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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 $\text{NH}_4^+\text{-N}$ 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 $\text{NH}_4^+\text{-N}$ 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 $\text{NH}_4^+\text{-N}$ 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 $\text{NH}_4^+\text{-N}$ 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 $\text{NH}_4^+\text{-N}$ and Mn^{2+} removal occurred within 6 to 7 hours HRT.

Keywords: BAF system, biofilm, drinking water treatment, HRT, simultaneous ammonia and manganese removal

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