

The influence and mechanism of influent pH on anaerobic co-digestion of sewage sludge and printing and dyeing wastewater

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Abstract

Two pilot-scale activated sludge systems consisting of an anaerobic baffled reactor (ABR) and an aerobic plug flow reactor (PFR) were operated with the aim of minimising excess sludge output of the activated sludge process through coupled alkaline hydrolysis and anaerobic digestion. Variations in the effluent of total chemical oxygen demand (TCOD), $\text{NH}_4^+\text{-N}$ and TP concentration proved that the recirculation ratio of aerobic excess biomass recirculated to ABR could obtain 60% of theoretically total aerobic excess sludge production, under aerobic conditions with effluent TCOD concentration well below the discharge limit of 150 mg/l. After hydrochloric acid addition in the influent to neutralise high influent pH, the solubilisation of alkaline hydrolysis was obviously damaged and the effluent concentrations exceeded the discharging limit. High influent pH could promote the reduction efficiency of excess sludge production during co-digestion of printing and dyeing wastewater and sewage sludge. A possible mechanism of influent pH acting on anaerobic co-digestion was put forward.

Keywords: alkaline hydrolysis, anaerobic co-digestion, influent pH, printing and dyeing wastewater, sludge