



ASSESSMENT OF HEAVY METALS IN SOILS FROM METAL RECYCLING COMPANIES IN ILE-IFE AND IKIRUN, OSUN STATE, NIGERIA.

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Abstract

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This study was conducted to assay the levels of six heavy metals (Cd, Cr, Cu, Fe, Mn & Zn) in soil samples from two metal recycling companies in Osun state using Flame Absorption Spectrophotometer 400 (FAAS). The results obtained showed the levels of these elements within the range of 0.32-1343.00 mg/kg in the order of magnitude Fe>Zn>Cu>Mn>Cr>Cd recycling sites and 0.00-456.65 mg/kg in the control. Using SPSS 17 ($t < 0.05$), the elemental levels (except Zn) of soils from the sites were significantly higher than the control. Cd, Cu and Zn were also found higher while Cr and Fe were within the maximum permissible limits recommended by WHO/FEPA for soil meant for cultivation of crops and agriculture [FJPAS 1(1)2016].

1.0 Introduction

Soil is defined as a reactor, transformer and integrator of material and energy from other natural resources (solar radiation, atmosphere, surface and subsurface waters, biological resources), storage of water, nutrients and heat, natural filter and a medium for biomass production, past and present human activities [1,2,3]. It is a basic component of ecosystem and also one of the most vulnerable to contamination and degradation through accidental or deliberate mismanagement. Anthropogenic activities such as essentially inadequate agricultural and forestry practices, tourism, urban and industrial sprawl are named as the main impacting factors that prevent the soil from performing to its full capacity leading to soil degradation. Soil degradation can cause decline in soil fertility, carbon and biodiversity; lower water retention capacity, disrupt gas and nutrient cycles and reduce degradation of contaminants particularly metals [2]. Other sources include the use of metal containing agricultural sprays or soil amendments, disposal of wastes from mines or mills, emissions from large industrial sources such as metal smelters and refineries, municipal incinerators, emissions from moving sources principally automobiles and other relatively minor sources of terrestrial contamination like small-scale industries that process metals. Recycling scrap

metals amongst all involves processes like collection, sorting, shredding, bailing and melting as well as fabrication. It requires significantly less energy than manufacturing new metals from virgin ore, reduces greenhouse gas emissions substantially and helps in conserving natural resources. Despite all these merits or environmental benefits, pollutants or toxic materials could be released from the plant into the environment thereby contaminates surface soil or in-fill material, surface and ground water, air, vegetation and could also be devastating to the existing buildings in the site [4]. It is important to have qualitative and quantitative data on heavy metals in soil used by a population for agricultural purposes. This is because heavy metals may pose health risk when they accumulate in the human body. The present study has produced a statistical data of heavy metal content of soil samples from the two metal recycling companies in Osun state, Nigeria. The data from this study might be used by the authorities to monitor and control the metal contamination in the soil within these locations.

2.0 Materials and methods

2.1.0 Study area

The two metal recycling companies studied in this work lie within the tropical zone with latitude 07°55' N and longitude 04°41' E as well as longitude 4°