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Use of tannery wastewater as an alternative substrate and a pre-treatment medium for biogas production

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Abstract

This study investigated biogas production as an alternative treatment of tannery wastewater (TWW) and its use as a pre-treatment medium to increase CH_4 yield from anaerobic digestion (AD) of wheat straw. The TWW had high levels of sulfate and chloride, so biochemical CH_4 potential could be estimated only when the TWW was diluted. Untreated straw yielded 255 NL CH_4 (kg VS)$^{-1}$, whereas straw that had been pre-treated with TWW yielded 314 NL CH_4 (kg VS)$^{-1}$ (35% increase). Treatment of TWW by AD with a co-substrate might be possible using a controlled feedstock mixing ratio. Use of TWW as a pre-treatment medium by simple co-storage before AD would be beneficial as an inexpensive treatment of lignocellulosic biomass.

Keywords

Tannery wastewater; Sulfide inhibition; Wheat straw; Anaerobic digestion; Lignocellulose.