



“Gheorghe Asachi” Technical University of Iasi, Romania



CHARACTERISTICS OF NUTRIENT REMOVAL FROM SYNTHETIC WASTEWATER WITH DIFFERENT ORGANIC SUBSTRATES

Guangxue Wu^{1*}, Yuntao Guan¹, Xinmin Zhan²

¹Research Center for Environmental Engineering and Management, Graduate School at Shenzhen, Tsinghua University, Shenzhen, 518055 China

²Civil Engineering, College of Engineering and Informatics, National University of Ireland, Galway, Ireland

Abstract

The characteristics of nutrient removal from synthetic wastewater were examined in two 2-litre laboratory-scale anaerobic/aerobic alternating sequencing batch reactors (SBRs) fed with different organic substrates. One SBR (SBR_A) was fed with acetate as the organic substrate and the other SBR (SBR_{AY}) was fed with acetate and yeast extract. In addition, effects of pH on nitrification and phosphorus removal were also examined in batch experiments. Two different types of carbon metabolism occurred in the two reactors: in SBR_A, the soluble chemical oxygen demand (COD) was mainly removed in the aerobic phase and no enhanced biological phosphorus removal (EBPR) was obtained; but in SBR_{AY}, the soluble COD was mainly removed in the anaerobic phase and EBPR was achieved. Despite that EBPR was not achieved in SBR_A, phosphorus removal through chemical precipitation was observed, and this was affected by pH, with a low pH causing dissolution of phosphate precipitate. Significant nitrite accumulation was found in SBR_A, and 71% of total oxidized nitrogen was nitrite. pH values of wastewater affected the nitrification dynamics with a high specific nitrification rate at pH 8.0 and a high nitrite accumulation at pH 7.0.

Key words: carbon metabolism, enhanced biological phosphorus removal, nitrite accumulation, nutrient removal, phosphate precipitation

Received: December, 2010; Revised final: March, 2011; Accepted: March, 2011

* Author to whom all correspondence should be addressed: e-mail: wu.guangxue@sz.tsinghua.edu.cn; Phone: +8675526036390