

# INFLUENCE OF SOIL CONTAMINATION WITH NICKEL AND LIMING ON LEAD AND MANGANESE CONTENTS IN RED CLOVER BIOMASS

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**Abstract:** In general, industrial pollution contributes to deeper degradation of agricultural production space, which leads to accumulation of heavy metals in soils. Nickel is a heavy metal. At small amounts, it is necessary for the growth and development of living organisms, while it is toxic in excess. The influence of soil contamination with nickel (50, 100, and 150 mg Ni/kg of soil –  $\text{NiSO}_4 \cdot 7\text{H}_2\text{O}$ ) on Pb and Mn at red clover was studied in four – year pot experiments on a background of varied liming levels (according to 0.5, 1, and 1.5  $\text{H}_h$  of soil –  $\text{CaCO}_3$ ). Metal contents were determined by means of ICP-AES technique after sample dry digestion in muffle furnace at 450°C and dissolution of ash in 10% HCl. The results were statistically processed using variance analysis and F-Fisher-Snedecor's distribution according to F.R. Anal. ver. 4.1. software, while  $\text{LSD}_{0.05}$  values were calculated according to Tukey's test. To find interactions between studied traits, a linear correlation analysis was performed. Both metals concentrations at plants grown on polluted soils were higher as compared to those cultivated on non-contaminated ones, which may indicate the synergism between nickel and both discussed heavy metals. Applied liming (regardless the amount of  $\text{CaCO}_3$ ) caused significant decrease of both metals contents at a test plant. The studies revealed synergistic dependencies between nickel and lead and manganese.