Bio Base Europe
Pilot Plant

BIOMASS PRETREATMENT

BIOCATALYSIS

FERMENTATION

GREEN CHEMISTRY

PRODUCT RECOVERY AND PURIFICATION

ANALYTICAL CAPABILITIES &
CELL CULTURE LAB

NEW INVESTMENTS

Pulper internals (2,000 L)

Biomass pretreatment

Bio Base Europe Pilot Plant

Equipment overview

Reactors for chemical pretreatment of biomass

These jacketed and agitated pressure reactors are suitable for acid, alkaline, solvent-based and chemical pretreatment. The reactors have temperature and pressure control and are coupled to a vacuum system for the evaporation of solvents.

Scale	#	Material	Pressure (bara)	Temp (up to)	Note
0.5, 2.5 L	Multiple	--	--	--	Bench scale
20 L	1	Hastelloy	0.060–10[2]	160°C	ATEX*
85 L	1	Stainless steel	0.050–9	165°C	ATEX*
250 L	1	Stainless steel	0.050–7	100°C	ATEX*
500 L	1	Glass lined	0.050–9	180°C	ATEX*
1,000 L	1	Glass lined	0.050–5.4	165°C	ATEX*
5,400 L	1	Glass lined	0.050–5.4	165°C	ATEX*

**ATEX: explosion proof*

Reactors for enzymatic hydrolysis of biomass

These jacketed and agitated atmospheric reactors are suitable for aqueous, temperature-controlled reactions.

Scale	#	Note
Bench scale	Multiple	Bench scale reactors
20 - 1,000 L	Multiple	Mobile reactors
250 mL - 15,000 L	Multiple	Aerated reactors *(See folder "Fermentation")*
500 L	2	Reaction vessels for slurries with high solids contents
4,000 L	2	
5,000 L	2	
8,000L	4	
14,500 L	2	
20,000 L	1	
24,000 L	4	
50,000 L	3	

Reactors for enzymatic hydrolysis

home

Our experienced staff at work

Auxiliary equipment

Equipment	Properties	Note
MILLING		
Dry Milling: biomass cutter		
Dry Milling: ball mill	Bench unit	
Wet Milling: pulper	2,000 L	
Wet Milling: inline mixer & inline colloid mixer		
Lab Sonicator	1-250 mL	Batch
Pilot Sonicator	1,000 L/day	Continuous
THERMAL TREATMENT		
Direct steam injection: jet cooker with holding tubes	4 x 50 L	max. 150 °C
Heat exchangers for indirect heating		

Dewatering and concentration equipment: CHAMBER FILTER PRESSES

Scale	Cake Vol.	Filtration Area	Note
BENCH scale unit	1.44 L	max. 822 cm^2	
PILOT unit	68 L	max. 2.5 m^2	Netsch
PILOT unit	120 L	max. 6.5 m^2	Schenk
Large PILOT unit	352 L	max. 35 m^2	Welders, Cake squeezing
Large PILOT unit ATEX*	352 L	max. 35 m^2	

Dewatering and concentration equipment: DECANTER CENTRIFUGES

Scale	Capacity	Centrifugal Force	Type
PILOT unit	max. 500 L/h	ca. 3,000 g	Alfa Laval
Large PILOT unit	max. 3 m^3/h	ca. 3,000 g	Alfa Laval
Large PILOT unit	max. 2,000 L/h	ca. 3,400 g	GEA
Large PILOT unit	max. 2.5 m^3/h	ca. 10,000 g	Flottweg Sedicanter

**ATEX: explosion proof*

Falling film evaporator

Warehouse

Dewatering and concentration equipment: OTHER

Type	#	Capacity	Note
Screw press	1		
Falling film	1	5 t/h water evaporation	three-effect evaporator
Wiped film evaporator	2	200 kg/h water evaporation	
Chemical reactors for batch evaporation	Multiple	20 L, 85 L, 250 L, 500 L, 1,000 L, 5,400 L	*See folder "Green Chemistry"*

What we offer

- Mechanical, thermal, physicochemical and enzymatic pre-treatment of biomass feedstocks
- A wide spectrum of modular operation units
- Operation at various scales
- Logistics and storage:
  - Truck (un)loading docks
  - Bulk solid biomass storage (55 t silo, 3x90 t bunkers)
  - Liquid storage (vessels up to 125 m^3)
  - Dedicated areas for IBC storage
  - Chemicals storage
  - Refrigerated storage rooms, freeze and cool containers
  - Warehouse at ambient temperature with a storage capacity of 200 pallets
  - Cool room at 4°C with a storage capacity of 130 pallets

Expertise

Experience in treating the following lignocellulosic raw materials:

- Agro-industrial side streams: paper pulp, spent grains, bagasse, press cakes, stillage...
- Agronomic by-products: corn stover, corn cobs, husk, fibre, stems, leaves, verge grass...
- Lignocellulosic crops: miscanthus, wood, wheat straw, bark...

Find our more about our core business

Come fly with us: A swirling and sensational virtual visit of the Bio Base Europe Pilot Plant!

Questions?

Please call +32 9 335 70 01
or contact busdev@bbeu.org

3 x 50,000 L vessels

Biocatalysis

Equipment overview

Process vessels for aqueous reactions

Scale	#	Note
Bench scale	Multiple	Bench scale reactors
20 - 1,000 L	Multiple	Mobile reactors
250 mL - 15,000 L	Multiple	Aerated reactors *(See folder "Fermentation")*
500 L	2	Reaction vessels for slurries with high solids contents
4,000 L	2	
5,000 L	2	
8,000L	4	
14,500 L	2	
20,000 L	1	
24,000 L	4	
50,000 L	3	

Process vessels for solvent-based reactions

Scale	#	ATEX*	Material	Pressure (bara)	Temp (up to)
0.5, 2.5 L	Multiple	--	--	--	--
20 L	1	✔	Hastelloy	0.060–10	160°C
85 L	1	✔	Stainless steel	0.050–9	165°C
250 L	1	✔	Stainless steel	0.050–7	100°C
500 L	1	✔	Glass lined	0.050–9	180°C
1,000 L	1	✔	Glass lined	0.050–5.4	165°C
5,400 L	1	✔	Glass lined	0.050–5.4	165°C

**ATEX: explosion proof*

Our experienced team at work

Moving equipment

Auxiliary equipment

To produce the biocatalyst	Fermenters of different sizes	*See folder "Fermentation"*
Enzyme purification equipment	Cross-flow membrane filtration (MF, UF, NF in different scales ranging from bench to 10,000 L scale)	*See folder "Product recovery and purification"*
To purify the product of interest from the reaction mixture	A variety of downstream purification equipment	*See folder "Product recovery and purification"*
ATEX (explosion proof) Solvent Storage Tanks	4 x 30,000 L	

What we offer

- Scale-up and demonstration of biocatalytic processes, using purified enzyme and whole-cell biocatalysts
- Bioconversion processes *(See folder "Fermentation")*
- Process development and optimization
- First series compound production and custom manufacturing at 15,000 L scale
- Food grade production (FSSC22000)
- Immobilization of enzymes and whole cells
- Aqueous and solvent-based reactions
- Production of enzymes through bacterial, yeast, or fungal fermentation
- Process design

Expertise

Bio Base Europe Pilot Plant team of process and R&D engineers have built up a significant track record in the production of biocatalysts and biocatalytic conversions at lab and pilot scale. The team has demonstrated various aqueous and solvent-based reactions at an industrially relevant scale.

Want to see more?

Questions?

Please call +32 9 335 70 01
or contact busdev@bbeu.org

2 x 1,500 L + 2 x 15,000 L fermenters

Want to see more about fermentation?

Want to see more about ATEX* & GAS fermentation?

Anaerobic fermenters: batch

In addition to the CSTR fermenters, we can also deploy our chemical reactors that are adapted in such way that they can run as fermenters.
See folder "Green Chemistry".

Fermentation

Bio Base Europe Pilot Plant

Equipment overview

(An)Aerobic fermenters: batch, fed-batch, continuous

All fermenters are Controlled Stirred Tank Reactors (CSTR) and have:

- Six-blade (hollow blade) Rushton impellers,
- High aeration,
- Baffles and optionally foam breakers.

Methanol (ethanol) dosage is possible at every scale.

Scale	#	Materialt	Pressure	Note
250 mL	4	Glass	---	Incl. central control system for parallel operation of the 4 reactors
2 L	4	Glass	---	
3.6 L	8	Glass	---	
7 L	4	Glass	---	
10 L	2	Glass	---	
30 L	8*	Stainless steel	1.4 barg	Bio Base NEXTGEN
150 L	10	Stainless steel	1.4 barg	
1,500 L	2	Stainless steel	1.4 barg	
1,500 L	3*	Stainless steel	1.4 barg	Incl. 3 x 1,000 L feed tanks, Bio Base TRANSITION
15,000 L	2	Stainless steel	1.4 barg	Incl. 2 x 12,000 L feed tanks
15,000 L	1*	Stainless steel	1.4 barg	Incl. 1,000 & 8,000 L feed tanks, Bio Base TRANSITION
7,500 L	1*	Stainless steel	1.4 barg	Incl. 2,500 L feed tank, Bio Base DEMO
75,000 L	1*	Stainless steel	2 barg	Incl. 2,500 & 35,000 L feed tanks, Bio Base DEMO

**Reactors under construction*

Incl. media preparation room

Gas fermenters, feed CO, CO_2, H_2, CH_4

Scale	#	Material	Pressure	Note
1 L	4	Stainless steel	10 barg	
10 L	1	Stainless steel	5 barg	ATEX*
24 L	1	Stainless steel	8.5 barg	Containerized mobile gas fermentation demo unit
150 L	1	Stainless steel	8.5 barg	

**ATEX: explosion proof*

6 x 150 L fermenters

Auxiliary equipment

Analytical capabilities	HPLC, GC, GC-MS, LC-MS, fast biochemistry analyzer (YSI), (mass spec) off-gas analysis and data logging	*See folder "Analytical Capabilities".*
Equipment for biomass separation	Centrifuges, decanters, plate filters, filter presses, membrane filtration equipment	*See folder "Product recovery and purification".*
A variety of downstream processing equipment to recover and purify the product of interest from the fermentation broth		*See folder "Product recovery and purification".*
Production of 2G fermentable sugars		*See folder "Biomass pretreatment".*
Cooling of the fermenters with cooling water from cooling tower and chiller		
Cell culture lab		

In situ product recovery (ISPR) & FAST500 FERMENTER (DAB)

We can perform organic overlay fermentations (with an oil layer in the fermenter) in all of our bioreactors.

In the dedicated 500 L FAST500 fermenter owned by **Delft Advanced Biorenewables (DAB)** but operated at Bio Base Europe Pilot Plant, rapid liquid-liquid phase separation within an ongoing fermentation (FAST) can be performed alleviating the need for downstream separation.

See Specifications "FAST 500 L fermenter"

Chemical reactors

Our experienced team at work

What we offer

- Scale-up and demonstration of fermentation processes
- Batch, fed-batch and continuous (with or without cell recycle) fermentations
- Experience with bacterial, yeast and fungal systems
- Food grade production (FSSC22000)
- Process development and optimization
- First series compound production & custom manufacturing at 15,000 L scale

Examples of products:

- Biochemicals
- Biocolorants
- Bioflavours
- Biofuels
- Bioplastics
- Biosolvents
- Biosurfactants
- Fine and bulk chemicals
- Food ingredients
- Industrial enzymes
- Nutraceuticals
- Proteins
- ...

Expertise

Bio Base Europe Pilot Plant has more than 10 years of experience in optimizing, scaling and transferring your fermentation protocol from the lab to commercial production. We count on an entire team of well-trained and highly motivated fermentation experts both with academic and industrial backgrounds to take your process to the next level.

Questions?

Please call +32 9 335 70 01
or contact busdev@bbeu.org

Our experienced team at work

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ATEX chemical reactors (80 & 250 L)

Green Chemistry

Bio Base Europe Pilot Plant

Equipment overview

Pressure-proof, jacketed, agitated and corrosion-resistant reactors, coupled to a condenser and vacuum pump.

Chemical reactors (ATEX, explosion proof)

Scale	#	ATEX	Material	Pressure (bara)	Temp (up to)
20 L	1	✓	Hastelloy	0.060–10	160°C
85 L	1	✓	Stainless steel	0.050–9	165°C
250 L	1	✓	Stainless steel	0.050–7	100°C
500 L	1	✓	Glass lined	0.050–9	180°C
1,000 L	1	✓	Glass lined	0.050–5.4	165°C
5,400 L	1	✓	Glass lined	0.050–5.4	165°C

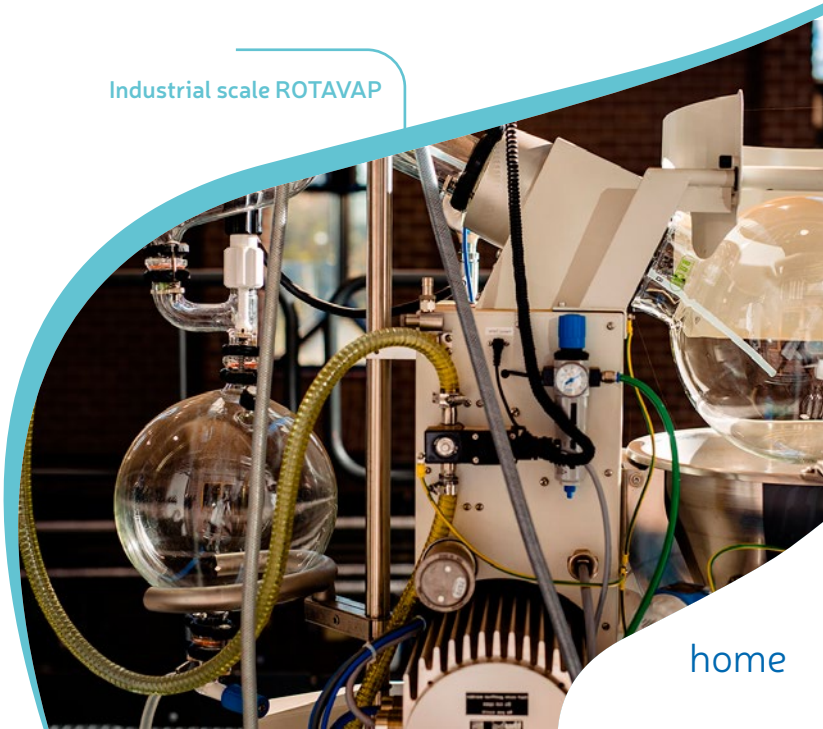
ATEX processes: YES, we can!

Auxiliary equipment (ATEX, explosion proof)

(for more information: See folder "Product recovery and purification")

	Properties	Comment
DISC STACK CENTRIFUGE	ca. 12,000 g max. 2.5 m^3/h	liquid-liquid or 3-phase separator
FILTER DRYER	1,900 L	solvent extraction, (pre-coat) filtration and solids drying
ATEX CHAMBER FILTER PRESS	cake vol. 352 L, max. 35 m^2 filtration area	cake squeezing
KARR COLUMN	ca. 6 L/h	for counter current liquid-liquid extraction
DEAD END PLATE AND FRAME FILTERS		
BAG FILTERS		
COLUMNS FOR ION EXCHANGE, adsorption chromatography or activated carbon treatment		

Industrial scale ROTAVAP



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5,400 L chemical reactor with view on the internals

What we offer

ATEX compliant installation and expertise for chemical processes:

- Solvent evaporation and condensation
- Zoning of the operational area to ATEX zone 2
- Explosion protection on all electrical equipment: **ExII2G T3**
- Nitrogen inertisation and blanketing

Examples:

- Functionalisation of biopolymers and oligosaccharides
- Esterification of fatty acids
- Synthesis of oleochemicals
- Chemical synthesis of biosurfactants
- Chemical synthesis of oleochemicals

Types of processes:

- Chemical synthesis reactions
- Chemical conversion reactions
- Chemical hydrolysis
- Extractions
- Flocculation

Our experienced team

Expertise

Our team is ready to bring your product to the next scale.
ATEX zoning challenges the possibilities and freedom of operation. However, our team of experienced engineers and operators can always find a safe and workable approach.

Questions?
Please call +32 9 335 70 01
or contact busdev@bbeu.org

Industrial unit for ceramic filtration

Product recovery and purification

Bio Base Europe Pilot Plant

Equipment overview

The equipment overview below gives an idea of the variety of modular unit operations we have available to perform your purification and product recovery processes. However, this list is not complete. If you are looking for specific equipment not listed below, do not hesitate to contact us

High speed disc stack centrifuges

Solid-liquid separators (ca. 7,000 g)	#		Liquid-liquid or three- phase separator (ca. 12,000 g)	
GEA	1	max. 60 L/h	GEA - ATEX*	ca. 1 m^3/h
Alfa Laval	2	max. 100 L/h		
GEA	1	max. 500 L/h		
Alfa Laval	1	max. 3 m^3/h		
Nozzle centrifuge	1	max. 3 m^3/h		

*ATEX: explosion proof

Decanter Centrifuges

Scale	Capacity	Centrifugal Force	Type
PILOT unit	max. 500 L/h	ca. 3,000 g	Alfa Laval
Large PILOT unit	max. 3 m^3/h	ca. 3,000 g	Alfa Laval
Large PILOT unit	max. 2,000 L/h	ca. 3,400 g	GEA
Large PILOT unit	max. 2.5 m^3/h	ca. 10,000 g	Flottweg Sedicanter

Homogenizers and Cell Disruption

Homogenizers	Capacity	Pressure
BENCH scale unit - GEA PANDA	1 L/h	2,000 bar
Small PILOT unit - GEA Panther	50 L/h	1,200 bar
Large PILOT unit - APV	850 L/h	1,200 bar
Sonicators	**Capacity**	**Note**
BENCH sonicator	1 – 250 mL	batch
PILOT sonicator	1,000 L/day	continuous
Jetcooker	**Capacity**	**Note**
Direct steam injection with holding tubes	4 x 50 L	max. 150 °C

Disc stack centrifuge 3 m^3/h

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Large scale spiral wound filtration

Cross flow membrane filtration: Micro Filtration (MF), Ultra Filtration (UF), Nano Filtration (NF) and Reverse Osmosis (RO)

Scale	# Membranes	Filtration area	MF	UF	NF	RO
Multi-functional BENCH unit: spiral wound, ceramic, hollow fibre	1-3 1	ca. 0.3 m^2	x	x	x	x
Flat sheet PILOT unit – LabStak™ M20	Several in parallel	max. 2 m^2	x	x	x	x
SPIRAL WOUND FILTRATION						
BENCH scale unit (RO mini)	1	ca. 0.23 m^2	x	x	x	x
BENCH scale (Octopus): 2 units	1 or 3	ca. 0.3 m^2	x	x	x	x
PILOT 3.8-inch membrane unit	1	max. 5.7 m^2	x	x		
PILOT 3.8-inch membranes: 2 units	max. 12	max. 70 m^2	x	x		
PILOT 6.3-inch membranes unit	9	max. 150 m^2	x	x		
PILOT 8-inch membranes unit	2	max. 45 m^2	x	x	x	x
PILOT 8-inch membranes: 2 units	6	max. 180 m^2	x	x	x	x
CERAMIC FILTRATION						
BENCH scale unit (Tami)		max. 0.032 m^2	x	x		
BENCH scale (Octopus): 2 units	1 or 3	ca. 0.3 m^2	x	x	x	x
SINGLE PILOT unit	1 to 3	0.2 or 0.6 m^2	x	x		
DOUBLE PILOT Cell Recycle unit	2		x	x	x	
TRIPLE PILOT unit	1 to 3	0.3 to 1 m^2	x	x		
SINGLE PILOT unit	55	(x0.2 m^2) = 11 m^2	x	x		
DOUBLE PILOT unit	110	(x0.2 m^2) = 22 m^2	x	x		
SINGLE/DOUBLE PILOT unit	55 to 110	11 to 22 m^2	x	x		
INDUSTRIAL unit (0.5 µm)	288	144 m^2	x			
HOLLOW FIBER FILTRATION						
BENCH scale (Octopus): 2 units	1 or 2	0.037 m^2	x	x	x	x
PILOT unit	2	max. 12.4 m^2	x	x		
PILOT unit	1 to 10	max. 50 m^2	x	x		

Chamber filter press pilot unit

Dead-end filtration: CHAMBER FILTER PRESSES

Scale	Cake Vol.	Filtration Area	Note
BENCH scale unit	1.44 L	max. 0.0822 cm^2	
PILOT unit	68 L	max. 2.5 m^2	Netsch
PILOT unit	120 L	max. 6.5 m^2	Schenk
Large PILOT unit	352 L	max. 35 m^2	Welders, Cake squeezing
Large PILOT unit ATEX*	352 L	max. 35 m^2	
Filter dryer 1900 L for solvent extraction, (pre-coat) filtration and solids drying			
Plate and frame units with cardboard filters			
Candle filters			
Rotary vacuum drum filter RVDF (3 m^2)			
See "Basket centrifuges for crystal separation"			

**ATEX: explosion proof*

Ion exchange columns, adsorption and chromatography

Scale	Material	Resin Volume	Pressure
Ion exchange			
BENCH scale	Glass	300 mL	
Pre-PILOT scale	Glass	3 x 5 L	max. 1 bar
PILOT scale	Fiberglass	3 x 30 L	max. 16 bar
PILOT scale	Fiberglass	4 x 300 L	max. 10 bar
PILOT scale	Fiberglass	4 x 1 m^3	max. 10 bar
PILOT scale	Fiberglass	1 x 1.3 m^3	max. 10 bar
PILOT scale	Fiberglass	4 x 1.9 m^3	max. 10 bar
PILOT scale	Fiberglass	2 x 3 m^3	max. 10 bar
Chromatography			
Pre-PILOT scale	Glass	8 L	
PILOT scale	Acrylic	38 L	max. 5 bar
PILOT scale	Glass	80 L	

Plate filters

Crystallisation line

Crystallization

Scale	Vol.	Note
BENCHTOP reactors	500 mL & 2 L	for cooling and/or evaporation crystallization
Various PILOT reactors	20 L to 5.4 m^3	for cooling and/or evaporation crystallization – several ATEX!
PILOT Crystallisation unit	50 L	continuous cooling
PILOT Crystallization line	up to 1,000 t/y	equipped with crystallizer 4 m^3, inverting filter basket centrifuge, rotary louvre dryer

Basket centrifuges for crystal separation:

Type	Capacity	
PILOT unit	10 kg	1,850 rpm
PILOT unit	40 kg	1,700 rpm
Heinkel inverting filter centrifuge	52 L	1,940 rpm

Evaporation

Evaporator Type	Note
ROTAVAP BENCH unit	
ROTAVAP PILOT unit	Flask size from 5-20 L
SPINNING CONE (Centritherm)	up to 50 kg/h
WIPED film (2 units available)	up to 200 kg/h
FALLING FILM three-effect	5 t/h
Batch evaporation reactors	• batch evaporation of water and organic solvents • condensation for solvent recuperation

Pilot Scale Centrifuge

Cleanroom with a metal detector for detection of ferro, non-ferro and stainless steel contamination in packaged powders (450 mm width x 250 mm height).

Drying

Dryer Type	Properties
Louvre crystal dryer	ca. 4 kg/h water evaporation
Vacuum tray dryer	300 L filling volume
Filter dryer	1,900 L (ATEX, explosion proof)
Drying oven	2,000 L
GEA Spray dryer	ca. 15 kg/h water evaporation
Lyophilizer	8 kg water evaporation per drying cycle
Access to external freeze and spray drying facilities	

Auxiliary equipment

Preparative chromatography unit (GRACE) – BENCH scale	
Ball Mill – BENCH scale	
Vibrating sieve: Sieve decks of 100, 400 and 1,000 µm	
Single-screw expeller press: max. 25 kg/h	
ATEX (explosion proof) extraction equipment *see Green Chemistry folder*	
TANKS (*see Biocatalysis Folder)*	
Multipurpose temperature-controlled process tanks	up to 24,000 L
Storage and process buffer tanks	up to 50 m^3
Solvent tanks ATEX (explosion proof)	4 x 30 m^3

On top of our own equipment, we provide access to a wide range of rental equipment

Our team at work

What we offer

- Expertise in development, scale-up and demonstration of product recovery and purification processes
- A broad range of processing equipment for aqueous and solvent-based applications
- Flexibility in setting up custom process lines
- Food grade production (FSSC22000)
- Warehouse at ambient temperature with a storage capacity of 200 pallets
- Cool room at 4°C with a storage capacity of 130 pallets

DSP development and scale-up @ BBEPP

Large DSP equipment @ BBEPP: A sneak preview

Expertise

Bio Base Europe Pilot Plant has more than 10 years of experience in purifying various metabolites from fermentation processes, as well as in purification of products from biomass via biorefinery or biocatalytic processes. The experienced team helps our customers to develop and scale-up their purification process from lab to commercial scale.

Questions?

Please call +32 9 335 70 01
or contact busdev@bbeu.org

Our team at work

Our experienced team at work

Analytical capabilities and Cell Culture Lab

Equipment overview

Process follow-up for the quantification of sugars, organic acids, intermediates, compounds of interest and enzyme activity

- 4 Agilent HPLCs and 1 UPLC with following detectors: DAD, RID, VWD and ELSD
- Dionex HPLC with ED electrochemical detector
- GC coupled to mass spectrometry
- GC with FID
- Colorimetric and fluorescent assays using Agilent and Tecan (micro plate reader) spectrophotometers
- Colorimetric using Agilent and Tecan (micro plate reader) spectrophotometers
- SDS-Page for protein/enzyme

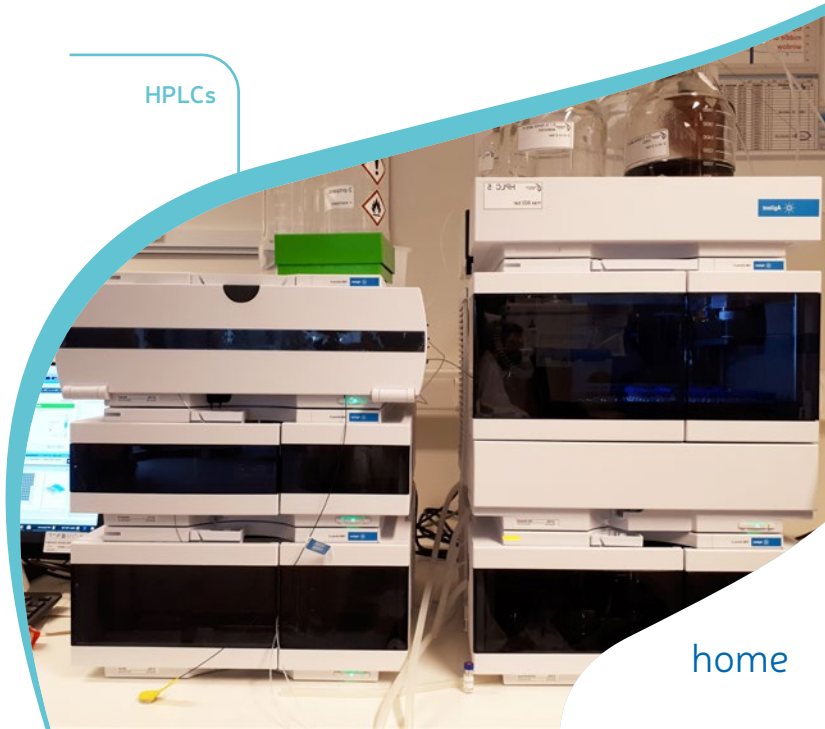
Evaluation of physico-chemical properties and moisture content

- Light microscopes
- Digital dino-lite crystal microscope
- Easy KFV Karl Fischer titration
- (Portable) Turbidimeters
- Sartorius moisture analyzers
- Brookfield Viscometer
- Thermogravimetric analyzer
- Conductivity, pH and brix meters
- ...

Off-gas analysis systems

- Off-gas MS analysis
- Mobile BlueSense off-gas analysis
- Mobile micro-GC

HPLCs



Liquid N_2 for cell storage

Cell Culture Laboratory

Equipment overview

Dedicated lab including:

- Laminar flow
- CO_2 incubator with O_2 control
- Liquid N_2 for cell storage
- Microscope
- Cell counter
- Analytics capabilities for metabolites measurement

Capabilities

- Process development and upscaling from millilitres (plates and stirrer flasks) to litres scale (bioreactors)
- Batch, fed-batch and perfusion (with or without cell recycle)
- Experience with CHO, HEK, HepG2 and other mammalian cells lines
- Experience with stem cells (proliferation and differentiation)

Examples of products:

- Recombinant protein/antibodies
- Cell therapy
- Cultivated meat
- ...

What we offer

- A dedicated team of analytical experts to implement your method of choice and to optimize methods to allow fast analysis
- A wide range of analytical methods available for quantification of various compounds
- Process control through close analytical follow-up of compounds of interest

Questions?

Please call +32 9 335 70 01
or contact busdev@bbeu.org

New Investments

Bio Base DEMO

In brief	Investment in a fully equipped 75 m^3 fermentation line
Total investment	€17.7M
Operational by	Operational by Q1 2024
RRF Project	Bio Base DEMO, Contract Nr. VV021/02

BBEPP's largest fermenter scale currently stands at 15 m^3 and these fermenters, like all other bioreactors present, are in high demand and permanently operational. For certain bio-based products, however, this scale is still too small for production trials or to generate sufficient quantities for application research. Large-scale demonstration is often the last essential step before a company makes the decision to invest in an industrial production installation. Through Bio Base Demo, BBEPP is investing in **a fully equipped 75 m^3** fermenter (50 m^3 working volume). In this way, the project contributes to the objectives of the Relance Plan "Vlaamse Veerkracht" (EU Recovery and Resilience Facility, RRF), with, as central spearhead "towards a more sustainable economy". As an open access demo infrastructure, it will increase the chance that an innovative process scaled up in Flanders can also be industrialized here.

Supported by:

DEPARTMENT OF ECONOMY SCIENCE & INNOVATION

Flanders State of the Art

Funded by the European Union NextGenerationEU

ghent:

Bio Base NEXTGEN

In brief	Eight pressurized stainless steel fermenters of 30 L each
Total investment	€2.3M
Operational by	Operational by Summer 2023
RRF Project	Bio Base NEXTGEN, Contract Nr. VV021/01

The Bio Base NextGen Fermentation Platform enables accelerated scale-up of innovative fermentation processes from lab scale to a relevant demonstration and production scale. The investment consists of **eight stainless steel fermenters of 30 L each.** Unlike BBEPP's current range of lab fermenters, these fermenters can be pressurized, and can therefore closely approximate the properties of larger-scale pilot fermenters. To enable automation and data analysis and to bridge the gap to an '**industrial biotechnology 4.0**', the NextGen fermenters will be equipped with **advanced sensors** for online measurements of certain process parameters. In addition to making the economy more sustainable, "digital transformation" is also a spearhead of the Relance Plan "Vlaamse Veerkracht" (EU Recovery and Resilience Facility, RRF).

Supported by:

DEPARTMENT OF ECONOMY SCIENCE & INNOVATION

Flanders State of the Art

Funded by the European Union NextGenerationEU

Microbial Protein Transition

In brief	Equipment for the purification of proteins or other nutrients from fermentation broth
Total investment	€3.6M
Operational by	January 2023
RRF Project	Microbial Protein Transition, Contract Nr. VV021/03

In response to the rapidly growing demand for sustainable food and feed, microbial proteins produced via fermentation have been gaining ground in recent years as an alternative to animal- and plant-based proteins. Renewable raw materials and side streams from various sectors can be used as feedstock for fermentation. The **Microbial Protein Transition platform** will support companies in the agri-food sector to produce and further develop microbial proteins into high-quality animal feed and food products or ingredients. This platform consists of a collaboration between the Bio Base Europe Pilot Plant and the Food Pilot, the living lab of ILVO and Flanders' Food. At both pilot facilities investments will be made in the necessary pilot **equipment for the production, purification and further processing of the microbial proteins.** The equipment will include the necessary sensors so that a sustainability analysis can be carried out on the entire process from fermentation to end product, in view of an objective communication to society and consumers. Bio Base Europe Pilot Plant will specifically invest in a pilot sedicanter, decanter, nozzle centrifuge, micro-, ultra- and nanofiltration equipment, sterilization equipment and a spray dryer.

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BIO BASE TRANSITION

In brief	Investment in a fully equipped 15 m^3 fermentation line
Total investment	€5M
Operational by	Summer 2023

The Bio Base Transition investment concerns a fermentation line (15 m^3) for demonstration of the valorisation of renewable raw materials, green methanol or waste materials into complex compounds, as an alternative to (petro)chemistry.

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