

Title:

Microalgae from wastewaters to tool up phycotechnology

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Abstract:

Microalgae or the microscopic algae typically found in fresh and marine waters also grow in most wastewaters. They exist as unicells, colonies, or filaments and carry out a number of processes resulting in diverse products or services that sustain life. In fact, microalgae can be considered as versatile micro-factories of nature. They are referred to as "green gold" owing to the wide variety of potential uses. They come in diverse colours and forms and are classified accordingly.

The newly isolated native microalgae from the waste waters of Oman include species of Chlorophycean algae such as *Chlorella*, *Nannochloropsis*, *Golenkinia*, *Dicellula* and *Scenedesmus* and Cyanobacterial species such as *Chroococcus*, *Lyngbya*, *Cylindrospermum* and *Gomphospaheria*. Diatoms species isolated from Omani waters include species of *Fragillaria*, *Amphiprora*, *Licmophora* etc. Waste waters from farms or other sources could be used to grow microgreen algae especially those species isolated from such waterbodies. This biomass could be used for developing feeds, biofuels, biochemicals of high value and materials for food supplements and medicines through biorefinery approach. Algae are the source of green fuel as they are used for the production of biodiesel, bioethanol, biogasoline, biomethanol, biobutanol and recently bio-hydrogen. Besides furnishing secure, pollution free and sustainable sources of energy microalgae also are used to develop new technologies to clean up wastes. Algae can carry out selective uptake, accumulation and biodegradation of pollutants and thus help in remediation of polluted waters. By Phycoremediation, pollutants such as excess nutrients, xenobiotics, heavy metals etc..can be removed from waters. Thus algae acting in multidimensions can promote a circular economy solution for sustainable development. Such multidimensional application of algae constitutes Phycotechnology - *putting algae into multiple uses!*