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Seasonal variation of elemental, physicochemical and microbiological characteristics of the stream water around hospital waste dumpsite in Ilesa, South-Western Nigeria

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This study assessed the seasonal variation of microbiological, physicochemical and heavy metal analysis of water samples from Ayao Stream around a hospital waste dumpsite. Four samples were collected downstream and analyzed for microbial count, coliforms, pH, electrical conductivity, BOD₅, alkalinity, total dissolved solids, water hardness, sulphate, nitrate, chloride and phosphate using standard methods. Heavy metals (Fe, Mn, Cu, Zn, Cd and Pb) in the water were determined by atomic absorption spectrophotometry. Results obtained showed that the stream was greatly polluted with microbial and coliform count of 2.1×10^4 to 3.6×10^5 CFU/ml, 1.8×10^2 to 8.0×10^2 CFU/ml, and 1.1×10^3 to $>1.1 \times 10^3$ CFU/100 ml for bacteria, fungi and coliform count, respectively during both wet and dry seasons. The bacteria recovered from the samples included the antibiotic resistant *Pseudomonas* and *Klebsiella*. The mean values of pH (8.0 to 9.1) and BOD₅ (17.2 to 26.3) were obtained during dry and wet season, respectively and were found to be beyond the acceptable limit in drinking water. This result established a relationship between the BOD₅ and microbial load, which indicate organic pollution through runoff input from the dumpsite into the stream. The concentration of Mn, Fe, Cu, Pb and Cd especially during rainy season was found to exceed the stipulated limit in drinking water. These metals could be bio accumulated to toxic level in aquatic organisms and end up in human through the food chain. This study shows that Ayao Stream is greatly polluted and unfit for domestic uses.

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