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Filter backwash water treatment by coagulation: A comparison study by polyaluminium ferric chloride and ferric chloride

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ABSTRACT

Now a day population increase and water shortage in many countries compels them to use reclaimed water. One of the options to combat this matter is to spent filter backwash water (SFBW) which is notably generated in most water treatment plants. There are many techniques for SFBW treatment, and coagulation is the most common process. The aim of this study was to investigate the effectiveness of polyaluminium ferric chloride (PAFCl) and ferric chloride ($FeCl_3$) for treatment of SFBW at water treatment plant in Isfahan, Iran. The results showed that the optimum pH ranges for the coagulation of both SFBW with PAFCl and $FeCl_3$ were 6 to 8.5. In addition, in the coagulation process, the optimum doses of PAFCl and $FeCl_3$ were 7 and 15 mg/L, respectively. The initial turbidity, colour, dissolved organic carbon, UV254 absorbance, aluminum and iron in settled SFBW were 38 NTU, 16 Pt. Co. units, 2.8 mg/L, 0.06 cm^{-1}, 0.2 and 0.15 mg/L, respectively. The removal efficiency by PAFCl for above parameters were 98.68, 100, 39.29, 40.68, 76.5 and 90%, respectively .While, the removal efficiency by $FeCl_3$ were 98.66, 100, 35.71, 35.59, 74.5 and -33.3%, respectively. It was concluded that PAFCl showed a better efficiency for removal of all the examined parameters in comparison with $FeCl_3$ at lower dose. Also, the quality of treated water by PAFCl was better than raw water entered to the WTP. Therefore, SFBW can be returned to the water treatment plant entrance.

Keywords: Water treatment plant; Spent filter backwash water; Water treatment; Coagulation; PAFCl; $FeCl_3$.

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