Pitchapat Kullama 2011: The Efficiency Comparison of Reactive Dye (RBBR) Adsorption of Pine and Teak Activated Carbons and Activated Charcoal Norit. Master of Science (Environmental Science), Major Field: Environmental Science, College of Enviroment. Thesis Advisor: Associate Prosessor Kanita Tungkananuruk, M.Sc. 109 pages.

The objective of this research was to study the optimum conditions for Remazol Brilliant Blue R (RBBR) adsorption using activated carbons from wasted pine, teak woods and activated charcoal norit. Three activated carbons had average particle size about 30 mesh (502.5 μm) and surface areas at 118.3, 0.58 and 831.3 m^2g^{-1}, respectively. The response surface methodology (RSM) was used for the optimization of adsorption condition. The factors at 5 levels included dye concentration, pH, shaking time, adsorbent amount and agitation speed. From the results, it was found that the relation between dye concentration and agitation speed significantly affected RBBR adsorption of pine activated carbon. The optimum condition of pine activated carbon was 140 mgL^{-1} RBBR concentration, pH 11, shaking time 270 minutes, adsorbent amount 5 g and agitation speed 200 rpm. The optimum condition of teak activated carbon adsorption was 50 mgL^{-1} RBBR concentration, pH 11, shaking time 270 minutes, adsorbent amount 5 g and agitation speed 50 rpm. The optimum condition of activated charcoal norit was 150 mgL^{-1} RBBR concentration, pH 12, shaking time 270 minutes, adsorbent amount 0.5 g and agitation speed 110 rpm. All factors did not significantly affect RBBR adsorption. It could be summarized that the activated charcoal norit was the most efficient (14.60 mgg^{-1}) due to its highest surface area. The second was pine activated carbon (1.35 mgg^{-1}) and the worst activated carbon was teak (0.46 mgg^{-1}). Further experiments showed that the RBBR adsorption of all three adsorbents was according to the Freundlich equilibrium.

The gravity continuous flow adsorption experiment showed that the commercial activated carbon could be used for the longest period 360 minutes; whereas pine and teak activated carbon lasted only for 230 minutes. The best recovery efficiency was obtained from the commercial activated carbon. The adsorption of RBBR in the factory effluent was also studied in the batch experiment without any adjustment of its quality. The commercial activated carbon showed the best adsorption efficiency at 103.38×10^{-3} mgg^{-1}, the second was at 9.76×10^{-3} mgg^{-1} from pine activated carbon and teak activated carbon was the worst adsorbent at 9.30×10^{-3} mgg^{-1}.

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