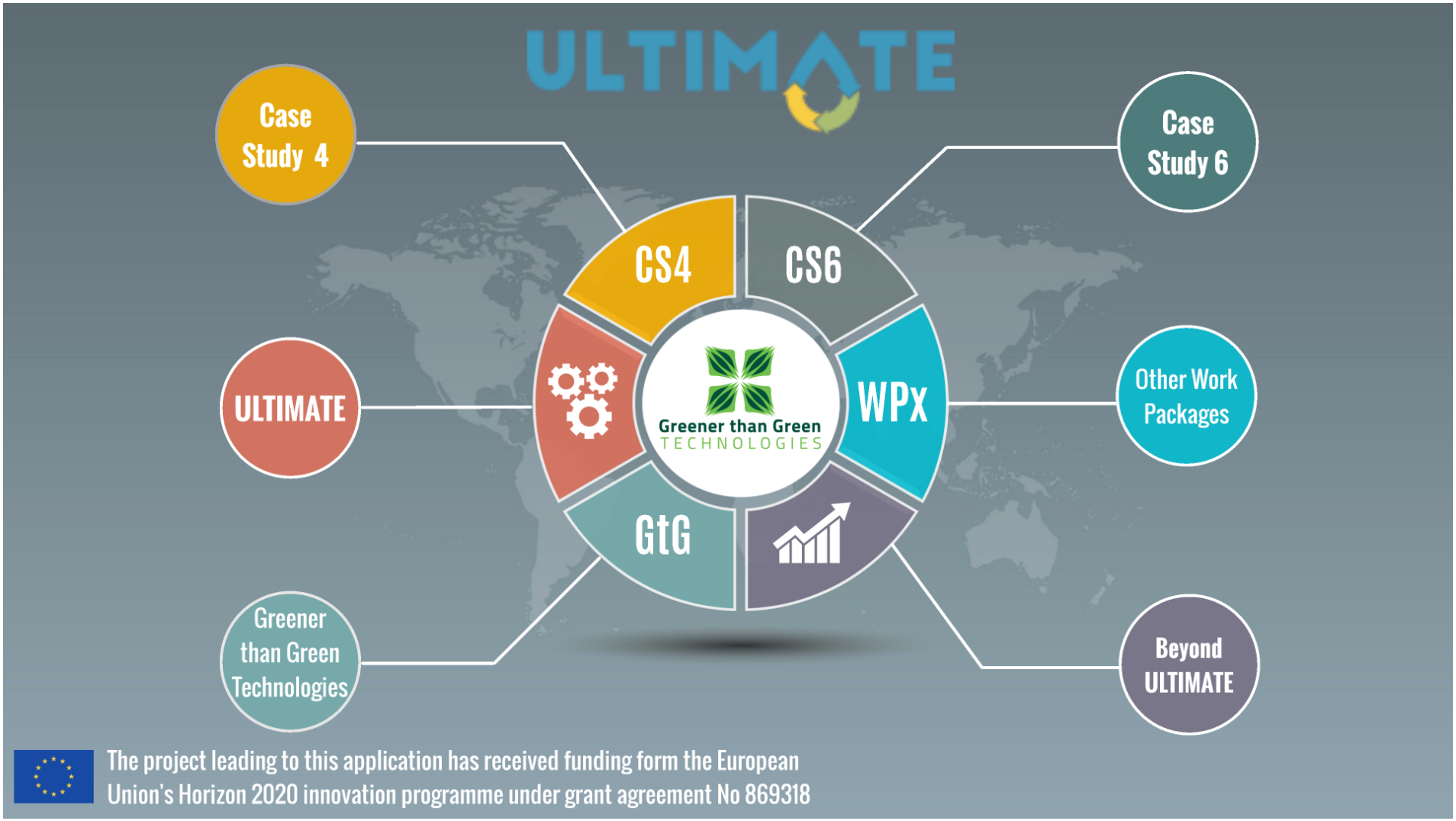
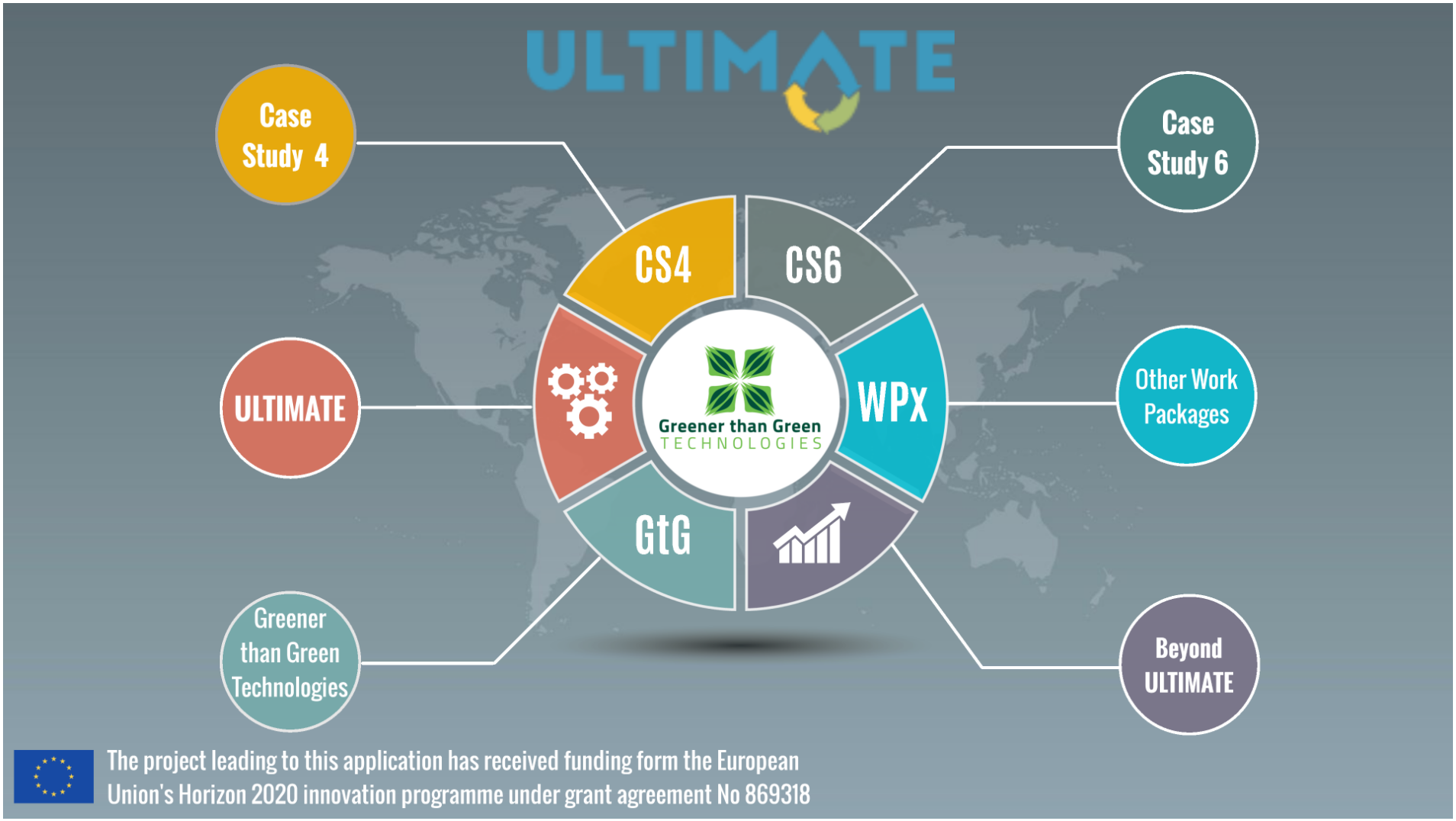

ULTIMATE
Case Study 4
Case Study 6
CS4
CS6
ULTIMATE
Greener than Green TECHNOLOGIES
WPx
Other Work Packages
GtG
Greener than Green Technologies
Beyond ULTIMATE
The project leading to this application has received funding form the European Union's Horizon 2020 innovation programme under grant agreement No 869318


ULTIMATE
Case Study 4
Case Study 6
CS4
CS6
ULTIMATE
Greener than Green TECHNOLOGIES
WPx
Other Work Packages
GtG
Greener than Green Technologies
Beyond ULTIMATE
The project leading to this application has received funding form the European Union's Horizon 2020 innovation programme under grant agreement No 869318

Greener than Green TECHNOLOGIES

Greener than Green Technologies SA (GtG)

is active in R&D and marketing of disruptive water and wastewater remediation technologies and methodologies for the circular usage of water providing valuable tools for the transition of industries and communities towards a circular economy model, taking a step closer to a circular economy. In cases where high interest and value added compounds are present in the waste, these can be reclaimed, purified and reused, minimising production cost, or can be commercially exploited, thus, turning waste into a resource.

Established in 2014, we are start-up company that sprung out of pioneering university research. Our research efforts are funded by private capital as well as EU grants and we continuously seeking synergies in both the industrial and research partners. Since 2019 we are marketing and promoting in Greece and the wider southeastern European area novel and innovative environmental technologies.

The team

The project leading to this application has received funding form the European Union's Horizon 2020 innovation programme under grant agreement No 869318

The team

Myrto Touloupi
Chemist BSc MSc

Christophoros Christophoridis
Chemist BSc MSc PhD

Haris Magonis
Environmental Engineer
MEng MSc

Charalampos- Philip Iossifidis
Chemist BSc MSc MBA

Dimitri Iossifidis
Chemist BSc MSc PhD

Eri Bizani
Chemist BSc MSc PhD

The project leading to this application has received funding form the European Union's Horizon 2020 innovation programme under grant agreement No 869318

Case Study 4

- Fruit processing industry

- Nafplio, Eastern Peloponese, Greece

- High water demand puts pressure in the aquifer

-Seasonality puts strain on the local biological treatment plant

- Under-performing biological treatment plant, leads to higher waste removal cost

Goals

The Unit

Value-added compound extraction

AOP

SBP

Greener than Green TECHNOLOGIES

ALBERTA S.A. Hellenic Fruit Processing Industry

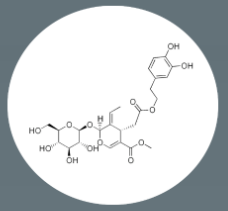
The project leading to this application has received funding form the European Union's Horizon 2020 innovation programme under grant agreement No 869318

Case Study 4 Goals

- Treat individual & final waste streams

- Isolate useful/value-added compounds compounds (properties & market price) e.g. polyphenols, flavonoids, anthocynins etc

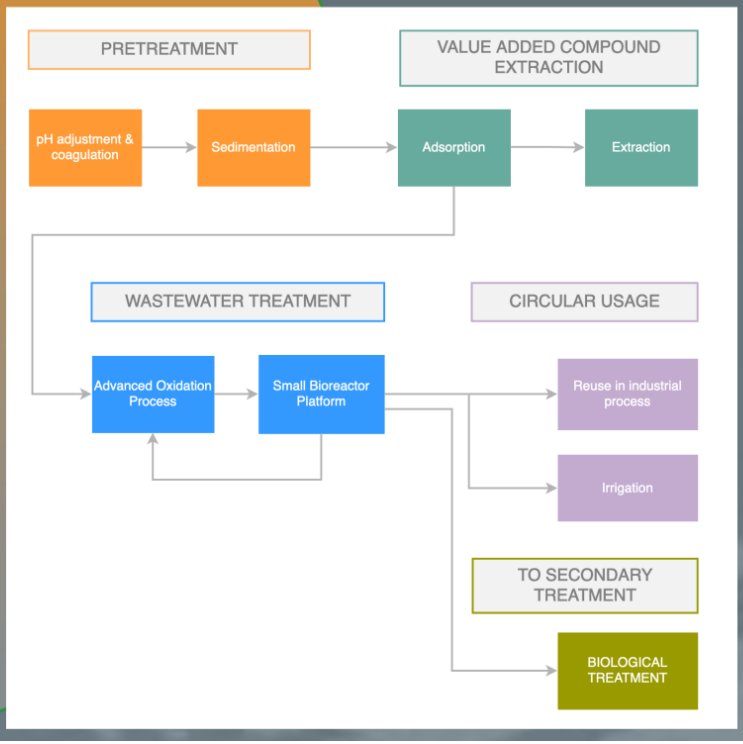
- Treat wastewater so it can be recycled:
  - **Irrigation of nearby orchards**
  - Reused within the plant for secondary uses or reduce the organic load sufficiently so the biological treatment plant can cope



The project leading to this application has received funding form the European Union's Horizon 2020 innovation programme under grant agreement No 869318

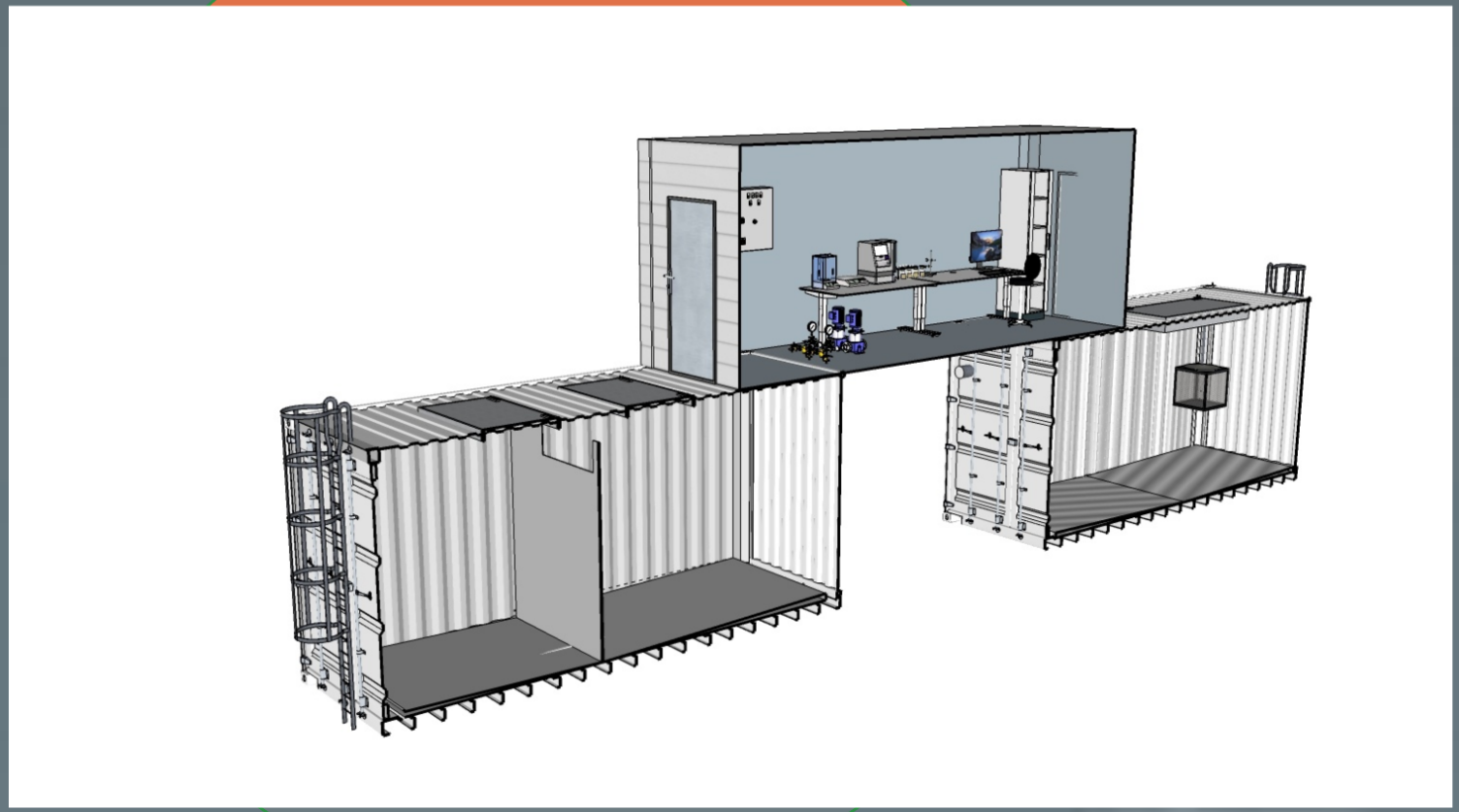
Unit Design

Cross-section



The project leading to this application has received funding form the European Union's Horizon 2020 innovation programme under grant agreement No 869318

Unit Cross-section



The project leading to this application has received funding form the European Union's Horizon 2020 innovation programme under grant agreement No 869318

Small Bioreactor Platform

BioCastle
Nature open-code inspired

SBP is a product of BioCastel, Israel
US Patent No. US 8,673,606
Europe Patent No. EP 2421544 (Germany, France, U.K, Nederland, Ireland and Switzerland)
Australia Patent No. 2010240486
Israel Patent No. 213072

Patented Technology by BioCastel, Israel

SBPs encapsulate bacteria within a porus membrane
Cellulose acetate
0.2 µm pore

The membrane:
- keeps bacteria safe from predators and other microorganisms
- prevents biomass from escaping to the environment

Problems addressed:
Controlling the type of bacteria needed
Defining the space they grow
Controlling the amount of biomass

How does it work

Benefits

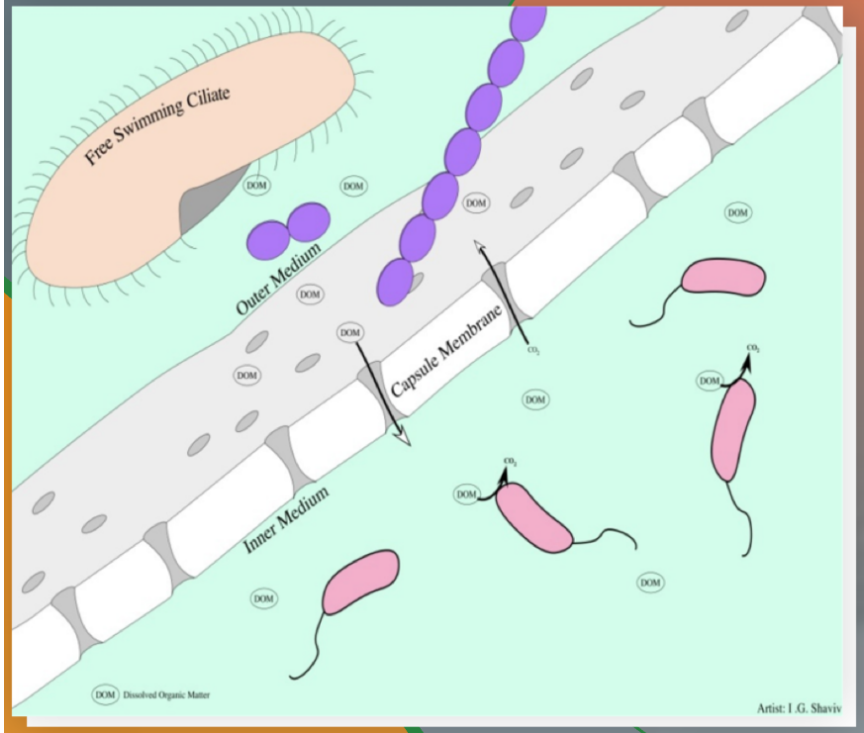
Applications

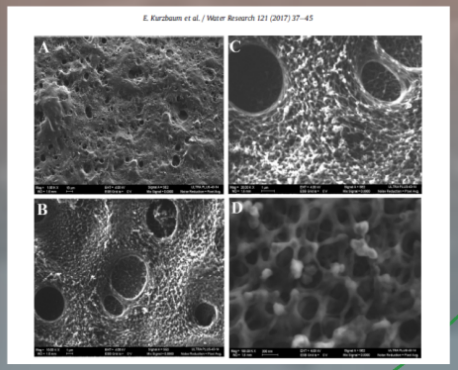
ULTIMATE

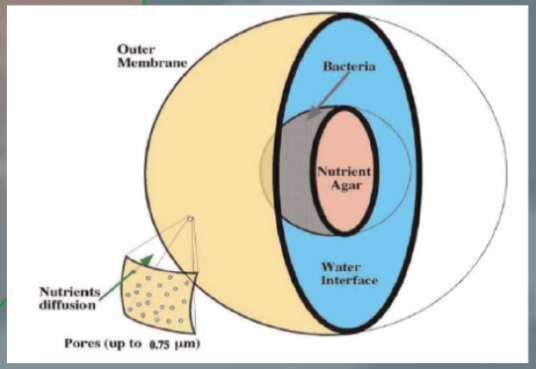
The project leading to this application has received funding form the European Union's Horizon 2020 innovation programme under grant agreement No 869318

How does it work

- A 0.2 µm cellulose acetate membrane encapsulates bacteria keeping it safe from predators and preventing biomass to escape
- Water and disolved pollutants migrate trough through the pores and are metabolised by bateria
- After the life cycle of the bacteria, approx. two month, the cellulose acetate membrane devomposes to sugars







The project leading to this application has received funding form the European Union's Horizon 2020 innovation programme under grant agreement No 869318

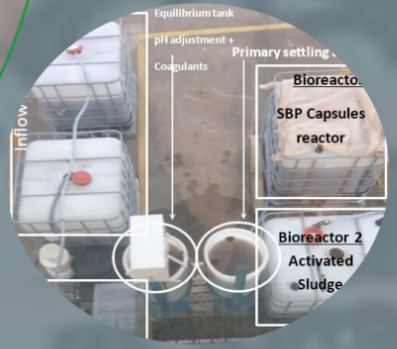
Benefits

SBP technology addresses certain biological treatment problems:

- Control of bacteria type growth
- Control of space bacteria grow
- Control of amount of bacteria

It can be implemented:

- to assist existing biological treatment units to cope with seasonal and unexpected shock load episodes
- to increase capacity with minimal CapEx
- as a small scale standalone solution with out the need of high-cost & extensive infrastructure



The project leading to this application has received funding form the European Union's Horizon 2020 innovation programme under grant agreement No 869318

Applications

Sanitary wastewater treatment examples:
- A20 5500 m3/d
- MBR 2400 m3/d
- AS 500 m3/d

Yield increase up to 15%
Increase in biodegradation rate
Increase in bioprocess stability

Industrial wastewater treatment:
- Food waste 200 m3/d
- Winery waste 0.5 m3/d

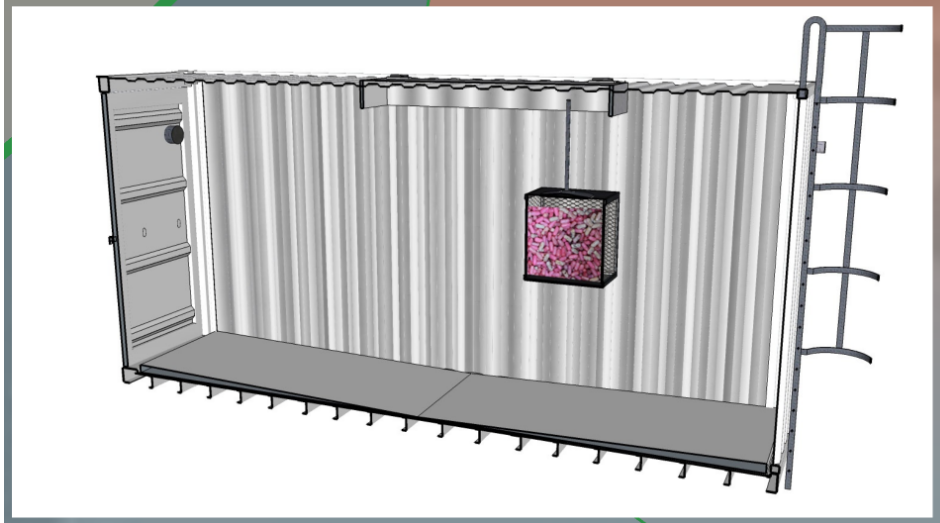
No need for natural biomass growing and all associated infrastructure
No need for professional manpower for plant operation
No need for waste sludge transporting and associated infastucture

The project leading to this application has received funding form the European Union's Horizon 2020 innovation programme under grant agreement No 869318

SBPs application in ULTIMATE

Investigate the synegistic effect of AOP-SBP

Goal: To create a universal treatment methodology for the food processing sector



Treat wastewater rich in compounds with antibacterial properties, e.g. polyphenols

Wastewater from:

- Olive oli mill
- Fruit & vegetable processing and juice production

Future: Phrmaceutical wastewater treatment

The project leading to this application has received funding form the European Union's Horizon 2020 innovation programme under grant agreement No 869318