

# To Study Heavy Metals in Continates Soils, System and Human Health

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**Abstract:** The environment it the surrounding where humans plants, animals and microorganism live together. It has composed of the Earth's surface and water. The Earths system is defined by the four spheres. i.e. Living things, air, land, and water. Heavy metals are found naturally on the earth crust since the earth's permeation natural causes can also increase heavy metals pollution such as Volcano activity, metal corrosions metal evaporation from soil and water and sediment re suspensive soil erosion, geological weathering.

Manure is very cheap and reliable technique for the solid waste management for compost fertility of soil in organic and inorganic Ions farms under in the soil. If the compost have containing contaminants such as heavy metal then its harm to ecosystem effect of heavy metals are toxicant in nature for biotic and abiotic factors such as soil, plants, aquatic life and human health. The concentration of heavy metals effected on the plant physiological metabolism, decrease the microbial activity of soil microorganisms and roots are affected. The concentration of heavy metals under in the water and effected on aquatic animals on their morphological and physiological mechanism and change the water buffers value acarcinogenic metal and the detrimental effect in human health. Excessive ingestion of as can coagulates proteins, reduced ATP production and cause ant immune disorder, muscles weakness and nerve inflammation.

**Keywords:** Fertilizer, heavy metals, pesticides, human health & aquatic animals.



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## INTRODUCTION

Soil pollution with heavy metals draw a serious concern because of their detrimental effects on the living organism. Agricultural soils are receiving tremendous amount of pollutants from the various sources. Heavy metals contamination in agricultural soils may impart functional disorders of soils, retarded plant growth and even harm. The health of humans through contamination of food chain the heavy metals bio accumulate in the living system and their concentrations increase as the passed from organism of lower trophic level to higher trophic level, a phenomenon known as biological concentration. (Freedman et al. 1981), (CPCB, 1997) The consumption of heavy metal such as Cr, Pb, Fe, Zn, Cv, Ni, Cd etc. contaminated food chain can dangerous deplete some researcher.

(Aldriano et al. 1986) (Chandra et al. 1997) have been reported to be of bio important nutrients in the body that are further responsible in the human and their daily medicinal and dietary allowances increasing immunological defenses, intra growth retardation, disabilities compost according to the sequences of metallic

nature of their ionic bond to malnutrition and high prevalence of gastro intestinal cancer rates.

### **METALS EFFECT ON SOIL:**

Soil contamination by heavy metal is known to causes detrimental effected on microbes organisms on microbes organisms growth (Spurgeon *et al.* 1996) . The industrial metabolism at high concentration (Ashraf and Ali, 2007). The increasing production of livestock and poultry product has led to generation of large amount of waste into the soil from the industries. The large quantity of waste product must be treated properly keeping into consideration to the environmental measures involved in land treatment. The elevated heavy metals levels in the agricultural land and the rate of application by the supplier with its elemental concentration (Vries *et al.* 2015). This review focuses on sources of heavy metals in soil strategies (Srivastava *et al.* 2015), or the technologies involved in their removal from the contaminated soils and further the challenges involved in use of various amendments for remediation of soils. (USEPA, 2007).

### **METAL EFFECT ON WATER:**

Lethal and sublethal concentration of the metals determined the sensitivity of individual organisms across aquatic species the complicated metal induced changes in the physiology and survival of aquatic fauna under metallic stress. Metal sulphide and the stability constant of metal ions with sulphate ( $=0.72-0.81$ ).

Such changes metal to metal from species to species from one experiment condition to another experiment condition. The exact causes of death due to heavy metal poisoning are multiple and depend on time concentration combination. The degree of PH of water also effected under the metallic nature of Ions concentration (Jeffrey *et al.* 1997) (Clayton 1989). Cytotoxicity of multiple parameters including measurement of cell death, viability, morphological, metabolism, cell attachment, cell membrane permeability, proliferation and growth kinetics (Barabasz *et al.* 2002).

Heavy metals significant decreases in the percent of hemoglobin and different PH levels have shown increased the clotting time. (Van *et al.* 1981).

### **METAL EFFECT ON PLANT:**

Some of these heavy metals i.e. As, Cd, Hg, Pb are not essential for plants growth. Others are Co, Cu, Fe, Mn, Ni and Zn essential elements required for normal growth for plant metabolism. When their concentration greater to the an optimal values the use of compost to improve cultivation yield carrying with possible negative effect might be a problem since the waste compost (Srivastava *et al.* 2005) applied to improve soils used to grow vegetables. The edible part of the plant most vegetables species, the risk of transference trace of metals from soil to humans should be a meal of concern. (Jewel *et al.* 2010) (Kumar *et al.* 2012). Metal concentrations in soil the median element composition of soil and the calculated means of the element content in land plants ( $=0.69-0.83$ ).

### **METAL EFFECT ON HUMAN BODIES:**

These heavy metals, a few have direct or indirect impact on the human body, such as Cu, Co, Fe, Ni, mg, Mb, Cr, Se, Mn and Zn have functional roles which are essential for various diverse physiological and biochemical activity in the body. High doses can be harmful to the body while other such as Cd, Hg, Ag, Pb. in minute quantities have delirious effect in the body causing acute and chronic toxicant in human (Tchounwou *et al.* 2005), (Patrick, 2002) Methyle Mercury is a neurotoxic compound which is destruction

microtubule and mitochondria damage in Kidney.

Biochemical mechanism (Monisha et al. 2014) of heavy metal intoxicant which involves binding to proteins and enzymes, altering their activity and causing damage the mechanism by which heavy metals causes neurotoxicity generate free radicals which performances oxidative stress damaging lipids, proteins and DNA molecules and how these free radicals propagate carcinogenesis (Kim et al. 2015).

Cellular organs and components of the cell have been reported to be affected by heavy metals, such as the mitochondria Nuclei, Lysosomes. Cell membrane and enzyme. It has emerged that metal Ions Interact with DNA and Nuclear protein this causing DNA Damaged to the cell cycle modulation, apoptosis or carcinogenic.

### **MICROBIAL EFFECT ON HEAVY METALS :**

Various microbial biomass has different biosorptive abilities which also varies directly with each group. The biosorbent should be cheap effective and easy to grow and harvest. The organism should also lend itself to alternative of the bioreactor configuration as well as physical and depends upon chemical condition to enhance biosorption and their sorption, capacity is due to their high surface to volume reaction and their humorous potential achieve chemisorption sites on the acid wall of cell. (Maitra 2016, (Kamran et al. 2017), Lukina et al. 2016).

**Table 1: Metal Toxicity effect**

<b>Metal</b>	<b>Toxicity</b>	<b>Animal</b>	<b>Plant</b>	<b>Microorganism</b>
Copper	Copper Polishing mining, paint plating, printing operations	Abdominal pain anemia, diarrhea headache liver, lungs, Kidney damaged metabolic disorder	Chlorosis oxidative stress retard growth	Disrupt cellular function inhibit enzyme activities
Nickel	Electro plating, nonferrous metal paints, porcelain enameling	Cardiovascular diseases, chest pain, dermatitis dizziness, dry cough and short times of breath headache kidney, diseases lung and nasal cancer housea.	Chlorophyll content initial enzyme activities and growth reduce nutrient uptake.	Activities oxidative stress.
Arsenic	Atmospheric deposition, mining, pesticides rate sedimentation smelting	Brain damage cardiovascular and Respiratory disorder conjunctivitis skin cancer	Decreased synthesis of plant growth inhibit chlorophyll synthesis	Inhibit enzyme activities reduce of growth rate
Cadmium	fertilizer mining pesticides, plastic	Bone diseases cough of headache , hypertension lung, kidney damaged	Nutrient growth inhibition reduced	Deactivation of enzymes, damaged

	refining welding	hypochromic anemia vomiting	seed germination	nucleic acid
Chromium	Dyeing electro planting paints production, steel, fabrication tanning , textile	Branch pneumonia chronic bronchitis irritation of skin lung cancer liver kidney damaged hyperactivity neurons	Chlorosis delayed senescence biochemical lesions reduced biosynthesis germination shrunken growth	Elongation of log face growth inhibition of oxygen uptake

**Table No. 2: Toxicity effect on Microorganism**

Microbial Biosordent	Metal	pH	Temperature	Time	Metal Ion concentration (mg/l)
Bacillus cereus	Hg	7	30°C	72 hrs	10
Bacillus laterosporus	cd Cr. (vi)	7 2.5	25°	2 hrs	1000
Desultovibrio desulturicans	Cu Ni Cr(vi)	7.8	37°C	168 hrs	100 100 100
Sulphate reducing bacteria	As (III) As (V)	6.9	2.4	1 hrs	0.07 0.11

**Table No. 3: Toxicity effect on water**

Temperature	During Winter Season October to February
pH	7 to 7.8
DO	7 to 7.5 mg/l
BOD	2.722 to 3.71 mg/l
Hardness	210 to 215 mg/l

Chloride content	35 to 38 mg/l
Alkalinity	67 to 69 mg/l
Free CO <sub>2</sub>	19.17 to 62.70 mg/l

## **CONCLUSION:**

Heavy metals containing compost may change the physical chemical and biological properties of soil. These metals uptake by plants from the soil reduce the crop productivity by inhibiting physiological metabolism (Sinha et al. 2012). Heavy metals uptake by plants and successive accumulation in human tissues and bio magnifications through the food chain causes both human health and environment concerns. Heavy metals containing agricultural runoff enter in aquatic environment, and harm to aquatic plants and animals therefore if the compost has to be applied in agriculture it should be free from pathogens and heavy metals.

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