Bioremediation of Wastewater - Effect of Algae in Bioremediation of Nitrate and Phosphate Content in Wastewater

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The progressive adoption of urban, industrial lifestyle deteriorated the quality of freshwater reservoirs and caused a huge challenge in the world in maintaining the demand and quality of water. Industrial, Agricultural and Domestic processes contaminate water with chemical and biological pollutants that cannot be released into the environment until treated to have less than specified limit of pollutants. Traditional Wastewater treatment plants are effective in remediating suspended solids and many harmful elements, but it is not effective in nitrate and phosphate content removal, causing these toxic elements discharged to the environment. This project aims to determine the effectivity of algae to bioremediate the nitrate and phosphate content from wastewater. Four different specimens of Algae were tested with wastewater in bioreactor setup for 10 days over 5 trials, and the nitrate and phosphate contents were measured every day using HACH-DR-890 colorimeter to see how effectively the specimen remediate the nitrate and phosphate contents. The collected data analysis shows all the 4 specimens were able to effectively remediate 93-96% of nitrate and 73-86% of phosphate content. Chlamydomonas reinhardtii (95.66%) is most effective in nitrate remediation followed by Chlorella vulgaris (94.98%), Arthrospira platensis (94.57%) and Scenedesmus quadricauda (93.97%). In the phosphate remediation, Scenedesmus quadricauda (85.22%) is most effective followed by Chlorella vulgaris (82.46%) Chlamydomonas reinhardtii (78.12%) and Arthrosphira platensis(73.36%). This project concludes that bioremediation using Algae is a viable technology in treating wastewater for nitrate and phosphate remediation in a natural and sustainable way in comparison to conventional treatment processes.

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