

Isotopic fractionations during nitrogen removal in the activated sludge

KOTAJIMA, Syoutoku^{1*} ; KOBAYASHI, Keisuke¹ ; IKEDA, Daisuke² ; TERADA, Akihiko² ; ISAKA, Kazuichi³

¹Tokyo University of Agriculture and Technology, ²Tokyo University of Agriculture and Technology, ³Hitachi, Ltd

Anammox is considered to be an important nitrogen removal pathway in the ecosystem. However, it is still unknown how much the anammox can contribute to the total nitrogen loss in the ecosystem. Natural abundance of stable isotopes can be a promising tool to investigate the relative contribution of anammox and denitrification in the intact ecosystem, although the isotopic fractionation factors during anammox which are necessary to interpret isotopic signatures are not fully known. Here we reported nitrogen and oxygen isotopic fractionation factors during anammox occurring in the activated sludge. We incubated the sludge anaerobically to trace the changes in concentrations and isotopic signatures of ammonium, nitrite and nitrate during the anammox process. We found the large isotopic fractionations for ammonium oxidation and nitrite reduction by anammox. In addition, the inverse isotopic fractionation during nitrite oxidation to nitrate was observed. We will discuss these factors with comparison of the latest study on anammox isotopic systematics (Brunner et al. 2013) in the presentation.