Post treatment of palm oil mill effluent (POME) using combined persulphate with hydrogen peroxide ($S_2O_8^{2-}/H_2O_2$) oxidation

Chia Ken Lin, Mohammed J. K. Bashir, Salem S. Abu Amr, Lan Ching Sim

Abstract

The aim of the current study is to evaluate the effectiveness of combined persulphate with hydrogen peroxide ($S_2O_8^{2-}/H_2O_2$) oxidation as a post treatment of biologically treated POME (BIOTPOME) for the first time in literature. The removal efficiencies of COD, ammoniacal nitrogen (NH_3–N), and suspended solids (SS) were 36.8%, 47.6%, and 90.6%, respectively, by $S_2O_8^{2-}$ oxidation alone under certain operation conditions (i.e., $S_2O_8^{2-}$ = 0.82 g, pH 11, and contact time 20 min). Nevertheless, the combined process ($S_2O_8^{2-}/H_2O_2$) achieved 75.8% and 87.1% of NH_3–N, and SS removals, respectively, under 2.45/1.63 g/g $H_2O_2/S_2O_8^{2-}$, pH 11, and 20 min oxidation. Moreover, 56.9 of COD was removed at 56.9% at pH 8.4.