Table 1. Summary of some recent literature showing content of cadmium (mg/kg) in vegetable samples from some parts of the world

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
1.	Bangladesh	Ruppur area, Pabna Distt, Bangladesh	<0.06	n.d.	n.d.	n.d.	0.65	<0.06	<0.06	n.d.	(Jolly *et al*., 2013)
2.	Bangladesh	Industrial areas, Dhaka, Bangladesh	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	2.91	2.05	(Ahmad and Goni, 2010)
3.	Bangladesh	Central market Rajshahi City, Bangladesh	n.d.	n.d.	n.d.	n.d.	1.178	n.d.	1.388	n.d.	(Saha and Zaman, 2013)
4.	Brazil	Sao Paulo State, Brazil	0.13	0.16	0.08	n.d.	n.d.	0.03	0.04	0.04	(Guerra *et al*., 2012)
5.	China	Wastewater Irrigated, Tongzhou Distt, Beijing, China	0.75	n.d.	>0.9	0.78	0.9	n.d.	n.d.	0.4	(Khan *et al*., 2008)
6.	China	Near Dabaoshan mine in Guangdong, China	3.8	n.d.	4	2.9	n.d.	n.d.	n.d.	1.8	(Zhuang *et al*., 2009)
7.	China	Zhongxin (ZX) , Near Dabaoshan Mine, China	n.d.	n.d.	0.33	0.28	0.13	0.38	0.28	0.21	(Zhuang *et al*., 2008)

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
8.	China	Vicinity of industrial zone in Jiangsu, China	0.042	n.d.	0.099	n.d.	n.d.	n.d.	0.014	0.025	(Cao *et al*., 2010)
9.	China	Peri-urban area of Nanjing, China	2.02	n.d.	1.49	n.d.	n.d.	n.d.	n.d.	n.d.	(Hu and Ding, 2009)
10.	China	Zhejiang province, China	0.03	n.d.	n.d.	n.d.	n.d.	n.d.	0.015	0.01	(Huang *et al*., 2014)
11.	China	Near e-waste processing site, China	n.d.	n.d.	0.38	n.d.	0.05	0.18	n.d.	n.d.	(Luo *et al*., 2011)
12.	China	Beijing	0.023	n.d.	n.d.	n.d.	0.037		0.062	0.020	(Song *et al*., 2009)
13.	China	Wastewater Irrigated Beijing and Tianjin city cluster, China	n.d.	n.d.	0.49	n.d.	0.2	n.d.	n.d.	0.19	(Wang *et al*., 2012)
14.	Ethiopia	Laelay Wukro	n.d.	n.d.	0.30	n.d.	n.d.	n.d.	n.d.	0.20	(Gebrekidan *et al*., 2013)
15.	Ethiopia	Addis Ababa, Ethiopia	n.d.	n.d.	0.66	n.d.	n.d.	n.d.	n.d.	1.8	(Weldegebriel *et al*., 2012)
16.	Ghana	Ghana Market	n.d.	n.d.	0.08	n.d.	n.d.	0.03	n.d.	0.15	(Bempah *et al*., 2011)
17.	Greece	Industrial Area, North	0.67	n.d.	0.67	n.d.	n.d.	0.5	n.d.	0.4	(Fytianos *et al*., 2001)

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
18.	India	Around sewage treatment plant, Varanasi	4	n.d.	n.d.	n.d.	2.3	n.d.	3.9	9.5	(Singh *et al*., 2010b)
19.	India	Soil waste disposal site, By Pass, Kolkata	0.37	n.d.	n.d.	n.d.	n.d.	n.d.	0.51	0.073	(Banerjee *et al*., 2010)
20.	India	Raichak, Parganas,	0.12	n.d.	n.d.	n.d.	n.d.	n.d.	7.32	0.85	(Banerjee *et al*., 2010)
21.	India	Ghatakpukur, Kolkata	BDL	n.d.	n.d.	n.d.	n.d.	n.d.	BDL	BDL	(Banerjee *et al*., 2010)
22.	India	Wastewater Irrigated area, Titagarh, West bengal	14.58	14.05	13.38	n.d.	17.79	n.d.	n.d.	n.d.	(Gupta *et al*., 2012)
23.	India	Vegetable market of Anand , Gujarat	n.d.	18	n.d.	n.d.	n.d.	6	8	n.d.	(Kumar *et al*., 2010)
24.	India	Wastewater irrigated site, Varanasi, India	0.39	n.d.	n.d.	n.d.	0.38	n.d.	n.d.	0.56	(Mishra and Tripathi, 2008)
25.	India	Industrial effluent irrigated Vadodara	4	3	n.d.	n.d.	25	n.d.	5	n.d.	(Tiwari *et al*., 2011)

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
26.	Iran	Wastewater Irrigated, Shah-Re Iran	0.20	0.13	n.d.	n.d.	0.59	n.d.	0.17	n.d.	(Bigdeli and Seilsepour, 2008)
27.	Libya	Market Sites Misurata Area, Libya	0.27	n.d.		n.d.	n.d.	0.12	n.d.	n.d.	(Elbagermi *et al*., 2012)
28.	Morocco	Market, Morocco.	0.0045	n.d.	0.0079	n.d.	n.d.	0.0045	n.d.	n.d.	(Bakkali *et al*., 2012)
29.	Pakistan	Effluent treated, Faislabad, Pakistan	0.061	0.062	0.049	n.d.	0.051	n.d.	n.d.	0.073	(Farooq *et al*., 2008)
30.	Pakistan	Gilgit, northern Pakistan	2.10	n.d.	0.84	n.d.	n.d.	n.d.	n.d.	n.d.	(Khan *et al*., 2010)
31.	Pakistan	Wastewater irrigating zone, Lahore, Pakistan	0.14	0.37	n.d.	n.d.	n.d.	0.09	n.d.	n.d.	(Mahmood and Malik, 2014)
32.	Pakistan	Wastewater Irrigated site, Peshawar, Pakistan	n.d.	16.24	15.24	n.d.	49.9	n.d.	n.d.	3.9	(Perveen *et al*., 2012)
33.	Romania	Near Mining Areas, Romania	n.d.	n.d.	0.09	n.d.	n.d.	0.02	n.d.	0.12	(Gergen and Harmanescu, 2012)
34.	Saudi Arabia	Urban areas, Dammam City	4.02	n.d.	n.d.	1.34	n.d.	1.20	n.d.	0.97	(Ali and Al-Qahtani, 2012)

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
35.	Saudi Arabia	Urban areas, Riyadh City, Saudi Arabia	4.13	n.d.	n.d.	1.29	n.d.	1.43	n.d.	1.34	(Ali and Al-Qahtani, 2012)
36.	Saudi Arabia	Urban areas, Tabouk City, Saudi Arabia	3.89	n.d.	n.d.	1.24	n.d.	1.21	n.d.	1.10	(Ali and Al-Qahtani, 2012)
37.	Saudi Arabia	Urban areas, Jazan City, Saudi Arabia	3.95	n.d.	n.d.	1.29	n.d.	1.25	n.d.	1.09	(Ali and Al-Qahtani, 2012)
38.	Spain	Market, Spain	0.0051	n.d.	0.0019	n.d.	n.d.	0.0036	n.d.	n.d.	(Bakkali *et al.*, 2012)
39.	Spain	Southern Spain, Central Spain, Northern Spain	0.0051 0.0081 0.0029	n.d.	0.0019 - -	n.d.	n.d.	0.0018 0.0105 0.0016	n.d.	n.d.	(Bakkali *et al.*, 2012)
40.	Tehran	Wastewater Irrigated, South of Tehran	1.3	n.d.	2.8	1.1	1.4	n.d.	n.d.	n.d.	(Harati *et al.*, 2011)
41.	Turkey	Manisa, Turkey	0.024	n.d.	0.005	n.d.	n.d.	n.d.	n.d.	n.d.	(Bagdatlioglu *et al.*, 2010)

n.d.- not done; BDL: Below Detection Limits

Permissible Limit: For Leafy Vegetables: 0.2 mg/kg; **Fruits/Tubers: 0.1 mg/kg**

Table 2. Summary of some recent literature showing content of lead (mg/kg) in vegetable samples from some parts of the world

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
1.	Bangladesh	Ruppur area, Pabna Distt,	0.98	n.d.	n.d.	n.d.	0.51	0.72	0.83	n.d.	(Jolly *et al*., 2013)
2.	Bangladesh	Industrial areas, Dhaka	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	11.97	22.09	(Ahmad and Goni, 2010)
3.	Bangladesh	Central market Rajshahi City,	n.d.	n.d.	n.d.	n.d.	10.430	n.d.	1.887	n.d.	(Saha and Zaman, 2013)
4.	Brazil	Sao Paulo State	1.05	1.24	0.48	n.d.	n.d.	0.38	0.44	0.60	(Guerra *et al*., 2012)
5.	China	Wastewater Irrigated, Tongzhou Distt, Beijing,	4.5	n.d.	5.8	5.2	2.2	n.d.	n.d.	4	(Khan *et al*., 2008)
6.	China	Near Dabaoshan mine in Guangdong,	1.9	n.d.	2.1	1.9	n.d.	n.d.	n.d.	1.9	(Zhuang *et al*., 2009)
7.	China	Zhongxin (ZX) , Near Dabaoshan Mine	n.d.	n.d.	0.13	0.20	0.12	0.09	0.18	0.12	(Zhuang *et al*., 2008)
8.	China	Vicinity of industrial zone in Jiangsu,	0.184	n.d.	0.192	n.d.	n.d.	n.d.	0.017	0.16	(Cao *et al*., 2010)
9.	China	Jiangsu Province,	0.093	n.d.	0.053	n.d.	n.d.	n.d.	0.126	n.d.	(Hao *et al*., 2009)

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
10.	China	Peri-urban area of Nanjing,	1.43	n.d.	1.14	n.d.	n.d.	n.d.	n.d.	n.d.	(Hu and Ding, 2009)
11.	China	Zhejiang province,	0.06	n.d.	n.d.	n.d.	n.d.	n.d.	0.02	0.02	(Huang *et al*., 2014)
12.	China	Near e-waste processing site,	n.d.	n.d.	0.77	n.d.	0.11	0.48	n.d.	n.d.	(Luo *et al*., 2011)
13.	China	Beijing	0.061	n.d.	n.d.	n.d.	0.440	n.d.	0.367	0.286	(Song *et al*., 2009)
14.	China	Wastewater Irrigated Beijing and Tianjin city cluster	n.d.	n.d.	0.9	n.d.	0.2	n.d.	n.d.	0.59	(Wang *et al*., 2012)
15.	Ghana	Mining Site	n.d.	n.d.	<0.005	n.d.	n.d.	<0.005	n.d.	<0.005	(Boamponsem *et al*., 2012)
16.	Ghana	Ghana Market	n.d.	n.d.	0.56	n.d.	n.d.	0.16	n.d.	0.43	(Bempah *et al*., 2011)
17.	Greece	Industrial Area,	> 7	n.d.	> 4	n.d.	n.d.	> 1	n.d.	> 2	(Fytianos *et al*., 2001)
18.	India	Across Musi River, Hyderabad	3.6	3.4	n.d.	n.d.	n.d.	n.d.	3.4	n.d.	(Chary *et al*., 2008)
19.	India	Urban area, Bangalore	149.5	75.5	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	(Ramesh and Yogananda Murthy, 2012)

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
20.	India	Durgapur Industrial Belt	n.d.	58	n.d.	n.d.	n.d.	n.d.	25	n.d.	(Kisku *et al*., 2011)
21.	India	Around sewage treatment plant, Varanasi	15	n.d.	n.d.	n.d.	12.5	n.d.	15.5	10	(Singh *et al*., 2010b)
22.	India	Industrial area, Bangalore	6.9	n.d.	n.d.	n.d.	6.1	5.8	n.d.	n.d.	(Varalakshmi and Ganeshamurthy, 2012)
23.	India	Solid waste disposal site, By Pass Kolkata	16.57	n.d.	n.d.	n.d.	n.d.	n.d.	14	5.14	(Banerjee *et al*., 2010)
24.	India	Raichak, Parganas, Kolkata	14.72	n.d.	n.d.	n.d.	n.d.	n.d.	7.32	13.19	(Banerjee *et al*., 2010)
25.	India	Ghatakpukur, West Bengal	3.567	n.d.	n.d.	n.d.	n.d.	n.d.	0.685	4.48	(Banerjee *et al*., 2010)
26.	India	Wastewater Irrigated area, Titagarh, West Bengal	49.59	31.13	34.94	n.d.	57.63	n.d.	n.d.	n.d.	(Gupta *et al*., 2012)
27.	India	Vegetable market of Anand town, Gujarat	n.d.	152	n.d.	n.d.	n.d.	78	111	n.d.	(Kumar *et al*., 2010)

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
28.	India	Wastewater irrigated site, Varanasi,	2.64	n.d.	n.d.	n.d.	2.85	n.d.	n.d.	3.56	(Mishra and Tripathi, 2008)
29.	India	Industrial effluent irrigated Vadodara,	16	24	n.d.	n.d.	10	n.d.	8	n.d.	(Tiwari *et al*., 2011)
30.	Iran	Wastewater Irrigated, Shah-Re Iran	2.57	1.35	n.d.	n.d.	0.75		1.43		(Bigdeli and Seilsepour, 2008)
31.	Libya	Market Sites in the Misurata Area,	0.32	n.d.	n.d.	n.d.	n.d.	0.21	n.d.	n.d.	(Elbagermi *et al*., 2012)
32.	Morocco.	Market, Morocco.	0.0107	n.d.	0.0598	n.d.	n.d.	0.0341	n.d.	n.d.	(Bakkali *et al*., 2012)
33.	Nigeria	Skoto	2.07	n.d.	1.59	n.d.	n.d.	n.d.	n.d.	n.d.	(Sani *et al*., 2011)
34.	Nigeria	Maiduguri	4.67	n.d.	5.88	n.d.	n.d.	n.d.	n.d.	n.d.	(Uwah *et al*., 2011)
35.	Pakistan	Effluent irrigated, Faislabad,	2.25	2.65	2.4	n.d.	2.25	n.d.	n.d.	1.92	(Farooq *et al*., 2008)
36.	Pakistan	Wastewater Irrigated, Distt Mardan	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	14.15	n.d.	(Amin *et al*., 2013)
37.	Pakistan	Tube-well Irrigated, Mardan Distt,	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	4.35	n.d.	(Amin *et al*., 2013)

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
38.	Pakistan	Gilgit, northern Pakistan	18	n.d.	15	n.d.	n.d.	n.d.	n.d.	n.d.	(Khan *et al.*, 2010)
39.	Pakistan	Wastewater irrigating zone, Lahore,	0.38	0.38	n.d.	n.d.	n.d.	0.26	n.d.	n.d.	(Mahmood and Malik, 2014)
40.	Pakistan	Wastewater Irrigated site, Peshawar	n.d.	36.1	2.20	n.d.	86.3	n.d.	n.d.	43	(Perveen *et al.*, 2012)
41.	Romania	Ruschita, Mining area	n.d.	n.d.	0.62	n.d.	n.d.	2.1	n.d.	0.9	(Harmanescu *et al.*, 2011)
42.	Romania	Mol Dova Noua, Mining Area, Banat County,	n.d.	n.d.	0.21	n.d.	n.d.	0.09	n.d.	0.25	(Harmanescu *et al.*, 2011)
43.	Romania	Near Mining Areas,	n.d.	n.d.	0.62	n.d.	n.d.	2.11	n.d.	0.90	(Gergen and Harmanescu, 2012)
44.	Saudi Arabia	Urban areas, Dammam City,	2.88	n.d.	n.d.	2.04	n.d.	1.42	n.d.	5.31	(Ali and Al-Qahtani, 2012)
45.	Saudi Arabia	Urban areas, Riyadh City, Saudi Arabia	1.26	n.d.	n.d.	1.27	n.d.	1.13	n.d.	3.80	(Ali and Al-Qahtani, 2012)
46.	Saudi Arabia	Urban areas, Tabouk City,	4.14	n.d.	n.d.	4.37	n.d.	1.64	n.d.	3.49	(Ali and Al-Qahtani, 2012)
47.	Saudi Arabia	Urban areas, Jazan City,	2.85	n.d.	n.d.	2.94	n.d.	1.52	n.d.	2.75	(Ali and Al-Qahtani, 2012)

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
48.	Spain	Market, Spain	0.0133	n.d.	0.0051	n.d.	n.d.	0.0071	n.d.	n.d.	(Bakkali *et al.*, 2012)
49.	Spain	Southern Spain, Central Spain, Northern Spain	0.0107 0.033 0.0083	n.d.	0.0041 0.0064 0.021	n.d.	n.d.	0.0071 0.0141 0.004	n.d.	n.d.	(Bakkali *et al.*, 2012)
50.	Tanzania	Across Industrial Area	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	31	(Chove *et al.*, 2006)
51.	Tehran	Wastewater irrigated, South of Tehran	8.4	n.d.	9.9	8.9	10.6	n.d.	n.d.	n.d.	(Harati *et al.*, 2011)
52.	Turkey	Manisa,	0.139	n.d.	0.163	n.d.	n.d.	n.d.	n.d.	n.d.	(Bagdatlioglu *et al.*, 2010)

n.d. – not done

Permissible Limit: For Leafy Vegetables: 0.3 mg/kg; **Fruits/Tubers: 0.1 mg/kg**

Table 3. Summary of some recent literature showing content of copper (mg/kg) in vegetable samples from some parts of the world

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
1.	Bangladesh	Ruppur area, Pabna Distt, Bangladesh	5.59	n.d.	n.d.	n.d.	4.45	5.35	6.69	n.d.	(Jolly *et al*., 2013)
2.	Bangladesh	Directly Polluted area, Bangladesh	18.3	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	(Naser *et al*., 2012)
3.	Bangladesh	Industrial areas, Dhaka, Bangladesh	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	8.63	14.25	(Ahmad and Goni, 2010)
4.	China	Wastewater Irrigated, Tongzhou Distt, Beijing, China	15	n.d.	14.8	15	9.8	n.d.	n.d.	13	(Khan *et al*., 2008)
5.	China	Near Dabaoshan mine in Guangdong, China	14	n.d.	14	9.8	n.d.	n.d.	n.d.	14	(Zhuang *et al*., 2009)
6.	China	Zhongxin (ZX) , Near Dabaoshan Mine, China	n.d.	n.d.	0.74	1.27	0.45	1.33	1.58	1.11	(Zhuang *et al*., 2008)
7.	China	Vicinity of industrial zone in Jiangsu, China	2.35	n.d.	1.31	n.d.	n.d.	n.d.	0.99	0.62	(Cao *et al*., 2010)
8.	China	Jiangsu Province, China	1.41	n.d.	0.62	n.d.	n.d.	n.d.	1.68	n.d.	(Hao *et al*., 2009)

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
9.	China	Near e-waste processing site, China	n.d.	n.d.	2.09	n.d.	0.59	0.99	n.d.	n.d.	(Luo *et al*., 2011)
10.	China	Beijing	1.05	n.d.	n.d.	n.d.	1.20	n.d.	2.71	1.0	(Song *et al*., 2009)
11.	China	Wastewater Irrigated Beijing and Tianjin city cluster, China	n.d.	n.d.	11	n.d.	4	n.d.	n.d.	9	(Wang *et al*., 2012)
12.	Ghana	Mining Site, Ghana	n.d.	n.d.	0.172	n.d.	n.d.	0.221	n.d.	0.040	(Boamponsem *et al*., 2012)
13.	Ghana	Ghana Market		n.d.	1.92	n.d.	n.d.	1.77	n.d.	2.32	(Bempah *et al*., 2011)
14.	Greece	Industrial Area, Northern Greece	>8	n.d.	>5	n.d.	n.d.	>4	n.d.	>1	(Fytianos *et al*., 2001)
15.	India	Wastewater Irrigated, Rajasthan, India	16.5	12.1	n.d.	16.1	6	12	10.2	n.d.	(Arora *et al*., 2008)
16.	India	Across Musi River, Hyderabad, India	1.1	1.6	n.d.	n.d.	n.d.	n.d.	0.9	n.d.	(Chary *et al*., 2008)
17.	India	Urban areas, Bangalore, India	34.7	60.7	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	(Ramesh and Yogananda Murthy, 2012)

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
18.	India	Durgapur Industrial Belt, India	n.d.	51	n.d.	n.d.	n.d.	n.d.	55	n.d.	(Kisku *et al.*, 2011)
19.	India	Around sewage treatment plant, Varanasi	15	n.d.	n.d.	n.d.	14.8	n.d.	14.8	6	(Singh *et al.*, 2010b)
20.	India	Soil waste disposal site, By Pass, Kolkata	16.13	n.d.	n.d.	n.d.	n.d.	n.d.	11.75	0.45	(Banerjee *et al.*, 2010)
21.	India	Raichak, Parganas,	5.91	n.d.	n.d.	n.d.	n.d.	n.d.	12.12	6.43	(Banerjee *et al.*, 2010)
22.	India	Ghatakpukur, Kolkata	8.97	n.d.	n.d.	n.d.	n.d.	n.d.	13.25	9.87	(Banerjee *et al.*, 2010)
23.	India	Wastewater Irrigated area, Titagarh, West Bengal	34.49	25.10	24.93	n.d.	28.08	n.d.	n.d.	n.d.	(Gupta *et al.*, 2012)
24.	India	Wastewater irrigated site, Varanasi,India	16.38	n.d.	n.d.	n.d.	7.28	n.d.	n.d.	12.25	(Mishra and Tripathi, 2008)
25.	India	Sewage irrigated site, Delhi, India	20.6	n.d.	n.d.	n.d.	10.4	n.d.	n.d.	n.d.	(Rattan *et al.*, 2005)
26.	India	Industrial effluent irrigated Vadodara, India	18	30	n.d.	n.d.	19	n.d.	29	n.d.	(Tiwari *et al.*, 2011)

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
27.	Iran	Wastewater Irrigated, Shah-Re Iran.	22.74	26.92	n.d.	n.d.	12.52	n.d.	27.53	n.d.	(Bigdeli and Seilsepour, 2008)
28.	Libya	Market Sites in the Misurata Area, Libya	5.32	n.d.	n.d.	n.d.	n.d.	5	n.d.	n.d.	(Elbagermi *et al*., 2012)
29.	Morocco	Market, Morocco.	0.0635	n.d.	0.353	n.d.	n.d.	0.0508	n.d.	n.d.	(Bakkali *et al*., 2012)
30.	Nigeria	Skoto, Nigeria	1.1	n.d.	0.8	n.d.	n.d.	n.d.	n.d.	n.d.	(Sani *et al*., 2011)
31.	Nigeria	Maiduguri, Nigeria	n.d.	n.d.	1.66	n.d.	n.d.	n.d.	n.d.	n.d.	(Uwah *et al*., 2011)
32.	Pakistan	Effluent treated, Faisalabad, Pakistan	0.923	0.653	0.851	n.d.	0.462	n.d.	n.d.	0.252	(Farooq *et al*., 2008)
33.	Pakistan	Wastewater Irrigated, Distt Mardan Pakistan	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	10.85	n.d.	(Amin *et al*., 2013)
34.	Pakistan	Tube-well Irrigated, Mardan Distt, Pakistan	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	6.85	n.d.	(Amin *et al*., 2013)
35.	Pakistan	Gilgit, northern Pakistan	11	n.d.	24	n.d.	n.d.	n.d.	n.d.	n.d.	(Khan *et al*., 2010)
36.	Pakistan	Wastewater irrigating zone, Lahore, Pakistan	0.44	1.65	n.d.	n.d.	n.d.	0.87	n.d.	n.d.	(Mahmood and Malik, 2014)

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
37.	Poznan	Markets, Poznañ	n.d.	n.d.	4.6	n.d.	n.d.	4.2	n.d.	2.1	(Bosiacki and Tyksiñski, 2009)
38.	Romania	Ruschita, Mining area, Banat County, Romania	n.d.	n.d.	1.86	n.d.	n.d.	1.54	n.d.	1.36	(Harmanescu *et al*., 2011)
39.	Romania	Mol Dova Noua, Mining, area, Banat County, Romania	n.d.	n.d.	2.22	n.d.	n.d.	1.77	n.d.	2.77	(Harmanescu *et al*., 2011)
40.	Romania	Near Mining Areas, Romania	n.d.	n.d.	2.22	n.d.	n.d.	1.77	n.d.	2.77	(Gergen and Harmanescu, 2012)
41.	Saudi Arabia	Urban areas, Dammam City, Saudi Arabia	11.38	n.d.	n.d.	6.21	n.d.	3.60	n.d.	4.24	(Ali and Al-Qahtani, 2012)
42.	Saudi Arabia	Urban areas, Riyadh City, Saudi Arabia	14.07	n.d.	n.d.	14.27	n.d.	4.49	n.d.	6.85	(Ali and Al-Qahtani, 2012)
43.	Saudi Arabia	Urban areas, Tabouk City, Saudi Arabia	7.82	n.d.	n.d.	n.d.	11.80	4.44	n.d.	2.76	(Ali and Al-Qahtani, 2012)
44.	Saudi Arabia	Urban areas, Jazan City, Saudi Arabia	10	n.d.	n.d.	7.45		7.82	n.d.	3.88	(Ali and Al-Qahtani, 2012)

S.No.	Country	Location	Spinach	Coriander	Lettuce	Turnip	Radish	Carrot	Brinjal	Cabbage	Reference
45.	Spain	Market, Spain	0.0518	n.d.	18.9	n.d.	n.d.	0.0514	n.d.	n.d.	(Bakkali *et al*., 2012)
46.	Spain	Southern Spain, Central Spain, Northern Spain	0.0518 0.0782 0.0453	n.d.	0.0189 0.0126 0.0235	n.d.	n.d.	0.0514 0.0252 0.0164	n.d.	n.d.	(Bakkali *et al*., 2012)
47.	Tanzania	Across Industrial Area, Tanzania	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	140	(Chove *et al*., 2006)
48.	Turkey	Manisa, Turkey	1.30	n.d.	0.48	n.d.	n.d.	n.d.	n.d.	n.d.	(Bagdatlioglu *et al*., 2010)

n.d. – not done

Table 4. Summary of recent literature showing effects of amendments on uptake of metals by different plants

S.No.	Amendment Used	Metal Studied	Experimental Plant	Observation	Reference
1.	• Gypsum • Citric acid • Farmyard manure • Compost • Mixture	Fe, Mn, Zn, Cu, Ni and Cd	Wheat	- Grain yield was increased with all amendments - Heavy metal content in shoots was reduced	(Abd Elrahman *et al*., 2012)
2.	• Concarpus biochar	Fe, Mn, Zn, Cd, Cu and Pb	*Zea mays*	- Biochar decreased bulk density and increased soil moisture - Increased shoot dry biomass - Except Fe uptake of all metals decreased in maize shoot	(Al-Wabel *et al*., 2014)
3.	• Peat, • Compost, • Vermicompost	Pb, Zn, Cd and Cu	Potato	- Increase in Crop Yield - Increase in Starch - Decrease in Reducing Sugars - Decrease in Metal Uptake (especially Cadmium)	(Angelova *et al*., 2010)
4.	• Vermicompost • Un-entrapped forms of inorganic fertilizers • Entrapped forms of inorganic fertilizers • Bio-fertilizers (Basillus subtilis and Azotobacter chrocoocum)	Cd	*Brassica juncea* *Ricinus communis*	- Significant increase in biomass - Protein and Proline content - Cd induced MDA content decreased - Un-trapped and biofertilizers increased the uptake - Vermicompost and Entrapped inorganic fertilizers decreased uptake - *Ricinus communis* uptakes more Cd than *Brassica juncea*	(Bauddh and Singh, 2015)
5.	• Municipal Solid Waste Compost • Cow dung manure	Cr	Rice	- Cr concentration was increased in plant grown on amended soil - Reduced Cr in CDM treated crop	(Bhattacharyya *et al*., 2005)

S.No.	Amendment Used	Metal Studied	Experimental Plant	Observation	Reference
6.	• Wheat straw biochar	Cd and Pb	Rice	- Significantly increased soil pH and TOC - Cd and Pb uptake in plant was reduced for 3 years	(Bian *et al*., 2014)
7.	• Lime • Phosphorus (P) • Red mud (RM) • Cyclonic ashes (CA) • Biosolids (BIO) • Water treatment residuals (WTR)	Cd, Pb and Zn	*Lolium mutiflorum* and *Lolium perenne*	- Lime increased Cd and Pb uptake - P significantly reduced metal uptake and gave highest yield - No significant difference using RM, CA and WTR	(Brown *et al*., 2005)
8.	• Nitrates	Hg	*Medicago sativa*	- Reduced Hg induced oxidative stress - Increased root development - Increased Hg uptake	(Carrasco-Gil *et al*., 2012)
9.	• Red Mud	Cd, Zn, Ni and Cr	Tomato and Wheat	- Decreased metal uptake - Significant increase in biomass in tomato - No significant difference in wheat grain yield.	(Chamon *et al*., 2010)
10.	• Biochar	Cd	Rice	- Increased soil pH - Decreased uptake of cadmium in plant by maximum of 54.2%	(Cui *et al*., 2011)
11.	• Biochar	Cd	Wheat	- Increased soil pH - Decreased Cd uptake for two seasons	(Cui *et al*., 2012)
12.	• Fly Ash • Steel Slag	Cd Zn Cu Pb	Rice	- Increased soil pH from 4-5 to 6.4 - Both amendments significantly decreased metal uptake in Rice. - Metals deposited on amendments as silicates, phosphates and hydroxides.	(Gu *et al*., 2011)

S.No.	Amendment Used	Metal Studied	Experimental Plant	Observation	Reference
13.	• Lime • Nano-Si foliar solution • Used diatomite	Cd and Zn	*Zea mays*	- Growth was increased with amendments (Lime > Nana-Si foliar solution > Used diatomite) - Lime significantly decreased metal uptake - No significant difference in uptake using other amendments	(Guo *et al*., 2011)
14.	• Swine manure • Salicylic acid (SA) • Potassium chloride (KCl)	Cd and Zn	*Helianthus annuus L.*	- Growth increased with amendments - Manure decreased Cd and Zn in flower - Both manure and KCl increased translocation from root to shoot - SA decreased Cd in plant	(Hao *et al*., 2012)
15.	• Fresh ramial chipped wood (RCW) • Composted sewage sludge (CSS)	Mo, Cr, Zn, Cu, Co, As	*Phaseolus vulgaris*	- No significant difference in pH of soil - CSS increased TOC content - RCW increased leaf dry weight - Both amendments decreased uptake Mo, Cr, As and Co - Increased uptake of Cu and Zn	(Hattab *et al*., 2015)
16.	• Biochar	Ni, Cr and Mn	*Lycopersicon esculentum*	- 40 fold increase in biomass in 5% amended soil - Upto 97% reduction in metal uptake in amended soil	(Herath *et al*., 2015)
17.	• Lime • Biochar	Cd, Zn and Pb	*Brassica napus*	- Increase in concentration of biochar resulted in decreased in metal uptake - Lime also reduced uptake in plant - 10% biochar tripled biomass	(Houben *et al*., 2013)

S.No.	Amendment Used	Metal Studied	Experimental Plant	Observation	Reference
18.	• Sewage sludge	Cd, Pb and Zn	*Dactylis glomerata, Festuca arundinacea, F. rubra, Lolium perenne,*	- Higher biomass of all species - Reduced metal uptake	(Kacprzak *et al*., 2014)
19.	• Chicken manure (CM) • Coconut tree sawdust (CTS)	Zn, Cu and Pb	Spinach	- Reduced uptake - Increased yield - Concentration of metal in plant was Zn> Cu > Pb	(Kamari *et al*., 2014)
20.	• Green waste Compost, • Biochar, • Green waste Compost + Biochar	Cu Pb	Ryegrass	- Compost significantly reduced Pb uptake but less effect on Cu uptake - Biochar significantly reduced Cu uptake but less effective for Pb - Combination of both reduced Cu uptake in 2nd and 3rd harvest	(Karami *et al*., 2011)
21.	• Farm yard manure (FYM), • Poultry manure (PM), • Diammonium phosphate (DAP), • Triple super phosphate (TSP) • Humic acid (HA)	Cd, Cr, Cu, Fe, Mn, Ni, Pb and Zn	Wheat	- HA reduced Cd, Cr and Mn uptake - DAP reduces Pb and Zn - TSP and PM reduced Fe and Cu uptake - FYM increase uptake of all metals except Ni.	(Khan *et al*., 2013b)
22.	• Compost	Cd, Pb and Zn	*Lactuca sativa*	- Decreased metal uptake	(Kubna *et al*., 2014)
23.	• Ethylene diamine tetraacetic acid (EDTA) • Ethylene diamine disuccinate (EDDS) • Humic acids (HAs)	Cd, Cu, Pb, Zn, and Ni	*Brassica juncea, Brassica campestris, Sorghum bicolor, and Helianthus annuus.*	- EDTA increased uptake and strongly affected plant growth - No significant increase in metal uptake by Has - EDDS also increased the uptake but the efficiency varied among species -	(Lee and Sung, 2014)

S.No.	Amendment Used	Metal Studied	Experimental Plant	Observation	Reference
24.	• Compost, • Zinc oxide, • Calcium carbonate, • Calcium carbonate + Zinc oxide, • Calcium carbonate + Compost.	Cd Pb	Wheat	- $CaCO3$, $CaCO3$ + ZnO and $CaCO3$ + compost significantly reduced Cd uptake in wheat. - No significance difference in uptake of Pb using $CaCO3$ - Compost significantly reduced Cd uptake in sandy soil but not in clayey soils.	(Lee *et al*., 2004)
25.	• Zero valent iron (ZVI) • Limestone (LS) • Acid mine drainage treatment sludge (AMD) • Bone mill (BM) • Bottom ash (BA)	Cd, Pb and Zn	*Latuca sativa*	- Except BM, no significant difference in plant yield using amendments - Reduced uptake of metals using ZVI, AMD, BM and BA amendments (except Cd in BA)	(Lee *et al*., 2011)
26.	• Bone mill • Bottom ash • Furnace slag • Red mud	Cd, Cu, Pb,Zn	*Miscanthus sinensis, Pteridium aquilinum*	- Maximum biomass in both species using bone mill amendment - Concentration of all metals was low plants growing in amended soils	(Lee *et al*., 2014)
27.	• Biochar • Compost • Biochar–compost	Cu	*Lotus corniculatus, Medicago lupulina, Trifolium spp., Anthyllis vulneraria, Hippocrepis comosa*	- No significant difference in uptake using Biochar and Compost - Increased uptake of Cu using combination	(Mackie *et al*., 2015)
28.	• Clay • Saw-dust sludge	Cu, Pb, Zn, Fe and Al	*Jatropha curcas*	- Increased growth - Increased uptake of Cu, Pb and Zn in root - Fe and Al increased in plant	(Majid *et al*., 2012)

S.No.	Amendment Used	Metal Studied	Experimental Plant	Observation	Reference
29.	• Biosolid compost (BC) • Alperujo compost (AC)	As, Pb, Mn and Zn	*Poa annua, Medicago polymorpha and Malva sylvestris*	- Soil pH increased - Trace elements immobilized	(Montiel-Rozas *et al*., 2015)
30.	• Cow manure • Hydroxyapatite	Cd	*Nicotiana tabacum*	- 71.75% reduction in Cd uptake using cow manure - 39.93% reduction using Hydroxyapatite	(Ngorwe *et al*., 2014)
31.	• Poultry Manure • Cow dung • Sludge from Rubber Processing Industry	As Cr Cu	*Zea mays*	- Increase in organic amendments decreased metal uptake in plant - Efficiency trend Poultry manure > Sludge > Cow dung	(Okieimen and Ikhuoria, 2011)
32.	• Lime • Phosphate • Compost • Combination of all	Pb and Mn	*Lolium perenne L, Festuca rubra L, and Poa pratensis*	- Lime reduced Pb and Mn in plant - Phosphate reduced Pb but increased Mn - Combination decreased Pb and increased Mn	(Padmavathiamma and Li, 2010)
33.	• Chicken manure biochar (CM) • Green waste biochars (GW)	Cd, Cu and Pb	*Brassica juncea*	- Both amendments increased biomass then control; CM being effective at 1% application - Both amendments reduced metal uptake - CM mainly reduced uptake in roots - Both amendments increased P uptake	(Park *et al*., 2011b)
34.	• Tannery Sludge	Cr, Cd, Co, Ni and Pb	*Ocimum basilicum*	- 50:50 (Soil:Sludge) increased uptake - Growth and oil yield was increased - SOD and CAT decreased at 100% TS - POD, MDA and Proline increased in 100% TS	(Patel *et al*., 2015)

S.No.	Amendment Used	Metal Studied	Experimental Plant	Observation	Reference
35.	• Limestone, • Calcium magnesium, phosphate, • Calcium silicate, • Pig manure, • Peat, • Chinese milk vetch • Zinc sulphate	Cd Cu	Rice	- Limestone increased grain yield by 12.5-16.5 fold; decreased Cu and Cd concentration by 23-50.4% - Slight reduction in Cd uptake using Chinese milk vetch and Zinc Sulphate - Other amendments effectively decreased Cd and Cu uptake; increase grain yield. - Cd and Cu in grain was dependent upon available Cd and Cu in soil further dependent upon pH of soil	(Ping *et al*., 2008)
36.	• MgCO3, • CaCO3, • Sulphur, • Chelating agents (NTA, DTPA, EDTA) • Acid mine tailings	Ni, Co	*Berkheya coddii*	- $MgCO_3$ and $CaCO_3$ decreased uptake of both metals also decreased solubility in soil - Sulphur increased uptake - Chelating agents decrease uptake of Ni but increased its solubility in soil - No affect of chelating agents on cobalt - Acid Mine tailings also increase uptake -	(Robinson, 1999)
37.	• EDTA • Compost • Hoagland Solution • Bacterial inoculums • Mixture of all above	Pb	*Eucalyptus camaldeulensis*	- Increased available Pb in soil amended with compost and EDTA. - Mixture increased the fresh and dry weight of plants parts. - Maximum uptake in soil inoculated with *Alcaligenes eutrophus*.	(Sallami *et al*., 2013)

S.No.	Amendment Used	Metal Studied	Experimental Plant	Observation	Reference
38.	• Nano-hydroxyapatite (HA) • Biochar (BI) • Chitosan (CH) • Organo-clay (OC) • Activated carbon (AC) • Bentonite (BE) • Cement bypass kiln dust (CBD) • Fly ash (FA) • Lime stone (LS) • Sugar beet factory lime (SBFL) • Zeolite (Z)	Cd Pb	*Brassica napus*	- CBD and OC increase Cd in plant by 3-4 folds - FA, HA and LS also increased Cd in plants - CBD, OC, FA, HA and LS also increased biomass - Z, BE, AC and BI decreased Cd in plant - Except OC all amendments decreased Pb uptake - 99% reduction in uptake exhibited by HA - Trend for reduction in Pb uptake: HA > SBFL > CBD > AC > FA > LS > BI > BE > CH.	(Shaheen and Rinklebe, 2015)
39.	• Limestone • Compost • Combination of both	Cu	*Microchloa altera*	- Plant fecundity was improved in highly contaminated land by combination - Reduced metal uptake	(Shutcha *et al.*, 2015)
40.	• Farmyard Manure (FYM) • NPK • FYM + N	Cd, Cu, Pb, Zn, Mn, Ni and Cr	*Beta vulgaris*	- FYM and FYM+N reduced metal uptake; increased yield - NPK increased uptake - TOC was significantly higher in FYM and FYM+N - No significant difference in pH	(Singh *et al.*, 2010b)
41.	• Lime • Phosphate	Cd	*Lactuca sativa* *Brassica rapa* *Brassica oleracea* *Amaranthus tricolor* *Amaranthus viridis*	- Efficiency of Cd reduction in plant was more of lime than phosphate - Liming reduced biomass in *Amaranthus tricolor* and *Amaranthus viridis* - Liming increased Ca uptake - No effect on uptake of other nutrients	(Tan *et al.*, 2011)

S.No.	Amendment Used	Metal Studied	Experimental Plant	Observation	Reference
42.	• *Burkholderia phytofirmans* strain PsJN • *Burkholderia phytofirmans* strain PsJN + gravel sludge • *Burkholderia phytofirmans* strain PsJN + siderite bearing material	Pb and Zn	*Zea mays*	- Inoculation of strain improved biomass - Strain with immobilizer decreased metal uptake significantly	(Touceda-González *et al*., 2015)
43.	• Chicken manure • Urea	Cd	*Solanum nigrum*	- Chicken manure reduced uptake to 34.6 % - Urea increased uptake in shoot	(Wei *et al*., 2010)
44.	• EDTA • Sodium polyacrylate (SPA) • Phosphate rock (PR) • Single superphosphate (SSP) • Compost	As	*Pteris vittata*	- EDTA, PR and SPA significantly increased As uptake - Growth was increased in all amendments	(Yan *et al*., 2012)
45.	• Water quenched Slag • Basic Furnace Slag • Lime Conditioner	Cd	Sunflower	- Growth of plant in amendments: Water quenched slag > Basic furnace slag > Lime conditioner - Plants growing without Cd were better developed than plants growing with Cd. - All amendments increased Cd uptake	(Yu *et al*., 2011)