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INFLUENCE OF NON-IONIZING ELECTROMAGNETIC FIELDS ON REDOX SYSTEMS IN SOLUTIONS

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Abstract

This paper presents the experimental results obtained during testing in an electromagnetic field with non-ionizing radiations from low-intensity microwaves acting on a group of substances consisting of: double distilled water, neutralized to pH = 7; drinking water with pH = 7.3; slightly acidic aqueous solutions obtained by diluting the acetic acid at concentrations of 2.25‰, 4.5‰ and 9‰ in double distilled water, for pH = 6.8, 6.7 and 6.5, respectively. The exposure of the samples was performed in a resonance cavity at 700 MHz in successive periods from 10 seconds to 5 minutes. After each period the evolution of redox potential was determined. Three samples were taken for each experiment, with a volume of 2 mL/sample and initial temperatures of: 19 °C, 21 °C and 22 °C, which represent temperature variations of the ambient environment. Experimental diagrams were established for each sample, based on which related analytical functions describing the evolution rate of the redox potential were identified, which sowed that: (i) distilled water with neutral pH showed no significant influences during exposure; (ii) the redox potential in drinking water varies mainly due to temperature variation in the resonance cavity; (iii) The evolution of the redox potential variation is linear for samples containing water.
For weak acid solutions, the variation of the redox potential is determined both by the thermal effects in the resonance cavity, dominant in the first part of the exposure, as well as the effects of radiation, dominant in the last part of the exposure, the diagrams for the process being nonlinear.

Key words: electromagnetic field, polynomial fit, redox potential

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