Descriptive analysis for physico-chemical parameters of leachate and groundwater resistivity in the sedimentary basin, Southern Nigeria: A case study

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Abstract

Geostatistical analysis has been applied in the investigation of groundwater contamination in three dumpsites and a Control site in Warri and its environs in Southern Nigeria. This was to map the impact of contaminant emanating from indiscriminate dumping of domestic and industrial wastes on groundwater in the area. Sixteen (16) VES stations were occupied in the three dumpsites and the control site studied using the Schlumberger configuration. From each of the site, water samples were collected from boreholes, hand dug wells, and swamps, close to VES stations for chemical analysis and statistical evaluation using multiple regression analysis and Two - way Analysis of Variance (ANOVA). Aquifer resistivity ranges from 15 Ωm to 215 Ωm in the dumpsites area, and 336 to 884 Ωm in the control site. Hydro-geochemical analysis of water samples showed values of parameters that are higher around the dumpsites when compared to the control site, with the results for conductivity, nitrates, iron, lead and total viable bacteria count exceeding the standard permissible limits. A correlation of aquifer resistivity and hydro-geochemical analysis parameters show that resistivity of groundwater is significantly related to its physico-chemical properties with a contribution of 49.2 %. Also, at the significant level, $P<0.05$, the contribution, R^2 value (0.513) show that 51.3% of the presence of Total Viable Bacteria Count is attributed to groundwater resistivity in Warri and its environs.

Keyword: Multiple regressions, Bacteria count, Leachate, Sounding curve, Permissible Limit

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