



## Utilizing aluminum etching wastewater for tannery wastewater coagulation: performance and feasibility

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Received 16 August 2014; Accepted 11 January 2015

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### ABSTRACT

The main objective of this study was to investigate the feasibility of utilizing etching wastewater (EW) of aluminum (Al) coating industry as an alum substitute in industrial wastewater treatment. Our hypothesis was that Al-rich EW could be an effective substitute for commercial liquid alum used in a nearby (<10 km) tannery wastewater treatment plant (Corlu, Turkey). Bench-scale alum and EW jar tests along with an economic analysis were performed to test this hypothesis. Jar test results conducted using identical pH and Al doses showed that Al-rich EW performed similar to alum in terms of chemical oxygen demand (COD), suspended solids (SS), and turbidity removal. Regardless of its origin (alum or EW), 1 g of Al approximately removed 30 g COD and 20 g SS via a combined effect of coagulation and plain settling. Commercial alum and EW removed more than 95% of COD and turbidity; 60% of total COD from the tannery wastewater. Preliminary cost analysis showed that coagulant expenditure could be reduced by 40% if alum was substituted with EW.

*Keywords:* Aluminum industry; Etching spent liquor; Coagulant; Cost effectiveness; Jar test; Wastewater treatment

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Presented at the 2nd International Conference on Recycling and Reuse (R&R2014), 4–6 June 2014, Istanbul, Turkey

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