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CAN DISINTEGRATION BASED ON COD (DD_{COD}) REPRESENT THE BIODEGRADABILITY OF DISINTEGRATED SLUDGE?

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Abstract

The research presented in this paper aimed to investigate the relationship between sludge anaerobic biodegradability and degree of sludge disintegration based on COD (DD_{COD}) in a wide range from 0 to 66.7%. Sonication as an advanced sludge pretreatment was used to disintegrate sludge. Meanwhile, biogas production in the anaerobic digestion process was used to present the sludge biodegradability. The performances of anaerobic digestion for pretreated sludge at different degrees of disintegration (DD_{COD}) were examined. Results show that the anaerobic biodegradability of the pretreated sludge displayed a stepwise appearance as the DD_{COD} increased in the range of 0 to 66.7%. The gas production increased with the increase of DD_{COD} at lower range of 0-15.2%, and then was in a platform stage when the DD_{COD} was in the range of 15.2%-38%. With the further increase of DD_{COD} at 46.6%, the gas production increased obviously, and finally another platform stage appeared when DD_{COD} reached up to 61.2%. Sludge sonication increased both the early stage biogas production and the ratio of early stage biogas production against total production. The increase of VS reduction in the anaerobic digester was not proportional to the degree of sludge disintegration. Disintegrated sludge facilitated the quick start of sludge anaerobic digestion progress.

Key words: anaerobic processes, biodegradation, sludge treatment, sonication

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