

The Determination of Pb and Zn Phytoremediation Potential and Effect of Interaction between Cadmium and Zinc on Metabolism of Buckwheat (*Fagopyrum Esculentum*)

Authors : Nurdan Olguncelik Kaplan, Aysen Akay

Abstract : Nowadays soil pollution has become a global problem. External added pollutants to the soil are destroying and changing the structure of the soil and the problems are becoming more complex and in this sense the correction of these problems is going to be harder and more costly. Cadmium has got a fast mobility in the soil and plant system because of that cadmium can interfere very easily to the human and animal food chain and in the same time this can be very dangerous. The cadmium which is absorbed and stored by the plants is causing to many metabolic changes of the plants like; protein synthesis, nitrogen and carbohydrate metabolism, enzyme (nitrate reductase) activation, photo and chlorophyll synthesis. The biological function of cadmium is not known over the plants and it is not a necessary element. The plant is generally taking in small amounts the cadmium and this element is competing with the zinc. Cadmium is causing root damages. Buckwheat (*Fagopyrum esculentum*) is an important nutraceutical because of its high content of flavonoids, minerals and vitamins, and their nutritionally balanced amino-acid composition. Buckwheat has relatively high biomass productivity, is adapted to many areas of the world, and can flourish in sterile fields; therefore buckwheat plants are widely used for the phytoremediation process. The aim of this study were to evaluate the phytoremediation capacity of the high-yielding plant Buckwheat (*Fagopyrum esculentum*) in soils contaminated with Cd and Zn. The soils were applied to different doses Cd (0-12.5-25-50-100 mg Cd kg⁻¹ soil in the form of 3CdSO₄.8H₂O) and Zn (0-10-30 mg Zn kg⁻¹ soil in the form of ZnSO₄.7H₂O) and incubated about 60 days. Later buckwheat seeds were sown and grown for three month under greenhouse conditions. The test plants were irrigated by using pure water after the planting process. Buckwheat seeds (Gunes and Aktas species) were taken from Bahri Dagdas International Agricultural Research. After harvest, Cd and Zn concentrations of plant biomass and grain, yield and translocation factors (TFs) for Cd and Cd were determined. Cadmium accumulation in biomass and grain significantly increased in dose-dependent manner. Long term field trials are required to further investigate the potential of buckwheat to reclaimed the soil. But this could be undertaken in conjunction with actual remediation schemes. However, the differences in element accumulation among the genotypes were affected more by the properties of genotypes than by the soil properties. Gunes genotype accumulated higher lead than Aktas genotypes.

Keywords : buckwheat, cadmium, phytoremediation, zinc

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