

## **Geochemical and Mineralogical Characteristics of the Thermal Mineral waters from Harsova, Romania**

C. SIMION<sup>1\*</sup>, D. DUMITRAS<sup>1</sup>, A. BALTRES<sup>1</sup>,  
D. PERSA<sup>1</sup> AND E. GHINESCU<sup>1</sup>

<sup>1</sup>Geological Institute of Romania, Caransebes 1, Bucharest,  
RO (\*correspondence: catalin.simion@usa.com)

Natural emergence of hypothermal waters on the right bank of the Danube River, between Harsova and Capidava are released along a system of deep fractures that affect Jurassic limestone deposits. The waters of springs reach temperatures up to 25.5°C. In the same area, the water in the boreholes reaches 52°C. Two kilometers north-west of Hârşova, at 400-500 m from the river bank, there are ascending, sulfurous springs, of 36-37°C, with gas emanations, while at Ostrovul Gâsca, to the west of the town, the artesian waters atop of the Jurassic limestones, under an alluvial deposit of 85 m thick, reached 45-52°C.

The local geology is represented by a basement that consists of Green Schists of Upper Proterozoic age made of green shales, feldspathic sandstones and quartz conglomerates, above which the Mesozoic sedimentary platform deposits are laying. The geothermal aquifer, which is hosted both in Jurassic limestones deposits and in the Danube aluvia, is studied since the seventies.

In 1979, based on data from the well F1, the exploitable resource was established by Conclusion 52-89 / 15 June 1979, for the substance 'chlorine and sulfurous thermal waters with temperatures of 23 - 42°C'. The extracted reserve is 432 cubic meters/day. The available reserve can be used as spa, for cure and recreation.

Despite its qualities proven through the analysis of 60 samples from wells, thermal mineral water remained untapped until 2018, when Harsova City Hall decided to start the procedures for its use in balneological purposes. This was the opportunity to carry out new research.

Beside the chemical analysis, mineralogical analyses of the rocks and of the precipitate resulted from evaporation of thermal mineral water were necessary in order to determine what is the influence of the substrate on the this water. The analysis methods that have been used are X-ray fluorescence, wet-chemical analysis, scanning electron microscopy (SEM), FTIR and X-ray powder diffraction.

The obtained data confirmed the influence of both the green schists and Jurassic limestones on the geothermal water.