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**ABSTRACT SAMPLE - MICROWAVE PRE-TREATMENTS FOR ENHANCED BIODEGRADABILITY OF MUNICIPAL SLUDGE**

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**Abstract**

An increasing number of studies has been focused on the investigation of sludge treatment by microwave irradiation alone or combined with chemical methods. Besides the promising results for municipal sludge processing, the applicability of microwave (MW) pre-treatment methods is less evaluated and verified for food industry sludge, especially in continuous-flow operations. Determination of dielectric constant and its change during wastewater and sludge processing make possible to decide on the applicability of dielectric measurements for detecting the organic matter removal efficiency of wastewater purification process or disintegration degree of sludge.

Therefore, our work is aimed at the investigation of microwave–alkaline treatment for meat processing sludge using disintegration degree (DD) and aerobic biodegradation index (BDI) as control parameters.

Our results verified that irradiated microwave energy, calculated from microwave power and flow rate applied during continuous flow microwave process, and alkaline dosage also have a significant effect on disintegration degree and aerobic biodegradability. MW pre-treatments increased the organic matter solubility and the biodegradability of sludge, but the worsening effect of microwave power intensity, over a certain value of irradiated energy was also experienced. Results from response surface modelling and optimization show that the optimal condition for MW process for highest biodegradability with minimum energy demand was determined at 420 kJ of irradiated energy and at 2.2 Wg-1 of specific microwave power intensity.

It can be concluded that disintegration process of food industry sludge can be detected by dielectric constant measurements. From technical purposes the applicability of dielectric measurements was tested in the purification process of municipal wastewater, as well. Determination of dielectric behaviour was a sensitive method to detect the purification degree of municipal wastewater.

*Key words: microwave, sludge, biodegradability, biogas*

*Acknowledgements: The authors are thankful for the financial support provided by the National Research, Development and Innovation Office under project number X21568.*