

Effect of Activated Carbon Produced from Spent Tea Leaves on Dechlorination of Water

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Dechlorination is the process that removes total residual chlorine from water. Activated carbon can be used as a dechlorinating agent as it is an excellent adsorbent. As a precursor material for producing activated carbon there is a possibility that spent tea leaves can be used, otherwise; they will be only an agricultural waste. The objective of the present study was to evaluate the possibility of removing total chlorine residuals present in water using activated carbon produced from spent tea leaves which was activated with H_2SO_4 and K_2CO_3 . The produced activated carbon was used to filter chlorinated water which has different concentrations of total residual chlorine. Retention time during filtering was changed as 0, 15 and 30 min. For the precursor material and activated carbon, FTIR, XRD and ash testing were conducted. The results showed that there is a positive correlation between chemical activating agent, initial residual chlorine concentration and retention time. Minimum total residual chlorine in the filtrate was given by H_2SO_4 chemical activation agent with 30 min retention time. When the initial total residual chlorine concentration was ≈ 780 ppm, it removed 100% chlorine residuals in the water regardless of the retention time. The pH of activated carbon produced using H_2SO_4 chemical activation agent was 7.27 whereas the other one produced using K_2CO_3 showed 7.41. The column of activated carbon which is produced from spent tea leaves and chemically activated using H_2SO_4 can be used to filter chlorinated water effectively under 30 min retention time.

Keywords: Activated carbon, Chemical activation, Dechlorination, Spent tea leaves