

**MATHEMATICAL MODELLING OF THE WASTEWATER  
SLUDGE BEHAVIOUR AT THE TREATMENT WITH  
MICROWAVES**

— research paper —

MONICA MIRONESCU\*<sup>1</sup>, LETITIA OPREAN\*, ION DAN  
MIRONESCU\*\*

\* Department of Food Biotechnology

\*\* Department of Chemistry and Food Engineering

Faculty of Agricultural Sciences, Food Industry and Environmental  
Protection, “Lucian Blaga” University of Sibiu, Romania

**Abstract:** In this paper, sludge resulted from the wastewater treatment unit of Sibiu, Romania was investigated. Sludge was irradiated with 2450-MHz microwaves and the concentration of the organic volatile fraction was measured, as indicator of the sludge quality. Two series of experiments were realised: the first series of experiments was realised with microwaves at constant intensity (700 W) for different times (1, 2 and 3 minutes) and the second series of experiments at different intensities (140 W, 420 W and 700 W) for 1 minute. The results were used to build a mathematical model which describes the sludge behaviour as function of microwaves intensity and action time. The variation of the concentration of the volatile fraction of sludge treated with microwaves ( $C_v$ ) as function of the volatile fraction of the untreated sludge ( $C_0$ ) is  $C_v = \frac{C_0}{I^{0,02}} \cdot e^{(0,066-0,0138 \cdot t)}$  where  $I$  is the microwaves intensity and  $t$  is the duration of treatment.

**Keywords:** wastewater, sludge, model, microwaves

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<sup>1</sup> Corresponding author. Mailing address: University “Lucian Blaga” of Sibiu, Faculty of Agricultural Sciences, Food Industry and Environmental Protection, Str. I. Rațiu 7-9, 550012 Sibiu, Romania. Phone: 0040/269/211338. Fax: 0040269212558. E-mail address: [monica.mironescu@ulbsibiu.ro](mailto:monica.mironescu@ulbsibiu.ro)