

MARINE MICROALGAE AND CYANOBACTERIA STRAINS FOR BIOREMEDIATION PROCESSES AND BIOSTIMULANT ACTIVITY: OUTPUTS FROM THE SABANA PROJECT

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Abstract: Marine eucaryotic microalgae and cyanobacteria from the BEA Culture Collection have been selected and assayed to evaluate bioremediation capabilities and biomass biostimulant activity under the framework of the H2020-SABANA Project. After an initial screening of 50 strains for growth performance at laboratory scale, biochemical composition and bioactivity determination, a final group of 6 strains was evaluated at an outdoor pilot scale using seawater diluted centrate (wastewaters obtained from a sludge anaerobic digestion process) as a culture medium, in two cultivation systems (tubular PBRs and open raceway ponds ORPs), during periods longer than 6-months. The simultaneous study of the biomass and biochemical productivity was performed in semi-continuous mode. Productivity, growth performance, nutrient removal capacity, biomass nutritional composition, microbiology, heavy metal content, and microalgae-bacteria consortium dynamic were studied and compared.

Selected strains were included into the bioassay work. The harvested biomass samples were freeze-dried and tested for their hormone-like activities: (1) auxin-like activities, and (2) cytokinin-like activity. The bioactivity was strain-dependent, but strongly influenced by the physiological status of the strain. Therefore, bioactivities of laboratory biomass samples were always similar to each other, while biomass samples produced in outdoor cultures either in nutrient medium or in diluted centrate showed varying, lower or higher bioactivities than the laboratory samples. One marine strain with plant biostimulating (*Chrysoreinhardia giraudii* BEA 0313B) and two with biopesticide activities (*Dolichospermum* sp. BEA 0866B and *Anabaena* sp. BEA 0912B) were selected as final candidates for application developments. Final conclusions focused on the methodologies and experimental activities carried out at the facilities of BEA in Taliarte (Gran Canaria) will be presented and discussed.

Key words: Microalgae, cyanobacteria, bioremediation, biostimulant activity, biomass production, Canary Islands

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