PestNu

"Field-testing and demonstration of Digital and Space based technologies with Agro-ecological and Organic practices in systemic innovation"

Plant enabler production using hydroponic wastewater

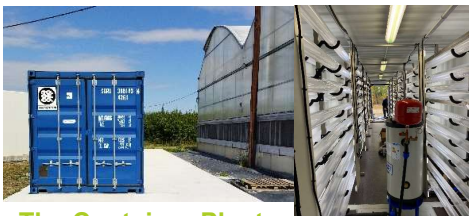
microalgae; biofertiliser; circular economy; green economy; no-waste

Italy + Greece

PestNu wastewater treatment is a microalgae-based, containerized, modular, scalable, and self-controlled plant capable of treating manure sludge in Photobioreactors (PBR) with low operational and installation costs.

The system treats wastewater to reduce the quantity of Nitrogen (N) and Phosphorous (P) contained, thanks to the microalgae that are fed with N, P and CO_2. As a result of the process, the water is partially depurated and it can be used for irrigation purposes, with concentrations of N & P compliant with EU regulations. In addition, the produced microalgae biomass can be harvested and used to produce high-value bio-products, such as plant biostimulants. The process is automated and continuously controlled by a central system (PLC) from which the sensors, the pumps and the lighting system are connected. The data recorded (pH, flow rates, temperature) through the sensors permits the system to be automatically adjusted and optimised. The main innovation is the installation of an additional tank, inserted after the biomass collection to convert the biomass into a biofertilizer. It is expected the system will produce a microalgae-based biofertilizer capacity of 10 Kg per five days. The main short-term effects of the plant are:

- Creation of a circular economy model compatible with the Agri-farm wastewater purification process.
- Production of algal biomass purification process Cost / Benefit analysis, allowing operators and managers to analyse the potential of PestNu technology.
- The agricultural sector has raised awareness of environmental impacts, transferring the concept of waste = resource.



The Container Plant

Tanks

PLC
Power Line Communication

Biofertiliser reactor

Practice abstract n.6

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