
Genesis, Classification and Heavy Metal Retention Potential of Soils in Mangrove Forest, Niger Delta, Nigeria

A. A. Amusan¹ and I.f. Adeniyi²

1. Department of Soil Science, Faculty of Agriculture, Obafemi Awolowo University, Ile-Ife, Nigeria

E-mail: aamusan@oauife.edu.ng

2. Department of Zoology, Faculty of Science, Obafemi Awolowo University, Ile-Ife, Nigeria

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ABSTRACT Soils under the main mangrove {*Rhizophora racemosa* and *Avicennia germinans*} forest in the Niger Delta, Nigeria were characterized and their capacities to retain heavy metals were examined using soil column leaching experiments. At the end of the leaching experiments, soil samples from each column were divided into two: 0-5 cm and 5-10 cm, and analyzed for total metal retained. The fractionation of heavy metals in the surface soil samples (0-5 cm) was investigated by the sequential extraction technique. The study showed that the soils were influenced by tidal flow and characterized by the presence of very fine textured, thin (0 – 5 cm) to moderately thick (10 – 15 cm) layer of alluvium (mud) on the surface. The fibric soil material beneath the surface mud varies in thickness from about 70 to 100 cm, and beyond the histic layer is the plastic, very sticky, massive clay. *In situ*, the soils were neutral in reaction (pH, 7.0 to 7.2) but became strongly acid (pH, 3.3 – 4.8) upon drying. They are saline, high in soluble salts, highly reduced, with low CEC in the fibric layer but high in the mineral, clayey subsoil horizon. The soils are saturated with water for much more than 30 days in a year and have fibre content that is more than 40-cm thick, with the fibric sphagnum constituting more than three – fourths by volume to a depth greater than 90 cm. The soils, classified as Typic Sphagnofibrists, sequestered considerable amounts of Cu, Zn, Cd, and Mn with most of the metals retained in the surface soils. The anthropogenic heavy metals were mostly adsorbed probably to the negatively charged sites of organics and clay. These loosely-bound metals may be desorbed and re-enter the aqueous phase, thus becoming a secondary source of metal pollution to the fauna and man in the environment.

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