CONVERSION OF DILUTED MIXED URBAN BIO-WASTES
INTO SUSTAINABLE MATERIALS AND PRODUCTS
IN FLEXIBLE PURPLE PHOTOBIOREFINERIES

PRESS RELEASE

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THE FIRST BIOREFINERY USING THE PURPLE PHOTOTROPHIC BACTERIA IN THE EU AND THE LARGEST WORLDWIDE!

We want to inform about the project DEEP PURPLE and highlights of the first publication on DEEP PURPLE, published in Elsevier.

The aim of DEEP PURPLE is to recover valuable resources from mixed urban waste streams, namely wastewater, sewage sludge and the organic fraction of the municipal solid waste (OFMSW). The DEEP PURPLE concept relies in a versatile, integrated, flexible and energy positive multiplatform photo biorefinery. This new approach is based on the metabolism of Purple Phototrophic Bacteria (PPB) to extract and recover high added-value compounds for the bio-based industry such as polyhydroxyalkanoates (PHA), ectoine and cellulose. Currently, Aqualia (project coordinator) operates the largest The DEEP PURPLE photobioreactors in the world, located at the wastewater treatment plant Estiviel (Toledo, Spain). The project envisages the construction and operation of two photobiorefineries in two demo sites (Spain and Czech Republic). Those will be the first European PPB photobiorefineries and the largest worldwide.

Horizon 2020 European Union Funding for Research & Innovation

Bio-based Industries Consortium

BBI JU

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Up to 138 million tons of bio-waste are annually generated in Europe. It is estimated that almost 75% of this waste is sent to incineration or landfilling, which carries a huge environmental and economic cost. This fact implies a great opportunity as waste holds a big potential as a source of nutrients and energy. Wastewater contains valuable components such as cellulose and nutrients that can be used as feedstock for target market applications. DEEP PURPLE, a project funded by the Bio Based Industries Joint Undertaking under the European Union's Horizon 2020 Research Innovation Programme, started in May 2019 and will end in April 2023.

The balanced **DEEP PURPLE consortium**, led by AQUALIA, Europe's fourth water company, comprises bio-based large and SMEs, universities and research centers.

AQUALIA is responsible for the management and coordination of the DEEP PURPLE consortium, Besides, AQUALIA will validate and demonstrate the photobiorefinery concept at demo scale in two replication sites (Spain and Czech Republic) for the synergistic treatment of domestic wastewater and the liquid fraction upon thermal hydrolysis of the organic fraction of municipal solid waste (OFMSW). The main plant will be located at the WWTP Estiviel (Toledo, Spain), whereas a mirror plant will be installed in Czech Republic. These plants will be the largest anaerobic pho-biological reactors installed worldwide.

URJC is the scientific coordinator of the proposal. They will work at a lower scale to optimize the operation of pilot-scale photo-bioreactors for obtaining bioplastics and organic fertilizers from the treatment of domestic wastewater and the liquid fraction upon thermal hydrolysis of the organic fraction of municipal solid waste. The optimization includes metabolic analysis of the process, as well as the development of a multi-physics approach including radiation transfer and continuous fluid dynamics.

The publication "Novel approach for the treatment of the organic fraction of municipal solid waste: Coupling thermal hydrolysis with anaerobic digestion and photo-fermentation" by the Universidad of Rey Juan Carlos was published in ELSEVIER, "Science of the Total Environment" with open access under a Creative Commons license,. It showed that for the transformation of bio-waste by purple-phototrophic bacteria-based treatment time had no impact on the overall performance in thermal hydrolysis pre-treatment. With the help of the phototrophic bacteria 15% of total solids were transformed into high added-value products like bioplastics, bio-hydrogen and single-cell proteins. To download and view the entire publication, please follow this link.

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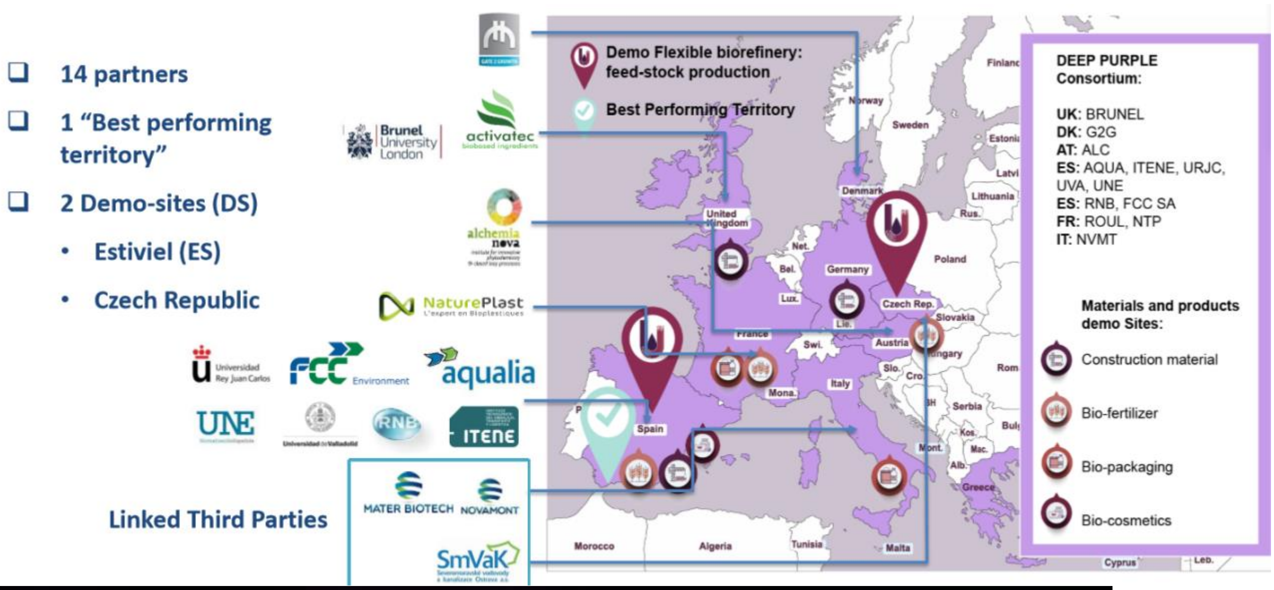
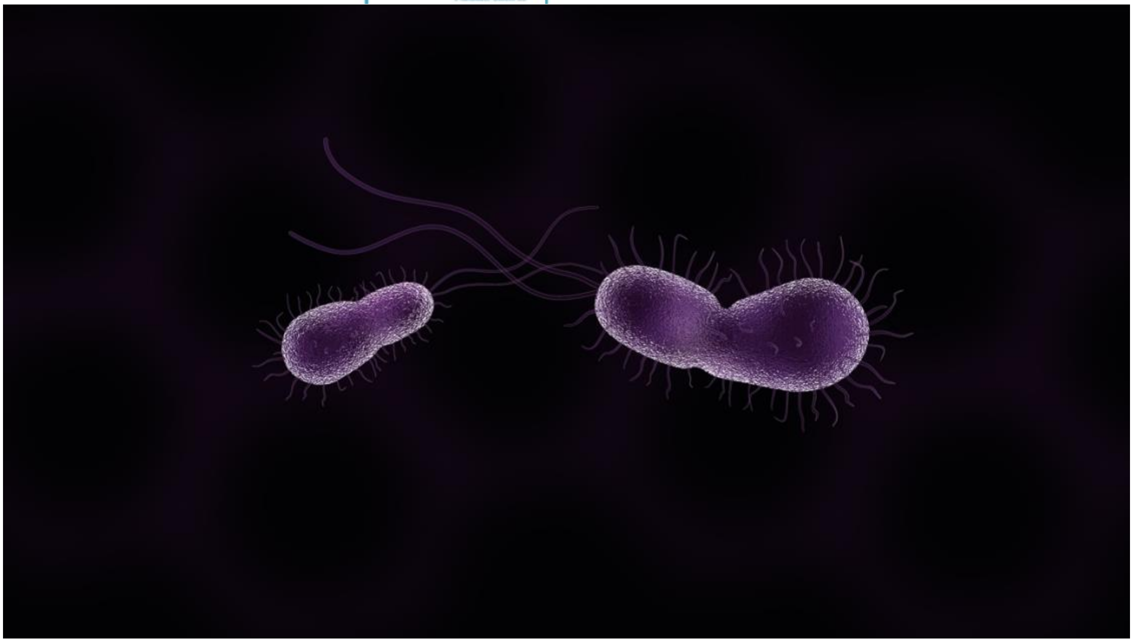
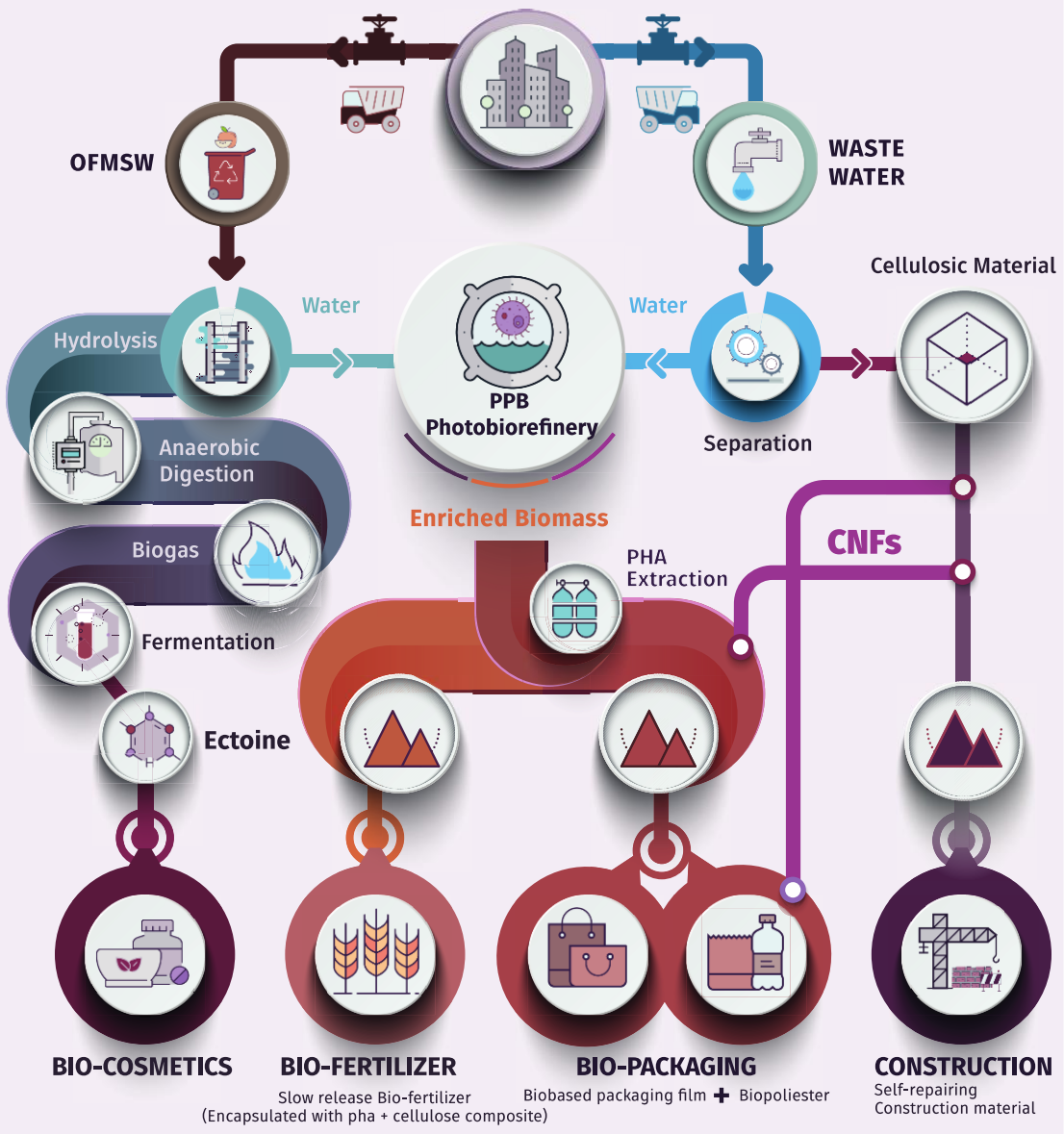
LINKS:

https://deep-purple.eu/
https://deep-purple.eu/publication-in-elsevier/
https://deep-purple.eu/official-deep-purple-animation-video-released/

PHOTO MATERIAL:


14 partners
1 "Best performing territory"
2 Demo-sites (DS)
Estiviel (ES)
Czech Republic
Linked Third Parties
Demo Flexible biorefinery: feed-stock production
Best Performing Territory
DEEP PURPLE Consortium:
UK: BRUNEL
DK: G2G
AT: ALC
ES: AQUA, ITENE, URJC, UVA, UNE
ES: RNB, FCC SA
FR: ROUL, NTP
IT: NVMT
Materials and products demo Sites:
Construction material
Bio-fertilizer
Bio-packaging
Bio-cosmetics




OFMSW
WASTE WATER
Cellulosic Material
Water
Water
Hydrolysis
PPB Photobiorefinery
Separation
Anaerobic Digestion
Enriched Biomass
CNFs
Biogas
PHA Extraction
Fermentation
Ectoine
BIO-COSMETICS
BIO-FERTILIZER
Slow release Bio-fertilizer (Encapsulated with pha + cellulose composite)
BIO-PACKAGING
Biobased packaging film + Biopoliester
CONSTRUCTION
Self-repairing Construction material