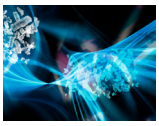
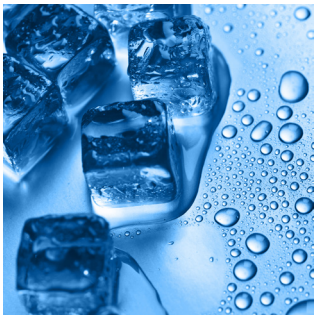
Vinegar

Freeze Concentration of vinegar





Why concentrate vinegar?

- Reduction of transportation cost
- Reduction packing/storage cost
- Product development
- New market opportunities – export
- High quality concentrate as ingredient
- Centralized production

Freeze concentration technology, your guarantee for:

- Saving the product characteristics
- Quality in = quality out
- Simple and efficient operation
- No intermediate cleaning needed
- Low maintenance cost

How to concentrate?

Innovation in GEA Messo PT freeze concentration technology has resulted in a new generation of low cost IceCon™ systems.

Which products?

White vinegar
Wine vinegar
Malt vinegar
Cider vinegar
Rice vinegar
Balsamic vinegar
Any natural vinegars

Pilot plant unit

Concentration Processes

Water removal is the key to concentration of all aqueous products. Various methods are available to remove water from liquid food products. They can be divided into three main categories:

- Vapour liquid separation
  Evaporation converts water (and other volatile components) into a vapour that can be separated from the concentrated liquid.
- Liquid-liquid separation
  Membrane technology provides a barrier that allows water (and all smaller molecules) to pass.
- Solid-liquid separation
  Crystallization converts the water into pure solid ice crystals. Solid-liquid separators are required to remove the ice.

Evaporation is the most common and the most applied technique for concentration. The limited selectivity and high temperatures generally result in relatively poor retention of the original product quality.

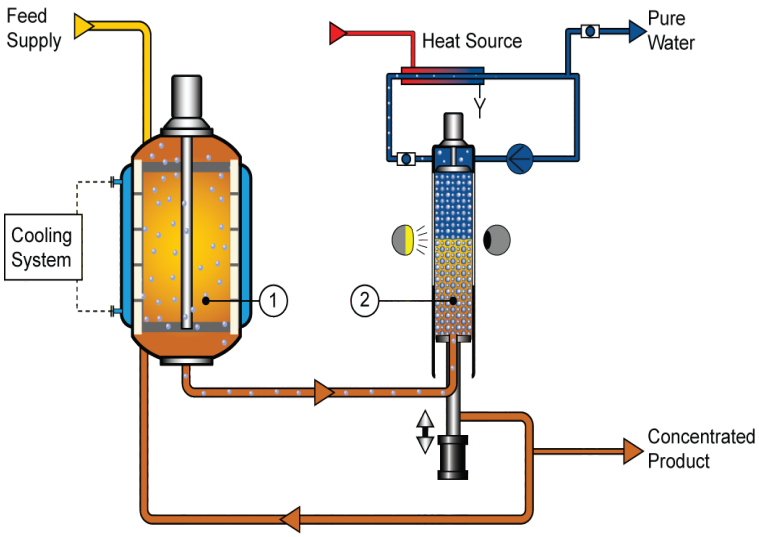
Membranes can provide low operational costs but provide a relatively poor concentration factor and limited selectivity.

Crystallization provides the highest selectivity toward water removal and due to the low operating temperatures the activity of sensitive nutritional and flavour components is maintained.

Freeze concentration

Crystallization of water from liquid products has commonly been referred to as Freeze Concentration. The process has been applied in various forms for centuries. In its earliest form it was as simple as leaving a barrel filled with product outside in the winter and then draining the remaining liquid as concentrated product. The ice is formed as pure water crystals and everything else remains in the liquid. The early forms of freeze concentration generally had problems in efficiently removing the ice crystals as pure water. The concentrated product would stick to the ice surfaces resulting in undesirable product losses. GEA Messo PT has enhanced the freeze concentration process with its unique solid-liquid separation into a sophisticated process that effectively eliminates these losses and fits perfectly into the modern processing plant. The schematic illustrates a basic single-stage freeze concentration process based on the patented GEA Messo PT process. This technique creates the optimum growth conditions for an efficient separation of the ice crystals and provides the highest concentration factor for most food liquids.

Commercial systems are designed from standard component sizes depending on your throughput requirements. Multistage systems allow for any capacity upto 30,000 kg/h.



Freeze concentration is the removal of pure water in the form of ice crystals at sub-zero tempratures. IceCon™ is the latest innovation of freeze concentration design. The diagram shows the complete processs in its simplest form. This single stage process consists of one crystallizer (1) and one wash column (2). The crystallizer is a vessel with a cooling jacket. The inner wall of the vessel is scraped. The outer wall is cooled by a circulating refrigerant. Ice production and crystal growth take place inside the crystallizer. By creating residence time ice crystals grow, creating an optimal crystal size distribution for efficient separation. In the wash column, the concentrated liquid is separated efficiently from the ice crystals. A compressed ice crystal bed is washed with melted ice to remove all traces of concentrated liuqid. Freeze concentration ensures that all original product characteristics remain in the concentrate.

Next Steps

On-site demonstration of this technology is possible in various configurations using GEA Messo PT's pilot plants. For more information regarding this technology and your specific configuration requirements please contact us at: info.niropt.nl@gea.com or phone +31 73 6390 390.

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