



## Ecological Risk Assessment in Port Harcourt Jetty Polluted by Petroleum Products Spillage

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**Abstract:** The level of heavy metals (Cu, Cd, Pb and Zn) in soils and plant from a petroleum jetty contaminated by petroleum products spillage were determined using digestion and atomic absorption spectrophotometer methods (AAS). Soil and plant samples were collected from soils around the petroleum jetty in Port Harcourt, Nigeria and other samples were collected from an area 1 km away from the jetty, which served as control. Environmental risk assessment measurements were calculated using contamination index, pollution load index and potential ecological risk and ecological risk index. The mean concentration of heavy metals in soil from polluted and unpolluted site were 0.800 and 0.729 mg kg<sup>-1</sup> respectively for copper, 0.240 and 0.183 mg kg<sup>-1</sup> respectively for cadmium, 0.851 and 0.586 mg kg<sup>-1</sup> respectively for lead and 2.665 and 2.197 mg kg<sup>-1</sup> respectively for zinc. The heavy metals mean concentration in plant from polluted and unpolluted site were 0.588 and 0.543 mg kg<sup>-1</sup> respectively for copper, 0.272 and 0.240 mg kg<sup>-1</sup> respectively for cadmium, 0.587 and 0.518 mg kg<sup>-1</sup> respectively for lead and 3.205 and 2.567 mg kg<sup>-1</sup> respectively for Zinc. The values of all the heavy metals analyzed for soil samples from the polluted sites were significantly higher than those from the control site by between 8.5 - 31.1 % whereas heavy metal values in plant sample were significantly higher in polluted sites between 7.7-19.9% when compared to the uncontaminated sites. The analysis of transfer factor, indicates an order of Cd > Zn > Cu > Pb in the uptake of heavy metals from soil to plant. Typical metal transfer factors are 0.7-0.8, 1.1-1.3, 0.5-1.1 and 1.1-1.4 for Cu, Cd, Pb and Zn, respectively. The relationship between transfer factor and the ratio of heavy-metal concentration in plants to that in soil can be used to assess the effect of heavy-metal concentration in the polluted soil on the heavy-metal uptake capabilities of plants growing on those soils. Environmental risk assessment measurement indices using contamination index indicates low to moderate contamination. Pollution load index indicate no pollution to moderate pollution among the three locations under both background scenario whereas potential ecological risk and ecological risk index indicates low ecological risk. Pollution of soils by oil spills increase metallic burden of soils, influence other soil properties and plant uptake of heavy metals in polluted soils. The ecological risks associated with usage of contaminated soil and plants should be continuously assessed and controlled.

**Keywords:** Heavy Metals, Transfer Factor, Ecological risks, Petroleum products, Petroleum Jetty

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