



Ecological and Health Risk Assessment of Heavy Metals in Soil around Sawmill Sapon Abeokuta, Ogun State

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Introduction: The release of heavy metals from wood and sawdust is of great concern worldwide, as heavy metals are non-biodegradable and cannot be detoxified or removed by metabolic activities once they are present in the environment. Hence, the increasing sawmilling activities which pose a serious threat of pollution in the surrounding soils, triggering some health challenges have necessitated the need for this work. This study investigated the ecological and health risk assessments of some selected heavy metals in soil at Sapon Sawmill, Abeokuta, Ogun State.

Methodology: Six samples were collected at a depth of 0-15 cm at the sawmill site (North, South, West, East, and Center) and a control site. The samples were analysed for some selected heavy metals; Cr, Cu, Cd, Pb, Zn, V, As and Ag, using Inductively Coupled Plasma Emission Spectrophotometry (ICP-OES).

Results and Discussion: The mean concentration of metals (mg/kg) in the samples were 6.07 ± 8.22 , 31.01 ± 29.56 , 3.69 ± 3.84 , 14.38 ± 20.80 , 49.89 ± 31.50 , 2.55 ± 2.14 , 6.74 ± 4.24 , 13.06 ± 13.43 for chromium, copper, vanadium, lead, zinc, cadmium, arsenic, and silver, respectively. Meanwhile, the control sample had (mg/kg) 0.07, 0.24, 0.13, 0.59, 0.12, 0.28, and 0.26 chromium, vanadium, lead, zinc, cadmium, arsenic, and silver, respectively. The heavy metals concentration at the sample site was higher than at the control site. The high concentrations of Zn and Cu in the sawmill soil were attributed to the presence of trace amounts of Zn in wood and copper sulphate used in pest control in forest plantations. Zn and Cu were found to be in the permissible limit set by WHO. The results revealed that the contamination factor and ecological risk for all the metals were low while the geo-accumulation and pollution load indexes were moderately and extremely polluted, respectively. The average daily doses of heavy metals varied, and the hazard quotient and hazard index in this study were less than 1, respectively. A Hazard Quotient for all heavy metals lower than 1 indicates a relatively light adverse health effect on adults and children. The results also revealed that cancer risk in adults and children was less than 1, indicating less cancer risk.

Conclusion: The results revealed that the geo-accumulation and pollution index were polluted. Hence, there is a need for proper management of Sapon sawmill soil which may expose human health to toxic metals.

Keywords: Ecological, Health risk, Heavy metals, Sawmill, Soil