

# BIOGAS PRODUCTION POTENTIAL AND KINETICS OF MICROWAVE PRE-TREATMENT OF FOOD INDUSTRIAL WASTEWATER

**Róbertné Kovács<sup>1</sup>, Gábor Keszthelyi-Szabó<sup>2</sup>, Péter Szendrő<sup>3</sup>**

<sup>1</sup>University of Szeged, Faculty of Engineering, Department of Technology, 9. Moszkvai krt. H-6725 Szeged, Hungary;

<sup>2</sup>University of Szeged, Faculty of Engineering, Department of Process Engineering, 9. Moszkvai krt. H-6725 Szeged, Hungary

<sup>3</sup>Szent István University, Faculty of Mechanical Engineering, Institute of Mechanics and Machinery, 1. Páter K. u., H-2100, Gödöllő, Hungary  
*veszelov@mk.u-szeged.hu*

## **Abstract**

In today's energy demanding life style, when fossil fuels are gradually depleting in addition to rising costs and instability in the major producer countries, there is always a need for exploring and exploiting new sources of energy which are renewable as well as eco-friendly.

Renewable energy has become one of the best alternatives for sustainable energy development. Among renewable energy sources, biomass as a primary energy source has the highest potential in Hungary. Organic waste produced by agriculture, food industry or any other area of the economy can not only be converted to renewable energy source but can also be disposed of during this process. In addition, the waste can be disposed of an alternative source of water in areas where there is no need to use drinking water.

Although anaerobic digestion is widely used to stabilize organic waste, pre-treatment technologies are gaining acceptance. The overall anaerobic degradation of organic waste is generally limited by the hydrolysis rate of organic suspended matter. Improving the steps of hydrolysis with different pretreatment methods allows the availability of solid substrates for anaerobic bacteria, accelerating digestion and increasing the amount of biogas generated.

In this study effect of microwave pre-treatment on the anaerobic degradation of meat industrial wastewater was evaluated through the calculation of performance parameters by using simplified mathematical models. The models were all used with experimental data from the anaerobic biodegradability tests fed with microwave pre-treated wastewater. Experiments indicated that pre-treated samples gave higher yield of biogas compared to non-pretreated one.

*Key words: wastewater, anaerobic digestion, kinetic model*