



Study of the conditions of activated carbon preparation from an agriculture by-product for 4BA elimination in aqueous solution using full factorial design

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Received 10 October 2011; Accepted 25 February 2013

ABSTRACT

An activated carbon prepared from an agricultural by-product (apricot stones) is used as an adsorbent for 4-bromoaniline (4BA) elimination. Several activation chemical agents are tested; the hydrochloric acid is found to be the best choice with 79% of elimination yield. The main and interactive effects of four experimentally controlled elaboration activated carbon factors, which are the carbonization temperature, the carbonization time, the concentration of activating agent (% HCl), and the activation time, are investigated through model equations designed with a two-level full factorial design by using a batch experimental method. Statistical design of experiments for the manufacture of activated carbon from apricot stones for 4BA adsorption is an efficient and rapid technique to quantify the effect of variable parameters compared with the conventional optimization. The characteristics of the optimal adsorbent are studied using scanning electron microscope, energy dispersive X-ray analysis, and Brunauer–Emmett–Teller nitrogen adsorption technique. The equilibrium adsorption isotherms have been analyzed with the Langmuir and Freundlich models at 28°C.

Keywords: Adsorption; Apricot stone carbon; 4-Bromoaniline; Factorial design

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