Assessment of surface water quality near municipal solid waste dumping facility in Bukoba, Kagera Region, Tanzania

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Abstract

Water samples were collected from River Kanoni which passes near a municipal solid waste (MSW) dumping facility in Bukoba Town, Kagera Region, United Republic of Tanzania. The objective of the study was to assess surface water pollution caused by a MSW dump. Selected physico-chemical parameters (pH, temperature, Electrical Conductivity [EC], and Total Dissolved Solids [TDS]), nutrient levels, as well as heavy metals concentrations (Pb, Zn, Cu, Cr, Cd) were analyzed in the laboratory at the University of Dar es Salaam, in accordance with standard methods, and were compared with the existing standard limits for freshwater qualities, as stipulated by WHO and US-EPA. Results have shown that pH values were within the allowable range of between 6.5 and 8.5, except for one value (8.82 ± 0.11) that was measured at the midstream. Temperature values were between 26.28 ± 1.02°C and 28.35 ± 0.15°C, which are within the allowable range of between 20°C and 50°C. EC values were between 262.50 ± 8.32 µS/cm and 345.01 ± 6.48 µS/cm, which are below the maximum allowable value of 400 µS/cm. TDS values were between 183.75 ± 6.55 mg/L and 241.51 ± 11.33 mg/L, which are below the maximum allowable value of 500 mg/L. Nitrate levels were between 17.52 ± 1.12 mg/L and 32.00 ± 3.02 mg/L, which are above the standard limit of 10 mg/L above. Concentrations of Lead, Chromium, and Cadmium were between 0.03 ± 0.01 mg/L and 0.16 ± 0.05 mg/L, 0.55 ± 0.02 mg/L and 1.14 ± 0.07 mg/L, and 0.009 ± 0.12 mg/L and 0.098 ± 0.22, respectively, which are all above the recommended limits of 0.01, 0.05, and 0.003 mg/L, respectively. Values for copper and zinc were between 0.02 ± 0.12 mg/L and 0.20 ± 0.22 mg/L, and 0.79 ± 0.32 mg/L and 1.57 ± 0.04 mg/L respectively, which are below the recommended limits of 1.3 and 5 mg/L, respectively. This study has revealed that Bukoba MSW dumping facility has potential impacts on the water quality in River Kanoni, for domestic usage. This, therefore, demands all relevant authorities to immediately find a proper and sustainable replacement for the existing MSW dump in Bukoba town.

Keywords: Tanzania, solid waste, environment, pollution, water pollution, heavy metals

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