

Table 5: Potentially Toxic Metals and Nutrients Concentration (mg kg⁻¹) in Different Parts of Wheat and Onion.

	Max.	Min.	Mean	Stdev.	Max.	Min.	Mean	Stdev.
Wheat Shoot				Wheat Grains				
Cr	87.2	84.1	85.5	1.53	81.65	79.98	80.62	0.84
Cd	43.5	41.9	42.4	0.8	39.98	37.12	38.75	1.43
Ni	29.8	27.3	28.7	1.25	23.5	20.8	22.3	1.35
Fe	23.9	21.2	22.4	1.35	21.9	19.3	20.8	1.31
Zn	105	105	105	0.29	98.95	99.89	99.54	0.48
Hg	32	30	30.6	1.24	21.69	19.85	20.75	0.92
Cu	54.7	53	53.9	0.86	52.02	49.24	50.45	1.39
K	54.3	51.1	52.4	1.03	52.6	46.9	49.9	2.85
Ca	194.5	190	192.4	2.2	189.4	183.9	186.7	2.75
Mg	52.9	50.9	51.5	1.61	53.4	48.1	50.6	2.65
Onion Shoot				Onion Bulb				
Cr	89.1	87.33	88.17	0.86	83.62	81.94	82.65	0.84
Cd	46.2	44.38	45.33	0.92	40.58	40.08	40.37	0.25
Ni	32.9	30.89	31.82	1.02	25.46	23.27	24.35	1.1
Fe	29.4	27.9	28.7	0.75	24.9	22.5	23.5	1.21
Zn	107	105	106	1.12	101.4	99.9	100.7	0.76
Hg	36.4	34.9	35.7	0.75	26.74	24.29	25.45	1.23
Cu	56.7	54.7	55.8	1.02	53.82	51.28	52.45	1.27
K	54.7	52.8	53.8	0.95	51.1	46.9	48.8	2.1
Ca	194	192.9	193.8	0.62	191.8	189.7	190.4	1.07
Mg	56.9	52.4	54.8	2.25	51.2	47.9	49.5	1.65

These metal set concentration in the leachate of control soil is deficient because a vast amount of heavy metal has been moved to the spinach (Figure 6). The Fe concentration was maximum during 1st event in sediments amended OFS (20-100cm) and during 10th event in sediments amended WFS (20-100cm). It aimed to provide a realistic theoretical basis for ecological threat evaluation, predicting trace metals accumulation in soil, and sustainable use of soil resources. Lake sediments may help in lowering the concentration of potentially toxic metals in the soil and plants. It may reduce the toxicity and eutrophication in dams. It may alleviate the leaching of potentially toxic metals from soil. Lake sediments may provide a basis for trace metal pollution, prevention, and control.

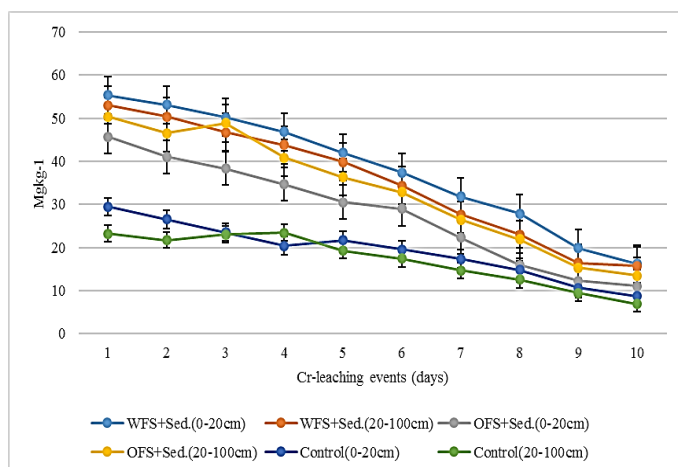


Figure 6: Cr concentration in the leachate of different soil and lake sediments profile. OFS, onion field soil; WFS, wheat field soil; Sed, sediments.

4. CONCLUSIONS

- 1) The fractionation of selected potentially toxic metals' concentration in the top layer (0-20 cm) and sub-layer (20 -100cm) of polluted soil taken from onion fields, wheat fields, and lake sediments were observed maximum in the onion field soil and minimum in sediments. Selected excessive nutrients fractionation were maximum in sediments and minimum in both sub-soil of onion field and wheat field.

- 2) The concentration of potentially toxic metals and nutrients in different components of wheat crops and onions show that the maximum in onion shoot (53.8-193.8 mgkg⁻¹ and 28.7-106.2 mgkg⁻¹, respectively) while the minimum in wheat grains (49.9-186.7 mgkg⁻¹ and 20.8-99.5 mgkg⁻¹, respectively).
- 3) The concentration of potentially toxic metals in laboratory grown spinach are in the following order control soil spinach (8.64mgkg⁻¹) > sediments amended onion field soil spinach (7.79mgkg⁻¹) > sediments amended wheat field soil spinach (5.66mgkg⁻¹), while nutrients are in order sediments amended wheat field soil spinach (979mgkg⁻¹) > sediments amended onion field soil spinach (959mgkg⁻¹) > control soil spinach (765mgkg⁻¹).
- 4) In leachate concentration of selected potentially toxic metals and nutrients during the leaching process decreased as the leaching events increased. The overall concentration of potentially toxic metals and nutrients in leachate were observed in the following order; sediments amended wheat field soil > sediments amended onion field soil > control soil.

The above results indicate that excessive nutrients and potentially toxic metals of irrigated industrial wastewater ruin soil quality and may result whole food chain contamination. The amendment of lake sediments in contaminated soil reduces the toxic metals and excessive nutrients uptake by the edible plants.

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SUPPLEMENTARY DATA

It contains fractionation data of toxic metals and leachate data of nutrients with toxic metals.

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