Molecular weight distributions in cotton-dyeing textile wastewaters

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Received 27 December 2013; Accepted 5 May 2015

ABSTRACT

Many different chemicals are used in the textile industry, with its effluent being a major pollution source if not treated properly. High-strength textile wastewater requires an environmentally friendly, cost-effective and highly efficient treatment before being discharged into the environment. The goal of this study is to determine the appropriate treatment alternatives of high-strength textile wastewater based on the pollution strength and molecular weight distribution (MWD) analyses of pollutants from a cotton-dyeing textile mill. Sequential filtrations through microfiltration and ultrafiltration membranes were conducted separately on wastewater samples from dying, bleaching and mixed processes. According to MWD analyses, half of the total organic carbon, chemical oxygen demand (COD) and biochemical oxygen demand (BOD5) found in the wastewater which came from the bleaching and mixed processes were less than 1 kDa, while 56% of the COD and BOD5 found in the wastewater from dyeing was between 100 and 1 kDa. Furthermore, UV_{254} absorbance in the mixed, bleaching and dyeing treatments was <1 kDa with ratios of 61, 49 and 25%, respectively. According to the Specific Ultraviolet Absorption values, the organic contents of all of these processes were hydrophilic. Experimental results indicated that biological and physical methods are more appropriate than chemical methods for treating the effluents of cotton-dyeing.

Keywords: Cotton-dyeing effluents; Molecular weight distribution; Organic matter; Treatment alternatives

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