

## Adsorption of 4-chloro-2,5-dimethoxyaniline from solution in batch mode using chemical activated pyrolytic char

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### ABSTRACT

In this work, activated pine-sawdust pyrolytic char (APC) was prepared using pine-sawdust pyrolytic char and activated using ammonium phosphate as a chemical agent. The yield of carbon was 72.1%. Characterization of APC was performed such as Fourier-transform infrared spectroscopy, X-ray diffraction and scanning electron microscopy, etc. The adsorption behavior of APC toward 4-chloro-2,5-dimethoxyaniline (CDMA) was studied in batch mode. The results showed that acidity affected adsorption property while ion strength had little effect on adsorption. The maximum adsorption capacity of CDMA onto APC was 134 mg g<sup>-1</sup> at pH 10, 0.005 g adsorbent dose, 180 min contact time, 80 mg L<sup>-1</sup> initial concentration at 303 K. There was good efficiency of regeneration using 1% HCl solution and the first time of regeneration rate reached 30.8%. The adsorption was a spontaneous, endothermic process. Koble–Corrigan, Langmuir, pseudo-second-order and Elovich models were suitable to predict the equilibrium and kinetic process. The best fitted were Koble–Corrigan and Elovich models with  $R^2$  value > 0.959 and >0.919, respectively. It was concluded that APC is promising as an alternative to remove CDMA from the solution.

*Keywords:* Activated pyrolytic char; Adsorption; 4-chloro-2,5-dimethoxyaniline; Regeneration

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