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ABSTRACTS**

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Physico-chemical characterization and tritium activity determination in spring waters

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The quality of drinking water should be monitored and analyzed with the aim of determination of water pollution and to minimize health hazards. From a radiological point of view, drinking water may contain natural and artificial radionuclides. One of the radionuclides that can occur in drinking water is tritium.

Tritium, as the only radioactive isotope of hydrogen, occurs naturally as a cosmogenic radioisotope in the stratosphere but also has an anthropogenic origin.

This study presents the results of some physico-chemical analysis and tritium activity determination carried out for natural water sources in the vicinity of Smederevska Palanka. Water samples from eleven natural water sources were analysed: (source “Veliki Sipovac” (Azanja), source “Pinosava” (Kusadak), source “Vrelo” (Glibovac), source “Vidovača” (Vodice), source “Mineral water” (Vodice), source “Mineral water” (Cerovac), source “Sveta Trojica” (Cerovac), source “Šiljakovac” (Ratari), source “Klis” (Golobok), source “Palanački Kiseljak” (Smederevska Palanka), source “Sveta Petka” (Smederevska Palanka)), in order to determine possible contamination, because the local population is supplied with drinking water from these springs.

Physico-chemical characterization was performed measuring pH, total dissolved solids (TDS) and conductivity. The pH values were measured using InoLab pH meter WTW with glass electrode SenTix 81. The conductivity of the samples was measured using Conductometer InoLab WTW Cond7110 at 20°C. TDS measurement was based on the weight of the solid residue remained after evaporation of 40 ml of sample and subsequent drying at 105°C.

For tritium activity determination samples were distilled and electrolytically enriched using direct current source SORENSON DCR60-B30. After electrolytic enrichment samples were measured by Ultra Low Level Liquid Scintillation Spectrometer Quantulus 1220.

Conductivity and pH were measured before and after distillation of water samples. Some of investigated waters are naturally acidic and measured values for pH and conductivity show different results for samples before and after distillation. TDS has a higher value for natural mineral waters.

In accordance with the legislation in the Republic of Serbia elevated tritium levels in water samples may indicate the presence of other artificial radionuclides. If tritium concentration exceeds allowed value, additional analysis is required. In that case it is necessary to perform gamma spectrometric analysis of the content of artificial radionuclides or analysis of ^{90}Sr . The permissible value of tritium in drinking water is 100 Bq/l. All analyzed waters in this study meet the legal regulations and from the radiation point of view can be used for drinking. The annual effective dose was calculated based on the tritium concentration in the investigated samples for different age groups. The obtained results are in accordance with legislation.

