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## **MICROWAVE ENHANCED BIODEGRADABILITY OF MEAT PROCESSING WASTEWATER SLUDGE**

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### **Abstract**

Studies about microwave (MW) sludge conditioning method have dealt mainly with municipal secondary sludge processing. We considered necessary to examine the applicability of the microwave process for other type of sludge, such as primary sludge originating from the food industry. The aim of our work is to identify the main influential operating parameters of MW pre-treatments applied for primary meat processing wastewater sludge (MPWS) as a conditioning process, followed by their optimization for ensuring enhanced biodegradability. The investigated process parameters, namely, irradiated microwave energy (IMWE) and specific microwave power level (MWPL) were examined in the range of 90-1050 kJ, and 0.5-5 Wg<sup>-1</sup> respectively. They had a significant effect on the solubilization index (SLI) and biodegradation index (BDI). MW pre-treatments increased the organic matter solubility and the biodegradability of sludge, but the worsening effect of high intensity irradiation, over a certain value of IMWE was also experienced. Results from response surface modeling and optimization show that the optimal conditions for ensuring highest biodegradability of MPWS with minimum energy demand was determined as being 621 kJ of IMWE and 2.6 Wg<sup>-1</sup> of MWPL. Applying the optimized process parameters for conditioning of MPWS, SLI increased 5 fold, while BDI increased 3 fold, respectively.

*Key words:* biodegradability, microwave, pre-treatment, wastewater sludge

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