

**BIODIAGNOSIS OF SOIL WITH A LOW LEVEL
OF ANTHROPOGENIC IMPACT**
(with the typical Urban Settlement Stepnoe, Saratov Region, as an example)

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With the urban-type settlement Stepnoe as an example, biodiagnosis of the soil of a settlement with low technogenic impact was conducted. In the course of our work, 30 soil samples were plated onto solid nutrition media to evaluate the following: the total numbers of heterotrophic microorganisms – on meat peptone agar, the numbers of hydrocarbon-oxidizing and iron-oxidizing microorganisms – on their corresponding selective media, and the activity of several soil redox and hydrolytic enzymes (dehydrogenases, catalases, peroxidases, and invertases) were also studied. To characterize the degree of anthropogenic impact on the soil, the content of the mobile forms of copper, zinc, lead, cadmium, chromium and nickel was evaluated and the total soil contamination coefficient (Z_c) was calculated. Within the studied area, an excess over the MPC of the mobile forms of Ni, Cu and Pb was found. In general, the values of the total soil pollution coefficient did not exceed 16 units, indicating a favorable environmental and geochemical situation in the territory of the settlement. Analysis of the total numbers of heterotrophic microorganisms, numbers of hydrocarbon-oxidizing and iron-oxidizing microorganisms, revealed deviations from the norm in certain regions of the territory surveyed, indicating an anthropogenic transformation of the soil biocenoses. The maximum deviations were typical for the index of hydrocarbon-oxidizing microorganisms, which indicated soil contamination with hydrocarbons. Our results of evaluation of the activity of indicator soil enzymes did not exclude possible functional damages in the soil. It was found that the activity of soil dehydrogenases and invertases corresponded to low and very low levels of soil enrichment with these enzymes. At the same time, the activity of soil catalases and peroxidases corresponded to the average and high levels of these enzymes, which indicated the absence of pathological changes in the soil. It has been shown that the studied soil microbiological and biochemical parameters are promising for soil health biodiagnosis in territories with low anthropogenic impact.

Key words: biodiagnosis, heterotrophic microorganisms, hydrocarbon-oxidizing microorganisms, iron-oxidizing microorganisms, soil enzymes.

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