Effect Of Nine Years Of Animal Waste Deposition On Profile Distribution Of Heavy Metals In Abeokuta, South-Western Nigeria And Its Implication For Environmental Quality

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Abstract

Uncontrolled deposition of waste from animal farms is a common practice in south-western Nigeria, and the presence of heavy metals in soil constitutes environmental and health hazards by polluting the soil, ground water, adjoining streams and rivers. The study investigated the profile distribution of Mn, Pb, Cd, Zn, Fe, Cu, Ni and Cr in some tropical Alfisols in south-western Nigeria after nine years disposal of animal wastes. The amount of these metals in the soil horizons was high enough to cause health and phytotoxic risks. All the metals except Zn and Cr increased down the profile, while Mn, Pb, Cd, Fe, Cu and Ni accumulated at 80–120 cm depth. The increment of these metals at this depth over the top soil were 26%, 143%, 72%, 47%, 328% for Mn, Pb, Cd, Cu and Ni, respectively. It thus, shows their mobility and the possibility of polluting ground water. The Mn content at the poultry and cattle waste sites increased by 127% and 25%, respectively over the control, while that of cattle and swine dump site for Cd content were 9.82 and 15.63 mg kg−1, respectively. Lead content also increased by 8.52 and 5.25 mg kg−1, respectively.

There was the accumulation of Zn and Cu at the swine dump site while the cattle dump site had the highest amounts of nickel and chromium. The least amount of Fe was recorded at the swine waste dump site. The reduction in organic matter with depths together with the reduced pH might have favored the mobility of the metals. The ranking of pollution among the sites was poultry > swine > cattle > sheep and could be due to the type of ration fed, the vaccination programmes, sanitation programmes and other management practices.