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Short Communication

Heavy metals concentration in soils and some aspects chime-remediation in Iraq and Poland

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Abstract

The heavy metal in Poland between (1999-2017) shows high increasing in level of heavy metals, but all not across the WHO , while Iraq in 2016 show high level of heavy metals in Cadmium that is more than the WHO level; The heavy metal concentration in plants ability to adsorbent them. Baghdad: Mn >Ni >Pb>Cd>Cu, while Poland: Mn=Ni> Cu>Pb>Cd. The chime-remediation by EDTA was better in the silty soil and low organic matter compared to citric acid were to Pb >Cu >Zn respectively. The high lead concentration in Iraqi soils observed acidity soils.

Keywords: Heavy metals, bio-remediation, soils, plants, Iraq, Poland.

Introduction

The Heavy metal accumulation through rapidly expanding in industrial areas, wastewater irrigation, mine tailings, land application of fertilizers, sewage sludge, leaded paints and gasoline, manures, pesticides[1,2].

The heavy metal like Manganese, lead, copper and others[3], are commonly present contaminated areas. Heavy metal is the major sink releasing into the environment through anthropogenic activities and microbial action that oxidized carbon (IV) oxidized to carbon oxide from organic contaminants[4].

The bio-degradation of organic heavy metals contaminants can severely inhibit in soils[5]. The restoration ecosystem of contaminated soils, require soils characterization and heavy metals remediation[6].

In this study, collection statistical for both Iraq and Poland about soils accumulations heavy metals, bioavailability, and hence selection of appropriate remedial options, also the aspects or bio- remediation and chemical remediation.

Materials and methods

The statistical data of minerals degradation soils and relationships with pH, for both Iraq and Poland Soils were analysis in comparative with the WHO maximum concentration[7] to gain the erosion, degradation caused by heavy metals, then comparative among bio-remediation (microorganism and phytoremediation) in relationships with pH and optimum temperature for heavy metals and also comparative in chime-remediation in both Iraq and Polish soils.

Results and discussion

When comparative in heavy metal concentration among Poland (Table-1) and all other places and Iraq and its places will find the difference in heavy metal concentration in Iraq soils is higher in than Poland, due to Poland climate specially the rainfall yearly is higher, that will cause decrease in concentration of heavy metal soils (Table-2)[8-11] also depending on the kind of soils in each of Poland and Iraq[12,13].

The results (Table-2) show heavy metal in Poland between (1999-2017) shows high increasing in level of heavy metals, but all not across the WHO, while Iraq in 2016 show high level of heavy metals in Cadmium that is more than the WHO level.

Heavy metals accumulation in plants in Poland[12] and Iraq[14,15] the heavy metal concentration in plants ability to adsorbent them (Table-1,3).

The chime-remediation by EDTA (Table-4), was better in the silty soil and low organic matter compared to citric acid were to Pb >Cu >Zn respectively.

The lead extraction among pH ≥ 4, less than 5 Iraqi soils[16,17].

The pH effects on soil nutrient lead to their availability due to positive ions on soils surface will replaced by the negative charges, also, high organic matter effect on chime-remediation (EDTA, AA and CA) in silty or sandy soils that contain (Ca^+ or K^+) ions that caused the ability binding to higher cation exchange capacity (CEC), causing complex of nutrient that cannot absorption by plants; also OM have greater buffering capacity[18].

Table-1: Heavy metals in plants leaves o in Poland (SW:South West; SE:South Est; NW: north West; NE: North East).

Heavy metal	Poland	All Region	Warsaw	Region SW	Region SE	Region NW	Region NE
Cd	0.5	0.6	0.38	1.2	0.6	0.5	0.4
Cu	9.4	9.4	11.4	13.4	10	8.4	7
Cr	0.8	0.8	0.81	0.7	1.3	0.7	0.4
Mn	60	65	41	74	103	69	42
Ni	3.4	1.3	4.3	4.2	6.4	3.1	1.9
Pb	1.1	1.2	2.4	3	1	1	0.5
Zn	45	50	59	72	67	35	40
Fe	241	261	325	525	526	218	103

Table-2: Heavy metal accumulation in Polish and Iraqi soils.

Heavy metal / Country	Year	Cd	Cu	Ni	Pb	Zn
Poland	1999	0.22	6.6	6.4	13.8	32.7
	2017	0.5	14.6	13.56	19.03	64.13
Iraq	2016	< 5	29.76	48	46290	52.87
WHO		1-3	50-140	30-75	50-300	150-300

Table-3: Heavy metals and their concentration in different plants (BAG: Baghdad; WAR: Warsaw).

Heavy metal(ppm) / Capital of country	Cd	Ni	Pb	Cu	Mn
Warsaw, Poland	0.38	41	2.4	11.4	41
Baghdad, Iraq	18.77	36.76	31	9.15	72

Table-4: Minerals –EDTA relationship with OM and pH.

Station names	EDTA-N_2			OM%	pH
	Pb	Cu	Zn		
Iraq soils	67.13%	51%	44.2%	2.93	4-5; 8;9
Bogomiee	80.3%	87.8%	-	0.25	7.3
Głogów	84.9%	87%	-	0.61	5.88
Legnica	90.6%	84.9%	-	1.06	7.06
Legnica	86.3%	76.9%	-	1.1	4.01
Rapocin	62.7%	73.6%	-	1.35	6.71
Zabiele	64.5%	73.8%	-	2.34	6.9

Conclusion

The heavy metal in Poland between (1999-2017) shows high increasing in level of heavy metals, but all not across the WHO, while Iraq in 2016 show high level of heavy metals in Cadmium that is more than the WHO level ; the heavy metal concentration in plants ability to adsorbent them. Heavy metals accumulation in plants: Baghdad were; Mn >Ni >Pb>Cd>Cu, while Poland; Mn=Ni> Cu>Pb>Cd. The best results of chime- remediation EDTA are associated with increasing organic matter.

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