

## **APPLICATION OF MULTIVARIATE ANALYSIS IN THE ASSESSMENT OF TRACE METAL POLLUTION IN ABANDONED ASPHALT AND BITUMEN PLANTS IN IDU, URUAN LOCAL GOVERNMENT AREA OF AKWA IBOM STATE, NIGERIA**

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### **ABSTRACT**

*The study evaluated seven trace metals concentration and pollution of the soil of the abandoned Asphalt and Bitumen plant site in Idu in Uruan Local Government Area of Akwa Ibom State, Nigeria. Multivariate statistical approaches were used to evaluate sources of the trace metal concentration in soil samples assessed. Results obtained indicated three components as a major source of trace metal load in the soil of the study site with Eigenvalue greater than one and significant total variance of 82.31%. Factor 1 contributed 40.74% of total variance with significant positive loading on Fe, Mn, Cu and Cr. This represents the impact of industrial activities and effluent on the quality of the studied soil. Factor 2 contributed 26.99% of the total variance with strong positive loading on Pb and Ni. This represents the impact of industrial effluent and pedogenic materials on the studied soil quality. Factor 3 contributed 14.84% of the total variance with strong positive loading on Fe and Zn which represents the impact of natural processes on the quality of the studied soil. Results showed that the soil of the study site in Idu, Uruan Local Government Area is affected by the activities of Asphalt and Bitumen production conducted and abandoned over the years. As such the site is not totally free from trace metal pollution load. It is therefore not quite safe and suitable for agricultural activities in view of the effect of such metals in the soil and plants of the study location. It is also obvious that the trace metal assessed in the study site may affect the edible plant species cultivated within the study location in view of their bioaccumulation and translocation factors of such plant species. Therefore, there is that tendency of the trace metals to enter the food chain leading to chronic or acute metal toxicity in humans*

**KEYWORDS:** *Principal Component Analysis (PCA), Cluster Analysis, Randomized Complete Block Design (RCBD), Idu, Uruan, Asphalt and Bitumen*

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