

August 20-21, 2018
Amsterdam, Netherlands

Expert Opin Environ Biol 2018 Volume: 6
DOI: 10.4172/2325-9655-C2-021

NUTRIENT REMOVAL EFFICIENCY OF A²O WASTEWATER TREATMENT SYSTEM AT VARYING CONDITIONS OF HYDRAULIC RETENTION TIME

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This study aimed at analyzing the nutrient removal efficiency corresponding to the variations in hydraulic retention time (HRT) using Anaerobic-Anoxic-Aerobic (A²O) process as advanced wastewater treatment system. The process was optimized for maximum removal of organic matter in the influent in meeting growing stringent quality standards of wastewater discharge. BOD₅/TKN ratio was recorded at 2.8 that suggested at lower value than the general single step nitrification process. A minimum target of 90% BOD₅ removal efficiency was achieved at all conditions of HRT. No big difference in BOD₅ removal was recorded at varying HRT, however, the rate was increased as F/M ratio was decreased depending on an extended HRT conditions. As the TN removal was concerned, it was reduced with decreasing HRT value. Nitrification rate was found increased along with increasing NH₄-N loading rate; however, nitrification rate was decreased by reducing HRT at identical loading rate. A high value of BOD₅/P ratio recorded in the experiment suggested an enhanced denitrogenation and phosphorous uptake ability by micro algae. Therefore, it is concluded that HRT and concentration of total dissolved solid (TDS) including ammonia nitrogen and total phosphorous have no influence on the removal rate of organic fraction but partly affects the adaptation period of microorganism in the system.

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