Characterization and treatment of flour mills wastewater for reuse – a case study of Al-kausar Flour Mills, Pakistan

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**ABSTRACT**

Pakistan is increasingly confronted with shortage of fresh water resources, as annual per capita water availability has reduced to less than 1,000 m\textsuperscript{3}. Wastewater reclamation and reuse practices must be adopted to deal with the situation. For this purpose, small and medium scale industries can play a vital role. With this mind set, wastewater from Al-Kausar Flour Mills Islamabad (AFM), Pakistan was investigated using physico-chemical treatment options. Total water consumption of AFM is 74.1 m\textsuperscript{3}/d, and groundwater is being pumped for 8 h/d. Four experimental trains were tested using various combinations of pre-sedimentation, horizontal roughing filter, coagulation/flocculation/settling setup, and multi-media filtration. Ferric chloride and alum were used as coagulants. Results revealed that flour mill wastewater had high concentration of total suspended solids. Ferric chloride provided appreciable suspended solids removal in terms of turbidity. While, every option tested, removed over 98% of turbidity but option C, with 25 mg/L ferric chloride dosage, produced effluent fit for water reuse in the industry. It was also evaluated that AFM could save up to PKR 83,500.0 (US $800) in terms of energy cost and ground water volume of at least 1.6 ML per year.

**Keywords:** physico-chemical treatment; Horizontal flow roughing filters; Wastewater reuse; Coagulants; Flour mills; Wastewater treatment