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ASSESSMENT OF GROUNDWATER QUALITY IN NW OF ROMANIA AND ITS SUITABILITY FOR DRINKING AND AGRICULTURAL PURPOSES

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Abstract

In the present study it was investigated the chemistry of groundwater and its suitability for drinking and irrigation purposes in several urban and rural areas from Cluj, Sălaj, Satu Mare and Alba counties (NW of Romania). In order to evaluate whether the samples are drinkable or not, water quality index (WQI) and daily intakes (DI) were calculated. Water suitability for irrigation was estimated based on specific indices as sodium adsorption ratio (SAR), sodium percentage (% Na) and residual sodium carbonate (RSC). Piper and Gibbs diagrams and chloro-alkaline indices were used to emphasize the hydrogeochemical features of the aquifers. Generally, the wells correspond to Ca – HCO₃ and Ca-Mg-Cl type. Based on the WQI values (10 - 152) a total of 24% of the investigated wells corresponds to an excellent quality status, 16% have a good quality status, 51% have a poor and very poor water quality, while 9% of the wells are unsuitable for drinking. The nitrate proved to be the main contaminant for the analysed wells, having values between 0.2 and 447.1 mg/L. For some samples the DI for NO₂⁻ (0.33 – 110.67 μg/day/kg bw) and NO₃⁻ (0.13 - 14.90 · 10³ μg/day/kg bw) exceeded the acceptable daily intake. The values of the specific indices SAR (0.1 – 3.6), Na% (1.9 – 58.4%) and RSC (-18.6 – 2.3), showed that all the wells can be safely used for irrigation purposes.

Keywords: aquifer hydrogeochemistry, groundwater quality, health risk assessment, Romania, WQI

Received: June, 2020; Revised final: December, 2020; Accepted: January, 2021; Published in final edited form: March, 2021

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