Arsenic occurrence in Europe: emphasis in Greece and description of the applied full-scale treatment plants

Ioannis A. Katsoyiannis\textsuperscript{a,*}, Manasis Mitrakas\textsuperscript{b}, Anastasios I. Zouboulis\textsuperscript{a}

\textsuperscript{a}Department of Chemistry, Division of Chemical Technology, Aristotle University of Thessaloniki, University Campus, Thessaloniki 54124, Greece, Tel./Fax: +30 2310997794; email: katsogia@chem.auth.gr (I.A. Katsoyiannis)
\textsuperscript{b}Laboratory of Analytical Chemistry, Department of Chemical Engineering, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece

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\textbf{ABSTRACT}

The presence of arsenic in groundwater comprises a worldwide problem and is recognized as a human health threat. The present work summarizes the arsenic contamination in Europe, where many countries are affected by elevated arsenic concentrations (i.e. Greece, Hungary, Romania, Croatia, Serbia, Turkey, and Spain). In particular, in Greece, several groundwater resources contain arsenic at increased concentrations, which render these water sources as non-potable. Arsenic-affected regions in Greece are classified mainly in three categories, namely, the geothermal-affected waters, the alluvial deposits of rivers and aquifers, and those influenced by mineralization and are typically close to mining activities. In Greece, arsenic concentrations in geothermal waters vary from 30 to 4,500 μg/L, in the regions close to alluvial deposits from 15 to 100 μg/L and in areas affected by mining activities from 20 to 60 μg/L. Arsenic-removal plants have been installed in several towns in Greece. The applied removal technologies are mainly based on chemical precipitation with FeClSO\textsubscript{4} or adsorption onto iron oxide materials, such as Bayoxide, granular ferric hydroxide or AquAsZero. In the cases where As(III) is present, biological oxidation or ozonation is applied to convert As(III) to the less mobile forms of As(V). Specific arsenic removal capacity at an equilibrium concentration equal to the regulation limit of 10 μg/L was between 1.7 and 4.2 mg As/g of adsorbent for adsorption processes and between 18 and 59 mg As/g Fe for chemical precipitation.

\textbf{Keywords:} Arsenic; Europe; Greece; Removal

\*Corresponding author.

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