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Spatial assessment of some physiochemical properties of rainwater around Ewekoro industrial area, Nigeria

Bello Mojeed Adetunji
Obafemi Awolowo University, Nigeria

This study characterized the general features of rainwater in the study area. The spatial variation in the physio-chemical properties of rain water was determined and the influence of industrial activities around Ewekoro Cement Industry, Ogun State, Nigeria was investigated. This was with the aim to assess the impact of pollution on rain water composition. It also provides information on the air quality (total suspended particles and carbon-monoxide) and vulnerability of ecosystem to pollution in the study area. The study evaluated the chemical composition of composite samples and compared it with standards. Rainfall was collected using bulk precipitation collector that was made up of 2 mm plastic funnel in a 5 litre polythene plastic bottle which was held firmly by an iron rod that prevented it from falling. The funnel was covered with a permeable synthetic mesh that prevented the samples from being contaminated with leaves and bird dungs. The water samples were collected using standard with 2.5 ml of nitric acid (HNO_3) and 2.5 ml of perchlorate acid (HClO_4) solution. The data collected were subjected to descriptive statistic and the spatial variability was described with isopleth. The secondary data involved an administrative map of the study area collected from Ogun state ministry of land and housing. The pH of rain water around Ewekoro Industrial Area ranged 7.20 and 9.00 with a mean \pm SD of 9.60 \pm 0.45; pH was noticeable to have uniform concentration in all sampling locations throughout the period of the study. The range of temperature (25.42-26.82 $^\circ\text{C}$) with a mean \pm SD of 26.34 \pm 0.72; conductivity (5.72-7.91 μScm^{-1}) with a mean of 6.90 \pm 0.96; Acidity (2.00-15.00 mgCaCO₃/L) with a mean \pm SE of 5.33 \pm 0.46; Total hardness (0.04-1.23 mgCaCO₃/L) with a mean \pm SE of 0.65 \pm 0.04 in rain water of the study area were all falling within the WHO (2010) and Nigeria Industrial Standards (NIS, 2007) permissible limits for drinking water quality. The mean concentration for the major ions of rain water in the study area occurred within the following categories: Mg²⁺ (<0.1 mg/l); NO₃>Na⁺>SO₄²⁺>K⁺>Ca²⁺ (0.1-1 mg/L); The concentration of cations were higher at northern direction (point D) while the concentration of sulphate was higher at the production plant (50 m radius) of the cement industry. The mean concentration of heavy metals in the study area were as follows; Cd (0.010 \pm 0.002 mg/L), Pb (0.00 \pm 0.001 mg/L), Mn (0.001 \pm 0.00 mg/L). They are all falling within the WHO (2010) and the Nigeria Industrial Standard (NIS, 2007) permissible limits for drinking water quality. The study concluded that industrial activities in the study area have an influence on all the physicochemical compositions of rain water in the study area, but more significant on major cation of calcium, magnesium, potassium and anion of sulphate, nitrate and chloride.

Biography

Bello Mojeed Adetunji studied BSc (Ed) in Geography and Environmental Management between year 2006 and 2011. He worked with Wole Oluseyi and Co. and Estate Surveyors and Valuers between year 2011 and 2012 and later proceeded to Ayeye and Company as a Business Development Officer in between year 2012 and 2014. During his undergraduate days, he was able to champion the Green Week. He is a Post-graduate student of Obafemi Awolowo University, Ile Ife, Nigeria. He is currently undertaking his Tutelage as MSc student in Institute of Ecology and Environmental Studies, Obafemi Awolowo University, Ile Ife. He is a Probationer Member of Nigeria Institute of Estate Surveyors and Valuers. He has attended several geoscience conferences and published a paper in a local journal titled "Social Analysis of Population and Land Use Dynamics in Ado Odo Ota L.G.A., Ogun State". He has done a number of researches in the field of environmental management.

bello_adetunji@yahoo.com

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