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**Bio removal of nutrients in tannery effluent water using marine micro algae, *Chlorella marina***

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**Abstract**

Waste water may contain high level of nutrients, when excessively released to the environment can lead to the undesirable growth of microorganisms and hence eutrophication. The presence of nitrogen and phosphorus in waste water causes ecological impacts and affect public health, thus control of their emission into receiving water bodies is therefore essential. Micro algae offer a low-cost effective approach to remove excess nutrients and other contaminants in tertiary waste water treatment, while producing potentially valuable biomass and high capacity for inorganic nutrient uptake. The micro algae strain *Chlorella marina* was maintained in Conway medium at 12-hours light and 12-hours dark photo period. The experiments were conducted for 16 days under temperature of  $25\pm 2^{\circ}\text{C}$  and light intensity of  $45000\pm 500$  Lux. The growth was estimated in a day interval by read the absorption at 650nm in Spectrophotometer. Effect of tannery effluent on the growth of *Chlorella marina* was tested and significant variations were 10%, 25%, 75% and 100%. The study was examined the characteristics of tannery effluent waste water and its biological treatment process using *Chlorella marina*. The process has shown increased ammonia, nitrate, phosphate, BOD and COD removal efficiencies of 68.75, 97.8, 99.29, 34.84 and 90% respectively. The maximum ammonia accumulation efficiencies were 8.2-68.75% for the first four consecutive days which increased significantly to 95%. It was further reported that the nitrate removal efficiency of 97.8% was achieved as a result of acclimatizing microorganisms with increasing residence time. The phosphate removal rate was only around 99.29%. These experiments confirmed that while micro algae may be considered as efficient nutrient removers and their efficiency is caused only in part of their active nutrient uptake and use for the synthesis of new biomass. The present study revealed that the *C. marina* were more effective in removing nutrients from tannery waste water. This was also indicated that the process of nutrient bio removal in effluent water is two-in-one for production of more biomass for further application.

**Keywords:** tannery effluent, bio-removal, nutrients, *Chlorella marina*, biomass