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RENEWABLE ENERGY PRODUCTION FROM ALGAE WITH EMPHASIS ON CLIMATE CHANGE

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Acknowledging that climate change and over population of the Mediterranean region, as in the world as a whole, makes most of the agricultural land resources threatened by decay and degradation. In addition to the use of vast quantities of environmentally polluted chemical fertilizers and rain scarcity, as well as the non-scientific treatment of solid wastes and industrial effluents are often disposed of in waterways. Therefore, the reuse of biological treated wastewater, especially the use of algae, is important for both economic and environmental purposes. Phycoremediation, is used to express the treatment of low quality water using algae, which is a preferred trend in the biological wastewater treatment approach for many of the benefits and products during the remediation process, CO_2 sequestering, oxygenating the treated effluent, removal of trace organic micropollutants. Furthermore, following wastewater remediation, the algal biomass can be processed for the production of value-added products within human and animal nutrition, cosmetics and biofuels as well as using the remediated effluent as PGPR source for fertigation. Egypt receives large amounts of daily solar radiation and has abundant flat desert land with large supplies of saline groundwater, sewage and pretreated industrial wastewater, making it an excellent location for algae growth. Two limitations of the site were the low nightly temperatures, which resulted in low productive species identified, and the climate change. Marine macroalgae (i.e. seaweeds) are mainly used for alginate production and the spent biomass is used for biomethane although it is a promising feedstock for the third generation bioethanol, as they are abundant, sustainable, with high carbohydrate content and little or no lignin. Thus sugars can be unconfined simply, which facilitates higher yield and making it superior over lignocellulosic biomass, and decreases the energy requirements and the overall cost. Moreover, they have the advantages of; recycling of CO_2, high productivity, no requirement of arable land, fertilizers, pesticides or fresh water resources, additionally, they have no negative impact on food supplies, with pre-existing markets for the bioethanol macroalgae wastes, for example biogas production. In this study, phycoremediation of wastewater and seawater desalination will be described with an emphasis on phycoremediation in terms of bioreactors, pollutants removal, biomass production and application, effluents quality and reuse in addition to the environmental and economic impact.

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