

REMOVAL OF CI DIRECT BLUE TEXTILE DYE USING COCONUT SHELL BASED AND BAMBOO BASED GRANULAR ACTIVATED CARBON

Sumaiya F. Idroos and Pathmalal M. Manage*

Centre for Water Quality and Algae Research, Department of Zoology, University of Sri Jayewardenepura, Sri Lanka
pathmalal@sjp.ac.lk

The textile dyeing and finishing industry has created a huge impact on environment by releasing most chemically intensive contaminants into water. Textile dye contamination can alter the physico-chemical composition of water. Consequently, Biochemical Oxidation Demand (BOD), Chemical Oxygen Demand (COD), heat, color, pH and electric conductivity of water may change. However, several physico-chemical methods have been proposed to treat textile dye contaminated water. The present study records the use of laboratory prepared coconut shell (*Cocos nucifera*) and bamboo (*Bambusa* sp) granular activated carbon (GAC) for removal of CI direct blue textile dye. Removal of CI direct blue dye was evaluated using two standard particle sizes of GAC (1.18 – 2.36 mm and 0.43 – 1.70 mm) produced using coconut shells and bamboo. 10, 50, 75 and 100 ppm of CI direct blue textile dye concentrations were prepared in 250ml flasks and 2g of coconut shell and bamboo GAC of both particle sizes were introduced into them. Control flasks contained granulated carbon particles without activation. These experimental and control flasks were maintained in dark for 5 days. Dye concentrations were measured at 570nm at 24 hour intervals. According to the results of the study coconut shell GAC (1.18 – 2.36 mm particle size) showed 100 % removal for 10, 50 and 75 ppm of dye whereas only 84.9% of removal for 100 ppm of dye. When 0.43 – 1.70 mm particle size of coconut shell GAC was used 100 % removal was observed for all studied concentrations of dye. Bamboo GAC (1.18 – 2.36 mm particle size) showed 92.5% dye removal for 10 ppm, 88.3% for 50 ppm and less than 70% for 75 and 100ppm. However, when 0.43 – 1.70 mm particle size of bamboo GAC was used 100 % of textile dye removal was observed for all studied dye concentrations. Thus, the results of the study records that, both coconut shell and bamboo GAC could be used to remove CI direct blue textile dye present in water. However, use of small particle sizes (0.43 – 1.70 mm) of both types of GAC is more effective to treat high concentrations of CI direct blue.

Keywords: *Textile dye, CI direct blue, Granular activated carbon (GAC), Coconut shell, Bamboo stem*