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## INCREASING ROLE OF MICROORGANISM WITH UBIQUINONE-9 IN DENITRIFYING PAO SLUDGE

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### Abstract

An anaerobic-aerobic (An-Ox) sequencing batch reactor (SBR) was operated for the growth of phosphate accumulating organisms (PAOs), while an anaerobic-anoxic (An-Ax) SBR was used for the growth of denitrifying PAOs (dPAOs). Both reactors exhibited successful enhanced biological phosphorous removal (EBPR) performance. The sludge P contents in the two reactors increased from approximately 2% at the beginning of the operation to 9.1% (An-Ox SBR) and 7.3% (An-Ax SBR) after 140 d. The results of the quinone profile analysis demonstrated that the proportions of UQ-8, UQ-10, and MK-8 (H<sub>4</sub>) in the An-Ox sludge increased compared to the beginning of the operation, whereas in the An-Ax sludge, the proportion of UQ-8 was the highest and exhibited the greatest increase, and the mole fraction of UQ-9 more than doubled from 8.3% to 16.9%. Thus, the role of microorganisms with UQ-8 and UQ-9 was found to have significantly increased in the An-Ax sludge. As a result of microbial identification through the fatty acid methyl ester (FAME) analysis, *Comamonas testosteroni* and *Pseudomonas alcaligenes*, which produce the UQ-9 in the An-Ax sludge, as well as *Psychrobacter immobilis*, which produces UQ-8.

**Keywords:** denitrifying phosphorus accumulating organism, fatty acid methyl ester, phosphorus accumulating organism, quinone profile

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