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H2 Production and Treatment of Cake Wastewater Industry via Up-Flow Anaerobic Staged Reactor

Authors : Manal A. Mohsen, Ahmed Tawfik

Abstract : Hydrogen production from cake wastewater by anaerobic dark fermentation via upflow anaerobic staged reactor (UASR) was investigated in this study. The reactor was continuously operated for four months at constant hydraulic retention time (HRT) of 21.57 hr, PH value of 6 ± 0.6, temperature of 21.1°C, and organic loading rate of 2.43 gCOD/l.d. The hydrogen production was 5.7 l H₂/d and the hydrogen yield was 134.8 ml H₂ /g COD_{removed}. The system showed an overall removal efficiency of TCOD, TBOD, TSS, TKN, and Carbohydrates of 40 ± 13%, 59 ± 18%, 84 ± 17%, 28 ± 27%, and 85 ± 15% respectively during the long term operation period. Based on the available results, the system is not sufficient for the effective treatment of cake wastewater, and the effluent quality of UASR is not complying for discharge into sewerage network, therefore a post treatment is needed (not covered in this study).

Keywords : cake wastewater industry, chemical oxygen demand (COD), hydrogen production, up-flow anaerobic staged reactor (UASR)
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