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Improving Turbidity Removal Efficiency in Slow Sand Filter during the Occurrence of High Turbidity Levels in Surface Water

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The prominent drinking water treatment process practised to eliminate turbidity from surface water, especially during high turbidity occurrence in the surface water, is coagulation, sedimentation and rapid sand filtration for many years. However, the possibility of turbidity removal using a slow sand filter (SSF) was not extensively studied in the case of high turbidity occurrence in the surface water. This study aimed to evaluate the performance of SSF in terms of turbidity removal in surface water, when pre-adding poly-aluminium chloride (PACl) as a coagulant chemical along with the pre-treatment by roughing filter. One per cent of PACl is prepared and dosed at the rate of 20 mg/L with raw water into the water intake chamber before it reaches the SSF. The raw and treated water samples were collected every six-hour intervals. The raw water samples whose turbidity level was more than 50 NTU were considered and analysed from 174 number of trails. Turbidity level of raw water and filtered water was observed in the range of 50-313 NTU and 0.31-5.5 NTU respectively. The turbidity of treated water by SSF was observed to be well below the SLS 614-2013 acceptable limit of 2 NTU in 98.8% of the treated samples. It is observed the turbidity removal efficiency increases when the raw water turbidity level increases. The result shows that the turbidity of treated water from SSF was complying with the requirement in 98.5% of the trails, which enable the proper function of the treatment plant during the high raw water turbidity by complying with SLS 614-2013 when adopting this methodology.

Keywords: *drinking water, poly-aluminium chloride, surface water treatment*