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NOVEL USES OF RED MUD IN TEXTILE WASTEWATER TREATMENT, DYEING, AND CONCRETE PRODUCTION

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Abstract

Optimum conditions for the reusability of red mud were explored testing both dried and HCl-activated red mud as a coagulant in the treatment of dyehouse wastewater. Treated dyehouse wastewater was further reused in five dyebaths with different mixture ratios of distilled water (D) and treated wastewater (W) for dyeing fabrics at three color strengths of three reactive dyes. Sludge obtained from the optimum dosage of HCl-activated red mud was tested for its reuse potential in the production of concrete. The best color removal efficiency occurred using 1 g/L dried red mud at pH 12 and 120 mg/L HCl-activated red mud at pH 12. The best color yield was obtained with a textile dyeing treatment of D50/W50 with 2% color strength when dyehouse wastewater was treated with HCl-activated red mud. Concrete samples with an addition ratio of 2% HCl-activated red mud sludge had the slightly highest compressive strength. The reuses of HCl-activated red mud and its sludge appear to be a promising alternative to some conventional treatments of dye wastewater, dyeing, and concrete production.

Key words: red mud, sludge, waste reduction, wastewater management

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