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Trends in high pressure processing (HPP) food

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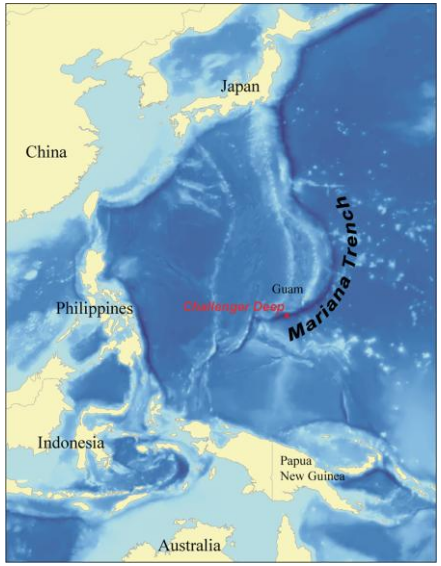
100 YEARS AHEAD

High pressure processing

- First research in 1890s – milk pathogens
- Non-thermal processing technology (combination with heat possible)
- First commercialised in Japan in the early 1990s for pasteurisation of acid foods for chilled storage
- High pressure treated foodstuffs have been marketed in Japan since 1990, in Europe and the United States since 1996 & Australia since 2001
- Rapid commercialisation since 2000
- Market size - US$2-3b

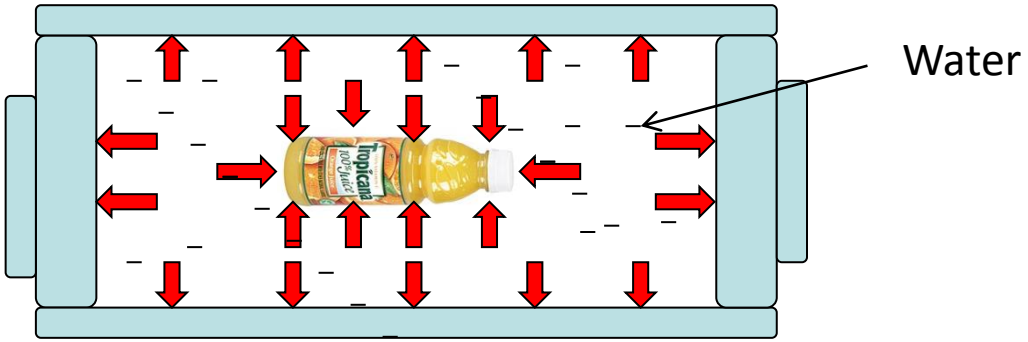
High pressure – how much pressure?



Mariana Trench

- deepest part of the world's oceans
- 11.03 km deep
-Water column pressure at the bottom
– 108.6 Mpa (15,750 psi)
- **1000 times atmospheric pressure**

6X



HPP – 6000 times atmospheric pressure

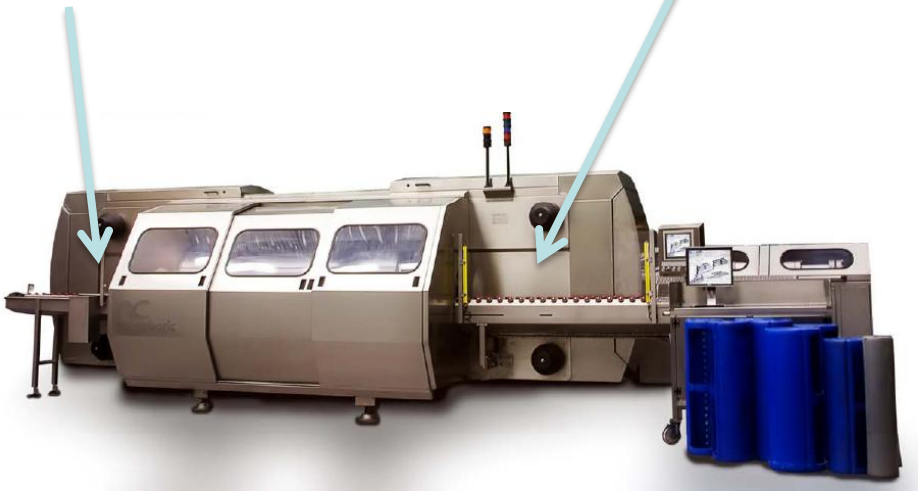
HPP machines

product in/out

Vertical

Processed product out

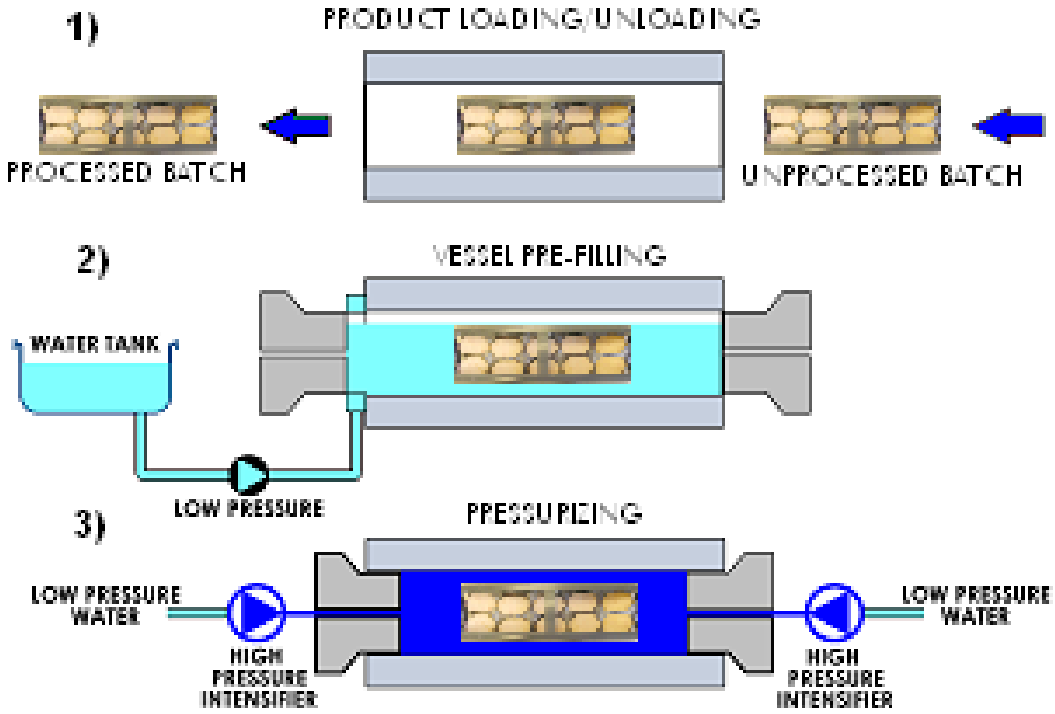
Unprocessed product in



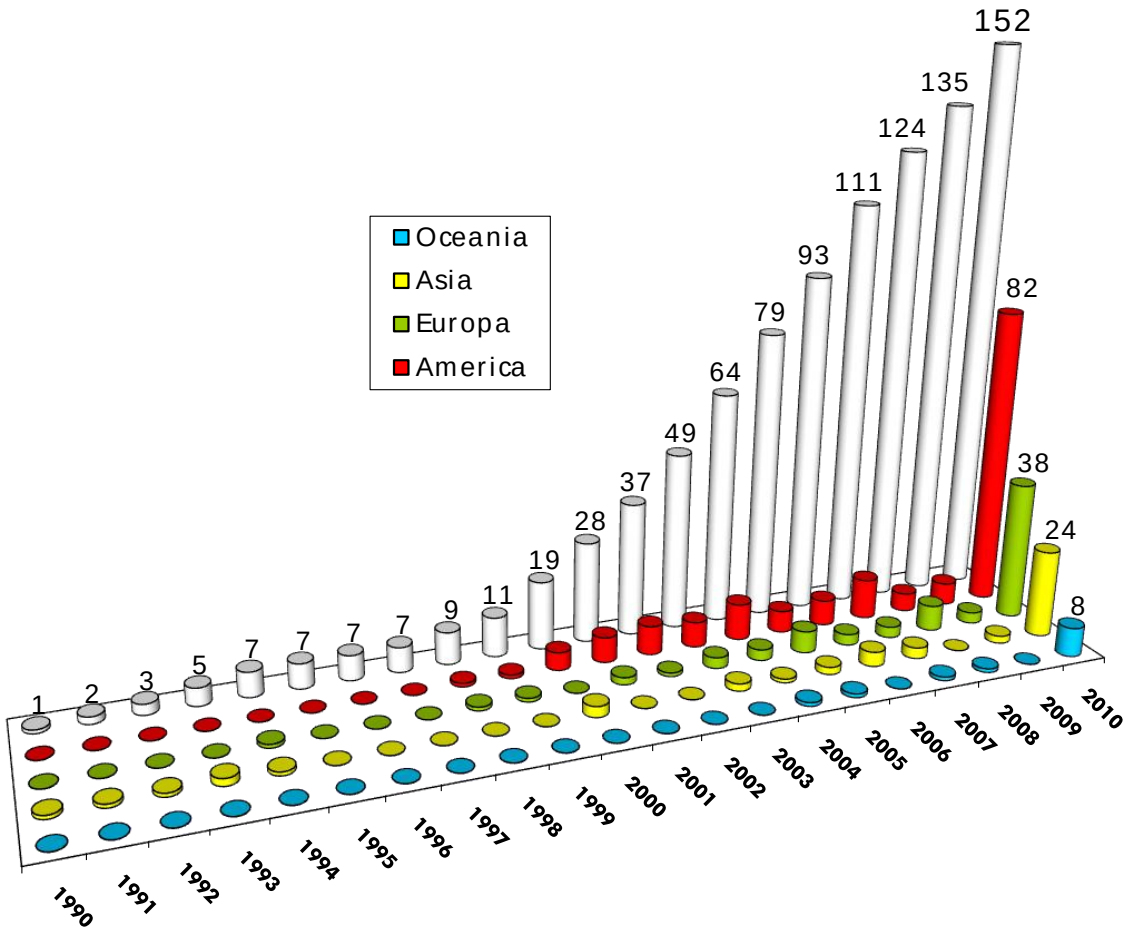
Horizontal

Trend is towards horizontal machines

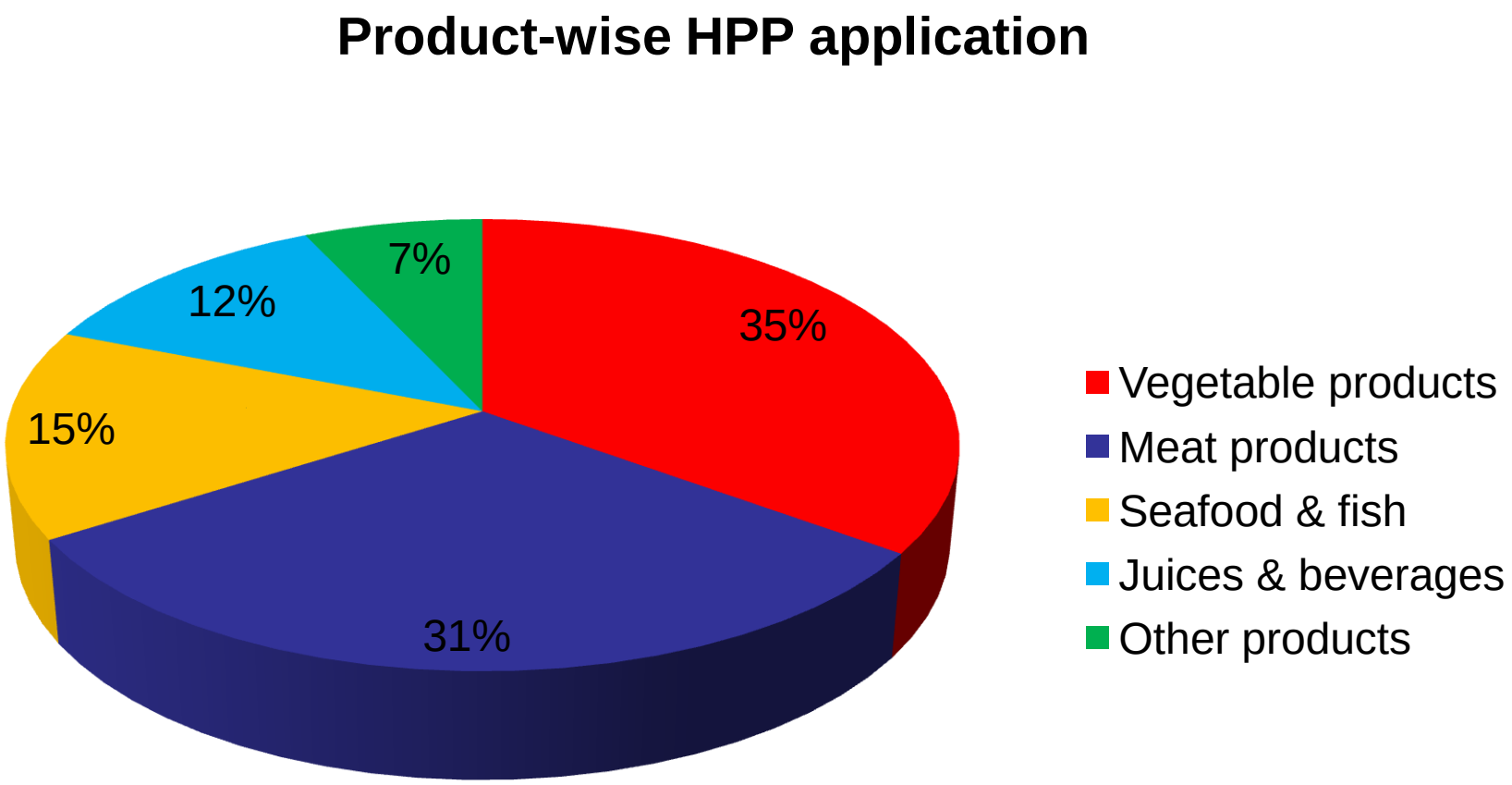
HPP process


1)
PRODUCT LOADING/UNLOADING
PROCESSED BATCH
UNPROCESSED BATCH
2)
VESSEL PRE-FILLING
WATER TANK
LOW PRESSURE
3)
PRESSURIZING
LOW PRESSURE WATER
HIGH PRESSURE INTENSIFIER
HIGH PRESSURE INTENSIFIER
LOW PRESSURE WATER

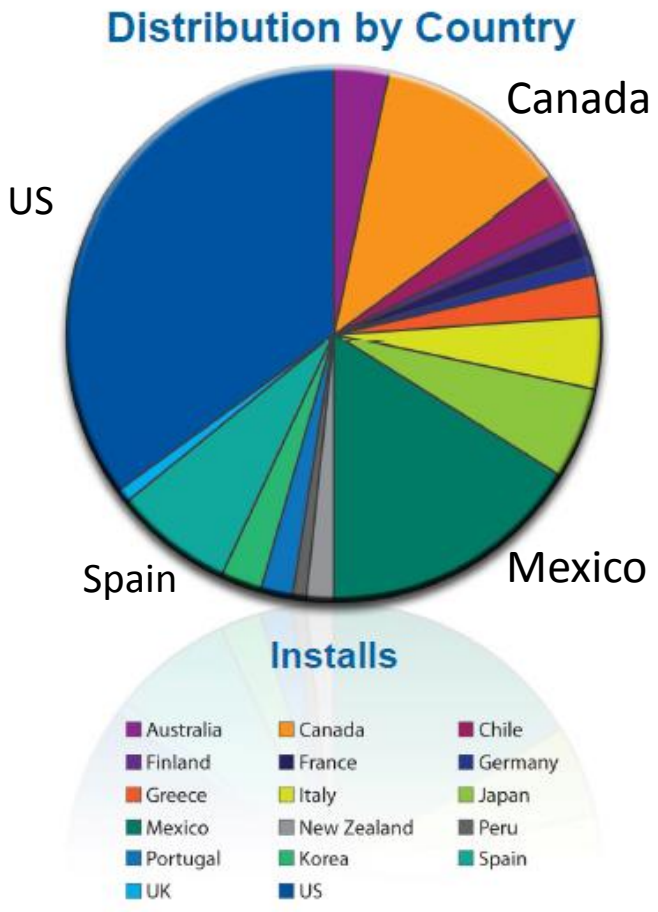
No. Of HPP machine installation around the world - 2010

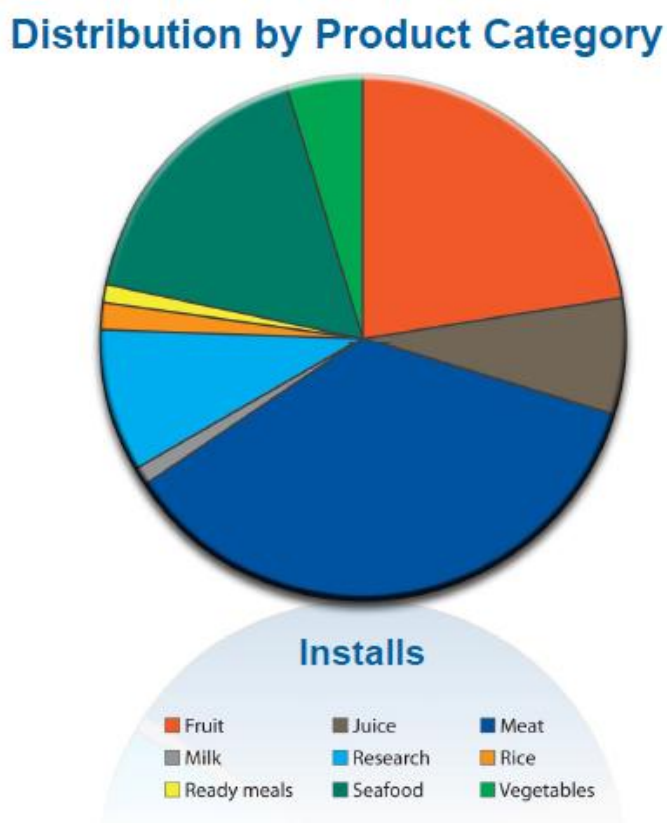


HPP product-wise application



HPP machines & products





AVURE 2010 - http://www.shellfish.org.uk/files/52909Rogers.pdf

HPP - Advantages

- Attractive for consumers - meets demand for **freshness and minimal processing** as it require **no chemical additives** or **no high temperatures**
- **No consumer negativity** *e.g.* irradiation and GM
- **Extended shelf life** - wider product distribution and results in fewer product returns
- **Uses less energy** (hence greenhouse gases) than other technologies and has the highest processing efficiency for pumpable foods
- Processing can be done in final packaging which **avoids post-processing contamination and tempering**
- Required processing times are also reduced and there are **no by-products**
- Permits the **inactivation of microorganisms** and enzymes at low temperatures, while valuable low molecular constituents, such as **bioactives, vitamins, colours and flavourings, remain largely unaffected**

Benefits - Branding HPP for premium returns

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BREAD READY® meats using TrueTaste™ technology

Ham, Turkey, Beef, Dry Sausage

BREAD READY® sliced meats now deliver truer, cleaner meat flavour without the use of chemical preservatives

Hormel® Natural Choice® Meats

Deli sandwich meats, Smoked dinner ham, carved chicken breast, bacon, Canadian bacon, pepperoni, hard salami and pork loin filet

"Have zero preservatives and are 100 percent natural with no artificial colours or flavours, and no added nitrites or nitrates, leaving only great taste"

Employing a cutting-edge water-based pasteurization process, *Hormel® Natural Choice®* products are sliced, sealed and packaged, and then placed in a TRUETASTE™ technology chamber where 87,000 pounds per square inch of water pressure are exerted, protecting against harmful bacteria. The process is all-natural, USDA approved and doesn't compromise the meat's great taste, texture, appearance or nutritional value.

100 YEARS AHEAD

Benefits – delivering fruits and vegetable serves

Authorities fail to achieve targets for eating fruits and vegetables in adults (US)

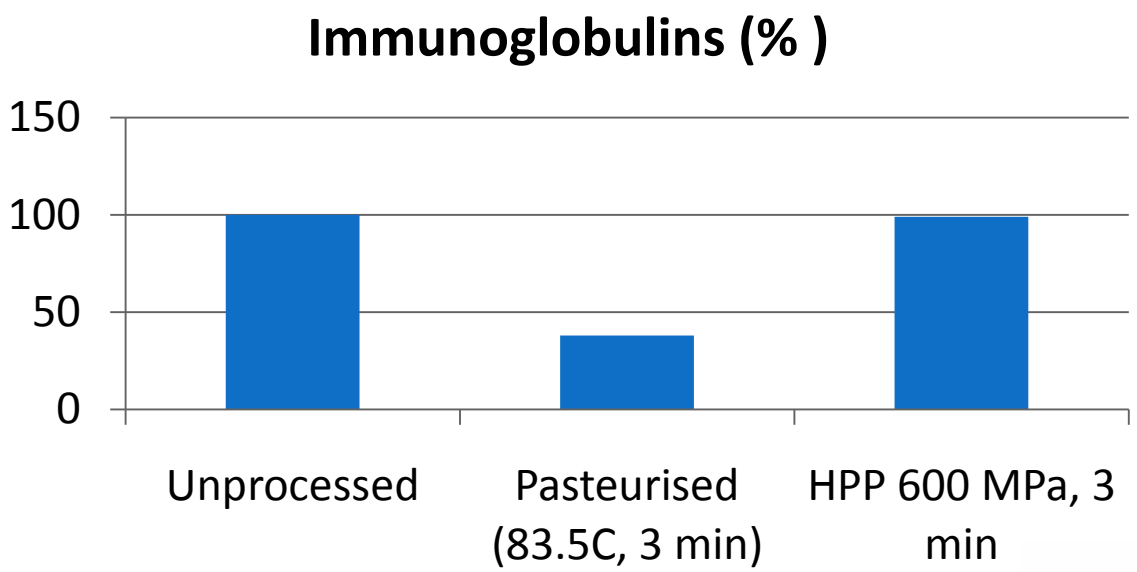
	Consumption target (%)		
	Consumption 2010	Target 2010	Nice to have target
Fruits	32.5	75	100
Vegetables	26.3	50	100

CDC, 2010

Fruit & Vegetable options
With HPP

- Whole
- Sliced
- Diced
- Coulis
- Smoothie
- Sauces
- Juices

Benefits – delivering bioactives



Patent WO/2006/096074 (Fonterra)

HPP will help deliver health claims

HPP machine trends

Smaller, more affordable machines targeting small manufacturers introduced

Feb 2010

Avure launched QFP100 horizontal 100 L HPP machine (price under **US $1 million**)

May 2010

NC Hyperbaric launched Wave 6000/120; 120L machine (price under **US $1 million**)

HPP with high temperature

Pressure-assisted thermal sterilisation (PATS) research

HPP product examples

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Meat & seafood

Ready meals

Juice & smoothie

Sauces & spreads

100 YEARS AHEAD

New HPP products - 2010

filet americain (raw meat spread)

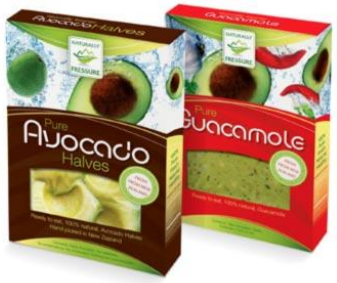
Meat toppings

All Natural *gazpacho* (typical Spanish cold soup based on tomato, cucumber, pepper, onion, garlic, olive oil) in 330ml and 1litre PET bottles

Mousse & Spreads

Zwanenberg, The Netherlands

New HPP products - 2010



Avocados and guacamole
(Fressure Foods, NZ)

Sliced meat
(Infantis, Greece/Germany)

Red & white grape juice
DGG Marketing - Australia/Singapore

Wholly Queso
Fresherized Foods, US

Future of HPP – what needs to happen?

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What is happening?	**What needs to happen**
Lack of interest or passive investment from large companies	Active investment from large companies
Food safety the main driver	Drivers need to be convenience, nutrition, bioactivity, naturalness, flavour & taste
Limited commercial research & innovation	More investment in R&D and innovation
Limited consumer awareness of HPP benefits	More consumer awareness/education efforts