EFFECTS OF EARTHWORMS TO REMEDIATION FROM SEWAGE SLUDGE CONTAINING HEAVY METALS

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BACKGROUND/OBJECTIVES.

The generation of sewage is increasing due to rapid urbanization. The municipalities all over the world are concerned with safe and feasible methods of its disposal.

So sewage sludge remediation is an important process for plants, animal and human health with earthworms remediation.

ABSTRACT

APPROACH/ACTIVITIES.

For this purpose worm addition has been made into several levels of heavy metal contented wastes. 5 different wastes have been selected which have different properties and heavy metal content. Samples have been taken, weekly and the heavy metal contents have been tested.

RESULTS/LESSONS LEARNED.

As a result of the study, application of different levels of worms were decreased the available heavy metal content in an important level and the eligibility of macro and micro nutrients were increased. For this reason to removal of heavy metal content of sewage sludge, the need of worm usage and remediation method were determined.

MATERIALS AND METHODS

- **Sewage sludge preparation**
- **Acclimatization and insertion of sewage sludge**
- **The determination of heavy metals' concentrations in sewage sludge**

RESULTS

The content of heavy metals in five-sewage sludge compared with the limit values for sludge used for agricultural purposes.

Metal [mg kg-1]	1. Sewage sludge	2. Sewage sludge	3. Sewage sludge	4. Sewage sludge	5. Sewage sludge
Cd	5.44	6.77	10.11	4.54	7.11
Pb	133.44	178.67	244.35	145.44	211.22
Cu	445.45	245.55	544.34	344.32	390.88
Zn	1212.56	876.56	1546.44	1011.22	997.66
Cr	35.45	30.12	39.11	32.65	34.25
Ni	27.68	20.55	30.22	24.35	31.44

Table 1. Description of the influence of selected properties of sewage sludge on the heavy metals content

Metal [mg kg-1]	1. Sewage sludge	2. Sewage sludge	3. Sewage sludge	4. Sewage sludge	5. Sewage sludge
Cd	2.45	4.44	6.77	2.34	4.57
Pb	98.78	133.23	177.65	102.33	144.56
Cu	377.68	122.34	342.33	255.43	278.9
Zn	1012.34	564.33	1123.22	768.79	772.32
Cr	28.79	19.8	31.24	22.32	27.68
Ni	21.33	14.35	20.12	17.68	25.61

Table 2. Description of the influence of selected properties of sewage sludge on the heavy metals content after adding of earthworm

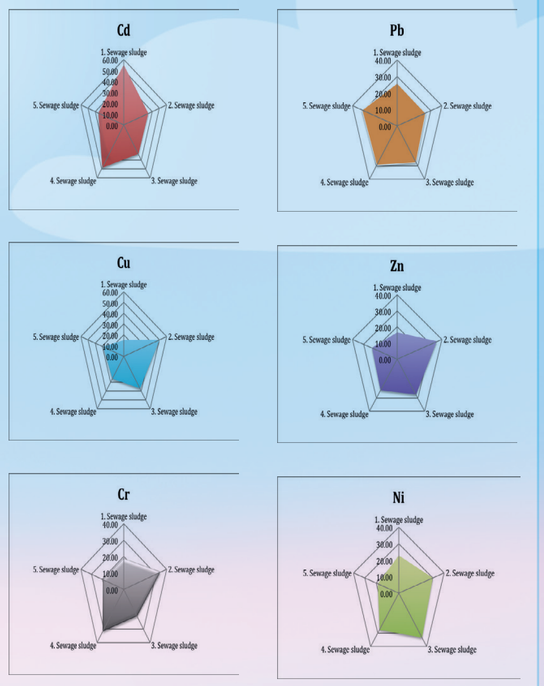

Figure 1. Effects of earthworm on rate of decrease sewage sludge heavy metal contents to no applications earthworm

Conclusion

The objective of the study was to evaluate the heavy metals disposal of sewage sludge and bioaccumulation of these substances in Californian earthworms. Having analyzed the results of other studies, there can be stated that our experimental results confirm the efficiency of the Californian earthworms when removing heavy metals from sewage sludge. Studies have shown that when vermicomposting sewage sludge, a large amount of heavy metals bioaccumulate in earthworms' body tissues, while some heavy metals concentrations in sewage sludge decreases.

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