POTENTIAL APPLICATIONS OF MONITORING METHODS BASED ON DIELECTRIC BEHAVIOUR IN WASTEWATER AND SLUDGE TREATMENT AND UTILIZATION PROCESSES

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ABSTRACT

In the treatment of wastewater and sludge, meeting the challenges of circular economy principles, there is nowadays an increasing emphasis on recovery as a complete material stream or on the recovery of selected components.

Dielectric parameters can be used to monitor changes in the composition, structure and biodegradability of wastewater and sludge, but there is just few experiences in this area. We have measured the dielectric constant and dielectric loss factor in the frequency range 200-2400 MHz (Speag DAK3.5 sensor) for municipal and industrial wastewater and sludge.

Our research results have demonstrated that organic matter removal (11-88% COD removal) can be monitored in two-stage (mechanical and biological) municipal wastewater treatment technology by the dielectric constant measurement. For meat industry wastewater the organic matter removal efficiency (in the range of 8-44%) when using Fenton reaction correlated with the dielectric loss tangent.

Furthermore, the disintegration degree, aerobic biodegradation index and biotransformation efficiency in anaerobic digestion process can be monitored by the dielectric constant and loss factor measured at the frequency range of 200-600 MHz.

Keywords: sludge, wastewater, dielectric parameters

Acknowledgements: The research is supported by Bolyai János Research Scholarship (BO/00161/21/4), NKFIH (OTKA FK 146344) and the New National Excellence Program (23-3-SZTE-246 and ÚNKP-23-5-SZTE-668).