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Improved efficiency of anaerobic digestion through direct interspecies electron transfer at mesophilic and thermophilic temperature ranges

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Abstract

Direct interspecies electron transfer (DIET) in microbial communities plays a significant role in improving efficiency of biomethane production from anaerobic digestion. In this study, the impacts of conductive graphene on mesophilic and thermophilic anaerobic digestion (MAD and TAD) were comparatively assessed using the model substrate ethanol. The maximum electron transfer flux for graphene-based DIET was calculated at mesophilic and thermophilic temperatures (35 °C and 55 °C).

Biomethane potential results showed that the addition of graphene (1.0 g/L) significantly enhanced biomethane production rates by 25.0% in MAD and 26.4% in TAD. The increased biomethane

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