What it is:
High Pressure Processing (HPP) is an emerging food treatment that makes food safer and extends its shelf life, while allowing the food to retain many of its original qualities and healthy attributes. HPP also tackles specific product quality and productivity issues without the use of flavor-altering additives or methods. It meets consumer demand for freshness without the negativity often associated with other methods such as irradiation. It is a non-thermal preservation and pasteurization technique that causes little or no change in the organoleptic and nutritional attributes of the product being processed, unlike most conventional heat treatments. HPP accomplishes all of this by applying high hydrostatic pressures (between 100 and 1000 MPa) to food products.

About hydrostatic pressure:
Hydrostatic pressure is applied to food products through a water bath that surrounds the product. The hydrostatic pressure is transmitted to food products equally from all sides. This equal distribution of pressure is the reason why foods are not crushed during treatment. This type of pressure also has little effect on covalent bonds, and as a result, the foods being processed do not undergo significant chemical transformations.

How can it be used?
HPP is suitable for products with a high water content, and can be modified for both batch processing (for pre-packaged foods) and semi-continuous processing (for pumpable liquids). It is especially useful because it can be used to process raw products, such as oysters, avocados, fresh juices, and salsa, without significantly altering their flavor, texture, or appearance. The product packaging must be able to withstand a change in volume up to 15%, followed by a return to its original size, without losing seal integrity or barrier properties.

A typical processing cycle:
1. Packaged food items are placed in the pressure vessel.
2. Vessel is sealed and filled with water.
3. A pump (with intensifier) forces more water into the vessel, creating hydrostatic pressure. Pressure is isostatically transmitted by the fluid medium. A small temperature increase (~ 3°C per 100 MPa applied) may occur in the product, depending on the product composition.
4. Vessel pressure is maintained for a predetermined period of time (usually between 30 seconds and 15 minutes), during which time pathogens and spoilage bacteria are inactivated.
5. When the cycle is complete, the vessel is quickly depressurized, and temperatures return to the starting temperature.
6. Vessel is opened and product is removed.
What HPP can accomplish:
High Pressure Processing (HPP) has been used with hundreds of products, and can reliably:
- Inactivate foodborne pathogens
- Inactivate spoilage organisms
- Activate or inactivate enzymes
- Germinate or inactivate some bacterial spores
- Marinate meats
- Shuck oysters
- Extend shelf life
- Reduce the potential for foodborne illness
- Pressure-shift freezing or thawing
- Promote ripening of cheeses
- Minimize oxidative browning

HPP products currently being marketed worldwide:
- Abalone
- Apple Cider
- Apple Juice
- Apple Sauce (single serving packs)
- Avocado (halves, pulp)
- Beef
- Chicken
- Cod (both dried and salted)
- Fruit Purees
- Fruit Smoothies
- Guacamole
- Jams/Jellies
- Limeade
- Mussels
- Onions (chopped)
- Orange Juice
- Oysters (shucked, in-shell, and shooters)
- Prosciutto Ham
- Ready-to-eat Meal Kits (beef and chicken)
- Salsa
- Seafood Salads
- Strawberry Juice

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*production estimates given based on optimal loading, with two shifts operating seven days per week at 90% efficiency, 50 weeks per year.