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EFFECT OF INFLUENT C/N AND C/P RATIOS ON NUTRIENTS REMOVAL INVESTIGATED VIA CHEMICAL AND MICROBIAL ANALYSES IN A NOVEL BNR-IC PROCESS

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Abstract

This work describes the variations in nitrogen (N) and phosphorus (P) removal performances and bacterial population dynamics in response to different influent C/N and C/P ratios in a novel BNR-IC process combining biological nutrients removal (BNR) with induced crystallization (IC). A good nutrients removal performance was achieved at 7.8 of C/N ratio and 23.3 of C/P ratio, where P and TN removal efficiencies were 94.0±2.4% and 90.5±4.3%, respectively. Moreover, significant changes of microbial community structure were found with the variations of influent C/N and C/P ratios. Increasing influent C/N and C/P ratios favored the development of DPAO, thus enhancing the TN and P removal efficiencies and causing a decrease in microbial community biodiversity. However, excessive P load in the influent strongly influenced the P removal performance when C/N ratio was maintained at appropriate levels. PCR-DGGE showed that microbial populations in sampled sludge were classified into five different phylum or class (*Alpha-*, *Beta-*, and *Gammaproteobacteria*, as well as *Firmicutes*, *Actinobacteria*).

Keywords: denitrifying polyphosphate accumulating organisms, enhanced biological phosphorus removal, nutrients removal, polymerase chain reaction-denaturing gradient gel electrophoresis, wastewater treatment

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