sustainable chemistry

MDPI

Supplementary Files

Utilization of *Azadirachta indica* Sawdust as a Potential Adsorbent for the Removal of Crystal Violet Dye

Zeeshan Ahamad and Abu Nasar *

Department of Applied Chemistry, Faculty of Engineering and Technology, Aligarh Muslim University, Aligarh 202002, India; shnz6926@gmail.com

* Correspondence: abunasaramu@gmail.com; Tel.: +91-0571-2700920 (ext. 3000); Fax: +91-0571-2700528

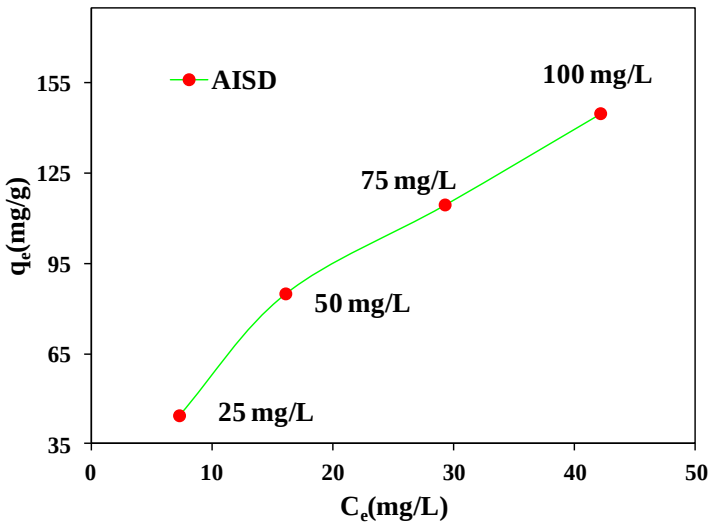

Figure S1. The effects of initial dye concentration on the adsorption of CV onto the AISD.

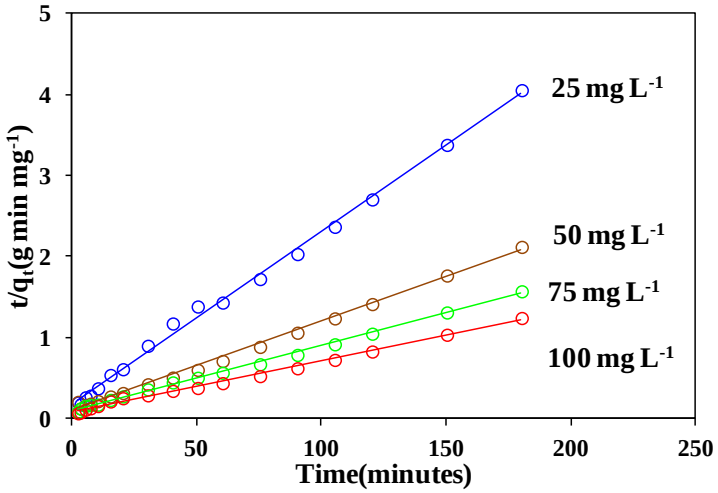

Figure S2. PSOR kinetic plots for the confiscation of CV dye onto AISD at varied starting dye concentrations.

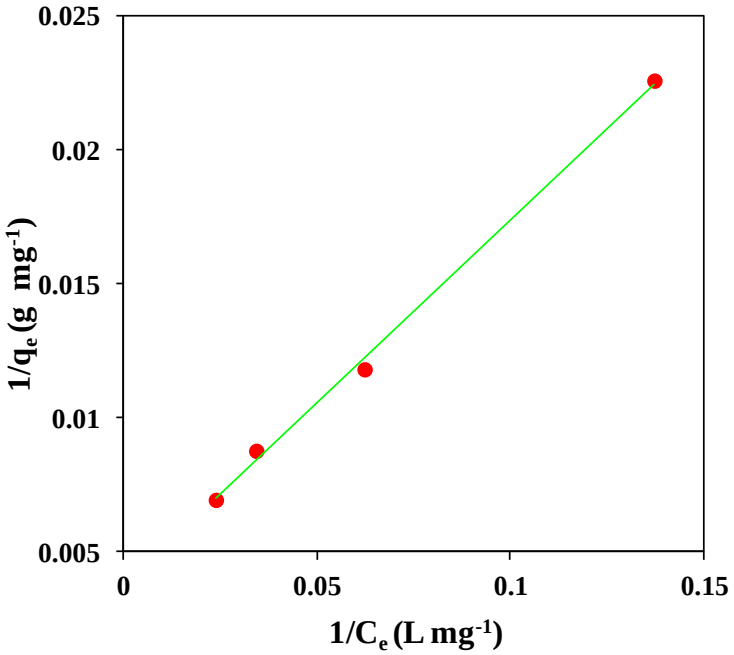

Figure S3. LR adsorption isotherm for CV adsorption onto AISD at 303 K.

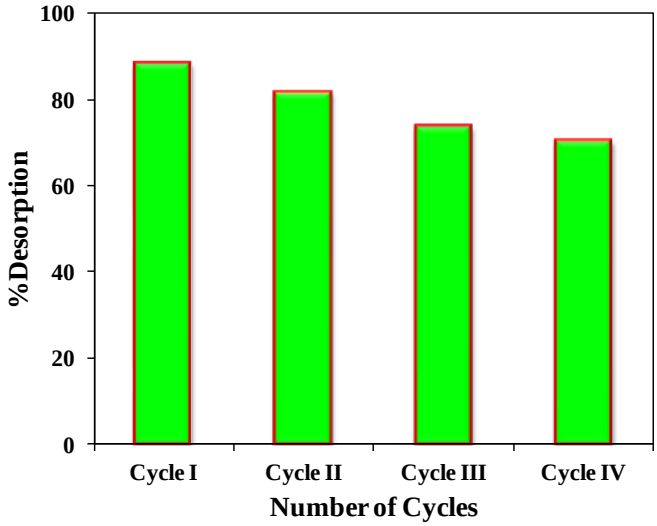

Figure S4. Reusability of AISD for four cycles.

Table S1. Linear forms of kinetic, isotherm and thermodynamic equations.

Model	Linear equations	Description of model parameters
	Kinetic models	
PFOR	$\ln(q_e - q_t) = \ln q_e - K_1 t$	K_1 (min^{-1}) = rate constant
PSOR	$\frac{t}{q_t} = \frac{1}{K_2 q_e^2} + \frac{t}{q_e}$	K_2 (g min^{-1} mg^{-1}) = rate constant
EVH	$q_t = \frac{\ln(\alpha\beta)}{\beta} + \frac{1}{\beta}\ln t$	α (mg g^{-1} min^{-1}) = initial adsorption rate, β (g mg^{-1}) = desorption constant
IDN	$q_t = K_{id} t^{1/2} + C$	K_{id} (mg $min^{-½}$ g^{-1}) = rate constant
LDN	$\ln(1 - F) = -K_{fd} t + D$	K_{fd} (min^{-1}) = rate constant F = (q_t/q_e) = achievement of fractional equilibrium D = constant
Isotherm models		
LR	$\frac{1}{q_e} = \frac{1}{q_m K_L C_e} + \frac{1}{q_m}$	q_m (mg g^{-1}) = for complete monolayer coverage adsorption capacity K_L (L mg^{-1}) = Langmuir adsorption constant
FH	$\ln q_e = \frac{1}{n}\ln C_e + \ln K_F$	K_F ($mg^{1-1/n}$ $L^{1/n}$ g^{-1}) = Freundlich constant n = Constant
TN	$q_e = \frac{RT}{b}\ln C_e + \frac{RT}{b}\ln K_T$	K_T (L g^{-1}) = Temkin isotherm constant b (J mol^{-1}) = Temkin constant
Thermodynamics equations		
	$\Delta G° = -RT\ln K_c$	Gibb's free energy ($\Delta G°$) and distribution coefficient(K_c)
	$\ln K_c = \frac{-\Delta G^\circ}{RT} = \frac{-\Delta H^\circ}{RT} + \frac{\Delta S^\circ}{R}$	Enthalpy ($\Delta H°$), entropy ($\Delta S°$), and Gas constant(R)

Table S2. Desorption % of CV from AISD-CV.

Desorbing agent	% Desorption
	AISD
HCl	70.25
CH_3COOH	36.17
NaOH	7.031
NaCl	5.62
DM-DW	1.31