

### Technology's description

This innovation is related to a **unique** strategy to operate in a sustainable way a **bio electrochemical system (BES)** made of a bioanode coupled with a biocathode. This design opens up opportunities to produce, in an energy efficient way, organic molecules of interest such as biochemical and biofuels from biodegradable wastes.

Actually, as feed material, organic wastes (wastewaters or process effluents) are providing energy to electroactive bacteria. This process makes it possible for the **BES device** to produce molecules (green biobased chemicals) for the chemical, biotechnological, pharmaceutical or biofuel industries. By playing on a number of catalytic parameters, the advantage of this creative BES design is to synchronize effectively the residual organic matter oxidation rate at the anode & the electrosynthesis kinetic at the cathode. This is achieved thanks to the stabilization & coordination of the bioelectro-activities between the two bioelectrodes. The result is a stable and continuous BES production process without oxidation breakdown. Applications are expected in electro-dialyse, advanced electrolytic & wastewaters & effluents treatment or reuse, anaerobic digestion processes, green chemistry, drugs, biofuels, bioengineering & biorefinary.

### Advantages

- Performances: a decreased BES electrical consumption (low current density catalysis)
- Operations: a long-term, stable & continuous production of chemicals or fuels
- Compatible with biodegradable hydrolysates
- Microbial selection and inoculation of wastewaters & industrial effluents
- Local production: material cost savings.

### Applications

- Electrodialyse - advanced electrolytic systems – wastes – wastewaters - effluents treatment or reuse - anaerobic

### Intellectual property

Patent

### Development level

Experimental proof of concept



### Technology transfer

- Licensing - co-developments - work packages.



Source: Iristea