Compounds Interaction on the Biochemical kinetic behaviors of Acetone and Methyl Ethyl Ketone mixture in a Composite Bead Biofilter

詹武忠,Tzu-Yu Lai
Civil Engineering & Engineering Informatics
Engineering
wcchan@chu.edu.tw

Abstract

The compound interaction on the biochemical kinetic behaviors of acetone and methyl ethyl ketone (MEK) mixture in a composite bead biofilter was investigated. The microbial growth rate and the biochemical reaction rate of biodegraded two ketone compounds was inhibited and the inhibitive effect resulting from increasing compound inlet concentration predominated at higher ketone compound inlet concentration for the single compound system. The microbial metabolic activity of biodegraded acetone in the microbial growth process and biochemical reaction process was inhibited by the MEK introduced and the inhibitive effect resulting from compounds interaction was more pronounced at higher MEK inlet concentration and lower acetone inlet concentration for the two compounds mixing system. Zero-order kinetic with diffusion limitation was regarded as the most adequate biochemical reaction kinetic model. The maximum elimination capacity of acetone and MEK were 50.5 and 42.14 g-C/h- m3 bed volume for the single compound system. The maximum EC of acetone and MEK in the two compounds mixing system were 35.9 and 59.9 g-C/h- m3 bed volume, respectively. The microbial metabolic activity of biodegraded acetone and MEK in the two compounds mixing system would be inhibited and enhanced by compounds interaction, respectively.

Keyword：acetone; methyl ethyl ketone; biochemical kinetic behavior; compounds interaction; composite bead biofilter