**Removal of heavy metals on modified dehydrated carbon**

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Some of the heavy metals are bio-essential for plants and animals such as Fe, Cu, Co, Mn, Zn and Cr, however, they can present problems at excessive levels. On the other hand, non-essential metals, such as Hg, Pb and Cd are directly toxic to plants and animals. Heavy metals are persisting in the environment as they do not degrade over time and are relatively immobile in soil. In Oman, ~ 180,000 tons of Date palm leaflets (agricultural waste) are produced annually with little or no use.

In this work, date palm leaflets were converted to acidic dehydrated carbon (ADC) via the treatment of sulfuric acid at 200 oC. The produced ADC was transformed to chelating dehydrated carbon (CDC) via ethylene diamine surface functionalization . Both carbons were surface characterizaed and tested for the removal Cu(II), Ni(II) and Zn(II) from aqueous solution. The surface area was 8.5 and 7.4 m2/g for both carbons. Cation exchange capacity was 121 and 7.4 meq/g and pHzpc 3.3 and 9.3 for ADC and CDC, respectively. Optimum sorption was achieved at pH 5 for al the metals. Sorption of these metals was fast reaching equilibrium within almost an hour with soprtion kinetic data fitting well the pseudo second order model. Sorption was faster on ADC than on BDC however with higher metal uptake on CDC than ADC. Sorption has increased by rising the temperature in the range of 25-45 oC because of carbon swelling.

Equilibrium sorption data were found to fit well the langmuir soprtion isotherm with an increase with temperature uptake. Soprtion monolayer capacities at 25 oC were 48.5 and 72.0 mg/g for Cu(II), 44 and 63.4 mg/g fo Ni(II), and 29 and 47.5 mg/g on ADC and CDC, respectively. Sorption recycle and reuse was carried out efficiently. Sorption preference followed the order Cu(II)>Ni(II)>Zn(II). Column studies were also carried out.