

Research on Bulk Soils in the Industrial Regions of Georgia (Bolnisi-Kazreti)

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The selected region for research is Kvemo Kartli, an industrial area where gold and copper ores are extracted in the Bolnisi Municipality, specifically at the "RMG COPPER" and "RMG GOLD" enterprises located in Kazreti. The primary objective of this research was to examine the technogenic (bulk) soils of the Bolnisi-Kazreti area.

The percentage content of organic substances (humus, sand, clay, silt) in the technogenic soils was analyzed. It was established that the technogenic soil consists of heavy and medium clay-loam types. The research identified the percentage and ppm content of 34 chemical elements within these soils. Based on X-ray fluorescence (XRF) analysis, it was determined that heavy metal concentrations significantly exceed the Maximum Permissible Concentration (MPC). Furthermore, the Cation Exchange Capacity (CEC) of the technogenic soils was investigated. The findings indicate that the cation exchange capacity in the soil is low. The surface of the technogenic soil is weathered, and the upper humus layer is poor and thin. The reserves of nutritional elements are extremely low due to the leaching of nutrients. The structural classification of the soil was also part of the research. Technogenic soil is deficient in MPK (C:N-25-30:1), water permeability, humidity, and aeration. Regarding the concentration of toxic heavy metals (mg/kg), it was confirmed that lead, cadmium, zinc, selenium, arsenic, etc., exceed the MPC. According to EPA testing, only 10% of these toxic heavy metals are in a mobile/soluble form, while the remaining 80-90% exist in insoluble forms. This suggests that for the purpose of reclamation, it may be possible to restore the soil structure to a level that allows for the establishment of green cover over the technogenic soil. presents a visual characterization of the soil samples:



Fig. 1. Labeled soil samples

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