Environmental Engineering and Management Journal *January 2015, Vol.14, No. 1, 223-232*
http://omicron.ch.tuiasi.ro/EEMJ/

"Gheorghe Asachi" Technical University of Iasi, Romania

FORECASTING THE PRESENCE OF Ca^{2+} AND Mg^{2+} CATIONS IN MINERAL WATERS. A MODEL BASED ON FUZZY LOGIC

Alina Ștefanache[1*], Eduard Mihăilescu[2], Cătălina Stan[1]

[1]University of Medicine and Pharmacy "Grigore T. Popa" of Iași, No.16 University Street, Iași, Romania
[2]Faculty of Electronics, Telecommunications and Information Technology, "Gheorghe Asachi" Technical University of Iași, 67 Prof.dr.docent D. Mangeron Street, Iasi, Romania

Abstract

This paper aims to develop the theoretical framework and the applicative implementation of a new analysis method, which has the purpose of determining and classifying mineral waters in Romania and Europe, with the use of mathematical modelling and fuzzy logic. Firstly, the article underlines the properties of mineral waters in terms of curative effects, particularly the role of Ca^{2+} and Mg^{2+} upon the human metabolism. The values of these two chemical elements will constitute an index, a basis for creating a comparative database, which will embed a limited number of samples, with statistical value; in brief, a mathematical model that determines the mineral water spring (or springs) has been implemented, which in the same time illustrates graphically the membership degree of an unknown water sample to a specific spring, making use only of the Ca^{2+} and Mg^{2+} concentration indexes.

Key words: Ca^{2+} concentration, fuzzy logic, genetic algorithms, ionic stability, Mg^{2+} concentration, mineral water

Received: November, 2013; Revised final: September, 2014; Accepted: September, 2014

[*] Author to whom all correspondence should be addressed: e-mail: alina.stefanache@yahoo.com, stef.alina@yahoo.com; Phone: +40.232.301.799; Fax: +40.232.211.820