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Ecological risk indices assessment of heavy metals pollution in soils selected from three auto mechanic villages in Abuja, Central Nigeria

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The research work is targeted at the use of some ecological risk indices models in evaluating the risk associated with heavy metal contamination of soils from selected auto mechanic villages in Abuja, Central Nigeria. The models are Contamination Factor (Cf), Ecological Risk Factor (Er), Degree of Contamination (CD), Pollution Index (PI), Average of Pollution Index (PIAvg), Pollution Load Index (PLI), Nemerow Pollution Index (PINemerow) and Potential Ecological Risk Index (RI). Mean concentrations (mg/kg) of heavy metals in all the sites were found to follow a decreasing order of Apo site: Cu > Zn > Cr > Fe > Pb > Ni > Cd; Kugbo site: Zn > Cu > Cr > Ni > Fe > Pb > Cd; Zuba site: Zn > Cr > Cu > Fe > Pb > Ni > Cd respectively. Correlation analysis results also reveal that strong correlations exist between heavy metals which probably indicate same origin, mutual dependence and identical behaviors. Results of ecological indices models showed that for PI; 71.24% of heavy metals in Apo and Kugbo sites and 54.14% of heavy metals in Zuba sites were in the class of very strong level of pollution. PIAvg values of 40.93, 12.39 and 7.14 were recorded in Apo, Kugbo and Zuba sites which indicate low quality of sites. PLI values were Apo (8.26), Kugbo (3.99) and Zuba (3.59) which indicate deterioration of site by heavy metals. A trend of decrease in PINemerow values can be deduced as; Apo (153.4) > Kugbo (22.3) > Zuba (11.3) showing strong level of heavy metal pollution in all the investigated sites. RI values also recorded a decreasing trend of Apo (1590) > Kugbo (570) > Zuba (517.8) signifying very high to considerable ecological risk to the environment.

Recent Publications

1. Nwoko CI., Enenebeaku CK., Ekeocha CI., (2018). Use of integrated pollution indices in assessing heavy metals pollution in soils of three auto mechanic villages in Abuja. African J. Environ. Sci. Technol. Vol. 12(10): 370-376 DOI: 10.5897/AJEST2018.2548
2. CI., Nwoko CI., Onyeke OL., (2017). Impact of Automobile Repairs Activities on Physicochemical and Microbial properties of soils in selected Automobile repair Sites in Abuja, Central Nigeria. Chem. Sci. Int'l. J. 20(2): 1-5 Doi: 10.9734/CSIJ/2017/36065
3. Uche UD., Uche M., Okechi NF, Ekeocha CI., (2017) Multicomponent Separation of Equilibrium Dispersive Model of Liquid Chromatography. J. Chem. Soc. Nigeria. 42(2): 67 – 70
4. Ekeocha CI., Anunuso C., (2016). Comparative Analysis of Geoaccumulation of Heavy Metals in Soils in Selected Auto Mechanic Villages of Abuja, Nigeria. J. Chem. Soc. Nigeria. 41(2): Doi:10.9734/BJAST/2017/30779
5. Okolue BN., Ekeocha CI., Ekwelem OM., Okike O., (2015). Study of the Effect of Temperature and Agitation on Solute Permeability across Some Polymeric Membranes. J. Chem. Soc. Nigeria. 40(2): 22 – 25

Biography

Ekeocha Christopher Ikechukwu is a young chemist with major interest in environmental pollution and pollution control. He has published some of his research finding in some notable National and International Journals. He's also a member of Nigerian Olympiad Team responsible for selection and preparation of Nigerian Chemistry Olympiad Team. The pollution indices models implored in their latest research work has been seen to be a useful tool for assessing the level of heavy metal in soil, sediment and water as well as in quantifying their degree of pollution (Gong et al 2008). Presently, He is also working on a more environmental friendly way of controlling pollution by heavy metal in the environment.