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Water quality of groundwater source in Gacko polje - Croatia

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The groundwater source in Gacko polje is characterised by a high discharge rate and exceptional water quality, which was why this catchment area was proclaimed by the Water Management Strategy as one of the strategically important area of drinking water reserves of the Republic of Croatia. It is situated in the Dinaric karst area. The catchment area of groundwater source consists predominately of carbonates (limestones and dolomites) of Jurassic and Cretaceous age. The groundwater source includes four major springs (Tonkovića vrelo, Majerovo vrelo, Klanac and Pećina) and several small with different discharge rates. Due to strategic importance of research area, the Tonkovića vrelo, which is the largest spring and used for water supply of surrounding settlements and town Otočac, is included in the National monitoring network since 2000. Sampling is performed on a monthly basis. In the research area only agricultural production is present, which is of low intensity and based on dairy farming and potato production. According to the major ionic composition, the sampled water from Tonkovića vrelo belongs to Ca – HCO₃ type. Such hydrogeochemical type is consequence of dissolving of limestones and dolomites in the catchment area. The water temperature ranged from 8.8 to 11.3°C and pH varied from 7.1 to 7.7. Spring water is saturated with oxygen - dissolved oxygen values varied from 8.9 to 11.9 mg/L. The spring water is recharged by precipitation and the average deuterium excess showed the influence of Mediterranean climate especially during the winter months, but the major influence is of the continental climate. Because the influence of precipitation, microbiological indicators (E. Coli, coliforms, aerobic bacteria, faecal streptococci) after heavy rains are elevated. There is a settlement in the vicinity of the spring which does not have sewage system. Furthermore, microorganisms live in the underground fissures and voids and are considered to be flushed during heavy rains. Concentrations of Cu, Cd, Hg, Zn, Ni and Cr are below detection limit of instrument (DLI). Only concentrations of Fe and Mn were occasionally above DLI, ranging from DLI to 26 µg/L for Fe and from DLI to 5 µg/L for Mn. Concentrations of PCB are below DLI. The nutrient content in water samples was low too. The water quality from chemical point of view is exceptional, although from time to time microbiological indicators are elevated - especially after the heavy rains. The construction of sewage system would prevent the microbiological pollution. The water chemistry justified the decision that the research area is proclaimed as an area with strategically important reserves of drinking water in the Republic of Croatia.

