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ECOLOGICAL DEBILITY: HEAVY METALS INCURSION AND THE BUILT ENVIRONMENT

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Abstract

Many heavy metal ions are hazardous or carcinogenic. The majority of heavy metals, such as cadmium, arsenic, mercury and lead, are linked to pollution and hazardous concerns. This study evaluates concentration of heavy metals (HM) in selected dumpsites across the three senatorial districts of Anambra State and assesses the associated ecological risks in the built environment. Employing systematic sampling and analytical research design soil and water samples were collected from dumpsites locations in Anambra North, Anambra Central, and Anambra South senatorial districts. Applying appropriate analytical methods specific HMs concentration levels were determined and potential ecological risks highlighted. The result showed that Pb, Cd, As, Fe, Cr, Cu detected at the 3 dumpsites are high when compare with FAO and WHO approved limits in both soil and water samples collected within the vicinities of the dumpsites. Lead in the analyzed soil samples ranged from 9.71>9.51>8.28 all higher than WHO permissible limit of 0.3mg/L. Cadmium ranged 0.751>0.070>0.066, higher than WHO permissible limit of 0.02 mg/L Chromium was found higher in all water samples analyzed, it ranged from 0.342>0.308 >0.278 in the 3 sites. Arsenic (As), Cadmium (Cd), and lead (Pb) are non-essential metals that are among primary hazardous elements at low concentrations, majorly due to its toxicity, persistence, and non-degradability nature. The research is posited to expose some heavy metals and the ecological risks of these minerals, on soil, water and habitats of the built environment. Hence, the finding contributes to baseline data appropriate for environmental monitoring to inform policy decisions on public health and sustainable waste management.

Keywords: Built environment, Ecological debility, Heavy metals, Region-specific pollution