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IMPROVING BIOGAS YIELD FROM MEAT PROCESSING WASTEWATER VIA MAGNETITE NANOPARTICLES AND MICROWAVE TREATMENT

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Abstract

Anaerobic digestion of meat industry wastewater was enhanced by magnetite nanoparticles and microwave irradiation at varied power levels. The fermentation was monitored using dielectric property measurements, revealing a clear correlation between decreasing dielectric constant values and the progression of digestion. Pretreatments significantly increased biogas yield, with methane content remaining stable. Microwave irradiation at 250 W with magnetite was optimal, likely due to longer treatment time leading to more uniform effects and a shorter lag phase. This approach enables earlier and more efficient microbial adaptation, offering industrial-scale energy savings. Dielectric measurements proved to be a reliable, non-destructive method for real-time fermentation monitoring.

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