Salt inhibition on anaerobic treatment of high salinity wastewater by upflow anaerobic sludge blanket (UASB) reactor

Sibel Aslan*, Nusret Şekerdağ

Faculty of Engineering, Department of Environmental Engineering, Fırat University, Elazığ 23119, Turkey, Tel. +90 424 2370000 5622; Fax: +90 424 2415526; email: sibela@firat.edu.tr (S. Aslan), Tel. +90 424 2370000 5607; Fax: +90 424 2415526; email: nusretsekerdag@firat.edu.tr (N. Şekerdağ)

Received 24 September 2014; Accepted 29 May 2015

ABSTRACT

The adverse effects of salt concentration on anaerobic treatment of synthetic high salinity wastewater were investigated using four lab-scale upflow anaerobic sludge blanket reactors at different salt (NaCl) concentrations. The reactors were inoculated with granular sludge previously not adapted to salinity, and they were fed with synthetic wastewater containing the salt concentrations of 0, 10, 25, and 50 g L⁻¹ NaCl. Hydraulic retention time and organic loading rate were kept constant at 1 d and 2 kg chemical oxygen demand (COD) m⁻³ d⁻¹, respectively. Salt inhibition on the COD removal rate and efficiency, methane production were determined. COD removal rate and efficiency significantly decreased when the salt concentration in the feed increased to 50 g L⁻¹ from 0. The maximum COD removal was obtained at salt concentration of 10 g L⁻¹.

Keywords: Anaerobic treatment; UASB; High salinity; NaCl; Inhibition