Simultaneous removal of particles and dissolved organic matter in floating media filter for surface water treatment

C. Chiemchaisri*, S. Passananona, H.H. Ngoa, S. Vigneswarana

aDepartment of Environmental Engineering/National Center of Excellence for Environmental and Hazardous Waste Management, Faculty of Engineering, Kasetsart University, Bangkok 10900, Thailand
Tel. +66(2)5790730; Fax. +66(2)5790730; email: fengccc@ku.ac.th
bSchool of Civil and Environmental Engineering, University of Technology Sydney, NSW 2007, Australia

Received 13 May 2009; Accepted 31 August 2009

ABSTRACT

This research investigated the performance of floating media filter in removing particles and dissolved organic matter from surface water. Pilot-scale study consists of floating plastic media pre-filter connected with either granular activated carbon (GAC) or sponge biological filter (BF) bed. In the floating plastic media filter, coagulation and flocculation processes using poly-aluminum chloride (PACl) as coagulant at an optimum dose of 8 mg/L helped removing particles from raw water. The floating media filter was operated a filtration rate of 11 m$^3$/m$^2$.h whereas those in GAC and BF units were maintained at 2 m$^3$/m$^2$.h. Continuous operation for over 120 days gave 98% and 99% average removal efficiencies of turbidity and UV$_{254}$ in floating media filter in combination with GAC unit whereas and 78% and 52% removal efficiencies of turbidity and UV$_{254}$ removal were obtained in floating media filter in combination with BF. The removal of dissolved organic carbon in GAC and BF units reduced chlorine demand for disinfection by 29% and 14%. It could also reduce the sum of trihalomethane (THMs) ratio from 1.1 to 0.1 and 0.5 respectively.

Keywords: Biological filter; Floating media; Granular activated carbon; Natural organic matter; Water treatment

* Corresponding author.