Start-up test on anaerobic sequencing batch biofilm reactor treating mustard tuber wastewater of the Three Gorges Reservoir in China

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Received 29 April 2013; Accepted 26 November 2013

ABSTRACT

Mustard tuber wastewater is characterized by high salinity and high organics concentration that is potentially detrimental to the biological treatment systems and accordingly affects the treatment efficacy. The start-up test of anaerobic sequencing batch biofilm reactor aimed at sorting out the bacteria that were adaptive to the wastewater with high salinity by gradient increase in the influent salinity to enhance the treatment efficiency and deciding the optimal acclimation condition. The results showed that the chemical oxygen demand removal rate, gas production rate, and dehydrogenase content of the reactor increased by 8.89, 500, and 200%, respectively, when the system reached the stable state, indicating that both the quantity and the quality of the inoculated anaerobic sludge have been improved through acclimation. Besides, four parallel reactors inoculated with anaerobic sludge at four different acclimation periods (1 month, 2 months, 6 months, and 10 months, respectively) were setup to determine the influence of the length of acclimation period on treatment efficiency. The results revealed that the acclimation period with six months was optimum. Besides, the methane production, which was estimated to around 57.5 million m³, was a considerable part of resources that cannot be ignored.

Keywords: ASBBR reactor; Acclimation; Anaerobic sludge; Saline wastewater; The three Gorges Reservoir

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