Fecal coliform removal from the effluent of UASB reactor through diffused aeration

Abid Ali Khan\textsuperscript{a,}\textsuperscript{*}, Rubia Zahid Gaur\textsuperscript{a}, Vinay Kumar Tyagi\textsuperscript{a}, Beni Lew\textsuperscript{b}, Vasileios Diamantis\textsuperscript{b}, Absar Ahmad Kazmi\textsuperscript{a}, Indu Mehrotra\textsuperscript{a}

\textsuperscript{a}Department of Civil Engineering, Indian Institute of Technology, Roorkee, India
Tel. +91-9760211192; email: dee.abid@gmail.com
\textsuperscript{b}The Volcani Center, Institute of Agriculture Engineering, Bet Dagan, 50250, Israel
\textsuperscript{c}Department of Environmental Engineering, Democritus University of Thrace, Xanthi, Greece

Received 16 December 2010; Accepted 13 September 2011

ABSTRACT

Although UASB systems treating municipal wastewater generally remove fecal coliform (FC) by ~ one order of magnitude, the effluent still contains concentrations higher than the WHO standard for unrestricted irrigation. In this study, the effect of continuous diffused aeration on the removal of FC was examined. The diffused aeration system was operated at different hydraulic retention times (60, 30 and 15 min) and dissolved oxygen (DO) concentrations (5−6 and 1−2 mg/l). The removal of FC was affected by the applied HRT and DO. Optimum results were obtained at HRT and DO equal to 60 min and 5–6 mg/l respectively, with FC removal of approximately 2 log (97%). The mechanisms responsible for FC die-off were the pH and oxidation reduction potential (ORP) of the medium.

Keywords: Diffused aeration; Municipal wastewater; Dissolved oxygen; ORP; Fecal coliform removal; UASB