



Research Article

Rhizosphere Saturation With Carcinogenic Heavy Metals (Cd, Cr, Pb and Ni) and their Uptake by Crops in Urban Wastewater Irrigated Lands- A Mayday Call

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Keywords | Heavy metals, Carcinogenic, Cd, Cr, Pb, Ni, Soil buildup, Crops



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Supplementary Table 1: National environmental quality standards (NEQS) for liquid industrial effluents and municipal wastes.

Parameter	Existing standard	Revised standards	
		Into inland water	Into sewage treatment
Cd	0.1	0.1	0.1
Cr	1.0	1.0	1.0
Ni	1.0	1.0	1.0
Pb	0.5	0.5	0.5

Methods for chemical analysis of industrial effluents, EPA, 1999.

Supplementary Table 2: USEPA standards for irrigation water USEPA, 1999.

Parameter	USEPA standards
Cd	5.00
Cr	0.10
Ni	0.02
Pb	5.00

Supplementary Table 3: Total concentration of trace elements considered as phyto-toxically excessive levels in soils Linzon, S. N., 1978.

S. No.	Elements	Concentration (mg kg ⁻¹)
1.	Cd	8.00
2.	Cr	75.00
3.	Pb	200.00
4.	Ni	100.00

Supplementary Table 4: Critical soil test values for Cd, Pb, Ni and Cr (mg kg⁻¹, DW). Kabata-Pendias and Pendias (1985).

Nutrient	Deficient	Marginal	Adequate
Cd	0.07 - 0.10	0.1 - 0.5	> 0.5
Pb	3.00 - 50.0	51.0 - 70.0	> 70.0
Ni	3.00 - 10.0	11.0 - 20.0	> 20.0
Cr	1.00 - 10.0	11.0 - 45.0	> 5.0

Supplementary Table 5: *Permissible limits of heavy metals in soils and plants (mg kg^{-1}) WHO, 1996.*

S. No	Metals	Soil	Plant
		mg kg^{-1}	
4.	Ni	08.10	10.00
5.	Cr	08.00	01.30
7.	Cd	00.31	00.02
8.	Pb	13.00	02.00

Supplementary Table 6: *Approximate concentration of heavy metals in mature leaf tissue generalized for various species (mg kg^{-1} ; DW) Kabata-Pendias and Pendias (1985).*

Ele- ments	Deficient if less than the stated amounts of essential elements	Sufficient or normal	Excessive or toxic
Cd	–	0.05–0.2	5–30
Cr	–	0.1–0.5	5–30
Ni	–	0.1–5.0	10–100
Pb	–	5–10	30–300