MEMBRANE ELECTRO-BIOREACTOR (MEBR) ACHIEVES HIGH NITRIFICATION RATES

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ABSTRACT

The performance of any nitrifying wastewater treatment processes are closely linked to the microbial community structure and dynamics. In this work, the effects of low-intermittent DC electrical field on the change of nitrifying community structure and process performance were examined. Microbial populations and dynamics were characterized using fluorescent *in situ* hybridization (FISH) technique. The results demonstrated that submerged membrane electro-bioreactor (SMEBR) system achieved substantial nitrification rates comparing to conventional MBR system. FISH analysis indicated a dominance of different nitrifying bacteria in both reactors, which could be a reason for the variation in nitrification performance. In SMEBR system, rapid nitrifiers such as AOB (*Nitrosomonas spp.*) and NOB (*Nitrobacter spp.*) were dominated. In contrast, control MBR was occupied by slower nitrifiers groups like AOB (*Nitrospira spp.*) and NOB (*Nitrospira spp.*). Such findings are of importance to design more effective nitrifying-based process, while more cost-saving opportunities are offered.

Keywords: nitrogen removal; nitrification rate; nitrifiers community; submerged membrane electro-bioreactor (SMEBR) system; sustainable design