Special Issue

Anaerobic Digestion Under Extreme Conditions: Advances in Process Resilience and Bioresource Recovery

Message from the Guest Editors

Anaerobic digestion (AD) is a biological process for the conversion of organic waste to renewable energy and digestate. The escalating demand for sustainable waste management strategies and renewable energy generation has prompted the need to advance technologies that can maintain efficient AD performance, even under challenging operating conditions. This Special Issue focuses on innovations that support the productivity, resilience and stability of AD systems exposed to conditions such as elevated total solids content, temperature extremes, salinity, elevated organic loading rates, ammonia inhibition, pH fluctuations, and the accumulation of inhibitory compounds.

We invite original research articles, reviews, and perspectives addressing strategies to optimize AD performance under these diverse challenging conditions. Topics of interest include, but are not limited to, dry AD, psychrophilic and thermophilic AD processes, microbial community adaptation to extreme AD conditions, extremophilic and syntrophic microbial interactions, bioaugmentation strategies, process-enhancing additives, reactor engineering and design, substrate pretreatment technologies, co-digestion strategies as well as process monitoring and modelling.

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