Sustainable technology of trickling biosand filter (TBSF) combined with rock media to reduce organic matters for drinking water

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ABSTRACT

Access to safe drinking water is still unavailable to many people in developing countries. Biosand filter (BSF) is one of the most promising emerging point of use technologies. A large amount of organic matters is contained in their water source. The purpose of this study is to develop a hybrid BSF system, called as a trickling biosand filter (TBSF), which is combined with rock media as trickling filter to reduce organic matters ranged from CODcr 50 to 150 mg/L in source water. The effects of TBSF and BSF on the factors as CODcr, flux, turbidity, and DO are analyzed. Results showed that the effluent CODcr of TBSF was obtained 2.3–4.2 mg/L during 41 d. However, that of BSF fluctuated within 13.1–28.6 mg/L. DO in standing water of TBSF increased to average 7.8 mg/L while that of BSF decreased to average 1.2 mg/L. DO played an important role to activate microbial activity in trickling filter and to ripen Schmutzdecke layer to decrease constantly turbidity and Escherichia coli (E. coli) in TBSF, though shock loading of organic matters occurred. The turbidity could be removed well if it was originated from organic matters. Removal of E. coli in BSF was fluctuated because of low DO. This could not provide perfect microbial layer on top sand and allow E. coli passing through sand filter, though enough time for ripening.

Keywords: Schmutzdecke; Biosand filter; Drinking water treatment; Point of use; Tricking filter

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