EFFECT OF ORGANIC CARBON LOADING (OCL) ON SIMULTANEOUS NH₄⁺-N AND Mn²⁺ REMOVAL IN DRINKING WATER USING A BAF SYSTEM

Hassimi Abu Hasan*, Siti Rozaimah Sheikh Abdullah, Siti Kartom Kamarudin, Noorhisham Tan Kofli

Universiti Kebangsaan Malaysia, Faculty of Engineering and Built Environment, Department of Chemical and Process Engineering, 43600 UKM Bangi Selangor, Malaysia

Abstract

The effect of organic carbon loadings (OCLs) on NH₄⁺-N and Mn²⁺ removal was investigated using a novel approach of biological aerated filter (BAF) for drinking water treatment system. Three different OCLs of 0.2, 0.5 and 1.0 kg COD/m³.d were loaded into BAF which was operated in batch-wise at 24 h hydraulic retention time. The experiments resulted in higher COD, NH₄⁺-N and Mn²⁺ removal percentages at OCL of 1.0 kg COD/m³.d with removal of 97.1%, 97.4% and 94.7%, respectively. The NH₄⁺-N effluent concentration at this phase was lower than Malaysian standard of 1.1 mg NH₄⁺-N/L and as for Mn²⁺, the effluent was 0.3 Mn²⁺ mg/L. However, at lower OCLs of 0.2 and 0.5 kg COD/m³.d, the removals were only 47.6% and 93.1% for NH₄⁺-N and 35.4% and 44.2% for Mn²⁺, respectively. Therefore, increasing organic carbon loaded to BAF system has increased the simultaneous NH₄⁺-N and Mn²⁺ removal degree in drinking water.

Key words: biological aerated filter, drinking water treatment, organic carbon loading, simultaneous ammonia and manganese removal

Received: October, 2010; Revised final: June, 2011; Accepted: July, 2011

* Author to whom all correspondence should be addressed: e-mail: simiabuhasan@gmail.com; Phone: +603 89216407; Fax: +603 89216148