Biochemical methane potential of kraft bleaching effluent and codigestion with other in-mill streams - DTU Orbit (08/11/2017)

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A biochemical methane potential assay was conducted to investigate the anaerobic digestibility of bleaching effluent from hardwood kraft pulping and the potential of codigestion with other effluents from an integrated pulp and paper mill. Four in-mill streams were tested individually and in combination: total bleaching effluent, alkaline bleaching effluent, kraft evaporator condensate, and chemithermomechanical pulping effluent. The total bleaching effluent, consisting of the chlorine dioxide bleaching and alkaline bleaching effluents, exhibited the highest potential for organic matter degradation and methane generation. Chemical oxygen demand (COD) removal ranged from 57%-76%, and methane generation was 220-280 mL/g COD contained in the wastewater, depending on the degree of dilution. When codigestion was tested, the composite consisting of total bleaching effluent, chemithermomechanical pulping effluent, and kraft condensate was most efficient in terms of COD removal (51%) and methane generation (200 mL/g COD contained in the wastewater). The total bleaching effluent is the largest contributor to the overall amount of wastewater at this mill; it contains relatively low concentrations of anaerobic inhibitors such as adsorbable organic halogens (36 mg/L), total sulfur (170 mg/L), and resin and fatty acids (3.2 mg/L). Therefore, the total bleaching effluent from hardwood kraft pulping may be considered for full-scale anaerobic wastewater treatment, either as a singular stream or as part of a composite stream including other in-mill effluents.

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