

[Look Up Full Text](#)[Save to EndNote online](#)[Add to Marked List](#)

1 of 1

Adsorption of methylene blue from aqueous solution using untreated and treated (Metroxylon spp.) waste adsorbent: equilibrium and kinetics studies

By: [Amode, JO](#) (Amode, Jeminat O.)^[1]; [Santos, JH](#) (Santos, Jose H.)^[1]; [Alam, ZM](#) (Alam, Zahangir Md.)^[2]; [Mirza, AH](#) (Mirza, Aminul H.)^[1]; [Mei, CC](#) (Mei, Chan C.)^[1]

INTERNATIONAL JOURNAL OF INDUSTRIAL CHEMISTRY

Volume: 7 Issue: 3 Pages: 333-345

DOI: 10.1007/s40090-016-0085-9

Published: SEP 2016

Abstract

Background (Metroxylon spp.) waste is an inexpensive and abundantly available material with the characteristics of a good adsorbent for treating dye from wastewater. We studied the effectiveness of alkali and acid modification in enhancing the adsorption capacity of sago waste. The untreated and treated adsorbent was characterized by FTIR, elemental analysis and BET surface area. The capacity of each adsorbent to adsorb MB was evaluated at different pH values, adsorbent dosage and initial dye concentrations and contact time.

Results According to the results obtained, alkali treatment more than doubled the sorption capacity of sago waste by increasing the porosity, surface area and number of adsorption sites. The alkali-treated material also adsorbed significantly more than many known biosorbents. The effects of the initial concentration of methylene blue, solution pH and adsorbent dosage on methylene blue removal are reported. Equilibrium data were best represented by the Langmuir isotherm model with adsorption capacities of 83.5, 212.8 and 36.82 mg/g for untreated, potassium hydroxide-treated and phosphoric acid-treated sago wastes, respectively. The kinetics of adsorption were best described by a pseudo-second-order model (R² = 0.999).

Conclusions The alkali treatment of sago waste demonstrates the use of a low-cost agricultural waste and a simple modification process to produce an effective adsorbent for removing cationic dye from wastewater.

Keywords

Author Keywords: (Metroxylon spp.) waste; Methylene blue; Low-cost adsorbent; Adsorption; Alkali modification; Water treatment

KeyWords Plus: BASIC DYE; ACTIVATED CARBON; MALACHITE GREEN; CITRIC-ACID; RICE STRAW; REMOVAL; CHITOSAN; SORPTION; MODELS; BATCH

Author Information

Reprint Address: Santos, JH (reprint author)

Univ Brunei Darussalam, Fac Sci, Gadong 1410, Brunei.

Addresses:

[1] Univ Brunei Darussalam, Fac Sci, Gadong 1410, Brunei

+ [2] IIUM, Fac Engn, BERU, Kuala Lumpur, Malaysia

E-mail Addresses: jose.santos@ubd.edu.bn

Funding

Funding Agency	Grant Number
Government of Brunei Darussalam	
Universiti Brunei Darussalam (UBD)	

[View funding text](#)

Publisher

SPRINGER HEIDELBERG, TIERGARTENSTRASSE 17, D-69121 HEIDELBERG, GERMANY

Citation Network

0 Times Cited

[48 Cited References](#)

[View Related Records](#)

[View Citation Map](#)

[Create Citation Alert](#)

(data from Web of Science™ Core Collection)

All Times Cited Counts

0 in All Databases

0 in Web of Science Core Collection

0 in BIOSIS Citation Index

0 in Chinese Science Citation Database

0 in Data Citation Index

0 in Russian Science Citation Index

0 in SciELO Citation Index

Usage Count

Last 180 Days: 3

Since 2013: 3

[Learn more](#)

This record is from:
Web of Science™ Core Collection

Suggest a correction

If you would like to improve the quality of the data in this record, please [suggest a correction](#).

Categories / Classification

Research Areas: Chemistry

Web of Science Categories: Chemistry, Multidisciplinary

Document Information

Document Type: Article

Language: English

Accession Number: WOS:000391124700010

ISSN: 2228-5547

Other Information

IDS Number: EG5ZY

Cited References in Web of Science Core Collection: [48](#)

Times Cited in Web of Science Core Collection: 0

