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Biotechnological Pilot-Plant

The Biotechnological Pilot-Plant is involved in the development of submerged aerobic and anaerobic fermentation technologies, optimization and scale-up processing for pharmaceutical, food, chemical and cosmetic industry, as well as for environment protection. We provide a process kinetics study, an engineering analysis and a process model development (control software incl.). Our services in biotechnology include:

UP-STREAM PROCESSING PILOT-PLANT FERMENTATION DOWN-STREAM PROCESSING

Equipment:

UP-STREAM:

- *Infors* shaker in tempered room, ~ 100 flasks
- *Infors* tempered shaker, ~ 8-10 flasks
- thermobox
- inoculation box, flow box
- laboratory centrifuges, UV spectrometers, balances etc.

Equipment:

Bioreactors:

bioreactor	number	total volume [L]	working volumes [L]
<i>Chemap</i>	1	8	3-5
<i>Chemap</i>	1	14	6-10
<i>Bioengineering</i>	1	30	8-20
<i>Bioengineering</i>	4	75	25-50
<i>Bioengineering</i>	2	300	100-200
<i>Bioengineering</i>	1	1500	450-1000

Technological equipment allows to perform:

- automatic sterilization of fermentation media, input and output filters, seals
- mechanical and chemical antifoaming
- measuring of pressure, air flow, frequency of mixing, temperature, pH, DOT, O₂, CO₂ in gas-off
- monitoring of acid, base, antifoam agent consumptions and feeding
- control of pressure, air flow, frequency of mixing, temperature and pH
- batch, feed-batch, continuous fermentations

Other aspects:

- 75 L fermentors are on tensometric balaces and allow an air-flow regime
- axial and radial impellers are also applicable
- central control system provides collection, archiving and data treatment as well as control strategies performing
- data archive is internet available

Equipment:

DOWN-STREAM:

Filtration

- Vacuum stainless steel suction filters - a 500 and a 800
- Press filter 400 x 400 (20 plates)

Ultrafiltration

- Ultrafiltration unit (TFF) Romicon (cut-off: 2 000 MW, 5 000, 10 000, 30 000, 50 000 MW)
- Universal unit Alfa Laval Combi M39/M3.8 for microfiltration, ultrafiltration, nanofiltration a reverse osmosis
- Laboratory unit Alfa Laval M20

Centrifuging

- Tubular-bowl centrifuge Sharples - up to 4-5 kg of sediment
- Disk-bowl centrifuge BTPX 205 (Alfa Laval), continuous
- Drum centrifuge Alfa Laval K 212 – 30S, 20-45 kg of sediment

Disintegration and homogenization

- French-press homogenizer APV Rannie 5-10.38, 1000 bar (60 L/h)

Evaporation

- Evaporator Centritherm CT - 1B (Alfa Laval, up to 50 L/h)

Drying

- Spray drier Niro Atomizer Minor (4 L/h)
- Spray drier Anhydro Compact (up to 20 L/h)

Lyophilization

- Lyophilization unit Frigera LZ - 45 (27 L, stainless plates)

Main activities:

- submerged microbial technologies to 1000 L
- down-stream processing
- bioprocess development
- pilot-plant production
- GMO I a II certificates
- HACCP
- commercial cooperations

Bioprocess development:

- bioreactor configuration design
 - oxygen supply, homogeneity, physical and chemical conditions, economy
- bioprocess control
 - fermentation media compositions
 - feeding
 - temperature and pH control
 - dissolved oxygen concentration control

Application areas:

- human and veterinary medicinals
 - antibiotics, vitamins, carriers, vaccines, biologically active compounds, proteins
- nutrition and feeds
 - proteins, polysaccharides, lipids, enzymes
- enzyme technology
 - detergents, pharmacy, food and feed industry
- decontaminations
 - environmental biotechnologies
- bioenergetics
 - biogas, agricultural waste treatment