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| Title | Removal of Ammonia-N Pollution from Surface Water by Sustainable Environmental Techniques | | |
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| Abstract |  |
| Water pollution in and around the Dhaka city, especially the rivers Sitalakshya, Buriganga, Balu, Turag and different canals has been threatening the supply of potable water to the city dwellers. Ammonia-N (NH 3-N) is one of the major pollutants for surface water treatment processes. The biological process of NH 3-N removal in polluted river water was accomplished by aquatic macrophytes such as duckweed (Lemna minor). Physicochemical and bacteriological quality parameters of raw and treated water of Saidabad Water Treatment Plant (SWTP) were studied in two consecutive years i.e. 2008 to 2009. Results indicate NH 3-N concentrations of the canal and river water systems ranges from 34.0 mg L-1 to 6.35 mg L-1 in the dry season, which is diluted remarkably in rainy season. Dissolved oxygen (DO) concentrations ranges from 0.46 mg L-1 to 2.50 mg L-1 in the canals and rivers water during both the seasons. The monthly averages of maximum and minimum NH 3-N concentrations of 7.6 mg L-1 and 0.12 mg L-1 in raw water of SWTP are recorded in consecutive two years. After treatment, monthly averages of maximum and minimum NH 3-N concentrations were between 6.7 mg L-1 and 0.0 mg L-1 in treated water. Physicochemical quality parameters of raw water such as pH, turbidity, EC, TDS, TH, chloride, Fe, PO 4 , and NO 3-N were detected very high concentration in the dry seasons compared to the rainy seasons. After treatment, the monthly average values of these parameters decreases and ranges from 6.69 to 7.41, 0.1 and 3.56 NTU, 112.0 and 703 µS/cm, 57 and 334 mg L-1 , 42 and 166 mg L-1 , 7.0 and 77 mg L-1 , 0.02 and 0.14 mg L-1 , 0.00 and 1.15 mg L-1 and 1.0 and 2.7 mg L-1 in treated water, respectively. Monthly averages of maximum total and thermo tolerant coliforms counts in raw water were recorded 9.43 × 10 3 cfu/100 mL and 5.91 × 10 2 cfu/100 mL in the dry seasons, respectively. No total and thermo tolerant coliforms are detected in the treated water of the SWTP throughout year. Concentrations of total chlorine ranges from 5.45 mg L-1 to 0.37 mg L-1 in treated water during this study. Monthly average values of COD in raw water ranges from 23.7 mg L-1 to 25.50 mg L-1 during the dry period and it decreases to 6.0 mg L-1 in the rainy seasons. After treatment the values of COD ranges from 7.7 mg L-1 to 19.2 mg L-1 in the dry seasons and 2.0 mg L-1 to 9.0 mg L-1 in the rainy seasons. Most of the physicochemical quality parameters are detected very high in the dry seasons compared to the rainy seasons. The aesthetic characters such as turbidity, pH, taste, odour, alkalinity, hardness, TDS, conductivity etc. of treated water increases significantly in the dry season. Aluminum concentration increases in the treated water during the peak dry seasons due to the formation of complexes with the metabolites of algal cells. Water treatment cost increases in the dry period with the significant increase of chemical consumptions for raw water treatment. With duckweed treatment, NH 3-N concentration decreases significantly from 9.8 mg L-1 to 0.12 mg L-1. It was observed that NH 3-N could be removed very effectively from the polluted river water with duckweed by about 78% to 98%. To mitigate the problems, duckweed has shown potential for the removal of excess NH 3-N in contaminated river water as a pretreatment which will be very helpful for the surface water treatment. | |

**Please specify which Sustainable Development Goal (SDG) (s) falls under your research:**

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| Goal 1 | No Poverty | Goal 2 | Zero Hunger |
| Goal 3 | Good Health and Well-Being | Goal 4 | Quality Education |
| Goal 5 | Gender Equality | **Goal 6** | **Clean Water and Sanitation** |
| Goal 7 | Affordable and Clean Energy | Goal 8 | Decent Work and Economic Growth |
| Goal 9 | Industry, Innovation and Infrastructure | Goal 10 | Reduced Inequalities |
| Goal 11 | Sustainable Cities and Communities | Goal 12 | Responsible Consumption and Production |
| Goal 13 | Climate Action | Goal 14 | Life below Water |
| Goal 15 | Life on Land | Goal 16 | Peace, Justice and Strong Institutions |
| Goal 17 | Partnerships for the Goals |  |  |