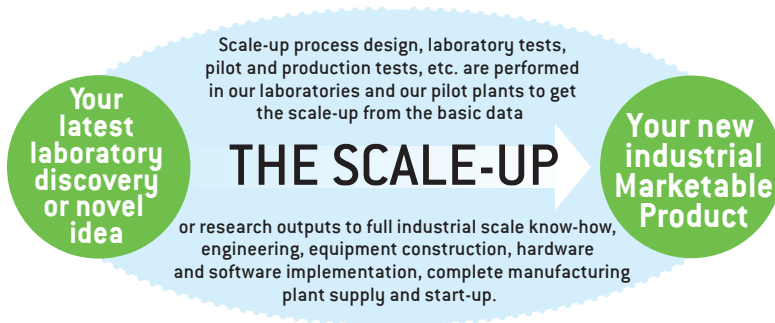


Services

Key Service: Scale-up of Biotech Processes and Plants

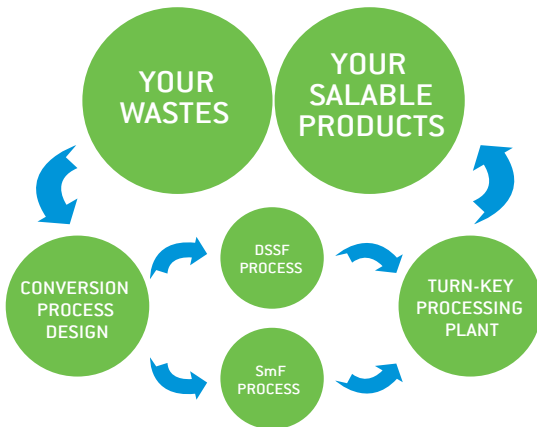


Engineering Services

MAINLY

- Basic engineering
- Data sheets
- Process and instrumentation sheets (P&I)
- Test run design and test run assistance
- Obsolete plants revamping
- Technology transfer

Services to Turn Your Waste Into a Salable Product Via Sustainable Biotech Processes



Some Successful Operations Performed

- Wastewater sludge turned into fertilizer
- Solid State Fermentation (SSF) residues post viable spores recovery turned into granular Bio-stimulants
- Biogas plant digestate turned into high value microbial fertilizer
- Spent grape skin turned into medium for DSSF (Dynamic Solid State Fermentation) production of yeast

TECHNOLOGIES for TRANSFER PRODUCTS for SUPPLY

Transferable Technologies

- Submerged Fermentation (SmF)
- Dynamic Solid State Fermentation (DSSF)
- Downstream Processing and Formulation
- Assembled and skid mounted (SmF, DSSF) units
- Thin Film Concentration Technology
- Mediums for SSF and DSSF Performance
- Biogas Digestates Conversion Into Fertilizers

All of them allowing to manufacture a wide range of sterile, food grade, or standard grade **Biotech AI**.



Some Product For Supply

ACTIVE INGREDIENTS FOR FOOD, FEED, BEVERAGES (AFI)

- Yeasts for wines
- Ochratoxin A degrader

PROBIOTICS, POSTBIOTICS (AHI) and COSMETICS (AFI)

- Bacteria based active ingredients

ACTIVE INGREDIENTS FOR PHARMACEUTICALS (API)

- Toll manufacturer only

MICROBIAL FERTILIZERS, BIOSTIMULANTS, BIOCONTROL INGREDIENTS (AAI) (As per Company's policy these kinds are not available for EU, USA, China until 2020)

- Microbial Fertilizers
- Bio-control Agents
- Bio-stimulant Ingredients

MEDIUMS FOR SSF/DSSF (MSF)

- Mediums for SSF/DSSF for Sporulation
- Mediums for SSF/DSSF for Biomass / Metabolites production

RAW ENZYMES for DIGESTATES and HIGH GRADE MICROBIAL FERTILIZERS from DIGESTATES

- Raw enzymes for getting available carbon source from biogas plant digestates
- Microbial Consortium to eliminate ammonium from biogas plants digestates
- Microbial Consortium to up-grade fertilizers efficacy
- Microbial high grade fertilizers from pre-treated biogas plants digestates



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SmF PLANTS

For Completely Automated Submerged Fermentation (SmF) Under Sterile Conditions

(either batch or semi-continuous process as well)
This is a 120 litres SmF plant (pilot or seed) in the final assembling, wiring and software installation phase in the workshop. As pre-fab skid mounted fermenter the recommended maximum capacity is 2,500 litres. Gibob can supply larger capacities as on site assembled plants.



In the workshop during assembling and wiring

SmF Bioreactors Main Features

Gibob SmF fermentation plants are constructed according to its proprietary design, as well as the hardware and the software. Gibob SmF fermentation plants are offering all the operation options, as a batch or semi-continuous fermenter controlled automatically or manual.

Furthermore, the fermentation can be started launching one of the protocols stored into the plant pc or upon direct writing of a new protocol on the PC Desktop. The stored protocols can be easily modified at any time if required. Operation and its control can be local from the control board or remote from your PC, tablet or phone.

Full record of performed operations can be called back at any time and details of all the data shown at the desired time (precision of seconds). Our system is very useful either for full production traceability (process validation) or for research programs.

The hydraulic, mechanical, electric and electronic parts are of the best market quality and largely diffused in the market, so easily available, as spares. This means convenient prices and no waste of time in research and waiting for spares.

Some Granted Advantages

- Full automation for all phases
- Local and remote controllable
- Batch or semi-continuous operation
- Validable process

Some Special Features

- Easy to use software
- High fermentation efficiency
- Records available in detail at any time
- Components and spare parts easily available

THIN FILM CONCENTRATION PLANT

FROM ANY LIQUID TO CONCENTRATED SLURRIES

(up to pumpability limits)

CAPABLE TO OPERATE UNDER STERILE CONDITIONS



Operation under pressure or vacuum and at any pressure

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DSSF BIOREACTOR

For Dynamic Solid State Fermentation (DSSF) Under Sterile Conditions

(allowing for downstream operation to finished products as well)



Gibob's 300 l pilot DSSF bioreactor in Gerenzano premises

The Real Dynamic Solid State Fermentation Is Performable In Our DSSF Bioreactor

Our DSSF Bioreactor and the related DSSF Technology allow to produce, under sterile controlled conditions, either sophisticated active ingredients (AI) for food, feed, pharma, agro sectors, or the final products as well. Downstream operation is performable in the same Bioreactor, immediately upon the fermentation process completion. There is no wastewater to be treated, saving plant and treatment cost.

The DSSF Bioreactor allows for full control of the key process conditions thanks to a complete proprietary Hardware and Software system, including WiFi communication as well. The process is perfectly recordable for products traceability.

Operation number, production cycles length and pollution risks are reduced to a minimum.

Gibob has filed its own patent application for its DSSF process or its DSSF Bioreactor.

Some Granted Advantages

- Easy to load and to un-load
- High efficiency (short processes length)
- High yields
- All downstream processes performable

Some Special Features

- Easy to use software
- Local and remote controllable
- Minimum manpower requirement
- Standard components, easy to replace

Thin Film Concentration Plant General Features (Sterilizable)

Gibob thin film concentration plants are adopting the principle of generating high turbulence on the evaporation surface, therefore high heat exchange rate, into the fluid to be concentrated. This, thanks to special blades, moved by a central shaft into a jacketed vertical cylinder, on the surface of which the liquid is flowing. It secures very short residence time (few seconds maximum), so avoiding products degradation risk.

The principle is well known, nevertheless Gibob can claim a proprietary special design, hardware, and software and in particular the process and the process related operation.

The plant can be sterilized, it can be heated by steam or hot water as well and it can operate under pressure or vacuum.

The plant is complete of a power and control board, with PC and PLC, proprietary hardware and software, such allow for fully automated operation and for full local or remote control as well.

Easy assembly and disassembly, easy cleaning, easy sterilizing.

Performances & Advantages

- Capacities: 100 to 1,000 kg/h evaporation
- Temperatures: 20° C to 185° C
- Vacuum or up to 10 bar pressure
- Very short residence time (few seconds)
- Suitable to concentrate sensible products

Special Features

- Extreme concentration capability
- Easy assembling and disassembling
- Easy cleaning
- Fully automated operation
- Easily available spares