



Effect of Dilution Rate on the Nutrient Removal from Urban Wastewater by *Chlorella Vulgaris* in the Continuous Culture System

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Abstract

The presence of nutrients in wastewater enriches the environment and creates algae blooms. Among the various methods used to separate nutrients from wastewater, microalgae have a good performance. Microalgae *Chlorella vulgaris* has characteristics such as high growth rate, manipulation-resistant culture systems, and also high nutrient uptake rates. Hence, in this study, the effect of this microalgae on the nutrient removal of Gorgan wastewater treatment plant in a continuous system was investigated. The purified stokes of microalgae *Chlorella vulgaris* exist in the phycolab of Gorgan University of Agricultural Sciences and Natural Resources were used for this research. For this purpose, the collected wastewater was prepared and water physicochemical factors including phosphate, nitrate, ammonia, COD, BOD5 and pH were measured every 48 hours during a period of 28 days. Moreover, some biological and productive indices of algae including number of cells, chlorophyll-a and dry biomass content were studied as well. In the current experiment, four concentrations (0, 25, 50 and 75%) of wastewater (prepared with freshwater) were analyzed. The results showed that treatment with the concentration of 50% had the best efficiency in phosphate removal while the maximum nitrate elimination occurred in the most diluted treatment. At the end COD, BOD5 and ammonia were declined but the number of cells, chlorophyll a and pH increased. The outcome of the research indicates that continuous culture of *Chlorella vulgaris* in diluted wastewater could be considered as a suitable method for municipal wastewater treatment.

Keywords: *Chlorella vulgaris*- continuous system -Nitrate-Phosphate-Wastewater