



**CIMA**<sup>®</sup>  
Industries Inc.  
Food and Beverage Equipment



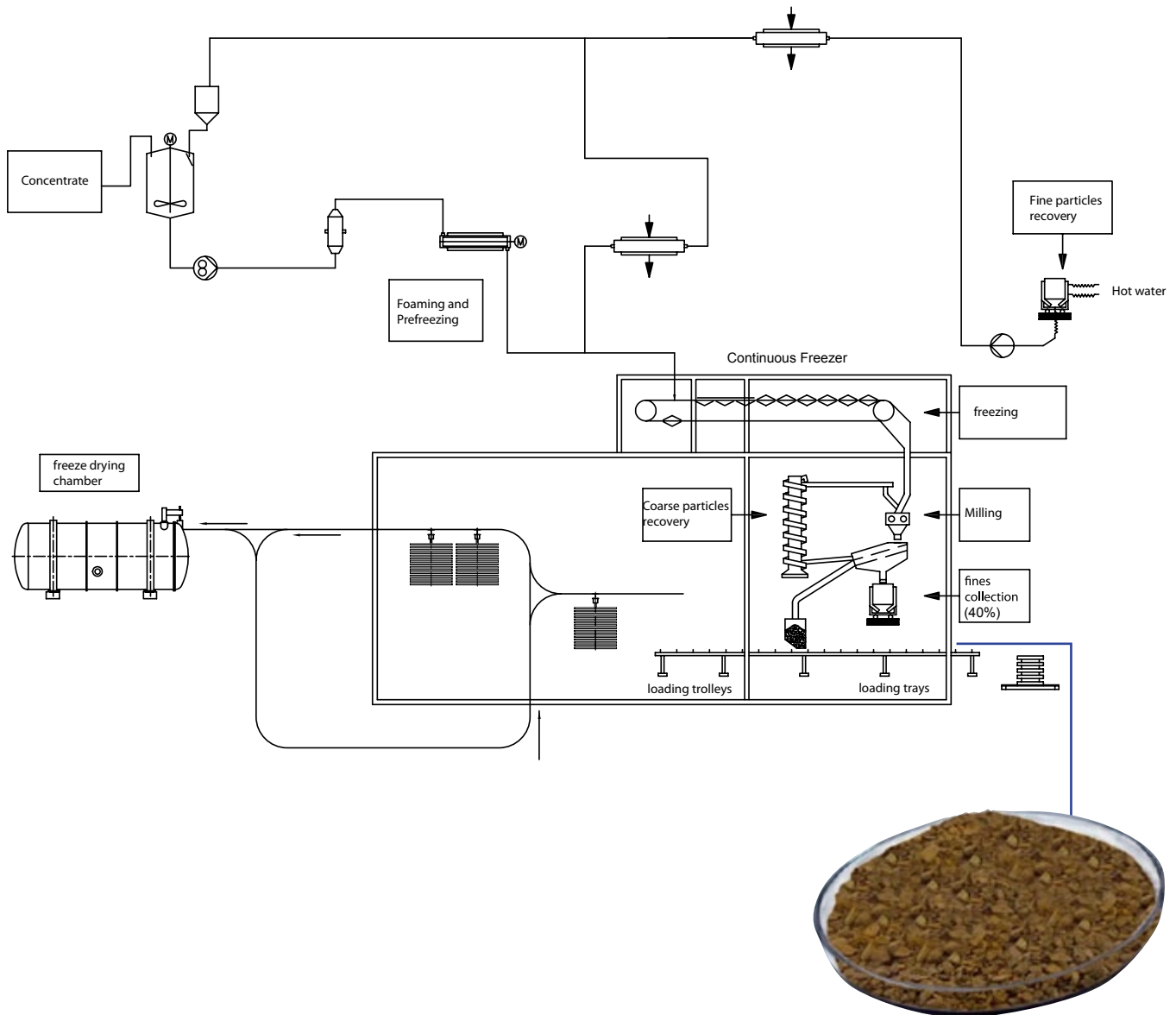
# FREEZE DRYING NATURAL CONCENTRATES AND EXTRACTS



FREEZEPHERE<sup>®</sup>

# TRADITIONAL METHODS

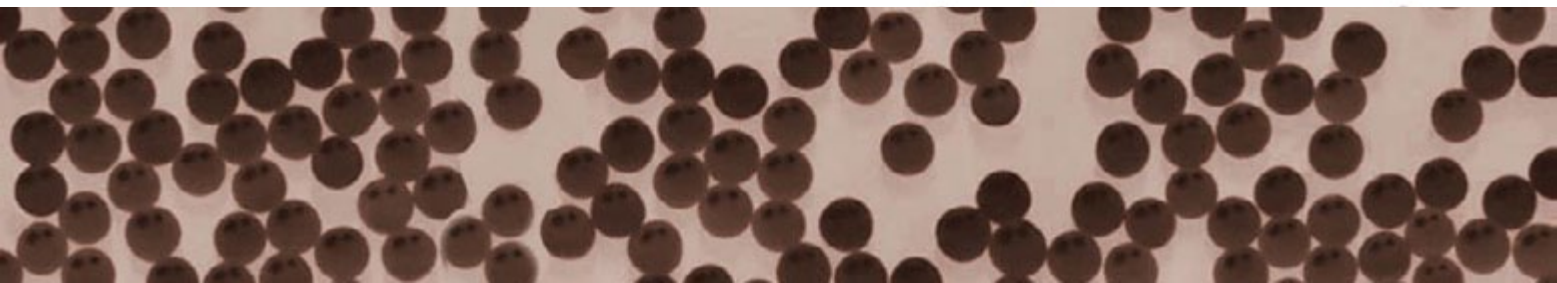
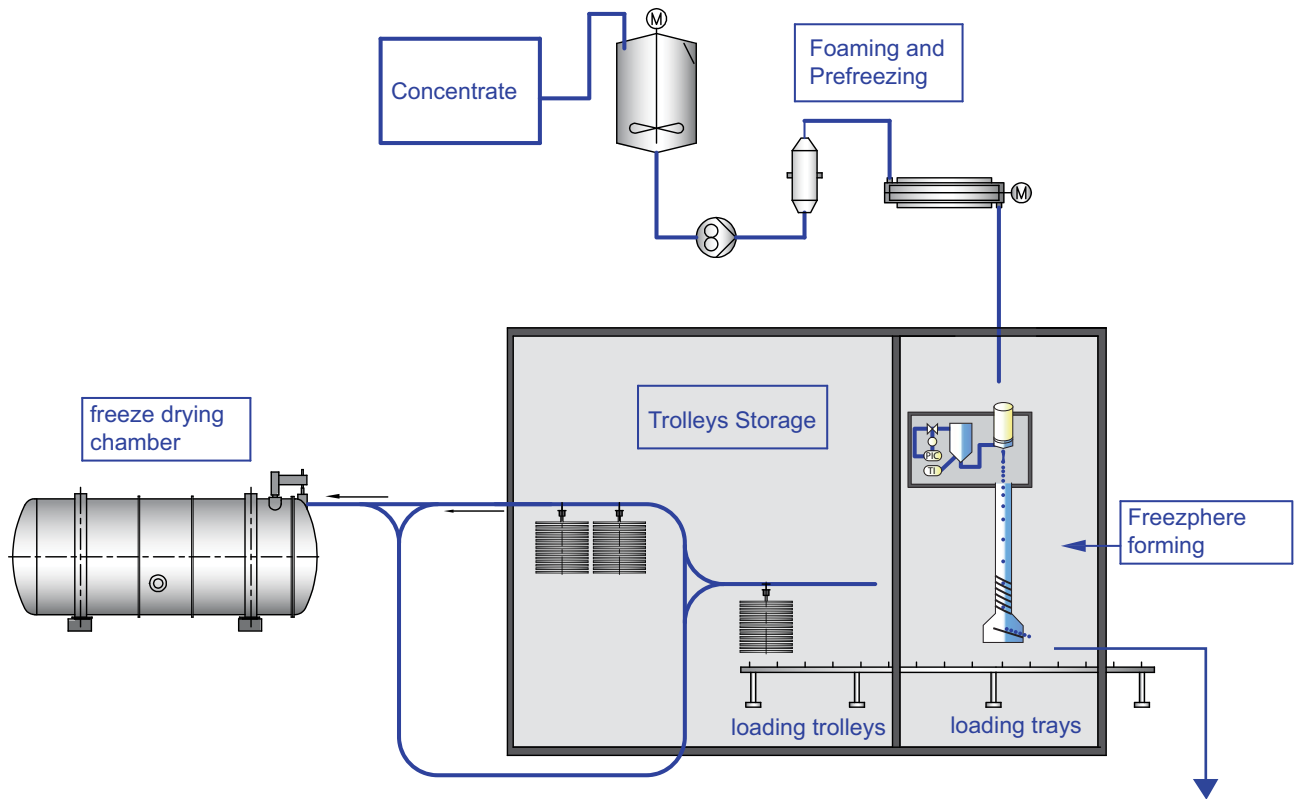
- High energy cost, approximately 40% of the product has to be reprocessed because of particle size.
- High maintenance cost, because of high amount of moving parts.
- Large floorspace required in facility.
- Uneven particle size distribution
- Cleaning Difficulty does not allow product versatility
- Use of environmentally unfriendly refrigerant gases.



# THE FREEZPHERE® DIFFERENCE

## FREEZPHERE®

- High energy savings through avoidance of reprocesses
- Low maintenance cost because small amount of moving parts.
- High Use of Facility space, due to Compact Design.
- Precise control of particle size.
- Environment Friendly
- Easy Cleaning
- Possibility of integration with CIMA LN2 plant.







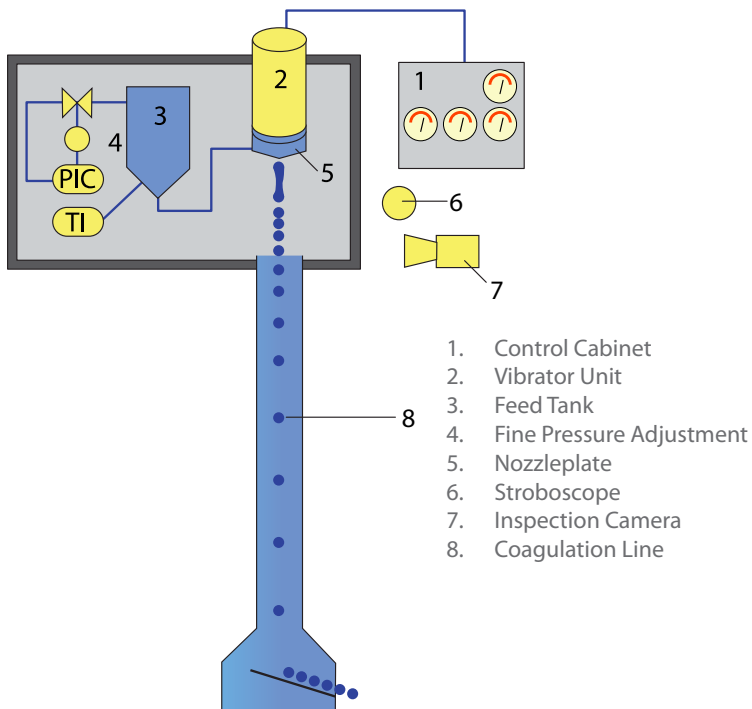
## PRE-FREEZING

- Process starts from an extract or liqueur (40-50% solid content)
- Concentrate is cooled (3-5°C) prior to foaming.
- After cooling, concentrate enters the foaming chamber, where N<sub>2</sub> is injected to create a foam. Nitrogen flow is thoroughly controlled in order to assure constant density of the foam.
- Immediately after foaming, precrystallizing is performed, where temperature is controlled very precisely in order to obtain homogeneous coloring of the crystal.

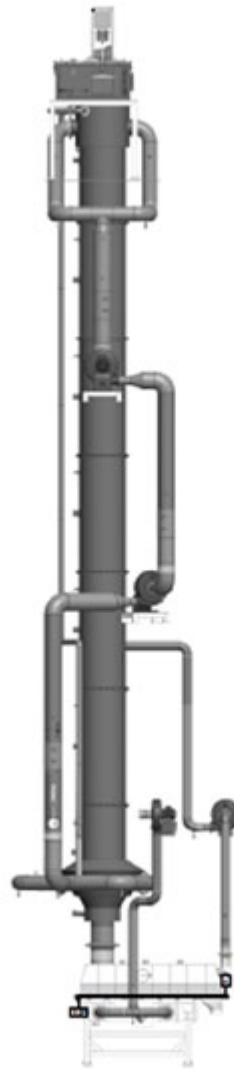
# FREEZEPHERE®

## FORMATION/DEEP FREEZING

- Prefrozen product is gently pumped through a vibrating nozzle, generating small droplets of uniform size, which turn to perfectly shaped freezpheres® during free fall inside the freezing chamber, obtain a high quality product with the following characteristics.
  - Perfectly spherical
  - Free from dusts and fines
  - Highly homogenous and monodispersed particle size.
- After the freezing chamber, product is placed in trays and trolleys and taken to a deep freezing chamber (-40,-45°C) prior to the freeze drying process.



Joint Venture Technology with BRACE GmbH





## FREEZE DRYING

- Trolleys are transported through a rail system inside the freeze drying chamber, where in controlled vacuum and temperature conditions, freeze drying process (dehydration by sublimation process) takes place.
  - Freeze drying system has the following characteristics:
    - Fully automated process
    - Recipe Operation for product versatility
    - Possibility of Residual moisture in product under 5%
    - Fully sanitary and easy cleaning design
    - High effectivity in steam collection and condensation.
    - Heat transfer by means of heating plates, without direct contact with the product, assuring dryness uniformity.
  - Automated loading and unloading (optional)
  - Redundant systems for cooling and vacuum (optional)







## PACKAGING

- Once product has been freeze dried is transported to packing area.
- Packing versatility according to market needs (single dose, bag, jar, can).
- Product packaging takes place under controlled Temperature and Humidity conditions assuring product integrity.
- Sanitary design for easy cleaning.





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