Phytoremediation of Endosulfan Sulfate-Contaminated Soil by Single and Mixed Plant Cultivations. (2018)

Table 1: Concentrations of endosulfan sulfatein shoot and root of sweet corn, cucumber, and cowpea grown in endosulfan sulphate contaminated soil for 25 days

Plant tissues	Amount accumulation
	(µg/plant shoot or µg/plant root)
Sweet corn shoot	
SC	BD
SC + CU	4.4±0.0a
SC + CP	BD
Cucumber shoot	
CU	14.3±8.1a
CU + SC	10.5±4.0a
CU + CP	BD
Cowpea shoot	
CP	18.1±1.1a
CP + SC	BD
CP + CU	20.3±2.2a
Sweet corn root	
SC	BD
SC + CU	0.2±0.0c
SC + CP	16.3±5.5bc
Cucumber root	
CU	17.0±5.9abc
CU + SC	34.4±11.0a
CU + CP	BD
Cowpea root	
CP	22.6±3.1ab
CP + SC	17.1±5.5abc
CP + CU	8.1±3.7bc

Different lower case letters denote significant difference ($P<0.05$) between the same plant on the same day SC sweet corn, CU cucumber, CP cowpea, NA not available because the plant died, BD below detection limit at 0.2 µg/plant.

Source: https://link.springer.com/article/10.1007/s11270-014-1886-0

Endosulfan Plant Uptake Suppression Effect on Char Amendment in Oriental Radish.(2018)

Table 1: BCF concentration and TF of endosulfan in oriental radish at harvest

	Root				Aerial part				TF	BCF[a]
	α	β	Sulfate	Total	α	β	Sulfate	Total		
Untreat	0.021	0.026	0.165	0.212	0.001	0.002	0.031	0.034	0.160	0.025
PAC	0.005	0.008	0.057	0.070	0.001	0.002	0.023	0.026	0.371	0.006
POC	0.001	0.001	0.010	0.012	0.001	0.001	0.004	0.005	0.417	0.002
GOC	0.021	0.028	0.246	0.295	0.002	0.001	0.043	0.046	0.156	0.028
RHC	0.018	0.021	0.143	0.182	0.001	0.002	0.035	0.038	0.209	0.021

PAC powdered activated carbon, POC powdered oak char, GOC granulated oak char, RHC rice husk char, TF translocation factor from root to aerial part of the radish. BCF was calculated with total endosulfan residue in the root of radish.

To survey the BCF for the radish in farm level, two sites contaminated with endosulfan (2.274 and 51.00 mg kg−1) were selected at Gochang in South Korea. In this study, the BCF of endosulfans in the root was 0.015 and 0.071, respectively. The BCF of endosulfan sulfate was of the range 0.069–0.097. These BCFs for the radish were similar to the previous reports (Hwang et al. 2016).

Source: https://link.springer.com/article/10.1007/s11270-017-3677-x

Endosulfan Degradation by Selected Strains of Plant Growth Promoting Rhizobacteria (2017)

Table 1: PGP activities of the selected strains at varying concentrations of endosulfan

Strains number	Treatments	Solubilization Index[a]	P-liberated in broth assay ($\mu g\ mL^{-1}$)[b]	Change in pH	IAA ($\mu g\ mL^{-1}$)	Siderophore zone size (mm)	HCN	NH_3
PRB08	Control	3.2 ± 0.15^a	174.3 ± 1.5^a	3.1 ± 0.17	67.0 ± 1.0^a	11 ± 1.5^a	+	+
	1X	3.0 ± 0.05^{ab}	170.0 ± 1.0^b	3.1 ± 0.15	65.3 ± 2.0^{ab}	11 ± 1.5^a	+	+
	2X	2.9 ± 0.05^b	167.3 ± 1.5^b	3.2 ± 0.11	61.3 ± 1.5^b	11 ± 1.7^a	+	+
PRB44	Control	3.0 ± 0.15^a	167.0 ± 2.0^a	3.1 ± 0.10	66.3 ± 1.5^a	10 ± 2.0^a	+	+
	1X	2.8 ± 0.10^a	165.3 ± 1.5^{ab}	3.1 ± 0.15	62.6 ± 2.5^{ab}	9 ± 0.5^a	+	+
	2X	2.7 ± 0.20^a	162.6 ± 1.5^b	3.1 ± 0.05	$59.3 \pm 0.5b$	9 ± 1.0^a	+	+
PRB77	Control	2.9 ± 0.10^a	185.6 ± 2.5^a	2.7 ± 0.30	67.6 ± 1.5^a	13 ± 0.5^a	+	+
	1X	3.1 ± 0.10^a	181.3 ± 1.5^{ab}	2.7 ± 0.36	68.6 ± 1.5^a	13 ± 0.5^a	+	+
	2X	3.0 ± 0.05^a	177.3 ± 1.6^b	2.9 ± 0.20	64.3 ± 2.5^a	12 ± 0.5^a	+	+
PRB90	Control	2.8 ± 0.15^a	153.0 ± 2.0^a	3.2 ± 0.05	57.3 ± 2.0^a	10 ± 1.0^a	+	+
	1X	2.6 ± 0.10^a	150.3 ± 3.2^a	3.2 ± 0.10	55.3 ± 1.5^a	8 ± 0.5^a	+	+
	2X	2.5 ± 0.20^a	147.3 ± 3.2^a	3.3 ± 0.05	52.6 ± 2.0^a	7 ± 1.0^a	+	+
PRB101	Control	3.3 ± 0.10^a	189.3 ± 3.5^a	2.7 ± 0.20	74.0 ± 2.6^a	13 ± 1.5^a	+	+
	1X	3.3 ± 0.15^a	186.6 ± 3.0^a	2.8 ± 0.15	71.3 ± 2.5^{ab}	13 ± 0.5^a	+	+
	2X	3.2 ± 0.15^a	183.0 ± 1.0^a	3.0 ± 0.05	67.3 ± 1.5^b	13 ± 1.0^a	+	+

Values represent Mean ± SD (n = 3). Different subscript letters represent significant differences along the column of individual strains in the solubilization indexes, P-liberated in broth assay, IAA and Siderophore zone size at $p \leq 0.05$ according to Tukey's test X recommended field dose, IAA indole-3-acetic acid, HCN hydrogen cyanide, NH3 ammonia a Solubilization index = Total diameter (colony diameter + halo zone)/colony diameter b Amount of P liberated in NBRIP broth after 6 days of incubation with pesticide amendment

Source:
https://www.researchgate.net/publication/316853194_Endosulfan_Degradation_by_Selected_Strains_of_Plant_Growth_Promoting_Rhizobacteria

Recovery of lindane and α- and β- endosulfan from soil samples spiked at three levels (2016)

Lindane			α- endosulfan			β- endosulfan		
Amount added ngg^{-1}	Amount found ngg^{-1}	% Recovery	Amount added ngg^{-1}	Amount found ngg^{-1}	% Recovery	Amount added ngg^{-1}	Amount found ngg^{-1}	% Recovery
3.01	2.50	83	2.48	2.10	85	2.53	2.20	87
6.32	5.00	80	5.00	4.20	84	5.04	4.40	87
9.32	9.04	97	9.00	8.93	99	9.83	9.77	99

Source: M.f. zaranyika, P. Mugari (2016), Soil persistence, plant and non-target insect uptake of endosulfan and lindane applied to soya bean and maize in field trials in zimbabwe, Chemistry Department, University of Zimbabwe