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Titre de l'article / ou bien communication:

Removal of heavy metal ions from aqueous solutions by a local dairy sludge as a biosorbant

Date de publication :

Jour/mois/année :

15/11/2010

Nom de journal :

Desalination

Numéro de série / ou bien collection :

1-3

Numéro de volume :

262

Identification :

ISSN/ ou bien ISBN :

0011-9164

Type :

Article/ ou bien communication

Article

Langue de l'article : Anglais

Mot clé :

Heavy metals, biosorption, dairy sludge, isotherms

Résumé :

In this work, the removal of lead and cadmium from an aqueous solution by a local dairy sludge was investigated in a batch system. Biosorption of these heavy metals was studied as a function of solution initial pH, equilibrium time, temperature, biosorbent dose, biosorbent particle diameter and initial metal ion concentration. Maximum sorption was observed at a pH value of 5 and a temperature of 40 °C. Equilibrium uptake increased with increasing metal ion concentration for both metals with a maximum sorption capacity of a 148.6 mg/g for Pb (II) and 66.7 mg/g for Cd(II). The Langmuir model was found to better describe the sorption of lead ions with a correlation factor of 0.99 while Freundlich and Temkin models were better for Cd(II) sorption. The temperature increase from 20 to 40 °C enhanced the uptake of Pb(II) by 20% and Cd(II) by 5%. The sorption kinetics were compatible with the pseudo-second order ...