



Analysis Of Some Heavy Metals In Diobu Port Harcourt

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ABSTRACT

Dust sample were collected in the Diobu Metropolis near Port Harcourt by random sampling method in the streets and strategic position of the city. Five different locations were selected for the study. Result of analysis using Atomic Absorption Spectrophotometer (AAS) showed that iron (Fe) was the highest metal present in the city dust with a total amount of 10.78mg/L at market station, while lead (Pb) 0.5mg/L was the least heavy metal present in Emenike sampling station. A reasonable amount of zinc (Zn) was also present in the four sample areas namely: Market 2.099mg/L, D/Line 2.10mg/L, Mile 1 2.45mg/L, and Park 2.94mg/L. Observation revealed that the heavy metals present were all above the permissible standard of federal ministry of Environment (FMEnv).

Keywords: Environment, pollutants, contamination, contaminants, sampling, metals, dust and pollution.

INTRODUCTION

The study area is located in Port Harcourt, Rivers State, Nigeria. It lies between latitude 70E of the meridian and longitude 50N of the Equator. The area experiences rapid industrial and commercial development of growth. Heavy metals such as Iron, Zinc, Mercury, Arsenic, Copper, Chromium, Lead and Manganese can occur in trace amount naturally but when they are found in macro or huge amount, they become pollutants.^{1,2} This cloud occur due to industrialization. ^{3,4&5} Heavy metals that occur in urban areas originate from anthropogenic sources such as industries, sewage, urban development, fossil fuel, motor vehicle emissions just to mention but a few.^{4,6} Cities like Port Harcourt, Warri receive a lot of soil pollutants due to petroleum industrial waste. Commercial and domestic activities often provide pollutants of varying levels into the urban settlements. ^{6,7} Pollution study of the environment may be studied by the physico-chemical analysis of the concentrations of toxic and heavy metals without affecting or altering the ecosystem.^{5,6} Pollution may be due to the introduction of harmful substances into the environment by the activities of man which constitute danger to man and his natural resources. ^{7,8} Some land pollutions are caused by wrong application of fertilizers, oil spillage, indiscriminate dumping of refuse into gutters, among others. ^{8,9} Land pollution is the breakdown of earth crust, agricultural practices, mineral exploitation, urban and industrial waste. ^{9,10} Air pollution is the total impure of the air around us by dust and sand particles. The cause of air pollution is mainly due to combustion of fossil fuels such as coal, petrol, gasoline and burning of wood. ^{7,8,10} Heavy metals can also be seen in rainwater, lakes, rivers, roots of plants (vegetables) as a result of runoffs water that wash off dust and soil particles after heavy rainfall. ^{5,4,9} International communities point accusation fingers on oil multi-national companies for polluting the environment but we must all work together to make our environment safe and free for habitation. Zinc, Copper and Lead are the three most common heavy metals released from road travel due to vehicular emission. ^{7,9,10} Some heavy metals such as Nickel and Cadmium are found in road run off and exhaust. ^{7,8,9} Automobiles release Zinc and Copper while brakes of vehicles release Copper, the tire releases Zinc. ^{2,7,9} The oil leaks release hydrocarbons of recalcitrant polycyclic Aromatic hydrocarbons PAHs.

The human exposure to heavy metals can result in a wide variety of biological problems like change of kidneys, lungs, gastrointestinal tracts, joints, reproductive impairments damage to nervous system and braveness.

This study is focused on the determination of the level of heavy metal pollution in Diobu area of Rivers State and probably find a solution to ameliorate the situation for good.

MATERIALS AND METHODS

Sampling Techniques

Random sampling was done to collect street dust at jump sites and on roads in the Diobu metropolis, the sites are: Market, D/Line, Mile 1, Park and Emenike. Samples were collected from roads, T-Junctions, Gutters and Roundabout.

Preparation and Treatment

The five sample were all oven dried to constant weight at 80oC-100oC. 0.1g of each sample from the five locations were introduced into a 50cm³ flask and digested with 1.0cm³ of conc HN0₃ and 3.0cm³ of HCl for 30minutes. The digestate was heated on a water bathe for 80minutes and filtered through a Whatman filter paper into a 100cm³ volumetric flask and made up to mark with deionized water. The solutions were analyzed using the Atomic Absorption Spectrophotometer (AAS) to determine the concentration of Zinc, Lead, Iron, Chromium and Manganese at their appropriate wavelength region.

Table 1. Heavy metals concentration mg/L in the sampling stations

Parameters	Market	D/Line	Mile 1	Park	Emenike	FME_{Env.} (Standard)
Zinc	2.099	2.10	2.45	2.94	2.01	1.50
Lead	2.45	1.00	1.92	1.53	0.59	0.05
Iron	4.92	6.21	3.14	8.22	2.14	1.00
Chromium	1.42	0.93	0.81	0.72	0.91	0.05
Manganese	1.29	1.05	0.11	0.57	0.98	0.10

RESULTS AND DISCUSSION

The Table 1 showed the result of analysis carried out in Dibou sub urban area. The analysis revealed that Market, D/line, Mile 1, Park and Emenike all have high Iron content. This is due to high industrialization, metal works, welding and fabrications of iron metal and building with metals. Indiscriminate dumping of metal scraps could lead to high level of iron in all the samples. The market has the highest iron concentration while Emenike has the least, all are above the permissible limit of 1.00 of FME_{Env.} Results showed that Emenike was mild in the concentrations with the exception of iron. The market area of Diobu has high concentrations. This is likely due to population density of the market and anthropogenic and automobile activities are much to cause the increase in concentration of pollutants.

CONCLUSION

Observation from the study shown that all the parameters analyzed were all above permissible limit of federal ministry of Environment (FME_{Env.}) this is an indication that the environment is polluted to a mild level. Indeed the environment requires a check and balance periodically. This will help us to live in a safe and comfortable environment.

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