

Removal of heavy metal ions from ground and surface water samples using carbons derived from date pits in Aseer area , KSA

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Date pits (DP) was chosen as a raw material for activated carbon preparation, due to highly abundant as renewable by-products, with good mechanical strength, generated in high amounts and of insignificant economic value and in fact it presents a disposal problem. DP was used for preparation of physically and chemically activated carbons. The raw material were physically activated with pure steam or steam with flow of nitrogen gas, while the chemically activated sample were prepared by impregnation of 10% calcium acetate. Selected samples were evaluated as to their efficiency and capacity in the removal of some ions (Pb^{2+} , Zn^{2+} , Co^{2+} and Fe^{3+}) from different ground and surface water samples collected from Aseer area. In this concern, decreasing of contaminating metal ions to permissible levels was achieved in various ground water under investigations.

Ground and surface water samples were collected from several sites in Aseer area, KSA. The ground water samples were collected from wells at depths between 20 and 95 m. The sample characteristics are represented. Water samples were collected by using plastic bottles (capacity 1.5 L), consequently acidified and kept at 5 °C. The samples were analysed immediately after collection. The concentration of heavy metals was measured using Atomic Absorption (model: Z-8100 Hitachi/Flame Spectrophotometer).

Apparent and pack density (D_a , D_p), yield, ash, slurry pH, S_{BET} surface area, total pore volume V_p and average pore diameter (r) were measured for the three activated carbon prepared. Date pits was demonstrated to be feasible raw materials for the production of valuable adsorbents. Many categories of adsorbents were derived from the raw biomass (i) activated carbons by steam pyrolysis, (ii) activated carbons by single-step steam pyrolysis conditions at 700°C with accompanying flow of N_2 -activation, (iii) activated carbons by steam pyrolysis technique at 700°C was performed in presence of catalytic gasifying metal oxides of calcium. Adsorbents of varying physico-chemical properties were thus obtained with good to high adsorbing capacity.

Selected samples were evaluated as to their efficiency and capacity in the removal of some ions (Pb^{2+} , Fe^{3+} , Co^{2+} , and Zn^{2+}) from ground and surface water samples collected from Aseer area, KSA. In this concern, complete removal of contaminating metal ions was achieved in various ground water under investigations. At a very low rate of adsorbents, (35-250 µg/L), complete removal for the contaminating metal ions from ground and surface water was achieved.

Biography

Nasser S Awwad has completed his Ph.D at the age of 30 years from Ain Shams University and postdoctoral studies from Sandia National Laboratories, New Mexico, USA. Now, he is professor of inorganic and radiochemistry at King Khalid university , department of chemistry. He has published more than 32 papers in impacted journals and serving as an reviewer and editorial board member at some of them.

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