NUMERICAL DATA

Lindane dissipation in a biomixture: Effect of soil properties and bioaugmentation (2018)

First-order kinetic parameters for lindane removal in biomixtures formulated with different soil types bioaugmented and non-bioaugmented, with two successive pesticide additions (100mgkg−1, each one). Different letters indicate significant differences between bioaugmented and non-bioaugmented systems ($p < 0.05$, Tukey test)

Biomixtures	**Parameters**					
	k (d^{-1})	**$t_{1/2}$ (d)**	**k (d^{-1})**		**$t_{1/2}$ (d)**	
	Fist lindane contamination		**Second lindane contamination**			
CS-bioaugmented	0.028 ± 0.002[b]	25.0 ± 2.0[a]	0.022	± 0.002[a]	32.2	± 3.0[b]
CS-non-bioaugmented	0.013 ± 0.001[a]	51.7 ± 1.4[b]	0.043	± 0.001[b]	16.0	± 0.4[a]
SS-bioaugmented	0.034 ± 0.002[b]	20.2 ± 1.0[a]	0.011	± 0.003	63.1	± 16.1
SS-non bioaugmented	0.021 ± 0.001[a]	32.9 ± 2.0[b]	ND		ND	
SLS-bioaugmented	0.029 ± 0.002[a]	23.8 ± 1.9[a]	0.037	± 0.003[b]	18.8	± 1.7[a]
SLS-non bioaugmented	0.026 ± 0.001[a]	27.2 ± 1.3[a]	0.007	± 0.001[a]	99.8	± 1.6[b]

CS: clayey soil; SS: Sandy soil; SLS: silty loam soil; k: degradation constant; t1/2: half life time; ND: not determined.

Source: https://doi.org/10.1016/j.ecoenv.2018.03.011

Microbial-enhanced lindane removal by sugarcane (Saccharum officinarum) in doped soil-applications in phytoremediation and bioaugmentation.(2017)

Table 1: Comparison of reported works on the phytoremediation of lindane.

Plant species/Microorganism	Concentration of lindane	Lindane dissipation	References
Spinacia oleracea L.	20 mg/kg	61% after 45 days	Dubey et al., 2014
Withania somnifera Dunal	20 mg/g	73% after 145ays	Abhilash and Singh, 2010a
Sesamum indicum L	20 mg/g	58.7% after 124 days	Abhilash and Singh, 2010b
Lolium multiflorum Rye grass		120 h	Li et al., 2002
Transgenic Nicotiana tabacum		25% more removal	Singh et al., 2011
Jatropha curcas L	20 mg/kg	72% after 300 days	Abhilash et al., 2013
Transgenic Arabidopsis thaliana			Dick, 2014
Maize plants/Streptomyces strains	2 mg/kg	94.4% after 21 days	Alvarez et al., 2015
Maize plants/Streptomyces A5		55%	Alvarez et al., 2013
Cytisus striatus/Rhodococcus erythropolis ET54b & Sphingomonas sp. D4	35 mg/kg		Becerra-Castro et al., 2013a
Cytisus striatus/Rhodococcus erythropolis ET54b & Sphingomonas sp. D4	65 mg/kg	43-53% enhanced removal in 2 weeks	Becerra-Castro et al. 2013b
Saccharum sp/Candida VITJzN04	100 mg/kg	95% in 30 days	Present study

The Table briefs the previously reported works on phytoremediation of lindane using various plants. The lindane degradation efficiency exhibited by others reports were less compared to the results presented in this study. Therefore, treatment of lindane contaminated soil using phyto- myco treatment along with bio-stimulation is superior due to the great efficiency of Candida VITJzN04 both as a lindane degrader as well as plant growth promoter. The Saccharum-Candida inoculation could be useful as cheap and effective alternative for the bio-treatment of lindane impacted soil.

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: J Environ Manage. 2017 May 15;193:394-399. doi: 10.1016/j.jenvman.2017.02.006. Epub 2017 Mar 1.

Shoot length; shoot dry weight, root length, root dry weight and seed germination of four plants grown in varying concentration of lindane-contaminated alkaline soil for 10 days. Values are the mean ±SD (2016)

Plant	[Lindane] (mg/kg dry soil)	% seed germination	Shoot length (cm)	Shoot dry weight (mg)	Root length (cm)	Root dry weight (mg)
	0	100±0a	20.6± 1.5a	54.0±13.5a	14.6± 1.4a	**54.0± 13.5a**
Corn	0.2	85±5.8a	14.5± 1.5b	55.8±20.5a	10.4± 1.7b	**55.8± 20.5a**
	2	80±10a	14.0± 1.7b	53.0±15.1a	9.2±1.8bc	**48.4± 14.0a**
	20	75±5a	13.0± 1.2b	43.5±10.6a	7.0± 1.1c	**41.0± 18.3a**
Sunflower	0	100±0a	8.4± 1.0a	28.5±7.33a	7.9± 1.8a	**16± 3.6a**
	0.2	95± 5.8a	6.8±1.4ab	26.4±6.07a	4.3± 1.9b	**20.6± 8.8a**
	2	95± 5.8a	4.2± 0.9c	23.2±4.33a	3.9± 1.7b	**17.7± 4.2a**
	20	85± 5.8a	5.6±1.4bc	25.8±7.28a	4.0± 1.3b	**10.1± 5.5b**
Water morning glory	0	85± 5.8a	7.7± 0.9a	18.4± 2.8a	7.3± 0.6a	**7.0± 3.0a**
	0.2	75±5a	6.8±0.7ab	16.8± 6.0a	4.9± 0.9b	**6.9± 1.2a**
	2	45**±15b**	6.4**±0.9b**	16.7**±8.4a**	4.0**±0.7b**	**5.8±2.1a**
	20	65±15a	5.6±0.7b	14.3± 2.8a	3.6± 0.9b	**5.2± 1.3a**
Pumpkin	0	90±10a	2.3± 1.2a	63± 2.6a	6.5± 1.7a	**15± 1.0a**
	0.2	60±10b	8.0± 1.3b	61.0±1.7ab	1.8± 0.2b	**10.±4.5a**
	2	50±10b	3.8± 1.8c	57.0± 3.0b	1.8± 0.2b	**9.0±2.6b**
	20	**55±5b**	**4.4± 1.7c**	**54.7± 5.8b**	**1.8± 0.4b**	**9.0±.6b**

Source: Organochlorine phytotoxicity to alkaline soil/International journal of agricultural biology, vol. 14, no. 5, 2016