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Marine cyanobacteria mediated calcification of ossein effluent towards bioremediation

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Ossein is the proteinaceous substance of the animal bone left after the mineral part is dissolved by acid treatment during gelatin production. The ossein effluent with strong odour and high calcium (30,000 mg L⁻¹ and chloride 18,000 mg L⁻¹) is of major concern in its disposal. The calcium of the ossein effluent can be converted to calcium carbonate efficiently only by biological process. Cyanobacteria the oxygenic photosynthetic autotrophs are the most successful and primitive life forms that can mediate biological calcification and carbon sequestration. Among cyanobacteria, marine forms have varied applications because of their ability to thrive in wide range of environmental regimes including the hazardous habitats. Our preliminary studies have shown two potent marine cyanobacteria, *Oscillatoria willei* and *Phormidium valderianum* capable of growing in ossein effluent in field conditions. Hence a study was planned to evaluate their potential in calcification. Of the various seawater dilutions of ossein effluent studied (1:1, 2:1, 3:1) the half strength low total dissolved solids (LTDS) and high total dissolved solids (HTDS) effluent with added cost effective nutrients proved to be suitable for marine cyanobacteria. Of the two organisms *O. willei* showed appreciable growth in LTDS effluent with a biomass productivity of 0.15 g d⁻¹ and *P. valderianum* revealed a productivity of 0.06 g d⁻¹ in HTDS effluent. The characteristic peak at 855.83 cm⁻¹ in LTDS effluent by *O. willei* and 875 cm⁻¹ by *P. valderianum* in HTDS identified from the IR spectrum of dried biomass augments the calcification potential of both the organisms. It is evident that both calcium and CO₂ could be alleviated and the resulting biomass could be valued as a feedstock for production of feed and fuel.

Biography

Uma V S pursued her Master's in Marine Biotechnology from Bharathidasan University and she is now a Doctoral degree student of Dr. D. Prabaharan at National Facility for Marine Cyanobacteria, Bharathidasan University. She is investigating the potentials of marine cyanobacteria as the feedstock for biodiesel. Her other research interests include phycoremediation, mass cultivation of marine cyanobacteria, diversity and molecular characterization of cyanobacteria.

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