dairy

by electrodialysis

Bringing versatility, efficiency and eco-friendly approach together.
About MEGA

With almost thirty years of experience in electro-membrane separation, MEGA helps the dairy industry to remove salts and acids from by-product liquids and turns them into valuable goods for sale. This is achieved using cutting-edge electrodialysis designed for food industry.

What does MEGA offer for dairies

- Demineralization of all types of whey
- Demineralization of UF permeate
- Delactosed whey demineralization
- Demineralization of skimmed milk
- Lactulose syrup demineralization
- Mother liquor demineralization

Use of demineralized whey

- Infant formula, breast milk substitutes
- Nurse nutrition products
- Sports nutrition products
- Ice creams, yoghurts
- Condensed dairy products
- Bakery, confectionery

Being a partner is a commitment and responsibility. MEGA works closely with customers to bring a tailored solution. After installation, periodical checks are done both remotely and on-site to ensure the solution works as desired.

Utilizing experience from projects around the world, MEGA is able to advise customers on the most convenient demineralization process design.

Compared to common methods, electrodialysis developed by MEGA can be adjusted for various level of purification to comply with customer’s needs. This can remove unnecessary further process steps and makes the treatment faster and more economical.

To stay ahead, MEGA has founded a R&D organization MemBrain and its European Membrane Innovation Centre. The Centre offers state-of-the-art equipment and conditions for membrane applications research in different industries.

Membrane Innovation Centre, Straz pod Ralskem, Czech Republic, EU
Get all the service you need

We develop, manufacture and care about electromembrane technologies for almost thirty years. Thanks to our own R&D we offer turn-key solutions based on our custom Ralex® membranes. On-site training, online monitoring and consultations are parts of MEGA Care services.

Complete in-house production

Lab & pilot testing

Custom Ralex® membranes
Enhanced Ralex® technology for food industry

Membranes are the core of effective and efficient process. We are developing the custom Ralex® membranes in our own European Membrane Innovation Centre to push the boundaries of membrane processes in the food industry.

Flexibility is not an empty phrase

The process design on MEGA’s electrodialysis units allows flexibility in both input feed and output product. Use the same equipment for different feed and let our process engineers to setup the process remotely. Or use the same feed and get different output product on the same equipment. These key features are backed with the expertise of our researches and engineers.

Eco-friendly design

The solution by MEGA guarantees high yield while keeping minimum true protein losses. The whole equipment is microbiologically safe thanks to sanitary design and low process temperature. Also mechanical cleaning is not needed and chemical cleaning is achieved using with just HNO₃ and NaOH; no enzymes are required. Compared to other technologies, electrodialysis is a low power consumption process, which also has a positive effect on running costs.

Certified quality

We take the responsibility of food processing seriously. Our reliability has been confirmed by acknowledging and continually renewing ISO certificates, EU hygiene, CE and GOST R, Kosher and Halal. We have also certificates for development and manufacturing.

Extended warranty and care

We trust what we sell and provide extended warranty on the whole equipment and also on the characteristics of the process.

We guarantee the capacity, microbiological safety, heat stability, chemicals consumption and demineralization performance.
Improved and patented

We have innovated and patented the manufacturing process to provide you with more efficient and durable membrane solution. Ralex® membranes are composed of fine polymer particles with ion-exchange groups anchoring polymer matrix and reinforced by fitting fabrics.

It just works

- Mono-, bi-, trivalent ions removal
- High permselectivity P [%] > 90
- Chemical resistance for pH 1-14

The proven solution

Excellent separation attributes, chemical and electric resistance as well as long lifetime are the foundation for proven solutions by MEGA. The enhanced manufacturing process gives membranes excellent mechanical and hydraulic properties as well as size stability under all conditions, which further improves handling and transport of the membranes and ED stacks.
Tell us what you need. Tell us what are the characteristics of the incoming feed, what is the desired outcome and what is your existing equipment. The solution is on us.

Design and engineering

We will design the optimal solution for you and optimize capital costs, operating expenses on water, energy and chemicals consumption. Our engineers will consider the input feed parameters, desired output, local footprint and expected volume to prepare a fitting custom solution.

Range of products and capacities

Sweet or acid whey can be demineralized for use in pharmacy, fitness products, yoghurts, ice creams or confectionery. To achieve economical processing, we are offering a wide range of products and capacities. Get the right size from the smallest units to nation-wide whey processing.

Customer care

Get warranty as well as post-warranty service with hotline support and remote diagnostics. A process specialist will guide you to solve any issues.
Our engineers will provide scheduled service visits to check the parameters of the process to ensure your technology will continue to work flawlessly.

Comprehensive project management

No costs are hidden or in tiny mini lettering. We will provide you with complete costs in detailed list, including expected consumption of energy, water and chemicals. We guarantee quick delivery and provide financing via EU banks.

Pilot runs and installation

Verify the separation process with your feed samples, we will provide complete chemical analysis. Come and see the fully operational unit during factory acceptance tests.
More than 50 whey demineralization projects since 2006 with total capacity 250,000 tons of whey powder per year corresponds to 11,500,000 litres of natural whey processed every day.

“A delivery of a brand new RALEX® ED equipment is successfully finished and I am happy to confirm that MEGA offers the state-of-the-art technology and services.”

Mr. Georg Ruchti
Lactoprot/Dairyfood GmbH, director
Germany

“We cooperate with MEGA few years already, and time has shown up that their solution is very competitive for Polish market.”

Mr. Janusz Dabrowski
GEA Poland, sales director
Poland

“We were one of MEGA’s first customers for D90 powder production. We are running RALEX® EWDU 6 since 2009 and now after five years of production, we are considering complete membrane replacement.”

Mr. Petr Tichovsky
Moravia Lacto, responsible for whey demineralisation business unit
Czech Republic

“Novasep has chosen electrodialysis by MEGA to enhance our combined whey demineralization solutions. Our success in five projects since 2011 and interest from more potential customers shows that our strategy was correct.”

Mr. François Roussset
Novasep IB, Food and Functional Ingredients, market director
France

“We have three RALEX® EWDU 6 units operating with excellent results, and major post sales services.”

Mr. Andres Etchepare
Remotti Group, director
Argentina
“While realizing the first project in 2011 with MEGA, their specialists and customer service showed high competence and deep knowledge of the process. In 2013 we bought additional electrodialysis equipment for our plant.”

Mr. P. P. Lavrinov  
OAO “Verhnedvinskij maslosyrzavod”, director  
Belarus

“Our company has been offering complete demineralization lines using RALEX® ED produced by MEGA for many years already and we both feel we are business partners that can rely on each other.”

Mr. Pavel Mertin  
Vzduchotorg, director  
Slovakia

“MEGA electrodialysis system is more stable and less fragile than other ED systems.”

Mr. Jean-Louis Guerrier  
Armor Protéines, director  
France

“MEGA was one of our subsuppliers in Tolle project and we must say their delivery was independent and reliable. We did not have to solve anything regarding electrodialysis part by ourselves.”

Mr. Laszlo Sandor  
TetraPak, project manager  
Hungary

“We have learnt a lot about MEGA electrodialysis and now we are happy to work on the first demi local project.”

Mr. Ismail Mumin  
APV Hemisan, director  
Turkey
Electrodialysis explained

Electrodialysis is an electric field gradient driven process enabling separate mineral matters from feed solution while moving dissociated ions through ion-perm selective membranes and forming two different flows - desalted flow called diluate and a concentrated flow called concentrate.

The physical principle

Under the influence of the electric field the negatively charged anions pass through the anionic membranes but cannot pass through cationic membranes and hence the anions are concentrated in concentrated channel. Similarly cations pass through cationic membrane and are trapped in the concentrate channel on the other side. This results in concentrated and diluate solutions being created in the channels between the alternating membranes.

Reversing electrodialysis

In course of the reversing electrodialysis process the DC polarity changes at defined time points (anode changes to cathode and vice versa) a consequently the hydraulic flows changes too, i.e. concentrate becomes dialuate and vice versa. The reversing of polarity removes the scaling deposits and extends the time period in which the chemical cleaning of membranes is not necessary.

Assets of enhanced demineralization

Adding electrodialysis into whey processing allows higher yield and enhance parameters of the output product. Microbiological safety is granted as well as heat stability. The nature of electrodialysis process also brings low ash content.
Batch system

Pre-concentrated whey is pumped from the first tank to the Feed/Diluate circuit for demineralization process by the ED stacks. Minerals removed from whey go to the concentrate circuit and then to the concentrate tank. Whey circulates in the Diluate circuit till it reaches the required level of demineralization.

Concentrate solution is continuously diluted with make-up water to avoid mineral crystallization/scaling on membrane surface. Feed and Diluate circuits are equipped with heat exchangers to maintain stable processing temperature. Electrode circuit provides better electrical conductivity in the stacks and helps to remove gases resulting of chemical reactions on electrodes.

The process is controlled by conductivity measurement. Once the whey in the first tank (first batch) reaches required conductivity the plant switches to the second tank. The first desalinated batch should be discharged and then the empty tank has to be fed with raw concentrated whey again.

The customer may install the third tank optionally following the same principle. The process includes chemical Cleaning in Place (CIP) to prevent membrane fouling and scaling. Acid and alkaline CIP is applied.

Demineralization by Electrodialysis

- simplified scheme

**POST-TREATMENT**

- DEMINERALIZED WHEY FOR INTERNAL RE-USE
- DEMINERALIZED LIQUID WHEY
  - Fermented milk
  - Condensed milk products
  - Milk desserts
- EVAPORATION
- CRystallization
  - Infant nutrition
  - Chocolate
  - Pastry
- SPRAY-DRYING
- DEMINERALIZED WHEY POWDER

**WORKING CONDITIONS**
- Low temperature (10-15 °C)
- Natural pH
- Batch time max. 4 hours
- ED reversal
demineralization in dairy by electrodialysis

Single technology to process all your feeds

- all types of whey
- UF permeate
- delactosed whey
- skimmed milk
- lactulose syrup
- mother liquor

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