HRT EFFECT ON SIMULTANEOUS COD, AMMONIA AND MANGANESE REMOVAL FROM DRINKING WATER TREATMENT SYSTEM USING A BIOLOGICAL AERATED FILTER (BAF)

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Abstract

Three different hydraulic retention times (HRTs) were investigated for NH$_4^+$-N and Mn$^{2+}$ removal using an upflow biological aerated system (BAF) as a new approach in drinking water treatment system. Currently in Malaysia, there is no specific treatment for NH$_4^+$-N and Mn$^{2+}$ in drinking water treatment plant. BAF is a well known system in biological treatment for wastewater but not for drinking water treatment. This study showed that at 24 hours operation of BAF system, about 91.3% of COD, 94.4% of NH$_4^+$-N and 83.4% of Mn$^{2+}$ were efficiently removed. When HRT was decreased to 12 and 6 hours, there was insignificant removal difference in COD and NH$_4^+$-N removal. Instead, the Mn$^{2+}$ removal significantly showed an increasing trend (p<0.05) as the HRT was decreased with the removal percentages of 92.1% (12 hours) and 94.8% (6 hours). Real-time monitoring through pH, ORP and DO profiles confirmed that completed simultaneous NH$_4^+$-N and Mn$^{2+}$ removal occurred within 6 to 7 hours HRT.

Key words: Simultaneous ammonia and manganese removal, BAF system, drinking water treatment, HRT, online monitoring

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