ASEPTIC PROCESSING & HEALTH

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Consumer Demands

- With rising demand of the consumers → great impact on the food industry.
- Compared with the marketplace of 25 years ago, today it has more perishable products, including fruits and vegetables, and more innovative packaging.
- In addition, consumer aversion to traditional chemical preservatives has left food processors with less flexibility in choosing preservation methods.
- To find a technologic edge in the marketplace, food processors are exploring new processing and preservation technologies.

Emerging Technologies

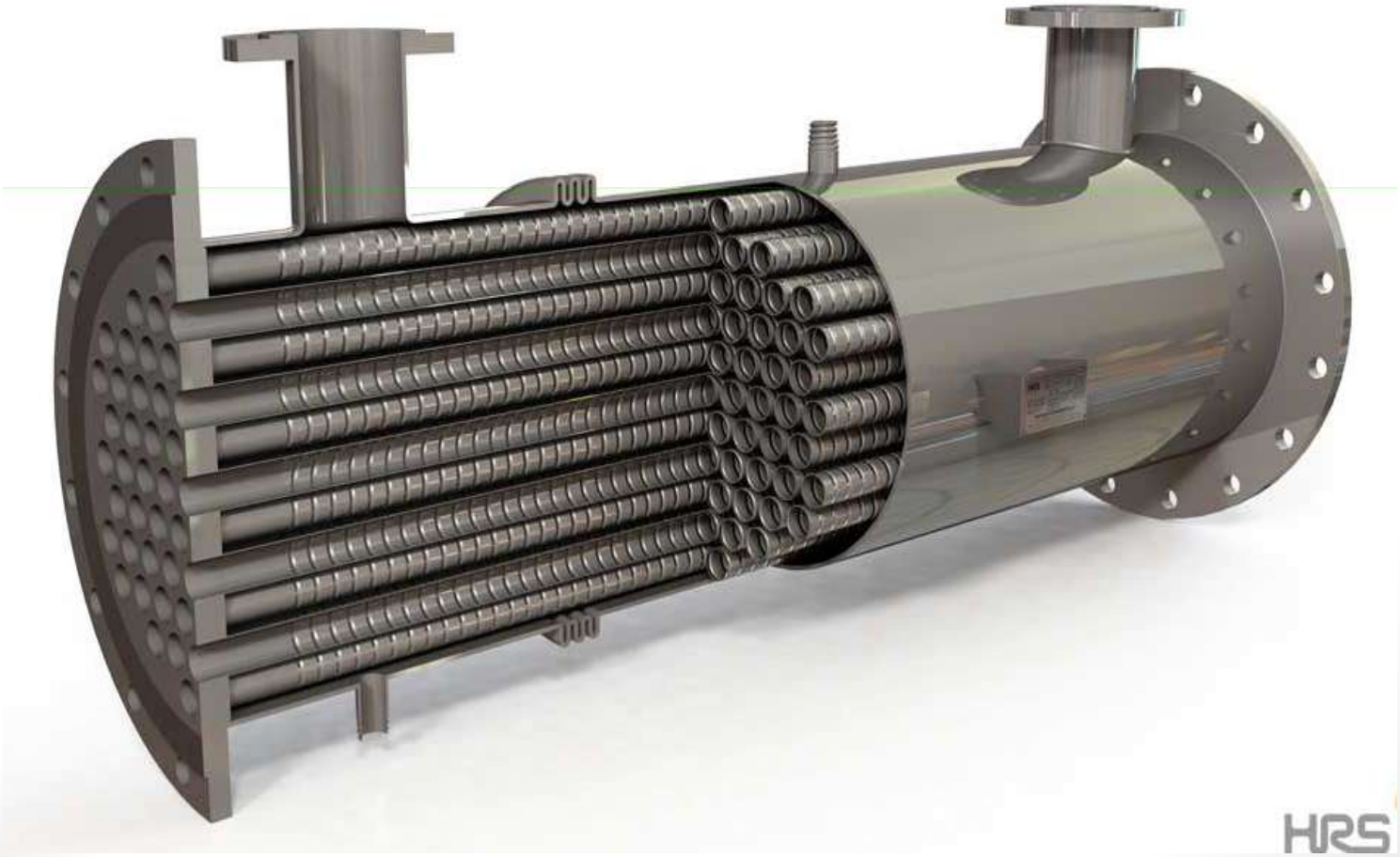
- Food processing and preservation are generic terms that cover all aspects of extending the shelf life of foods.
- A number of novel thermal and non-thermal processing methods are actively undergoing research and development.
- Some of these technologies include ohmic heating, high-pressure, pulsed electric field, bright light, and aseptic processing.

Aseptic Processing

Aseptic Processing can be defined as the processing and packaging of a commercially sterile product into sterilised containers followed by hermetic sealing with a sterilised closure in a manner that prevents viable microbiological recontamination of the sterile product (Betta et al., 2011).

Principle

- Sterilizing a food product in a continuous process through a **Heat Exchanger** and then filling that food in an aseptic filler.



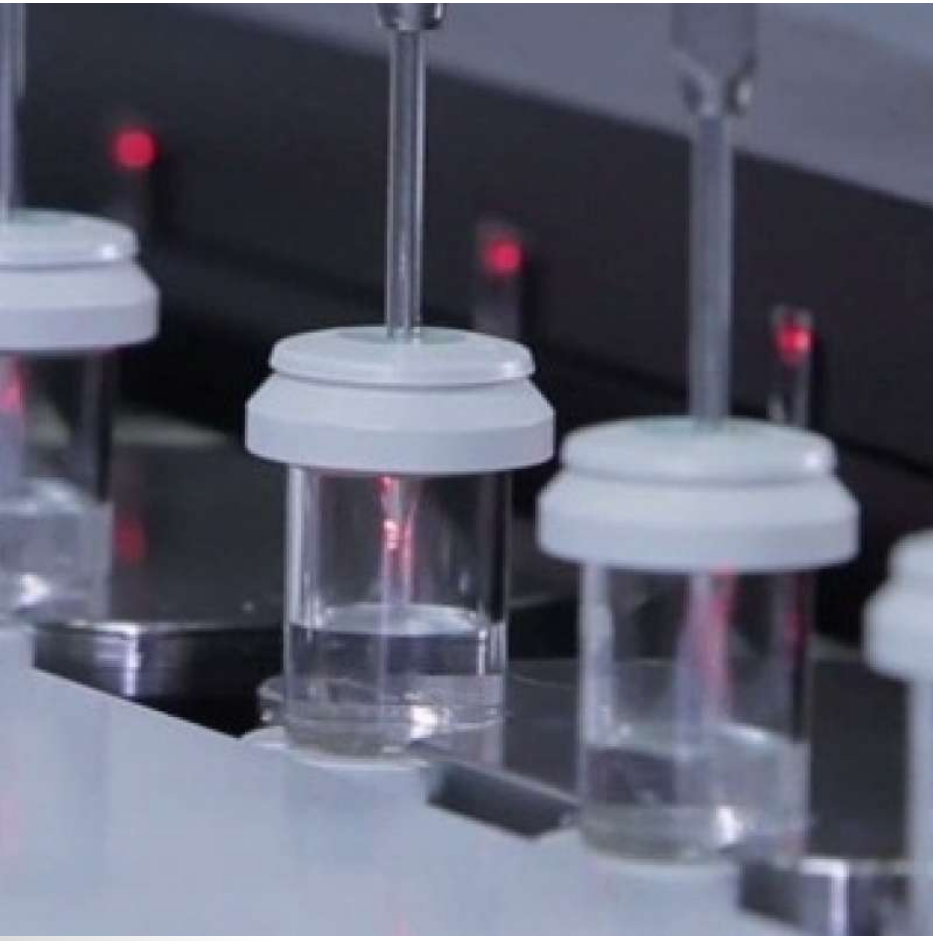
- The heating and cooling of liquid foods can be performed using metal plate heat exchangers→ large surface areas→ improved heating and cooling rates.

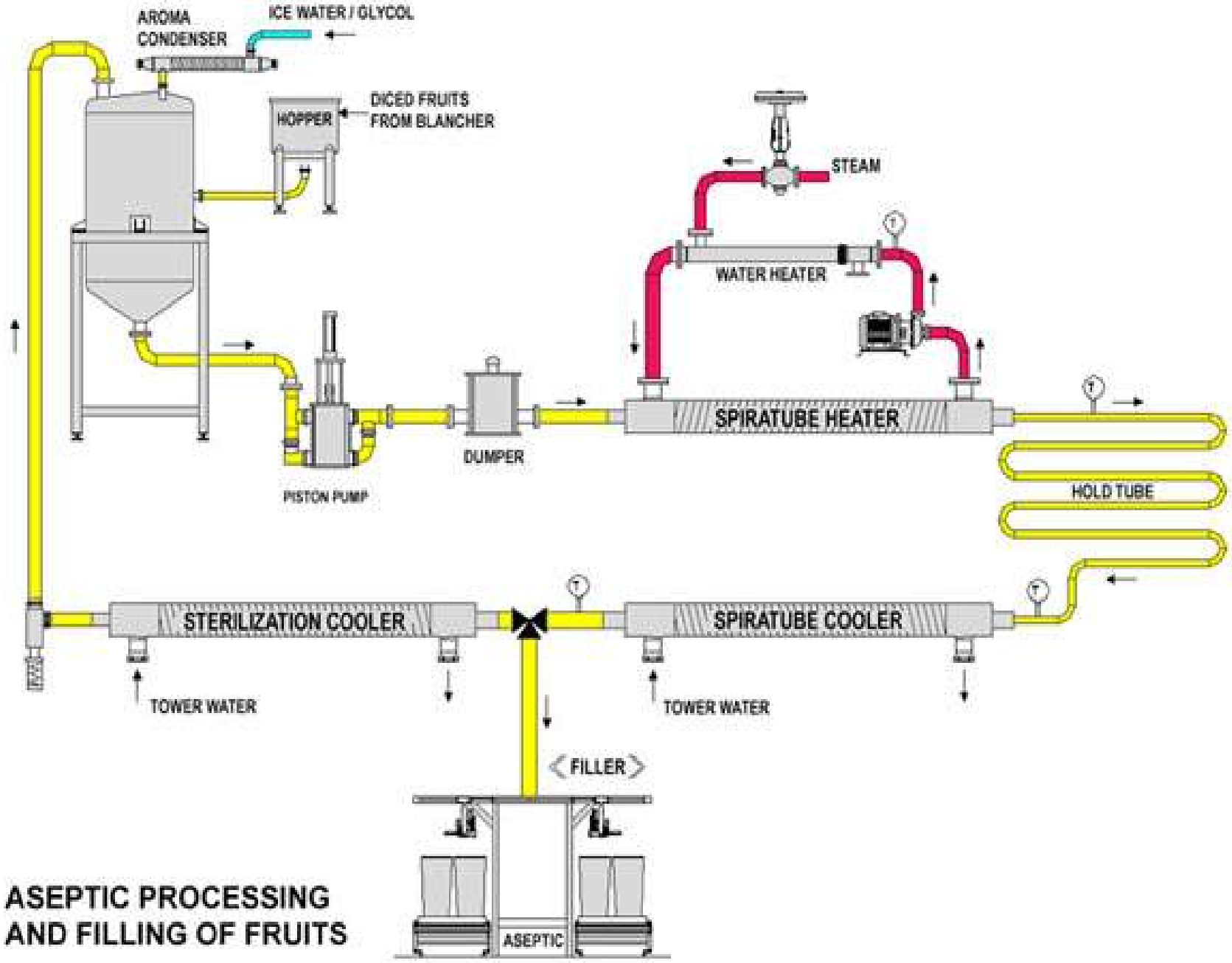
- Other types of heat exchangers involve surrounding the food with steam or directly injecting steam into the food.

- Products sterilized with steam are then pumped into a vacuum chamber, where they are cooled rapidly.

Aseptic Filler

- The **Aseptic Filler** is a highly specialized piece of equipment designed to sterilize the packaging material, fill the sterile product into its container in a sterile environment, and then seal the package.





ASEPTIC PROCESSING AND FILLING OF FRUITS

- The system permits sterilizing the product and container separately, without the rate limiting heat transfer modes,
- or the attendant thermal or pressure stress to the container closure,
- or seal integrity and permitting HTST or UHT processing of every heat-labile products without excessive quality or nutritional degradation, while achieving requisite commercial sterility.

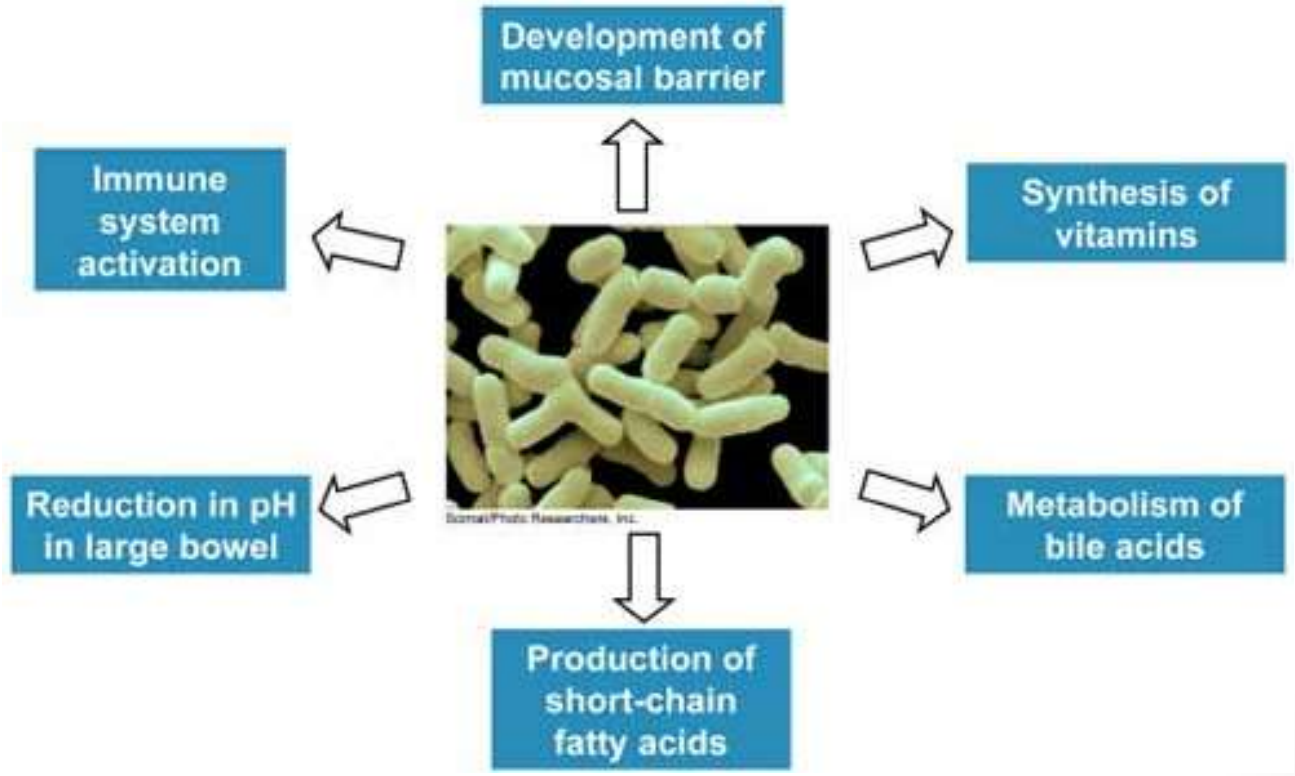
- The aseptic process uses the **HTST method.**
- Factors affecting Time & Temperature conditions:
  - ✓ Size
  - ✓ Shape
  - ✓ Type of food.
- Higher retention of quality characteristics:
  - ✓ Vitamins
  - ✓ Odour
  - ✓ Flavour
  - ✓ Texture
- Achieves the same level of sterility as the traditional canning process in which food is heated at a lower temperature for a longer period of time.

Ohmic Heating: An Alternative

- An alternate method for heating foods: **Ohmic heating**
- passes a low-frequency **electric current of 50 to 60 hertz** directly through the food.
- A liquid food containing solids, such as diced fruit is pumped through a pipe surrounded by electrodes.
- The product is heated as long as the electrical conductivity of the food is uniform throughout the entire volume → **prevents the over processing of any individual region of the food.**
- Yields a food product of higher quality than those processed using conventional systems.

Health and Safety

- A technological breakthrough enabling aseptic addition of probiotic strains during final steps of filling has opened the door for probiotic beverages .



Pros & Cons

Pros

- Beneficial to maintain the flavor, color and nutritional benefits of certain products such as fruit juices.
- Decreased energy requirements to maintain inventory

Cons

- Replacement of glass with plastic has caused concern
- Loss of nutrients during flash heating process
- Challenges in recycling the packaging materials currently in use
- Challenges in maintaining and creating sterility
- Flash pasteurization could also kill some non-pathogenic beneficial microbes in products

References

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Thank You