



MILK CONCENTRATION WITH PORIFERA

Creating up to 40 total solids milk product

- » Milk can be processed at low or high temperature
- » 80% CAPEX and 50% OPEX savings over thermal systems
- » Concentrates can be used a functional ingredient or reconstituted to deliver sustainable “fresh” milk
- » Customers also save on transportation and storage

Why Concentrate Milk?

Porifera’s technology gently removes water using its patented forward osmosis PFO membrane. Milk is concentrated to remove up to 75% of the water, producing a 4x concentrate or 40 total solids milk product. Porifera’s PFO technology delivers a higher quality product without the “cooked” flavor or browning from thermal processing. The membrane process also minimizes protein denaturation. By removing the water weight, the milk concentrate can be transported and stored using less energy and at lower cost. The milk concentrate can be rehydrated before distribution to stores or dispensed with bag-in-box systems to deliver a “fresh” milk product directly to the consumer. Alternatively, the milk concentrate can be used as a functional food with significant savings from processing efficiency improvements.



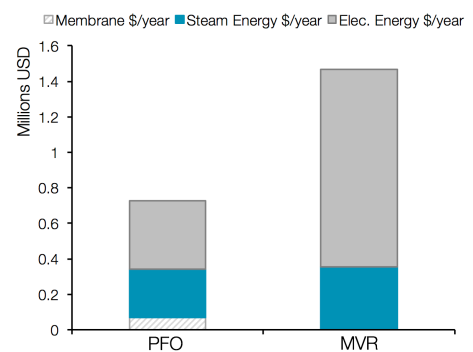
40 TS Milk Concentrate

Case Study Comparison with Thermal Evaporation

A PFO system with a feed volume of 45,000 kg/h, producing 11,250 kg/h of 40 total solids milk concentrate, has a CAPEX savings of 80% and a total energy savings of 44% compared to MVR thermal evaporation systems. The PFO system processes milk in a once-through manner operating at constant flux, with a product residence time of less than twenty minutes within the membrane module. Microbial growth is further minimized by operating the PFO system at 65 °C before pasteurization.

- » 66% electrical savings
- » 24% steam savings
- » Combined OPEX savings of 50%, including the membrane replacement cost in the PFO system.
- » Note: customers that have an available feed stream on-site for dilution will see an additional 90% in both CAPEX and energy savings.

PFO OPEX Comparison



Produced in collaboration with Kirthi De Silva, CSIRO, Australia.