

Patel, Ajay, MEng, “Wastewater treatment through biological nutrient removal using liquid-solid circulating fluidized bed”, The University of Western Ontario, July 2005 (co-supervised, with G. Nakhla)..

Abstract

This research work addresses the performance of a novel fixed film system, which uses a circulating fluidized bed bioreactor (CFBB) having two beds, the anoxic and aerobic, employing lava rock as a carrier media for the biological nutrient removal (BNR) from synthetic and real municipal wastewater at an HRT of 2 hrs. The system achieved excellent treatment efficiency producing BOD, COD, TKN and Phosphorus (P) less than 6, 20, 1.4 and 1 mg/L with municipal wastewater. The system observed biomass yield averaged at 0.13 g VSS/g COD at SRT of 50 days.

The detachment of multispecies biofilm was studied by determining the detachment rate coefficients of the generic and specific microbial species. The biological phosphorous removal (bio-P) mechanism was investigated in batch tests performed on the different sludges and the effect of various parameters on the bio-P kinetics was analyzed. The feasibility of the CFBB performance was checked at the varying influent flow rate and ammonia concentration in the dynamic stress study.