



INTENSIFICATION AND MONITORING OF ANAEROBIC FERMENTATION OF SEWAGE SLUDGE FROM THE MEAT INDUSTRY

Zsófia Gréta Sánta¹, Balázs Lemmer², Zoltán Péter Jákói¹

¹Department of Biosystems Engineering, Faculty of Engineering, University of Szeged, Moszkvai krt.
9, H-6725 Szeged, Hungary

²Department of Food Engineering, Faculty of Engineering, University of Szeged, Moszkvai krt. 5-7,
H-6725 Szeged, Hungary
e-mail: zsofiasanta71@gmail.com

ABSTRACT

As the global economy is growing, the quantity of industrial wastewater is also increasing. Hence, research of modern wastewater and sewage sludge treatment technologies is necessary. One promising approach involves utilizing sewage sludge as feedstock for anaerobic fermentation to produce biogas, a renewable energy source. The food industry (especially the meat industry) is one of those industries that produce the most biodegradable effluents. Although sewage sludge from the meat industry is not optimal for biogas production, its properties can be improved with adequate pretreatments. Our goal was to investigate the effects of microwave irradiation in the presence of magnetite nanoparticles as pretreatment on the quantity of biogas produced via anaerobic digestion. During fermentation, we monitored the process by tracking the dielectric properties of the sludge samples. Results clearly demonstrate the positive effects of the chosen pretreatments on biogas production during fermentation. While the methane content of the produced biogas remained unaffected (as confirmed by gas chromatography), the microwave treatment in the presence of magnetite nanoparticles significantly increased gas production, without compromising quality.

Keywords: meat industry, sewage sludge, waste water, microwave treatment, dielectric properties