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Optimization of Anaerobic Co-digestion of Multiple Feedstocks for Biomethane Recovery

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Abstract

Anaerobic co-digestion of organic waste has been a promising technology for contributing to waste minimization, biogas recovery, and greenhouse gas reduction. The proper operation of this technology requires optimization of different parameters such as suitable feedstocks selection and their proper mixing ratios. This research was aimed to investigate the influence of mixing ratios of the feedstocks and lipids: proteins: carbohydrates ratios on biomethane production in batch anaerobic co-digestion of thickened waste activated sludge (TWAS), manure and source separated organics (SSO) under mesophilic condition. The results showed that the maximum methane yield was 356 mL CH4/g CODadded corresponding to TWAS: manure: SSO mixing ratio of 2:4:4 and lipids: proteins: carbohydrate ratio of 1: 3.5: 18.5. In comparison, 134, 299, and 332 mL CH4/g CODadded were obtained by mono digestion of TWAS, manure, and SSO. The trend of the methane yield variations in response to the COD: N and to the lipids: proteins ratios relatively conform to each other excluding some of the ratios. On the contrary, the methane yields demonstrated different responses to the ratios of lipids: carbohydrates and proteins: carbohydrates compared to COD: N ratios. Synergistic effect increased the methane yield by 19% in co-digestion of TWAS/manure/SSO

Biography

Annahita Rabii has completed her PhD in civil engineering in environmental stream from Ryerson University, Canada. She is president of Water Environment Assosiation of Ontario (WEAO)- Ryerson Chapterr. Anahita's area of interest includes, municipal and industrial wastewater treatment, anaerobic digestion, and municipal solid waste management. Her professional work experience includes both industry and academia.