



*Application  
in the dairy industry*

# MEMBRANE FILTRATION DAIRY INDUSTRY

Separation using membrane filtration was born in the early 60's to become 20 years later a technology used in the dairy industry for a wide range of applications. The principle of application remains conceptually straight forward, however the use of membrane filtration systems involves complex aspects such as:

- **Knowledge of the technologies** regarding the product to treat and the fractions of the outcome from separation;
- Plant solutions capable of obtaining the planned **industrial results**.

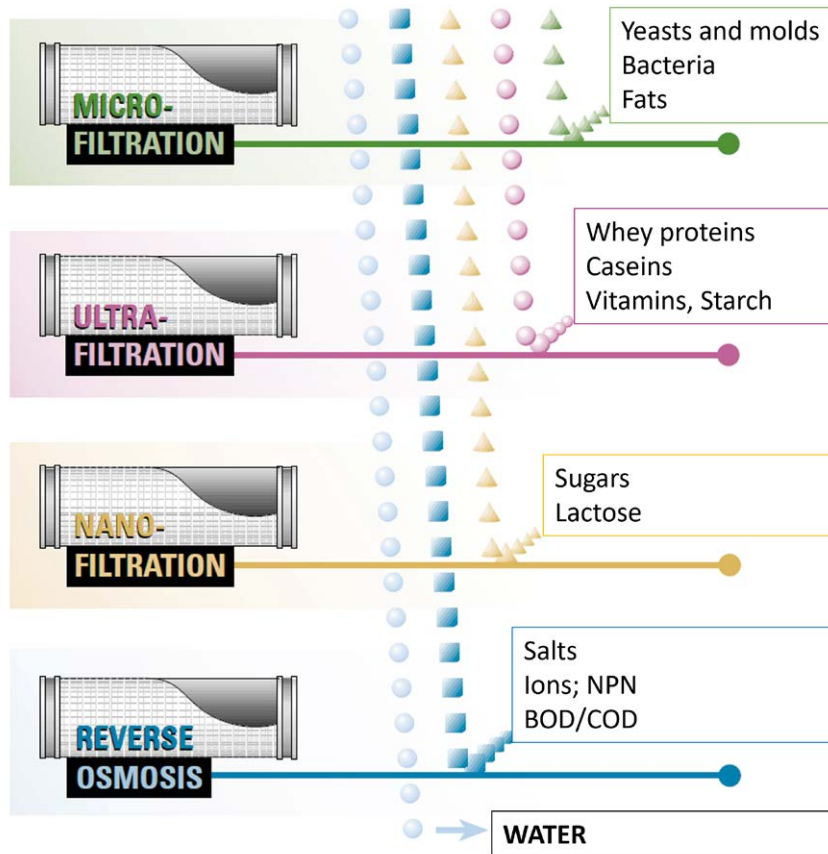


# TECNOLOGY OVERVIEW

SEPPRA offers a complete set of membrane elements for food industry applications, which are exploited to concentrate, separate, purify in many different situations:

The type of membrane used obviously depends on the objectives of the application.

By changing the porosity, the membrane is capable of acting selectively on different components of a solution.



# APPLICATIONS

## BACTERIA REMOVAL FROM MILK, MICROFILTRATION

Is used nowadays for the production of **high quality** milk and long-life milk, where all properties are kept the same. It is an alternative to the traditional thermal treatment where the organoleptic composition is modified.

## REMOVAL OF MILK FAT

Allows to maintain a high quality milk microbiologically also with low fat content.

## CONCENTRATION OF MILK PROTEINS

Is widely used for standardizing the protein fraction of the milk to be then employed for cheese production or **high protein value** concentrates.

## PURIFICATION OF BRINE AND FIRING WATERS

In comparison to traditional methods, membranes allow to eliminate bacteria and impurities and at the same time **maintain the chemical composition unaltered**. This all comes with the advantage of lower renewal operation costs.

## WHEY PROTEIN CONCENTRATION (WPC)

Technology that allows the **total recovery** of the protein fraction and the concentration of whey, which can be used for example to produce ricotta cheese or for the food and pharmaceutical industry. Ultrafiltration is a reliable method to obtain the standard concentration of the protein component of whey.



## BY-PRODUCTS CONCENTRATION

The concentration of by-products from the treatment of milk is widely used for the **reduction of volumes** to reduce transportation costs. The whey is also a perfect ingredient to generate various complex fodders if appropriately mixed for example with cereal flour or vegetable oils. It therefore can be considered a resource which can be exploited and is not a waste anymore.

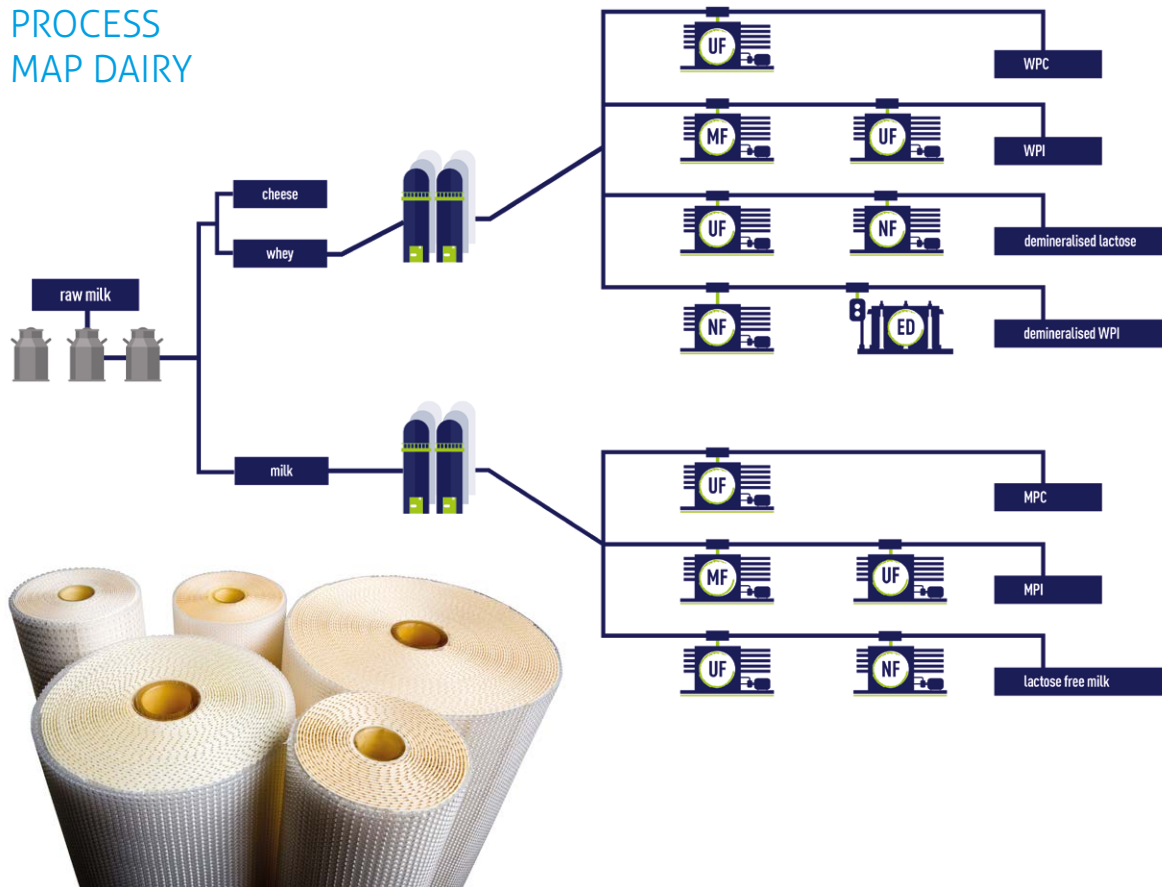
## WHEY DEMINERALIZATION

The high ash content in milk whey can influence negatively on the taste and the nutritional value of the product. The reduction of the saline content allows to obtain a solution of **great quality**.

## LACTOSE SEPARATION

Lactose is widely used in the food and pharmaceutical industry.

## PROCESS MAP DAIRY



# APPLICATIONS

## POLISHER

The permeate from reverse osmosis, nanofiltration and condensates from evaporators are composed of nearly only water. With a further reverse osmosis treatment, this water can be treated and purified in order to be used inside the building for other purposes.

## RECOVERY OF CLEANING WATER

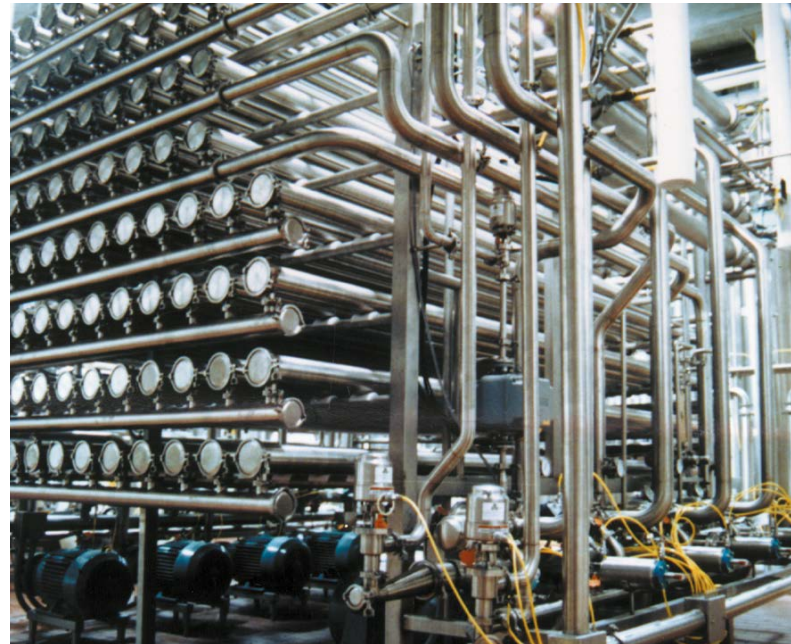
The water coming from processing in the dairy industry involve cleaning of plants (CIP), cleaning of containers and cleaning of floors.

The milk whey containing lactose, proteins and fat cannot be sent to the sewers directly. In the absence of a biological depurator as the levels of pollutants in the solution is too high, a membrane system is used in a multiple barrier configuration. Every stage is designed to remove specific contaminants.

## WASTEWATER TREATMENT IN THE DAIRY INDUSTRY, MEMBRANE BIOREACTORS (MBR)

MBR technology is much different to traditional systems, which are based on the principal that certain bacterial strands are capable of aggregating in flakes and removed as sediment. MBR allows to completely remove the sediment characteristic of biomass. This allows to reduce significantly the volumes of the tanks and the space required for the depurator.

The use of semi-permeable membranes allows to eliminate the sedimentation guaranteeing a fixed and inviolable barrier, which separates suspended solids, bacteria and some viruses. This method assures a great effluent water quality.





## MEMBRANE FILTERS CLEANING

Membrane filtration in the dairy industry involves risks of fouling due to the build-up of proteins and fats on the surface of the membrane. Moreover, the porous part can be obstructed, which ultimately leads to the loss in permeability of the element.

The chemical and physical characteristics of the concentrated product (whey), the operating conditions desired by the client during the processing and the sensibility of the operators that manage the plant are the main factors that determine the fouling velocity of the membrane.

## PILOT PLANTS

SEBRA offers a complete support service to assess the feasibility of the desired innovative processes guaranteeing the presence of qualified technicians in all the critical steps of the process (start, cleaning, modification of operation parameters). In particular, SEBRA is involved in:

- Final scale up
- Evaluation of fouling and membrane life
- Determining appropriate cleaning cycles





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