

Characterization of bioadsorbent produced using incorporated treatment of chemical and carbonization procedures

ABSTRACT

The production of bioadsorbent from palm kernel shell (PKS) and coconut shell (CS) pretreated with 30% phosphoric acid (H_3PO_4) was optimized using the response surface methodology (RSM). Iodine adsorption for both bioadsorbents was optimized by central composite design. Two parameters including the H_3PO_4 pretreatment temperature and carbonization temperature were determined as significant factors to improve the iodine adsorption of the bioadsorbent. Statistical analysis results divulge that both factors had significant effect on the iodine adsorption for the bioadsorbent. From the RSM analysis, it was suggested that using 80 and 79°C as H_3PO_4 pretreatment temperature and 714 and 715°C as carbonization temperature would enhance the iodine adsorption of the CS and PKS bioadsorbent, respectively. These results indicated that H_3PO_4 is a good pretreatment for preparing PKS and CS prior to carbonization process to produce bioadsorbent with well developed microporous and mesoporous volume. The effort to produce alternative high grade and inexpensive adsorbent derived from lignocellulosic biomass, particularly in the nut shell form was implied in this research.