Anaerobic digestion of waste activated sludge—comparison of thermal pretreatments with thermal inter-stage treatments - DTU Orbit (24/12/2018)

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BACKGROUND: Treatment methods for improved anaerobic digestion (AD) of waste activated sludge were evaluated. Pretreatments at moderate thermal (water bath at 80 °C), high thermal (loop autoclave at 130–170 °C) and thermo-chemical (170 °C/pH 10) conditions prior to AD in batch vials (40 days/37 °C) were compared with inter-stage treatments under the same conditions carried out between two separate steps of AD (19–21 days/37 °C). Combined treatment at 80 °C with CO2/ NH3-stripping was also evaluated. RESULTS: Pretreatment at 80 °C had no effect on methane yield while inter-stage treatment gave a 20% increase, compared with controls. Combining inter-stage treatment with CO2/ NH3-stripping gave an increase in pH (7.1 to 9.3), a drop in ammonia-N concentration (910 mg-N to 510 mg-N) and a methane yield improvement of 31%. Pretreatment at 130 °C, 170 °C and 170 °C/pH 10 considerably increased the methane production within the first 4 days but the improvement following 40 days of digestion was only 13%, 9% and 2%, respectively. In comparison, inter-stage treatment led to improvements of 9% (130 °C), 29% (170 °C) and 28% (170 °C/pH 10). All treatment processes increased sludge solubilization. CONCLUSION: Thermal treatment of waste activated sludge for improved anaerobic digestion seems more effective when applied as an inter-stage treatment rather than a pretreatment. Copyright © 2010 Society of Chemical Industry
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