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**Al -Muthanna University College
of Science Department of Biology**



Bioremediation of sanitary sewage using Some Plants and Bacteria /Al-Rumaytha/Iraq

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By

Zahraa Ali Jassim

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Supervisor

Assist. prof. Dr. Ibtehal Aqeel Abdulmuneem

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Abstract

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The present study indicates the ability of some aquatic plants such as *Lemna minor* and *Ceratophyllum demersum* to reduce some pollutants from the final settling ponds of the domestic wastewater treatment plant in Al-Rumaytha. The experiment included growing aquatic plants in plastic containers with dimensions (70 × 30 × 35). The physical and chemical parameters of domestic wastewater, heavy metals and physiological parameters of plants were measured by taking water samples every 5 days for 25 days.

The results showed that all plants raised the pH value to the alkaline side, and showed the ability to reduce domestic wastewater pollutants which include biological oxygen demand, ammonia, nitrite, nitrate, phosphate, zinc and calcium. With removal percentages (78.9%, 80.8%, 91.9%, 75%, 76.7%, 100%, 85.04% respectively). While the plants were not effective in reducing the values of total dissolved solids, total suspended solids, electrical conductivity, total alkalinity, salinity, copper, total hardness, magnesium, copper and iron.

The plants did not show any efficiency in reducing iron throughout the treatment period. The physiological condition of the aquatic plants was affected by the bioremediation as the chlorophyll content in *Ceratophyllum demersum* decreased while it increased in *Lemna minor* after treatment. The activity of SOD enzyme decreased in all plants, and the activity of catalase enzyme increased in both plants after treatment. The study also showed an increase in malondialdehyde (MDA) enzyme in all plants after treatment. The study included the possibility of using *Escherichia coli* bacteria in the treatment and proving its ability to remove some pollutants.

Abstract

The results showed that the pH tended slightly towards alkaline side , and the values of electrical conductivity, salinity, nitrate , nitrite and total hardness were low and at reduction rates (4.20%, 4.20%, 50.00%, 26.45% ,5.45% respectively), while showed high efficiency in reducing total alkalinity, calcium, magnesium, phosphate, zinc and copper, and at reduction rates(58.54%, 31.25%,10.05%,80.76%,99.90%,70.73% respectively) as for ammonia, its values increased after treatment, while it did not show any efficiency in reducing iron throughout the treatment period.

Significant differences were found for each (nitrite, pH, malondialdehyde, chlorophyll, catalase, superoxide dismutase) for the water treated by plants. As for the bacteria, significant differences were found for each of (calcium, magnesium, phosphate, ammonia, zinc, copper, total alkalinity, nitrite, nitrate), and no significant differences were found for each (salinity, electrical conductivity, total suspended solids, total dissolved solids, zinc, copper, Biological oxygen demand (BOD) when treating water with plants, and for each (salinity, electrical conductivity, pH, total copper).