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Phycoremediation of olive mill wastewater (OMW) using cyanobacteria for sustainable biofertilizer and biofuel production

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The dual role of cyanobacteria in wastewater phycoremediation for sustainable biomass production combined with biorefinery approach is a feasible option. Phycoremediation is the process of employing algae for removing excess nutrient load from wastewater and subsequently diminish the pollution load. Industrial processes for olive production generate a considerable amount of oil waste water, designated "olive mill wastewater" (OMW) known as alpechin, it caused serious environmental problems particularly in the Mediterranean areas where it is generated in huge quantities in short periods of time. The objective of this research was to study the ability of three cyanobacteria strains (Nostoc muscorum, Anabaena oryzae and Spirulina platensis) to grow, either individually or in a mixture, on relatively high olive mill wastewater (OMW) concentrations of 50, 75 and 100%. The highest phenolic compounds biodegradability and maximum biomass production have been taken as main criteria in the selection of the best treatment in this study. Best results of all growth parameters and phenolic compounds degradation were obtained by mixed culture and 50% OMW and these parameters make the potential of bio-formulating such these wastes into sources for olive trees bio-organic fertilizer is the most preferable methods for the agro-sustainable system. The cultivated algal species are suggested to be a promising feedstock for biofuel (biodiesel or bioethanol), food and animal feed production according to the biochemical composition.

Biography

Soha S M Mostafa is a Phycologist, with over 20-years research experience in the area of applied phycology. Main fields of work include: Isolation and characterization of microalgae from different environments; phycoremediation of agro-industrial effluents and domestic wastewater into biodiesel and biofertilizers production; seawater desalination; bio-precipitation of heavy metals via cyanobacterial off-gases; phytohormones, pigments, antioxidant, anticancer and other bioactive compounds production from algae; using microalgae in controlling Schistosoma mansoni, nematode, fungal and viral plant diseases. He was a guest author in the European online publication "INTECH" with a chapter entitled " Micro-algal Biotechnology: Prospects and Applications" on Plant Science (2012).

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