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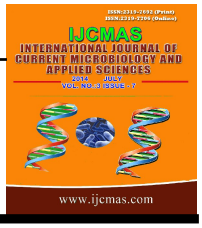

Original Research Article

Heavy Metal Identification in Different Agroecosystem by using Earthworm

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Keywords

Soil, Heavymetals, Earthworm

A B S T R A C T

India has a long and strong agricultural background. Earthworms are an important part of the soil ecosystem. Ecotoxicological studies on earthworms have focused on metals. Earthworms that tolerate high concentrations of toxic heavy metals. earthworms-soil:Zn-7.02, 6.74, Pb-5.04, 4.94, mn-10.54, 10.41, Cu-1.03, 1.60, Cd-0.80, 0.81 and Cr-0.55, 0.49 µg/g

Introduction

India has a long and strong agricultural background. India ranks second worldwide in farm output. India is the second biggest producer of wheat, rice, cotton, sugarcane, silk, and groundnut etc. (Krishna and uma, 2009). Now a day's agriculture is commercial based agriculture so the farmers used large number of chemical fertilizer and pesticides. Agricultural soil pollution extremely increased in last few decades by the way of using chemical fertilizer and pesticides in agricultural field. Heavymetals has danger to both the human and environment.

Plant only need some amount of heavymetals for growing, chemical fertilizers comprises rare amount of heavymetals. Heavy metals they are stable and non-degradable elements and sediment in soils, they are toxic or poisonous even at low concentrations. Excess amount of heavymetals are affect to the soil, not only the soil also a many soil biota of agricultural soil. In worldwide considerable amount of heavymetals are present in insecticides.

Earthworms are invertebrates composed of many segments. They also have little bristlelike organs that help them cling to slippery surfaces. Most earthworms have both male and female organs. Earthworms are an important part of the soil ecosystem. They help improve soil structure and soil chemical and biological properties (extension.psu.edu). Earthworm uptakes the various organic wastes, and produce castings these vermicasting act as a natural fertilizer these type of fertilizer support to plant growth and without affect of other soil biota.

Earthworms can play a various important roles in agricultural field. Their feeding and burrowing activities incorporate organic residues and amendments into the soil, improving decomposition, humus formation, nutrient cycling, and soil

structural development (Kladivko et al., 1986). Earthworms can accumulate in their tissues, heavy metals from the environment. The use of earthworm as a bio-indicator for soil pollution (Agbaire and Emoyan, 2012). In recent years, ecotoxicological investigations have benefited greatly from the emergence of molecular biology techniques, which lead to a better understanding of the mechanisms of contaminant action at molecular level (Brulle et al., 2010).Though large numbers of published ecotoxicological studies on earthworms have focused on metals (Lowe and Butt, 2007)

Materials and Methods

Sample collection:

Specimen earthworm (*Lampito mauritii*) was collected from different agricultural field like paddy, groundnut and sugarcane at arimalam village, Pudukottai district, Tamil nadu, India. This earthworm was identified by Dr.T.S.Sravanan, Professor and Head, P.G. Research department of zoology, Jamal Mohamed college, Thiruchirappali, Tamil nadu, India.

Estimation of Lead and Cadmium (AOAC., 1984)

For the determination of lead and cadmium, about 10 ± 0.001 g of homogenized sample were weighed into a 200 ml beaker and 10 ml of concentrated HNO3 were added. The beaker was covered with a watch glass, and after most of the sample was dissolved by standing overnight, it was then heated on a hot plate with boiling until any vigorous reaction had subsided. The solution was allowed to cool, transferred into a 50 ml volumetric flask and diluted to the mark with distilled water. For each run, a duplicate sample, spiked samples for recovery and two blanks were carried through the whole procedure. Cadmium and lead concentrations were determined spectrophotometer at a wave length of 253.7 nm.

Determination of zinc using AOAC method (AOAC., 1984)

Pipette 5 mL sample, respectively standard solution, and approx. 50 ml dist. H2O into the titration vessel. Add carefully 5 mL H2SO4 and heat the mixture up to 65 to 70°C, and then titrate with Potassium Ferric Cyanide.

Calculation

G /L Zn = EP1 * C01 / C00
C00 = Sample weight in mL
C01 = 4.904

Results and Discussion

In this present study focused heavymetal identification in earthworm. Majorly lead, cadmium and zinc these heavymetals are only particularly identified. Table 1 shows the heavy metal levels in the earthworm's samples respectively from the different agriculture fields such as groundnut field, sugarcane field, and paddy fields.

Ireland (1983) has demonstrated the pathways of heavy metal accumulation and execration vary between species. Earthworms that tolerate high concentrations of toxic heavy metals do not absorb the metal, accumulate it in a non-toxic form or excrete it efficiently. These findings are closely related to the Bamgbose (2000) findings. Bamgbose previously reported earthworm have the capacity to uptake the heavy metals metal concentrations (Zn, Pb, Cu, Cd and Cr) and contents were measured in earthworms (*Libyodrills violaceus*) and

soil samples from three non-contaminated sites and ten dump sites located in Abeokuta, Nigeria.

Table.1 Heavy metal levels in the earthworms samples in different agriculture fields

S. No	Name of the Sample	Zinc/ Ppm	Lead/ Ppm	Cadmium/ Ppm
1	Groundnut field	1.07	0.0017	0.0009
2	Sugarcane field	1.76	0.0011	0.0011
3	Paddy field	Absent	0.0002	0.0012

Samples from control sites show levels of metals to be higher in earthworms than in soil samples, as shown by concentrations, (earthworms-soil:Zn-7.02, 6.74, Pb-5.04, 4.94, mn-10.54, 10.41, Cu-1.03, 1.60, Cd-0.80, 0.81 and Cr-0.55, 0.49 µg/g)

Although heavy metal poisoning could be clinically diagnosed and medically treated, the best option is to prevent heavy metal pollution and the subsequent human poisoning (Duruibe, 2007).

Biotoxic effects, when unduly exposed to them could be potentially life threatening hence, cannot be neglected. While these metals are in many ways indispensable, good precaution and adequate occupational hygiene should be taken in handling them. (Tuomas Lukkari, 2004).

Vandecasteel (2004) focused on earthworm biomass determination as additional information for risk assessment of heavy metal biomagnification through the food web on DSDS relative to the surrounding alluvial plains. In general it can be concluded that relative to the surrounding environment, earthworm biomass is four times lower for contaminated dredged sediment derived heavy clay soils and comparable to alluvial soils for sandy loam DSDS. Risks for secondary poisoning at the more polluted heavy clay DSDS are thus partially compensated by the lower earthworm biomass.

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