

Process Development Services

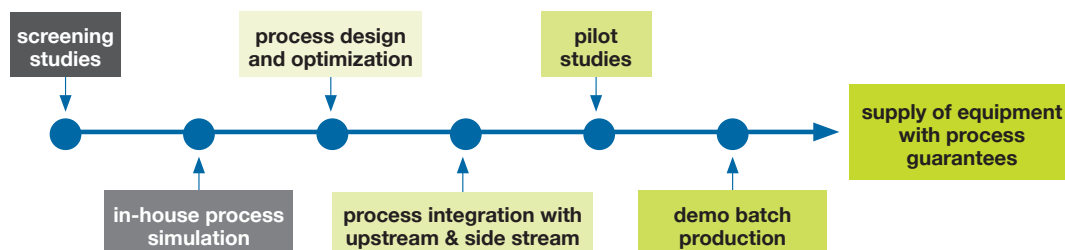
Equipment with guaranteed performances

- Feasibility studies and process line definition
- Process modeling, process optimization, robustness
- Process validation and scale-up
- Sample production (on customer site or at our premises)

A Unique Value Proposition

Each year, Novasep's team develops about 30 processes for the Industrial Biotechnology industries. In particular, our team can:

- Define the most appropriate process line
- Determine your scale-up parameters
- Simulate your process performances
- Produce your samples from kg to ton scale
- Assure clean and safe procedures
- Guarantee the performances of your process



Bio-Industries
Bio-based chemicals
Amino acids
Organic acids
Antibiotics
Vitamins



Food Ingredients
Milk,
Sugar,
Starch



Functional Ingredients
Oligosaccharides
Sweeteners
Fatty Acids
Antioxidants
Proteins

Novasep Enables your Targeted Product Development

Our Facilities

- 50 mobile pilot units
- A global presence with locations in France, USA and China
- Possible piloting or pilot line building on any customer site worldwide
- A team of 25 dedicated and highly skilled people



Saint-Maurice-De-Beynost, France

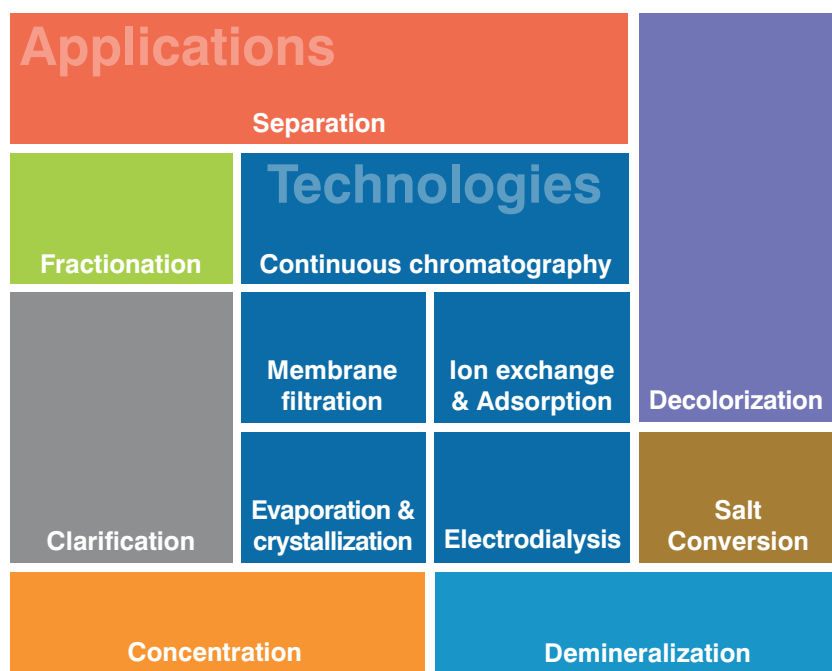


550m² pilot hall, France



400 m² pilot hall and Labs, China

Our technologies



Analytical Development Capabilities

Novasep applies the following analytical tools:

- HPLC/UPLC with UV-Vis, DAD, ELSD and RI detectors
- Ion chromatography (Conductimetry detector)
- Gas chromatography and Headspace GC
- Spectrophotometry
- SDS-PAGE electrophoresis
- Mass spectrometry
- ELISA development



Our Key Technologies Available at Pilot Scale

Batch Chromatography and Ion Exchange

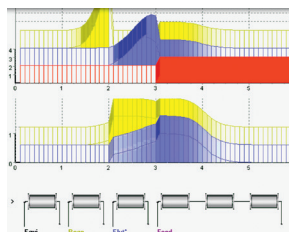
- Columns range from 20 L to 800 L
- Fully automated skids available



170 L Automated Ion Exchange Skid

Continuous Chromatography and Ion Exchange

- SSMB (Sequential Simulated Moving Bed) skids available with 2 to 12 columns
- Continuous Ion Exchange skids with up to 10 columns



Simulation software



SSMB Skid

Membrane Filtration

A wide range of membranes can be used:

- **Organic membranes** for Nanofiltration and Reverse osmosis from 0.3 m² to 240 m²
- **Mineral membranes** for Micro and Ultrafiltration from 0.2 m² to 10 m²

Novasep uses its proprietary ceramic membranes Kerasep®



Ultrafiltration Skid and Kerasep® module

Electrodialysis (ED)

Membranes and systems for:

- Conventional ED
- Bipolar Membrane ED from 2 to 4 m²



Electrodialysis Skid

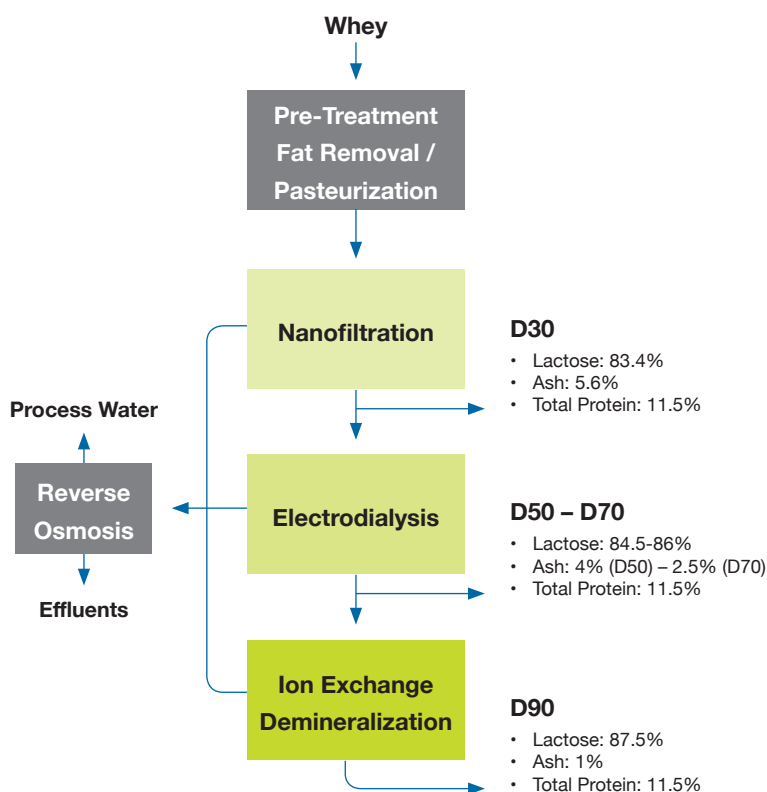
Evaporation & Crystallization



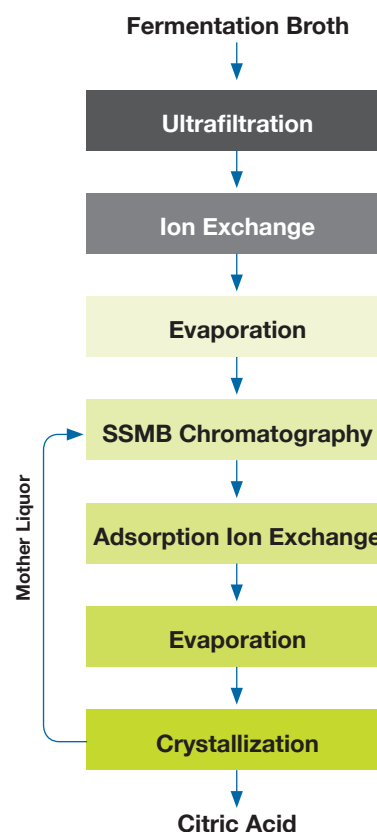
Evaporation Skid

Case studies: process lines fully developed by our teams

Whey demineralization



Citric acid purification



Some examples of our sample production capacities:



Liquid sugar

- Batch chromatography: **200 g** of high purity plant extract
- Electrodialysis: **100 kg** of demineralized lactose (D50, D70 & D90)
- SSMB continuous chromatography: **500 kg** of purified oligosaccharides
- Filtration: up to **6 m³/day** for broth filtration



**Services and technologies
for the life science industries**

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