Nitrogen removal was studied in a pilot-scale anaerobic–anoxic–oxic (AAO) system that was bioaugmented with nitrifiers cultivated from reject water after seasonal deterioration. The process of nitrogen removal was evaluated with increased temperature from 11 to 24°C. Nitrification efficiency rapidly recovered with increased temperature from 12 to 15°C, and the nitrification rates at 18°C were 3.1 times that at 12°C, higher than the report in ASM1. Bioaugmentation may shorten the recovery time of nitrification activity in WWTPs. The nitrification activity and microbial ecology of the full-scale system operating parallel with the pilot-scale were correspondingly studied, and similar community structures were observed. Despite the lower nitrifying bacteria count, the nitrification activity of the bioaugmented pilot-scale plant was still higher than that of the full-scale one.

Keywords: Bioaugmentation; Nitrification; Seasonal deterioration; Nitrifying activity; Community structure