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Monitoring of Industrial Waste Disposal by the Use of Computer-Developed Models: A Case Study of the Jakara Waste-Water Channel In Kano Metropolis, Kano State, Nigeria - Timothy Akpomie - Federal University Lafia

Timothy Akpomie
Federal University Lafia

Abstract

The concentrations of four heavy metals (Fe, Cd, Cu and Pb), from a previous study, on the determination of pollutants in waste-water samples along the Jakara waste-water channel in Kano metropolis were modelled using the Minitab statistical software. This was with the view of obtaining a model that would estimate and forecast the extent of pollution by the continuous discharge of industrial sewage on the canal. Though the initial concentrations of these metals were higher than the acceptable limits for sewage disposal by the World health organization (WHO), the obtained models showed that the concentrations of the respective heavy metals were increasing in a quadratic manner with time. Furthermore, from an initial concentration of 21.45, 3.58, 3.78 and 2.87mg/l for each respective heavy metal in the year 2008, the obtained models forecasted the concentrations at 95% confidence level, to be 15, 56, 30 and 35 times higher than their initial concentrations respectively by the year 2013. Finally, the order for this bioaccumulation was found to be Cd > Pb > Cu > Fe. The predicted concentrations would be indicative of the degree of bioaccumulation of these metals by vegetables if irrigated from this wastewater source. The models were also found to be invaluable tools not only on risk/hazard assessment, but also on the environmental impact assessment of the waste-water channel.

Introduction:

The issue of ecological contamination because of harmful metals radiating from ill-advised mechanical sewage removal is currently a significant wellspring of worry in most metropolitan urban communities. These harmful substantial metals, which incorporate, Cu, Zn, Co, Mn, Mg, Fe, Cr, Cd, As, Ni, Pb and so on entering the biological system may prompt geoaccumulation, bioaccumulation what's more, biomagnification. In any case, a portion of these substantial metals like Fe, Cu, Zn, Ni and other follow components are

significant for appropriate working of natural frameworks, their inadequacies or abundances could prompt various clutters, (Wu, 1995). Sewage effluents of metropolitan beginning has been accounted for to contain apparent measure of significant fundamental plant supplements and along these lines the fruitfulness levels of the dirts are improved impressively under sewage water system of harvest fields, (Thomann and Mueller 1987). Be that as it may, further investigations by (Kashefipour, 2004), appeared that, the nearness of poisonous substantial metals like Fe, Pb and Hg decrease soil richness and farming yield. Also, rewarded sewage water additionally contains variable measures of substantial metals, for example, Pb, Ni, Cd, Cu Hg, Zn and Cr, which can possibly defile crops developing under such water system. The strategy for Chemo-measurements was utilized in checking this pollution.

Biography

Timothy Akpomie completed his PhD about three years ago from Abubakar Tafawa Balewa University, Bauchi, Nigeria. He has run a water factory for over twelve years before joining the Federal University Lafia, Nigeria, as a researcher and lecturer in late 2015. He has published a couple of papers in reputable journals and is the author of the book " Modeling and simulating pollution indices in some Nigerian cities", by Lambert academic publishing. He is physically challenged.