High Pressure Processing for Food: The Time Is Now

Part 1: Opportunities for Food Product Innovation Using HPP
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If you have anything to do with the development or delivery of food 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 want to respond to those consumer demands, but need shelf life in order to do so, and to do so safely. Creating products that can meet these requirements - not to mention regulatory compliance - is truly a balancing act.

What’s a Food Processor to Do?
There is a solution. High pressure processing (HPP), with a 20-year track record in many categories, offers food marketers and innovators the opportunity to ensure food safety and extend market reach with existing products, while enabling refrigerated and preservative-free products that traditionally were shelf stable through application of heat or preservatives.

It should be mentioned that besides new product opportunities created by HPP, processor revenues stand to benefit from the higher price points possible with them.

The use of HPP, a non-thermal post-package process, continues to rapidly increase in the following refrigerated foods categories:
• Pre-cooked and ready-to-eat sliced and whole meats
• Ready meals (MREs)
• Juices and freshly cut fruits
• Dips and spreads, such as guacamole, hummus and salsa, and dressings, soups and condiments
• Deli salads
• Seafood and shellfish

HPP is also seeing adoption in the tenderization and marinating of raw meats and most recently, as a listeria lethality treatment for ground meats. And, while not in the category of food for human consumption, HPP is being used by several natural pet food processors to ensure safety and extend shelf life of their products, and is showing great promise in the pharmaceutical and cosmetic industries.

HPP works so well, in fact, many food processors have been reluctant to reveal their use of HPP, preferring instead to keep it quiet – a part of their “secret sauce”. But as demand for greater food safety increases – and the desire for high value, unique, fresh products - more processors are publicly leveraging their use of HPP as an opportunity to demonstrate commitment to food safety and product innovation.

Many processors consider HPP such a competitive weapon, that they create their own brand for HPP products, such as Fressure™ fresh ground beef from Cargill, High Pressure Protection™ for Maple Lodge Farms poultry products, and Fresherized Wholly Guacamole products from Fresherized Foods™.
Where Can HPP Take YOUR Products?
Examples of how leading food manufacturers strategically leverage the benefits of HPP today to expand markets, create new products and extend the shelf life of existing ones illustrate a range of creative opportunities.

- A leading pre-sliced meat and salad processor in Greece increased food safety assurance for its line of packaged meats, along with shelf life extension in order to ship to Greek Islands where the cold chain may not be reliable.
- With all natural “raw” juice products, maintaining taste, fresh quality and nutritional value without preservatives can only be achieved with HPP. Using HPP, a Dutch company can now export their juices, chilled, into new geographic markets while maintaining nutritional value and organoleptic properties.
- One of the world’s largest processors of meat products for food service, uses HPP with fresh ground beef to extend shelf life of its preservative-free ground beef patties through pathogen elimination – without change in color, texture, taste, smell or other organoleptic qualities.
- With consumers demanding “fresh fresh fresh”, leading salsa and guacamole producers in the US look to HPP for shelf life extension and safety solutions that satisfy high quality and taste standards of award-winning product lines.
- A producer of packaged pre-sliced deli meats with major market share for both retail and food service in the US 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 hospitality use.
- Traditionally preserved baccala (dried salted codfish) is well-loved but inconvenient for consumer preparation. Using HPP after hydration and packaging, a gourmet convenience product was created for consumers with the shelf life demanded by retailers, and increased sales of the product – even in traditionally low-use seasons.
- Packaged cooked meat products such as chicken strips, and seasoned chicken or beef chunks, provide the ultimate in convenience for the creation of quick but delicious meals. With the extended shelf life and safety provided by HPP, even some tapas products have been successfully launched.
- At retail deli counters, non-high pressure processed wet salads (such as macaroni, coleslaw, potato salad and others) can become dangerously contaminated quickly due to spoilage organisms and typical presentation on open platters. For these products, HPP delivers dramatic extension of shelf life, increased safety and enhanced rheological properties of finished products due to the unique behavior of selected food components under pressure – all without heat or preservatives.
- Using HPP, a southern California seafood processor, recently launched a new line of refrigerated value-added seafood with a 30-day shelf life, consisting of varieties of fresh fish in a sauce. With texture and taste unaltered, the products satisfy consumer tastes for healthful, fresh, and convenient eating, and can be added to other ingredients for a delicious, nutritious, cooked-at-home seafood meal.
Yoghurt-based products such as dressings and smoothies are filling the refrigerated sections of many retailers today due to the efficacy of HPP in extending shelf life and are in high demand. Though HPP inactivates yeast and molds (for up to three months), and contamination and acidification bacteria, selected probiotic strains can be maintained for health benefit.

Export into new markets is possible for some cheese producers using HPP who attain shelf life of up to eight weeks with refrigeration (normal shelf life of fresh cheeses is three weeks). With minimal effect on texture, taste or nutritional properties, HPP can also provide cold pasteurization of raw milk cheeses.

Time-Proven Benefits of HPP
The effectiveness and benefits of HPP to products like those mentioned above, have been well researched and undergone multiple tests and documentation through each step of the production process, showing the following key benefits

- HPP inactivates dangerous pathogens, including the lethal Listeria, E. coli and Salmonella bacteria, as well as spoilage organisms. This ensures brand protection for the processor and food safety assurance for the consumer.
- HPP enables double or more the expected shelf life. This translates into (a) the preservation of food quality, (b) convenience for the consumer, and (c) ability to ship product over longer distances, which allows processors to reach new markets.
- HPP results in clean labels free of preservatives, without the addition of heat or chemicals, while maintaining organoleptic qualities of taste, texture, smell, color, and proven retention of original nutritional value, as well as the ability to process reduced sodium products. Included are lower sodium, all-natural food projects, and functional foods that have evolved out of the “health foods” niche. Processors can use HPP to create new fresh and high value product (including refrigerated versions of formerly fresh-only products), expand markets and distribution.
- HPP enables 100% meat separation (for shellfish), resulting in dramatically reduced labor costs and increased yields, innovative seafood product opportunities and convenience for the consumer.

How HPP Works
Exactly what is HPP and how does it work?

Basically, there are three components to the technology, variable depending on what is being processed: pressure (as high as 87,000 psi or 6,000 bars), hold time (generally two to three minutes), and temperature (6 to 40º C).

High pressure processing consists of applying ultra high water pressure to a packaged food. Prior to pressurization, the packaged food is loaded into a type of basket, which is then loaded into a closed chamber or vessel, sealed and then pressurized by injecting water into it until a defined pressure specific for the food to be treated is reached. The process is run in batch mode for prepackaged foods but can also be run in continuous mode, for easily pumped liquid foods (juices, purees, sauces, etc.).
The duration of the pressurization phase (generally two to three minutes) determines the efficacy of pathogen inactivation. The high hydrostatic pressure does not affect any of the structural components of the food itself (structural 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.

**The Time Is Now for High Pressure Processing**

Making the decision to incorporate HPP into your product strategy means you will embark on a process requiring investment of resources and expertise and in the selection of partners to help you successfully deliver your HPP products - from product concept to market launch.

Avure Technologies, the global leader in high pressure processing solutions, has a track record in delivery of systems that meets the needs of processors of all sizes and requirements, deep food science expertise, worldwide support and service, and market launch support.

High pressure processing provides the ability to offer innovative high value products, brand protection, regulatory compliance and new revenue opportunities, while offering the highest of food safety assurance and preservation of quality in shelf life extension. Whoever gets from concept to market first with food products that meet this combination of requirements, will enjoy competitive advantage and peace of mind.

**Key Takeaways**

- High pressure processing (HPP) is a non-thermal vegetative pathogen kill that provides the ability to create innovative, clean label products with extended shelf life - without sacrificing quality, taste, texture, flavor, or nutritional value.
- HPP can immediately assist food marketers with their current products to make them more marketable or expand their reach, and with new product development, often allowing higher price point possibilities resulting in increased revenues.
- The market for high pressure processed foods has reached the tipping point into mainstream, evidenced by the US$ 3 billion plus sales of HPP products* with unmatched HPP systems sales over the last two years.
- Selection of a provider of HPP solutions should take into consideration the ability of the vendor to support your product from concept to market launch.

For more information about what Avure HPP can do for your existing products or new ones in development, contact Avure Technologies at info@avure.com or +1 800.959.1135.

* Avure estimate
For more information on HPP benefits within food categories:
Avure HPP Application Briefs:
High Pressure Processing of Wet Salads and Dips >>
High Pressure Processing of Fresh Cut Fruits and Vegetables and Juices >>
High Pressure Processing of Meat Products >>
High Pressure Processing of Seafood and Shellfish >>

Other resources:
Avure Customer Video Brief >>

Avure Customer Use Briefs:
Maple Lodge Farms >>
Ghezzi Alimentari >>
Ifantis >>

Avure Technologies
The high pressure systems from Avure are designed, manufactured, and installed by Avure Technologies. With headquarters in Franklin, Tennessee, USA and a facility in Columbus, Ohio, USA, Avure specializes in high pressure presses for food processing and preservation, metal forming and densification of critical industrial parts. Avure and its predecessor companies have been leading the development of high-pressure technology applications for more than 50 years.

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