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# Mobility of Lead in Soil after Application the Innovative Mineral-Organic Mixtures

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## Abstract

Lead is present in soils all over the world, and its elevated content can pose a threat to living organisms. Lead in soils comes from various sources and in miscellaneous forms that undergo both chemical and biotic transformation [1]. The extraction of lead from the soil using acetic acid allows us to imitate the natural conditions found in the rhizosphere and in the litter layer. This analysis may be a reliable test to study the actual and potential availability of heavy metals to plants.

The soil application of zeolites immobilizes heavy metals in contaminated soils because of the high sorption capacity of these materials and their affinity for cations and anions. The literature is rich in results that indicate the high ability of zeolites to absorb cadmium and lead [2,3]. The data clearly confirm that direct and residual influences of zeolite can be applied efficiently for Pb immobilization and decrease its uptake by cabbage in rotation with corn from contaminated soils [4].

The aim of this study was to investigate the effect of the applied mineral-organic mixtures with the addition of zeolite composites (NaX-Vermiculite and NaX-Carbon) and organic additives (lignite or leonardite) on the changes in the content of the bioavailable form of lead in contaminated loamy sand soil. A two-year pot experiment was carried out in a vegetation hall using a testing plant - maize.

In this study, the effect of the use of mineral-organic mixtures on changes in the lead content (Pb) in the soil was compared. The immobilization of lead was calculated using the equation:

$$\text{Immobilized metal (\%)} = \frac{(\text{CH3COOH metal for the control} - \text{CH3COOH metal for treated sample}) \text{x } 100}{\text{CH3COOH metal for the control}}$$

Based on the results obtained on the content of lead forms extractable with 0.03M acetic acid, the average immobilization of lead after the use of mineral-organic mixtures after the first year of research was 3%. However, the results obtained after the second year of research indicate the immobilization of lead after the use of mineral-organic mixtures at the average level of 43%.

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