

Wastewater bioremediation using Algae-Bacteria consortia for rural Area (WABA)



Resumen:

The Water bioremediation using Algae-Bacteria consortia for rural Areas project, WABA project principal goal is to develop an alternative eco-friendly and sustainable wastewater treatment process for rural areas based on a microalgae- bacteria consortium.

The potential of microalgae for bioremediation of wastewater has recently received considerable interest. Compared to physical and chemical treatment processes, algae based treatment can potentially achieve nutrient removal in a less expensive and ecologically safer way with the added benefits of resource recovery and recycling. However, no study has analyzed the energetic benefits and techno-economic limitations of this concept in the context of Euro-Mediterranean rural areas.

Bacteria-algae consortia can enjoy most of metabolic features of both components, and are potentially economically sustainable, thanks to their capacity to operate with minimal natural inputs such as sunlight, atmospheric CO₂ and nutrients from wastewaters. Thus, this system can be energetically efficient, and ecologically friendly. The project will study the relationship between algae and bacteria to understand how we can improve this partnership and maximize non-energy intensive treatments of rural wastewater, combined with the production of algae-based agronomical useful products.

Objetivos:

The WABA Project aims to investigate different aspects related to the development of new processes for bioremediation of wastewater in rural areas and the production of useful agronomical product by:

- investigating the growth potential of different algae-bacteria consortiums.
- optimizing wastewater treatment through the use of novel systems.
- valorizing the biomass produced as potential plant biofertilizer.
- evaluation of the new bioremediation process by comparison with existing conventional processes.
- analysis of the socioeconomic impact of this new process in rural areas.

Objetivos contribución:

The UCO is in charge of the Ecophysiological study of algae-bacteria consortia. Our objective is to investigate new consortium (artificial and originating from wastewater) and evaluate their impact on the bioremediation of the major pollutants (C, N, P and other xenobiotics) and optimize their growth condition to produce useful biomass.

Entregables:

1.1 Report on the algae-bacteria consortium growth behavior, impact on the biomass and their remediation effect.

Impacto:

The results of the WABA project will: improve the understanding of bacteria-algae physiology and interaction processes (WP1), study currently identified algae-bacteria consortium and identify new potential ones (WP1), provide data on potential usage of the consortium for wastewater treatment facilities (WP2), develop a new engineering low-energy optimized system for bioremediation (WP2), develop innovative analytical methods to monitor biomass quality produced during the wastewater treatment (WP3), produce valuable biomass, potentially tailorable by growth condition (WP3), provide an analysis of the energetic and economic impact of the process (WP4), and deliver an eco-sociological and societal study based on specific case-studies (WP5).

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