



Radioactivity assessment of drinking water - a case study from a mixed bank filtered and karst water supply system

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In Hungary the drinking water supply is mainly based on groundwater from aquifers characterized by different lithology. According to the EURATOM drinking water directive, there are recent regulations in Hungary regarding the natural radioactivity of drinking waters. Based on this, if gross alpha or gross beta radiation exceeds the limit, nuclide-specific measurements are required to be performed by the relevant waterworks. Since the mobility of uranium and radium is strongly influenced by the geochemical conditions, knowledge on the geochemical parameters of water is required. Therefore hydrogeology has a crucial role in revealing the origin of elevated activity concentrations. This study is based on the hydrogeological and hydraulic approach of the wells with elevated natural radioactivity, because the different chemical characteristics of different order flow systems can affect the appearance of higher radioactivity. This research presents a case study in Hungary where the drinking water supply is provided by bank filtered and karst wells. In most of the wells of the research area the gross alpha values are above the limit, 0.1 Bq/l. The aim of this study to determine which radionuclides may cause the elevated radioactivity and explain their occurrence using the hydrogeological approach. All samples of the study were analysed for U-(234+238), Ra-226, Rn-222. Alpha spectrometry applied on Nucfilm discs was used to measure the uranium and radium activity while radon activity was determined by TriCarb 1000 TR liquid scintillation. The results of this study can help waterworks to understand the hydrogeological cause of radioactivity and to develop a method to reduce the high radioactivity below the limit in the consumed drinking water.

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