

# The Disinfection of Water by Microalloyed Aluminium-based Composite

Bojić A.<sup>1</sup>, Purenović M.<sup>1</sup>, Kocić B.<sup>2</sup>, Perović J.<sup>1</sup>, Ursić-Janković J.<sup>1</sup>, Bojić D.<sup>1</sup>

<sup>1</sup> Department of Chemistry, University of Niš, Niš

<sup>2</sup> Institute for Health Protection, University of Niš, Niš, Serbia

## Summary

*In the submitted paper the water disinfection capacity of the microalloyed aluminium based composite (MABC) was studied. MABC is material in the form of steel wire, plated with microalloyed aluminium. The effects of the composite are based on the very negative stationary potential of microalloyed aluminium, and its spontaneous dissolution in water with generation of Al(III) ions, and reduction of water with the generation of H<sub>2</sub> and OH<sup>-</sup> ions. As a final product of these reactions, a voluminous Al(OH)<sub>3</sub> precipitate is formed. Having in mind its great efficacy in purification of different waters from many chemical pollutants we made the following hypothesis: reduction characteristics of the MABC surface, presence of Al(III) and OH<sup>-</sup> ions, and coprecipitation on Al(OH)<sub>3</sub>, can be also toxic and destructive for bacteria in water. The experiments were carried out with the water model solutions (WMS) based on adapted natural surface water (NSW), inoculated with the Escherichia coli. All treatments were performed in the original semi-flow system (SFS), in which convection increases efficacy. The results show that approximately every 10 min the number of viable bacteria was reduced for about one log<sub>10</sub> count, with the complete disinfected water phase as the outcome of the treatment. At the end of the treatment, the Al(OH)<sub>3</sub> precipitate still contained a low amount of coprecipitated viable bacteria, which died within a relatively short period.*

**Key words:** microalloyed aluminium based composite, stationary potential, water model solution, Escherichia coli, semi-flow system, disinfection of water, toxicity, coprecipitation

**Address for correspondence:** A. Bojić, Department of Chemistry, Faculty of Mathematics and Natural Sciences, University of Niš, P.O. Box 224, 18 000 Niš, Serbia. E-mail: bojic@bankerinter.net