WHEY PROCESSING

REDA
Food Processing Plants

Whey processing line

WHEY PROCESSING LINE

Solutions for the whey processing in the cheese industry

Introduction

For the valorization of whey and its derivates, REDA proposes combinations of technologies developed in the course of his pluriannual experience.
Factors such as the environmental problems associated with the disposal of whey, the high logistic costs related to its transport, the high value added of whey products and the growing demand for these products from the food industry, generate a more and more interest by the operators.
Since that the quality of whey varies with the processing and that the resulting concentrate may have a different use depending on the demands of the market, tailored solutions are evaluated and studied according to the objectives to be achieved.
The whey constituents (especially whey proteins and lactose), thanks also to the development and consolidation of technologies elaborated by REDA, can be recovered and processed into products with high added value that can be used in many sectors: food industry (food and baby food, food ingredients), nutraceutical (nutritional), beverage, health industry, pharmaceutical industry.

PRE-TREATMENT

The basic starting point for the whey valorization is the observance of precise timing and procedures to ensure optimal initial conditions of collection and preservation.
Secondarily, since that the major limitation of the whey lies in its low solids content (transport of whey means especially to transport water), any project of its valorization implies the need for a pre-concentration directly at the dairy.

REDA supplies the following whey pre-treatment processing:

- Removing of curd residuals from whey (it improves the skimming efficiency and the membrane filtration treatments subsequent, besides to recover the curd that would otherwise be lost).
- Whey clarification with centrifugal separator (to remove curd residuals that are non-removable by filtration process).
- Whey skimming with high efficiency centrifugal separator (residual fat content <0.5%). The efficiency of skimming separation is essential for the quality of the product, improves the membrane filtration and the spraying process, valorizing in addition the fat thus obtained.
- Reduction of microorganisms present in the whey through a bacteria separator (eliminates spores, bacteria, molds, yeasts present in whey and allows to increase the value of the final product).
- Pasteurization (reduces the microbiological load and inactivates residual ferments and rennet).
- Cooling of the treated whey for storage.
- Chemical clean-in-place (CIP) unit.

Whey rotative filter

Whey pasteurizing line of 10 000 l/h with clarifier and skim separator

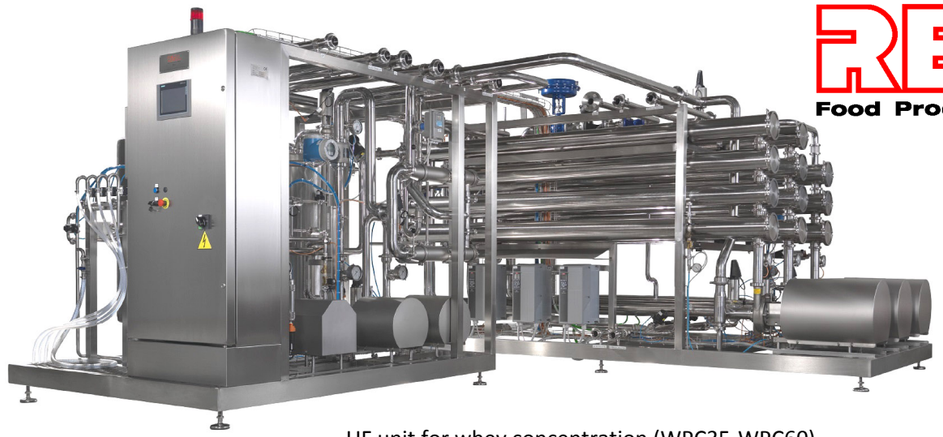
PRE-CONCENTRATION TECHNOLOGIES

REDA proposes the following whey pre-concentration technologies / applications:

1) Concentration and separation with membranes (at low or high temperature) through: MF, UF, NF, RO.

2) Thermic concentration through:
   Heat pump single stage evaporators or multi-effects evaporators.
   Evaporators of MVR's serie (Mechanical Vapour Recompression).

Depending on the target that the dairy wants to achieve, these applications can be taken individually or combined together.



UF unit for whey concentration (WPC35-WPC60)

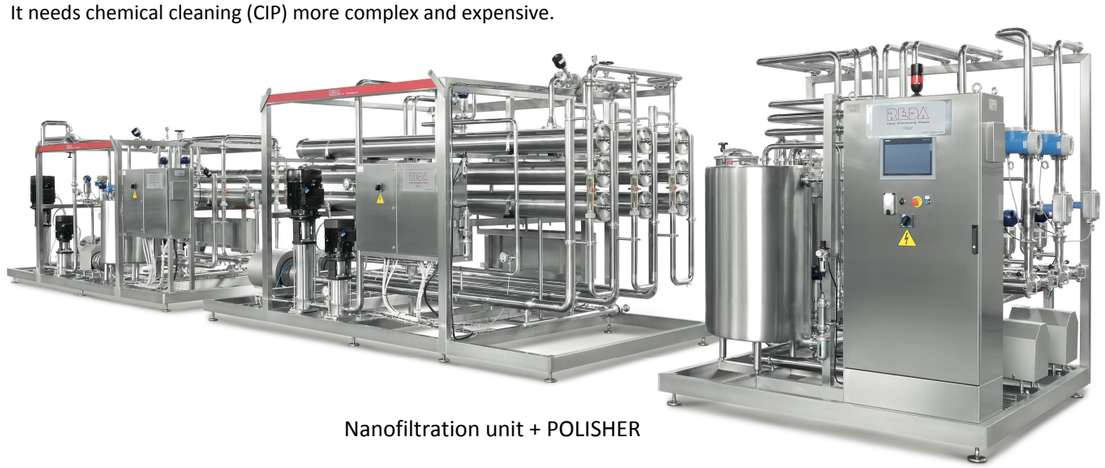
MEMBRANE CONCENTRATION

Compared to the thermic concentration, this technology has the following advantages:

- Reduced energy costs, because the removal of the liquid part is by filtration.
- Reduced investment costs, both for the installation and for the auxiliaries services.
- Possibility to make a product fractionation (the NF removes part of the salts, with the UF is possible to separate the lactose by getting a concentrate of whey proteins).
- The fractionation allows to obtain differentiated products and to follow market trends.

On the other hand, it has some limitations and disadvantages (always with respect to the thermic system):

- It requires a more controlled and accurate pre-treatment of the whey.
- The concentration of the product reaches about 20/22% of total solids; the increasement to 30% implies higher costs of the system, higher energy consumptions and shorter duration of the membranes, that not always justify the investment.
- It has a higher maintenance (periodic exchange of membranes).
- It needs chemical cleaning (CIP) more complex and expensive.



Nanofiltration unit + POLISHER

THERMIC CONCENTRATION

The thermic concentration through evaporation technology (at cold or hot), gives the following advantages:

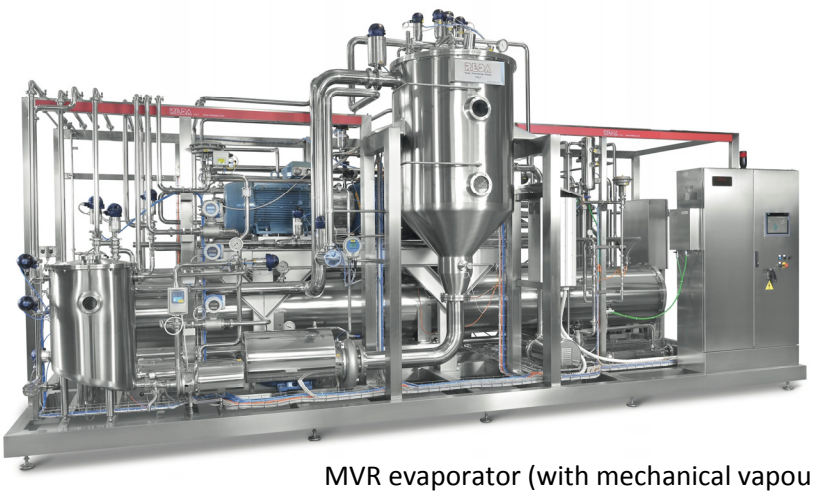
- The pre-treatment of the whey before the concentration can be less careful.
- It has a less sensitivity to the quality of the whey (curd residuals, fat, acidity).
- It has a higher capacity of concentration compared to the membranes (normally the concentration reaches the 36% of solids, but it may reach 50-54% with no problems).
- No consumables (membranes).
- Low maintenance and personnel costs (automatic system that doesn't require qualified personnel).

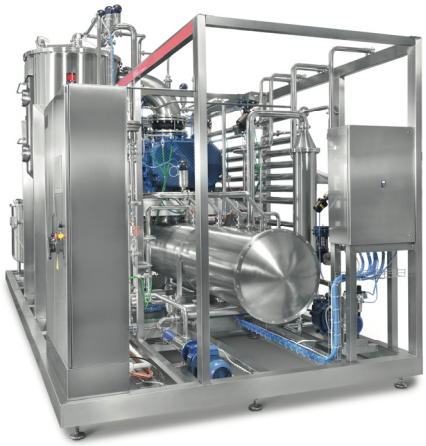
The system, however, presents the following disadvantages compared to the membrane system:

- Higher energy costs.
- No possibility to perform a fractionation, like separate the minerals or the lactose, as it is a pure evaporation of water.

3-effects evaporator

Single stage evaporator





MVR evaporator (with mechanical vapour recompression)

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