ANALYSIS OF SOILS AND LICORICE ROOTS GROWING ON THEM IN THE VILLAGE OF UDABNO, SAGAREJO MUNICIPALITY

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Soils and plants represent unique natural resources of paramount importance for the development of humans and all living organisms comprising the planet. From this perspective, it is of considerable interest to conduct comprehensive research on these objects.

Metal contamination of soils attracts particular attention, as it significantly affects human health, environmental sustainability and soil quality. Occasionally, heavy metal migration from contaminated soils to plants occurs. Consequently, certain plants can remediate soil at the expense of self-contamination through the utilization of their innate capabilities. This plant capacity is termed phytoremediation. From this perspective, we conducted analysis of both, soils and the roots of licorice plants growing thereon.

The soils of Udabno village in Sagarejo municipality are of weakly alkaline nature, with pH values ranging from 7.70 to 7.97; calcium carbonate content in the upper soil layer (0-30 cm) varies within the range of 45-62 mg/g (i.e., g/kg).

In the aforementioned soils, the content of heavy metals (Cd, Pb, As, Zn, Cu, Ni, Sb, Cr, Mn, V, Fe), as well as light metals (Ti, Si, Al), alkali metals (Li, K, Na), and alkaline earth metals (Mg, Ba) was investigated using microwave plasma atomic emission spectroscopy (MP-AES). It was found to be considerably higher than in various parts of licorice plants (root, stem, leaf) grown on these soils. Exceptions are the heavy metal Cu and the metalloid B. Their concentration in licorice plants is higher than in soil. In the case of copper, the excess is maximum 7-fold, while for boron it is 9-fold.

Furthermore, in the investigated soils and licorice roots, the content of most heavy metals is within internationally permitted levels. In soils, exceptions are antimony and chromium: Sb content exceeds maximum permitted concentrations by 5-6 times, while Cr content exceeds them by 6-8 times. In licorice roots, content of nickel exceeds the norms established by the World Health Organization by 2-3 times.

Along with inorganic components, we determined the organic component - glycyrrhizic acid - in licorice roots using high-performance liquid chromatography.