

Evaluation of Health Risk Degree Arising from Heavy Metals Present in Drinking Water

Authors : Alma Shehu, Majlinda Vasjari, Sonila Duka, Loreta Vallja, Nevila Broli

Abstract : Humans consume drinking water from several sources, including tap water, bottled water, natural springs, filtered tap water, etc. The quality of drinking water is crucial for human survival given the fact that the consumption of contaminated drinking water is related to many diseases and deaths all over the world. This study represents the investigation of the quality and health risks of different types of drinking waters being consumed by the population in Albania, arising from heavy metals content. Investigated water included industrialized water, tap water, and spring water. In total, 20 samples were analyzed for the content of Pb, Cd, Cr, Ni, Cu, Fe, Zn, Al, and Mn. Determination of each metal concentration in selected samples was conducted by atomic absorption spectroscopy method with electrothermal atomization, GFAAS. Water quality was evaluated by comparing the obtained metals concentrations with the recommended maximum limits, according to the European Directive (98/83/EC) and Guidelines for Drinking Water Quality (WHO, 2017). Metal Index (MI) was used to assess the overall water quality due to heavy metals content. Health risk assessment was conducted based on the recommendations of the USEPA (1996), human health risk assessment, via ingestion. Results of this investigation showed that Al, Ni, Fe, and Cu were the metals found in higher concentrations while Cd exhibited the lowest concentration. Among the analyzed metals, Al (one sample) and Ni (in five samples) exceeded the maximum allowed limit. Based on the pollution metal index, it was concluded that the overall quality of Glina bottled water can be considered as toxic to humans, while the quality of bottled water (Trebeshina) was classified as moderately toxic. Values of health risk quotient (HQ) varied between 1×10^{-6} - 1.3×10^{-1} , following the order Ni > Cd > Pb > Cu > Al > Fe > Zn > Mn. All the values were lower than 1, which suggests that the analyzed samples exhibit no health risk for humans.

Keywords : drinking water, health risk assessment, heavy metals, pollution index

Conference Title : ICEEEB 2021 : International Conference on Environment, Ecology, Energy and Biotechnology

Conference Location : Athens, Greece

Conference Dates : April 08-09, 2021