



Heavy metals in system "soil-farm produce-organism" within the area of environmental impact of ore-mining production

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To complexly investigate territories exposed to the impact of mining enterprises, the application of versatile methodic approaches including both the assessment of the state of basic components of the ecosystem (soil cover, surface waters, farm produce, etc.) and conjugated analysis of data obtained, are required. All this allows getting a comprehensive picture of ecological state of urban sites from positions of sanitary-hygienic, eco-toxicological, functional, and sustainable development of the territory.

In Armenia, it is northern and southern portions of the republic, which are attributed to mining centers in the first turn. Of particular interest is South Armenia where a whole set of mining enterprises is focused. There, the cities of Kapan, Kajaran, Meghri, Agarak etc. are located. This research covers the areas both of Kajaran c. and 3 tailing repositories: Darazami, Pkhrut, Voghchi.

The city of Kajaran is one of major ore-mining centers not only in Armenia but also in the former USSR. The city-forming enterprise – a set of the Zangezur mining and dressing plants-produces a copper and molybdenum concentrate. The territory of Kajaran lies in the area of sulfide copper-molybdenum deposit and is a natural biogeochemical province described for the first time by D. P. Malyuga [1958] and V. V. Kovalskiy [1974].

The research goal was to assess ecological state of Kajaran's territory with regard for the impact of the Zangezur copper-molybdenum group of enterprises and adjacent tailing repositories. The **tasks** to achieve the stated goal were

- to assess pollution level of basic natural environments on Kajaran's territory and give their sanitary-hygienic assessment,
- to provide eco-toxicological assessment of farm produce obtained on the territory of the city and tailing repository sites.
- to reveal risk groups among the local populace. For this purpose, pilot studies were initiated to determine concentration of metals in the hair of children living in Kajaran as hair is one of the most informative bio-substrates.

The research indicated that

- the study soils, where crops are cultivated and the grasslands situated, are polluted with heavy metals. Along with typomorphic elements (Mo, Cu) Hg, Cd and As were determined,
- the contents of heavy metals for crops growing on polluted sites and fresh milk of cows grazing there, are excessive vs. MAC, including elements of first-class danger,
- in most cases, concentrations of toxic elements (As, Cd, Pb, Cu, Ni) in the hair of children are excessive vs. the lowest and sometimes peak accepted levels.

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