Processes for demineralized whey
Novasep and MEGA high-efficiency solutions

- Design and implementation of processes adjusted to your capacity target for multiple grade (D30, D50, D70 and D90)
- Conception of flexible processes allowing future capacity increase

By combining their process expertise, Novasep and MEGA have defined the best process solutions for each production capacity and each level of demineralization. This extensive work, optimally combining our high performance technologies enables us to propose optimized and most competitive process solutions for meeting your project needs.

Typical process for various grade of demineralized whey

The purpose of the process is to remove mineral ions naturally present in whey as 6 to 15% of the total dissolved solids, while preserving the microbiological quality, the native protein content and functionalities of the demineralized whey.

Depending on the production capacity and demineralization target (D30, D50, D70 or D90), process solutions combining 1, 2, or 3 demineralization technologies can be considered.

Novasep supports strategic decisions in having capital and operating costs balance adapted to the customer needs.
Novasep/MEGA strategy for Whey Demineralization

Our process solutions are optimized in order to maximize ROI...

• 1 or 2 steps purification process for smaller production capacities to minimize CAPEX
• 3 or 4 steps purification process for larger production capacities to minimize OPEX and provide the best ROI

...while always providing most competitive production costs:

• Optimized combination of technologies and processes
• Guaranteed lifetime of NF/RO membranes, ED membranes and ion-exchange resins
• Maximum throughput from processing equipment
• Water recycling in the purification process, in order to reduce fresh water requirements and effluents disposal

(CAPEX: Capital Expenditure; OPEX: Operating Expenses; ROI: Return On Investment)

The dairy map hereunder summarizes the proposed global strategy for each product quality and production capacity:

This map is based on average costs for chemicals, water, and electrical power in Western European countries. We are committed to adjust it to your local conditions and every specific project objectives in order to always select your best process solution.
Whey demineralization technologies

**Cross-Flow Nanofiltration**

- Most competitive demineralization technology for limited demineralization rate 30-35%
- Also provides pre-concentration of whey up to 18 to 20%TS
- Minimal usage of water and chemicals, limited to NF membranes cleaning
- Highly efficient for acid whey or salty whey, which are rich in monovalent mineral ions

![Nanofiltration unit](image)

**Applexion® Ion Exchange**

- Applicable to all types of whey
- Extremely versatile and efficient mineral ions removal process
- Most efficient removal of divalent ions
- Production of highly demineralized whey, compliance with specific D90 ionic profiles

![Applexion® Ion-Exchange unit](image)
MEGA™ Electrodialysis

- Flexible demineralization rates: D50, D70, D90
- Minimal usage of chemicals, limited to ED membranes cleaning and pH control
- Minimal requirements for peripheral equipment
- Optimum with 15-22% TS pre-concentrated whey

MEGA's RALEX® ED membranes are ion-exchange heterogeneous membranes providing tangible benefits compared with traditional and homogeneous membranes:

- Efficient for all types of whey (acid, casein, sweet whey)
- Better transport of multivalent ions
- Demineralization rate tunable from 50% to 90% with the same equipment
- High recovery yield of the product
- No special chemicals required for CIP (industrial grade HNO3 and NaOH are used)
- Electrodialysis process running at low temperature to ensure microbiological stability of whey
- 4 years membrane lifetime warranty and post-warranty services
- High process productivity: working cycle time of ED unit is up to 20 hours per day; CIP cycle time is only 4 hours

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CM: cationic membrane; AM: anionic membrane