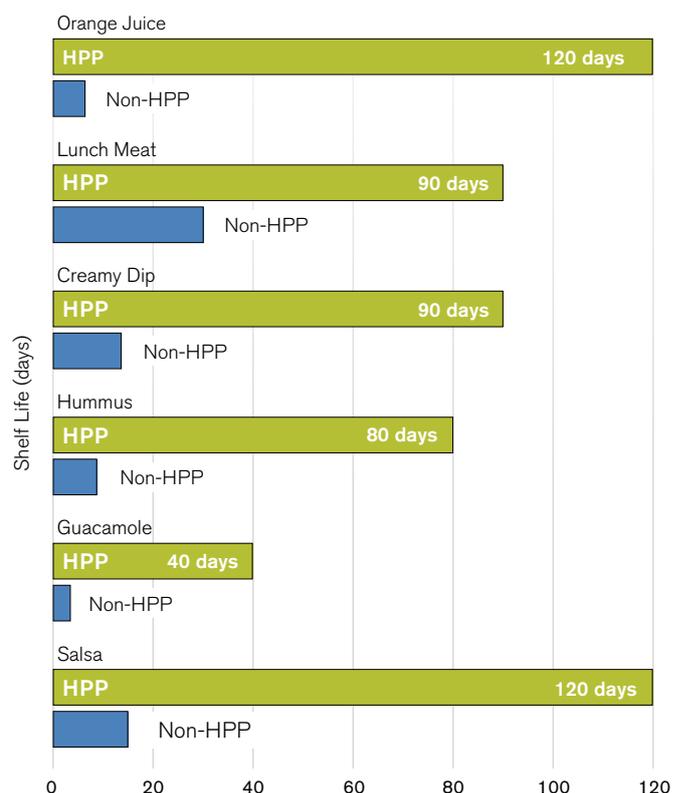
It's after you've determined that HPP will achieve your objectives and is suitable for your product, that the "process" of high pressure processing begins. It often happens that processes become narrowly defined to meet the needs of whoever is describing it – at the sake of the more complete picture. This is often the case with high pressure processing. "HPP is the packaging." "It's the equipment." "It's the food science and product development." "It's all about the marketing."

Successful high pressure processing is in fact all of these things, requiring a coordinated cross-functional effort in the processor organization and a vendor who can support the processor from its conception through its life cycle. Embarking on delivery of a new HPP product is a journey, that will require resources from your:

- ✓ R&D: Product and packaging development and validation
- ✓ Operations: Equipment and automation/material handling selection, installation planning and support, and on-going operation of your HPP site

- ✓ Safety/Quality Control: HACCP planning and approvals, adherence to processor's quality standards
- ✓ Marketing: Product testing, branding and go to market/launch efforts
- ✓ Maintenance: Team training, efficient system maintenance, initial spare parts quantities planning.

Shelf Life Comparison



JBT Avure Technologies: A complete HPP solution provider

More than 60%
of the world's HPP
treated food is produced
by manufacturers
and tollers using
Avure's HPP machines.

JBT offices serving as information center
for JBT Avure's HPP solutions:

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Only JBT Avure Technologies has complete HPP solutions to take a processor from new product conception to market launch and beyond. We've been the leader in high pressure technologies since 1950 and our equipment has been involved in the creation and delivery of 70% of commercially available HPP products today.

- ✓ Our market-leading family of equipment can fit the needs of processors of all sizes.
- ✓ The leader in high pressure processing, JBT Avure offers unmatched food science, lab support and packaging optimization, and operates the world's only dedicated HPP lab.
- ✓ Our growing global network of certified HPP contract service providers (tollers) provide services to companies of all sizes for short and long-term production, new product trials and seasonal upturns.
- ✓ Customers receive aftermarket 24/7 telephone support, worldwide service team access and global spare parts depots.
- ✓ Trusted and established high pressure processing solutions from the world leader minimizes your time to market while maximizing your success.

Request more info?

We look forward to answering all your questions about JBT Avure and High Pressure Processing

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