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**REVIEW**

# An Analytical Approach for the Heavy Metals Assemblage or Accumulation in Crop Soil Fertility and its Impacts on Health

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In current scenario the whole world facing a big problem for the collection and assemblages the heavy metal in Agriculture land or crop soil-fertility. The heavy metal contamination (HMC) is very harmful for our beautiful earth planet as well as human health issue. Due to the collection and assemblages of heavy metals in earth crust the soil -fertility will be reduced day by day, it is directly or indirectly affected the whole ecosystem and our environment. There are the many innovative methods or technique to analysis and determination for the assemblages and collection the heavy metal pollution or contaminated soil-fertility in Agriculture land, but they have some basic problem like high cost issue is a big problem, time taking process or method and technique, sophistication or complication issues of processes, some problem in planning and strategy issues. The main heavy metals are generally found in earth crust is Zn, Cd, Hg, Pb, Cr, Cu and As. The soil-fertility of farming crop depends on the contamination of heavy metals. These heavy metals will be isolate from the crop soil by some innovative methods, technique or research approaches like- phytochemical, phtyoremediation, phytodegradation processes. My research and analysis work on the assemblages or collection of common heavy metals (Cd, Cr, As, Pb, Hg, Cu, and Zn) in paddy crop soil atmosphere. The corn pickup and acquired the heavy metals in compare then paddy was very prone, it is commonly found. The descending order of assemblages and collection in paddy grains - (Cd > Cu > Cr > Pb > Hg > Zn).

*Key words: Heavy metals contamination (HMC), sophistication, assemblages, phytodegradation, phytochemical, phytoremediation, soil fertility*

Generally the metallic elements are called as heavy metals, which are having the more relatively high density compared then the density of water, the most of the heavy metal on the basis of toxic character and heaviness property are correlated to each other. The heavy metals having the arsenic as metalloids which are more toxic in nature and our environmental system. The heavy metals assemblages and collections are the main reason for the soil contamination or hazardousness and toxic effect to the crop soil fertility reported by (Arora *et al.,* 2008; Kabata-Pendias, 2011; Christou *et al.,* 2014). In current scenario, the productivity of crop soil is reduced due to the highly presence of heavy metals contamination [HMC] and pollution is the primary source of heavy metals in agriculture land into crop soil-plant ecosystems, heavy metal ions in soil pore water may consume and ingest plant roots (McLaughlin *et al.,* 2011). The pH of the agriculture land soil and quantity of organic substances is a distinguish property for a unique or particular heavy metal help to easily absorb in crop soil or our ecosystem reported from (Sanders *et al.,* 1987; Badawy *et al.,* 2002; Xia, 2006). The scattering and dispersal or spread out of heavy metals are depend on sprinkling and dash contaminated water, environment condition and circumstances, various numbers of vegetable species, plant uniqueness, clay content of soil, soil erosion, iron, nitrogen fixation, manganese oxide or peroxide probability, physical state of heavy metals and the chemical state and Redox formula of heavy metals, cation interchange or transfer possibilities (CIP). (De Matos *et al.,* 2000; Aydinalp and Marinova, 2003; Gall and Rajakaruna, 2013; Neilson and Rajakaruna, 2014). Throughout the world nearby 5 million locations of crop soil contaminated and there are 500-502 million hectare of agriculture land are polluted due to the heavy metals pollution or contamination and metalloids with the maximum concentrations geochemical -baseline values and premium quality and position. (Liu *et al.,* 2018)

**Assemblages and collection of heavy metals in soil to crop:**

The heavy metals are classified into the two categories on the basis of availability and origin of sources. They may be natural sources and may not be natural sources, i.e. the Anthropogenic sources. The natural sources like volcanic eruptions, Hydrothermal sources of energy, rock weathering, dissolving of rocks, and sedimentary rocks etc., while on the other side the anthropogenic sources like petroleum chemical releases (nitrogen oxide, sulfur dioxide), coal burning, domestics effluents, mining, industry waste, municipal solid waste, Agricultural chemicals and maximum uses of fertilizers, pesticides uses, *Sorghum bicolor* L. was discriminated an Agriculture civilization was more reluctant to Cd (cadmium) stress by Zancheta *et al.,* (2015) in our report. Cd stress was more reluctant than the *Canavalia ensiformis* L. Majewska and Kurek (2008) reported that, in Cd assimilation and consumption of *Festuca ovina* and *Secale cereale* like rye plant and the much more assemblages or collection of the cadmium by grass route than rye roots and transference more to the above-ground essential part or organ of grass plants.

The *Sesbania exaltata* or coffee weed is extensively used and helpful to removing the lead [Pb] pollution and contamination in crop soil or agriculture land, according to the Begonia *et al.*, (2002). Nickel [Ni] metal is highly assemblages and accumulation in above ground [1051 µg $g^{-1}$ DW] area of *Sesuvium portulacastrum* investigated by Fourati *et al.*, (2016). The *Melilotus ofcinalis* and *Amaranthus retrofexus* has a espical properties to reduce and removing capacity the copper [Cu] metal into the crop soil ecosystem and copper polluted land reported by Ghazaryan *et al.*, (2019). The shoots of Napier grass type (*Pennisteum purpurreum)* to uptake and absorption the cadmium [Cd] and zinc [Zn] into the crop soil environment or soil composition and Reported that extreme amount of cadmium [Cd] (197.5 g $ha^{-1}$) and Zinc [Zn] (5023.9 g $ha^{-1}$) Metal will be assemblages and accumulated by *P. purpureum* cv. Guiminyin.

Generally term – shoot is defined as the young plant, after the growing of seed in soil or crop land. Khalid *et al.,* (2020) reported that nickel [Ni] and copper [Cu] estimated and evaluated that the capability, implementation the pot tests, after that they found that prevention and treatment timing nearby 7 to 9 weeks, the shoots or young plant

assemblages twice or more than twice, thrice copper [Cu] controlled.

The shorter plants of rice (*Oryza sativa)* has a tendency to reduce the bio-assemblages of mercury [Hg] in their root of seedlings and young plant or shoots of the plant, The term tillering – an a physiological method or technique for regularly branching of compact node of early shoot in below the earth and panicles (Group of flowers in a single branch), minimum yields, and less plant height (Kibra, 2008). The Arsenic [As], metal causes lung and skin diseases like – cancers, abdominal pain, liver diseases [angiosarcoma] in human being, chlorosis, wilting means reduce water loss, and stunted development in canola (*Brassica napus*) (Cox *et al*., 1996).

**Factors affect the assemblages and collection of heavy metals:**

The accumulation or assemblages of heavy metal from land soil to crop or plants which are very difficult method and process are effected and depend on the following factors like –the collection of heavy metal from soil to crop is depend of the various technique or method and tools. The chemical state and physical probability of heavy metal is also responsible for the accumulation from soil to crop and plants. The crop soil assemblages and transfer is depended on the crop soil pH. The accumulation of heavy metal from soil to plants is also effected the organic substance content and quality or quantity. The biodiversity, various variety of plants are the another factors which is also responsible for the accumulation and collection the heavy metal into soil to crop. The environment ecosystem affected for assemblages the heavy metal into soil to crop. The polluted water irrigation plays an important role for the assemblages of heavy metal from land soil to agriculture land reported by the (Bali *et al*., 2010; Bennedsen *et al.,* 2012; Neilson and Rajakaruna, 2014). A significant component controlling the transmission and accumulation of heavy metals is the organic acid exudation by plants (Badawy *et al*., 2002; Zeng *et al.,* 2011). By changing the rhizosphere's nutrient-absorption pathways, they influence the intake and fusion of heavy metals.

**Effects on soil microorganisms:**

The microbial biomass in the polluted or contaminated soil by the zinc [ Zn], copper [Cu], lead [Pb], cadmium [Cd], arsenic [As] and other heavy metals were withdrawn and bottled-up, reported to the Sobolev *et al*., (2008). The concentration and amount of heavy metals are responsible for the microbial Biomass. The unique metals show the different and unique effects of microbial biomass soil. The agricultural land or crop soil microbial biomass which is far away from the mine generally greater than the crop soils or land of microbial Biomass nearby the mine. According to the Bruins *et al.,* (2000) investigated that the maximum concentration and contamination of heavy metals could not helpful for the stimulation of microbial progress or growth, on the other side minimum presence or concentration of heavy metals are helpful for the signified growth of crop soil microbial Biomass. The process of decomposition and nutrient cycling is depended on the presence of Enzymes in crop soil. Due to the presence of enzymes have a tendency to improve the growth of soil.

**Effects of Heavy Metal Contamination on Agriculture land soil:**

The application of sewage sludge, waste water irrigation and flooding, phosphate and nitrogen fertilizer, pesticides, and pig slurry are some of the methods by which heavy metals are introduced into soils. These methods include atmospheric pollution by metal-bearing particles, application of sewage sludge, waste water soaking and maximum uses the pesticides. One of the biggest environmental issues today is the result of the heavy metal poisoning of agricultural crop soils. Increased heavy metal uptake by crops due to excessive heavy metal deposition in agricultural soils from wastewater irrigation could impact and affected the quality and safety of food in addition to contaminating the soil (Chabukdhara *et al.,* 2016). Because of the possible hazards to human health posed by the transmission and transference of heavy metals from soil to crops to food, heavy metal assemblages and accumulation in soil and plants is a growing source of worry. Various Number of crop, including rice, paddy, soybeans, wheat, maize, and vegetables, have been implicated in the accumulation and collection of hazardous metals in edible components. Because plant metabolic processes are inhibited, plants may experience significantly reduced growth, which can also lead to decreased crop output (Singh and Aggarwal,

2006). The soil-crop system's soil qualities and crop management practices, as well as dietary toxicity thresholds, can affect the accumulation and assemblages of metals in agricultural crops (Cooper *et al.,* 2011).

**Toxic effects of heavy metals contamination on public health issues:**

The cadmium [Cd] metal is very harmful for the human being. Due to the presence of cadmium heavy metal many diseases will be occur in human being like – microcytic (decrease red colour of RBC), hypochromic Anemia, lymphocytic (group of diseases) diseases, testicular atrophy, hypertension, kidney diseases, lung and prostate cancer, coughing, emphysema, headache investigated by (Ayangbenro and Babalola, 2017) and many more diseases caused by cadmium for example-respiratory disorders, cardiovascular diseases, some brain issues, as well as conjunctivitis, skin diseases or dermatological disorders on human health or life. Cadmium metal also responsible for the learning disability, decreased fertility disorder, chronic nephropathy, Anorexia, neuronal dead, high blood pressure disorder, hyperactivity, sleeplessness, learning disabilities, fertility disorder, renal system destroying, risk factor for Alzheimer's problem,, and as well as the harmful effects of lead [Pb] on public health like – Bronchopneumonia diseases, chronic bronchitis disorder, Diarrhoea problem, emphysema, headaches, skin irritation generally, itching of the respiratory tract disorder etc., liver function problem, lung cancer diseases, nausea, renal failure problem, reproductive toxicity symptoms and vomiting are very dangerous health issues that chromium [Cr] can have on public health. Mercury [Hg] can also affected the public health in different ways such as ataxia diseases, attention deficit disorder problem, eyes blindness, ear deafness, decreased fertility disorder, dementia problem, vertigo diseases, dysphasia disorder, some gynaecological problem, gastrointestinal discomfort problem, gingivitis symptoms, kidney failure problems, memory loss diseases, pulmonary edoema disorder, human lowered immunity, and sclerosis power, copper [Cu] has an intensively effected on medical challenges and can cause nausea problem, vomiting symptoms, anaemia diseases, diarrhoea and liver or kidney destroying system, headaches problem and Digestive metabolic abnormalities found in public health. Nickel [Ni] has an adverse effects or impact on our medical problem and challenges in the form of nausea disorder, lung and nasal symptoms of cancer, kidney failure, dermatological or dermatitis, lung sieases like-dry cough, dizziness disorder and shortness of respiratory system and breath. Zinc [Zn] may cause ataxia health issues, depression problem, gastrointestinal discomfort and system disorder, haematuria disorder, icterus problem, impotence problem facing, kidney and liver failure position, lethargy problem, macular degeneration in body, metal fume fever disorder, prostate cancer in body, seizures, and vomiting public health issues.

## Conclusion:

When we choosing the crops should be neglect the maximum tendency for accumulation and assemblages the heavy metals [Cd, Hg, Cu, As, Pb, Zn] in crop soil is very good for human health hazards issues, it is helpful way to reduce the hazards of crop soil and its fertility. The cation transfer capability factor is helpful for the reduction of heavy metal assemblages and accumulation in agriculture land or crop soil. The pH of crop soil is also affected factor for the collection of heavy metal contamination or pollution. As well as the root exudation and soil texture plays an important role for the transfer and collection of heavy metal in crop land soil. The chemical representation and chemical forms of heavy metals is also an important factor for the accumulation and collection in crop soil. According to this review article reported the heavy metal transfer and collection processes for the crop – soil environment help to determination the health issues of our beautiful Earth planet. Generally these process and technique or methods are having some complication and limitations. In order to comprise and contained the contribution or benefaction of the many effecting heavy metal elements into the collection and accumulation or assemblages, many work must be done.

## CONFLICT OF INTERESTS

The author declare that he has no potential conflicts of interest.

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