CHAPTER 5

CONCLUSION

This work was conducted to the following conclusions which concerns process performance of the laboratory sequencing batch reactor (SBR) under anaerobic condition, efficiency of the SBR process and evaluation of N_2O production by using synthetic wastewater with the influent ratios of R0.5(50), R0.5(75), R0.5(100), R0.75(75), R0.75(100) and R1(100). The presence of Anammox organism in the primary stock culture was confirmed by probe AMX365 with Fluorescent in situ hybridization (FISH). Nitrite was completely removed except in R0.5(100) while ammonia was remained in all SBRs even in low influent ratio in SBRs (R0.5). The ammonia removal efficiency was decreased when influent contained higher nitrogen concentration and only 48.2±5.4% was obtained in R0.5(100).

At influent ammonia concentration of 100 mgN/L, higher nitrite concentration of low ratio (0.5:1) causes the inhibition to the Anammox activity hence the ammonia removal was lower. At feed of stoichiometric (0.75:1) and greater (1:1) ratios, the average N_2O gas concentrations collected from reactor headspace of R0.75(75), R0.75(100) and R1(100) are 0.83, 2.04 and 1.05 ppm respectively at ambient temperature and pressure (~30°C, 1atm) and considerable increased to 12.63 and 200.55 ppm when influent ammonia in solution was 75 and 100 mgN/L respectively at feed ratio of 0.5. In the other words, N_2O production increases when electron donor in solution is limited.

According to dead cell lysis organic carbon in the SBRs, nitrite can be competitively used by denitrifying heterotroph and results to higher nitrite to ammonia consumption ratio than Anammox stoichiometric one (1.32). N_2O concentration as high as 200 ppm found in reactor headspace at influent NH_4^+-N to NO_2^--N ratio of 0.5 and influent nitrite concentration of 200 mgN/L as well as the high nitrite to ammonia consumption ratio (3.4) indicated that N_2O partially produced from the existence of heterotrophic denitrification.