ABSTRACT

For the purpose of achieving relatively high efficiency, low energy demands, and easy maintenance for nutrient removal, the performance of a pilot-scale biological nutrient removal process consisting of anaerobic baffled reactor and membrane bioreactor has been evaluated for 301 d in treating two kinds of raw wastewaters. The results showed that the process enabled a relatively stable and high performance in both organics and nutrient removals, and high quality effluent was achieved under temperature of 25 ± 5˚C. When the ambient temperature were 10 ± 5 and 35 ± 5˚C, average COD, NH₄⁺-N, TN, and TP removal efficiencies of both kinds wastewaters were more than 88, 87, 70, and 75%, respectively. Analysis of the results by fluorescence in situ hybridization showed that ammonia-oxidizing bacteria, nitrite-oxidizing bacteria, and phosphorus-accumulating organisms were always the enriched micro-organisms in the process during the change of temperature, ensuring the efficient nutrient removal under ambient environment with low energy exhaustion.

Keywords: ABR; Community analysis; MBR; Temperature; Domestic sewage; Nutrient removal