Determination of several heavy metals in the soil of Kaspi Municipality village Metekhi and hydrochemical analysis of village Igoeti waters

Liza Chukhua, Nino Takaishvili, Bezhan Chankvetadze

liza.chukhua367@ens.tsu.edu.ge

Tbilisi State University, Faculty of Exact and Natural Sciences. Department of Physical and Analytical Chemistry
Ilia Chavchavadze Avenue 3, 0179, Tbilisi, Georgia

Water and soil are among the essential and unique natural resources. They have a primary importance for the development of every living organism that makes up the planetary environment. Mainly because of this, but many other reasons, it is highly relevant to conduct research on the said objects.

The purpose of our study was to determine a content several heavy metals, such as Cd, Pb, Zn, Cu, Ni. Mn and Fe in the five samples of Kaspi municipality village Metekhi with the use of microwave plasma atomic emission spectrometry. This method is widely used in agricultural, geochemical and environmental analysis [1]. Along with determining heavy metals in the soil samples, we also studied hydrochemical parameters HCO_3^-, Cl^-, SO_4^{2-}, Ca^{2+}, Mg^{2+}, Na^+, K^+, of several drinking waters of the Igoeti village.

The results indicate that soils in the village Metekhi have a pH value varying between 7.97-8.03. Hence, they are of alkaline nature. This result aligns with the complementary literature value (pH 7.6-8.1) [2]. In Metekhi soils, the concentration of Cd exceeds the maximal permissible value almost twice. The content of Pb, Zn, Ni, Cu and Mn fall within the permissible range. As for Fe, its highest content value does not exceed 3% (therefore, it is not higher than Clarke number, 0.02%-3.8%).

Along with the heavy metal determination in soils, the drinking water samples were also collected from Kaspi municipality village Igoeti: well water and tap water. These belong to the 2^{nd} class of waters, i.e hydrocarbonate Ca^{2+} type. Unlike tap water, the overall rigidity/salinity of well water is significantly higher (8 mg-eq/L) and exceeds maximal permissible concentration (7 mg-eq/L). Permanganometric oxidizability also exceeds the normal value by 1.24.

1. https://www.agilent.com/cs/library/applications/5991-7282EN_MP-AES-eBook.pdf
2. https://rustaveli.org.ge/geo/200916032128tsignebi/agroniadagmtsodneoba