



Supplementary Materials

Table S1. Physicochemical Properties and Structure of Dyes

Dyes	Molecular structure	Molecular size (nm)	M _w (g.mol ⁻¹)	Nature	λ _{max} (nm)	pK _a
MB		1.26Í0.77Í0.65	319.85	Positive	665	3.8
RB		1.59Í1.18Í0.56	479.02	Positive	554	3.7
MO		1.31Í0.55Í0.18	327.33	Negative	465	3.4
CR		2.62Í0.74Í0.43	696.67	Negative	497	5.5

Table S2. Elemental Analysis of LSB, LSC and LSAC

Sample	Proximate analysis (dry basis), wt.%			Ultimate analysis, wt.%						
	Volatile matter	Fixed carbon	Ash	C	H	O	S	N	K	P
LSB	79.93	20.18	1.89	45.83	7.21	42.60	0.10	2.15	2.11	-
LSC	24.07	71.08	4.13	59.83	3.93	33.43	-	1.54	1.27	-
LSAC	7.85	88.55	3.60	74.92	0.32	24.30	-	0.25	-	0.21

Table S3. Isotherm Parameters for Adsorption of Dyes onto LSAC at 30 °C

Dyes	q _{e,exp} (mg.g ⁻¹)	Langmuir isotherm model				Freundlich isotherm model		
		q _{max} (mg.g ⁻¹)	K _L (L.mg ⁻¹)	R _L	R ²	K _F	n _F	R ²
MB	499.53	502.84	0.982	0.003	0.993	370.280	15.394	0.796
RhB	390.15	397.77	0.326	0.009	0.996	286.559	16.106	0.894
MO	453.95	464.66	0.366	0.008	0.992	310.135	12.421	0.849
CR	341.38	350.64	0.223	0.015	0.991	251.605	16.703	0.898

Table S4. Thermodynamic Parameters for Adsorption of Dyes onto LSAC

Dyes	ΔH^0 (kJ.mol ⁻¹)	ΔS^0 (J.mol ⁻¹ .K ⁻¹)	R^2	ΔG^0 (kJ.mol ⁻¹)			
				303 K	313 K	323 K	333 K
MB	36.91	197.73	0.981	-5.55	-5.91	-6.20	-6.48
RhB	31.88	138.38	0.992	-3.46	-3.87	-4.21	-4.50
MO	-39.36	-82.00	0.974	-4.45	-4.26	-4.18	-4.12
CR	27.50	116.16	0.973	-2.77	-3.22	-3.59	-3.82

Table S5. Porous Properties of LSAC Samples before and after Three Cycles of MB (LSAC/MB) and CR (LSAC/CR) Adsorption

Sample	Surface area (m ² .g ⁻¹)			Pore volume (cm ³ .g ⁻¹)			D_{apd} (nm)
	S_{BET}	S_{mic}	S_{mes}	V_{tot}	V_{mic}	V_{mes}	
LSAC	818.1	703.4	114.7	0.46	0.33	0.13	3.95
LSAC/MB	809.2	686.1	123.1	0.45	0.31	0.14	3.98
LSAC/CR	796.5	664.2	132.3	0.43	0.28	0.15	3.95

S_{BET} : BET surface area; S_{mic} : micropore surface area; S_{mes} : mesopore surface area;

V_{tot} : total pore volume; V_{mic} : micropore volume; V_{mes} : mesopore volume and D_{apd} : average pore diameter.

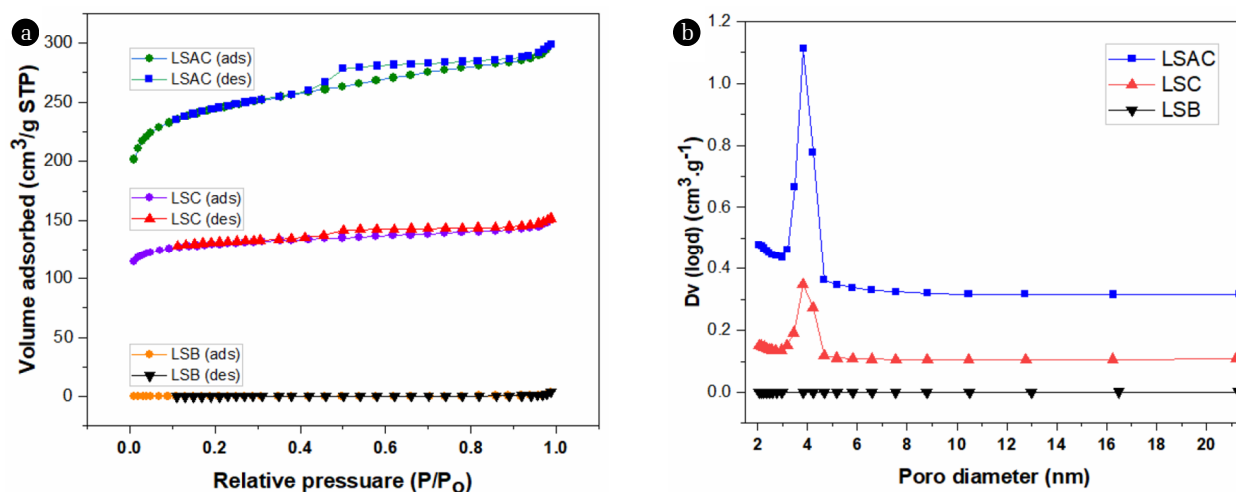


Fig. S1. Nitrogen adsorption-desorption isotherms (a) and pore size distribution of LSB, LSC and LSAC samples (b).

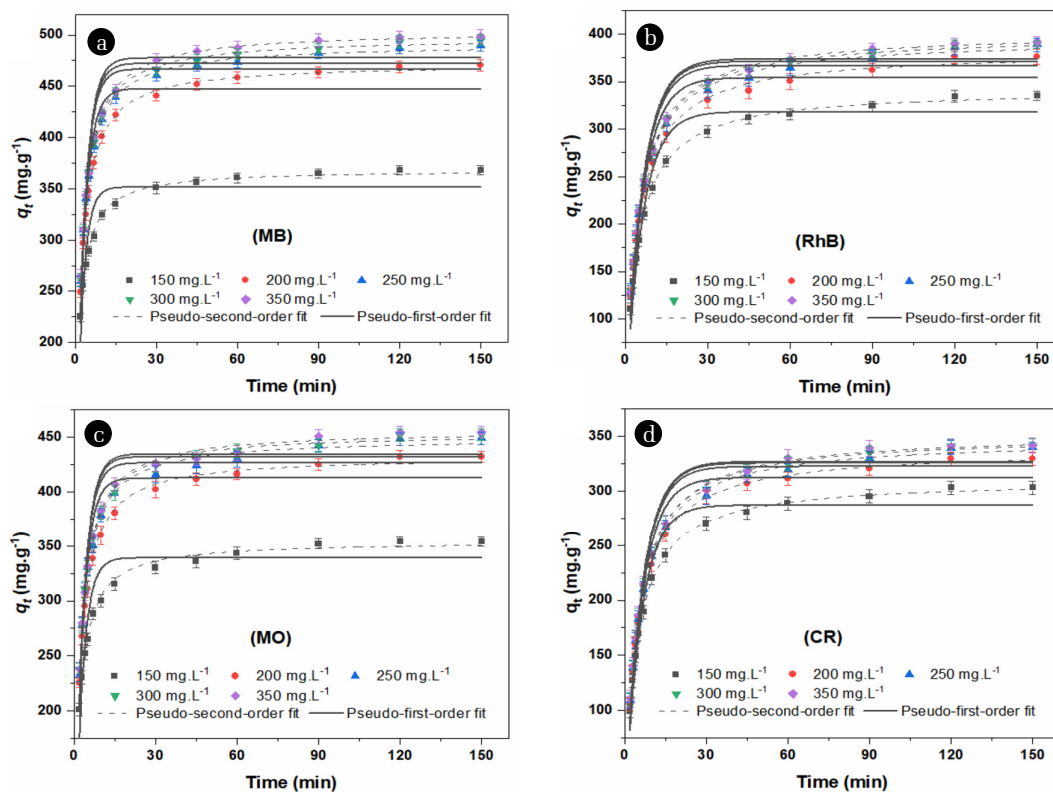


Fig. S2. Kinetic modeling for adsorption of a) MB; b) RhB; c) MO and d) CR dyes onto LSAC at 30 °C.

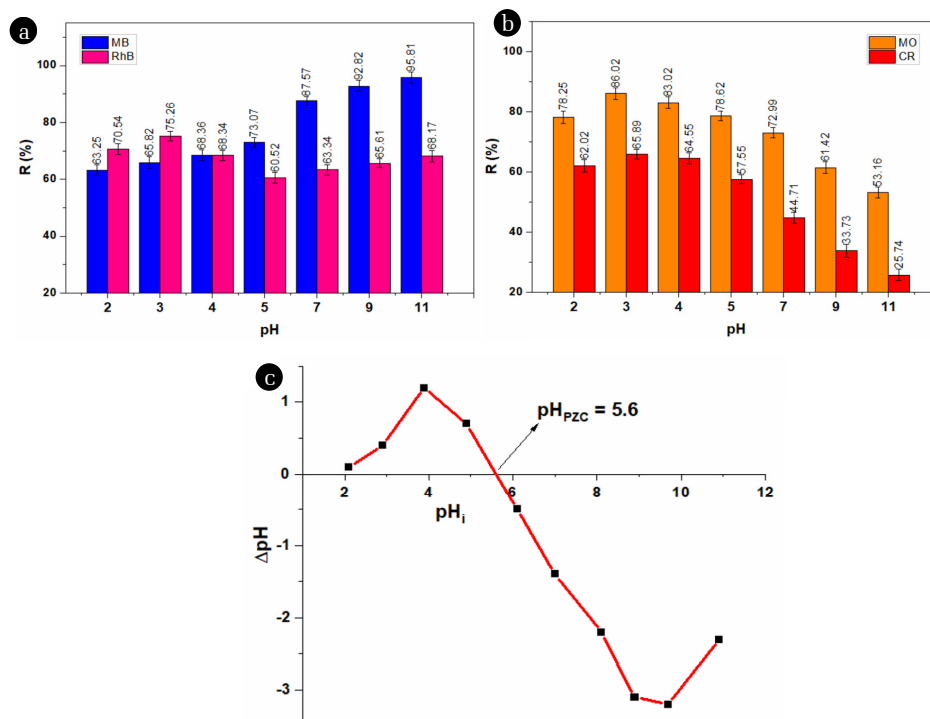


Fig. S3. Influence of pH on the adsorption of a) MB and RhB and b) MO and CR by LSAC; c) the point of zero charge obtained from the pH drift method.

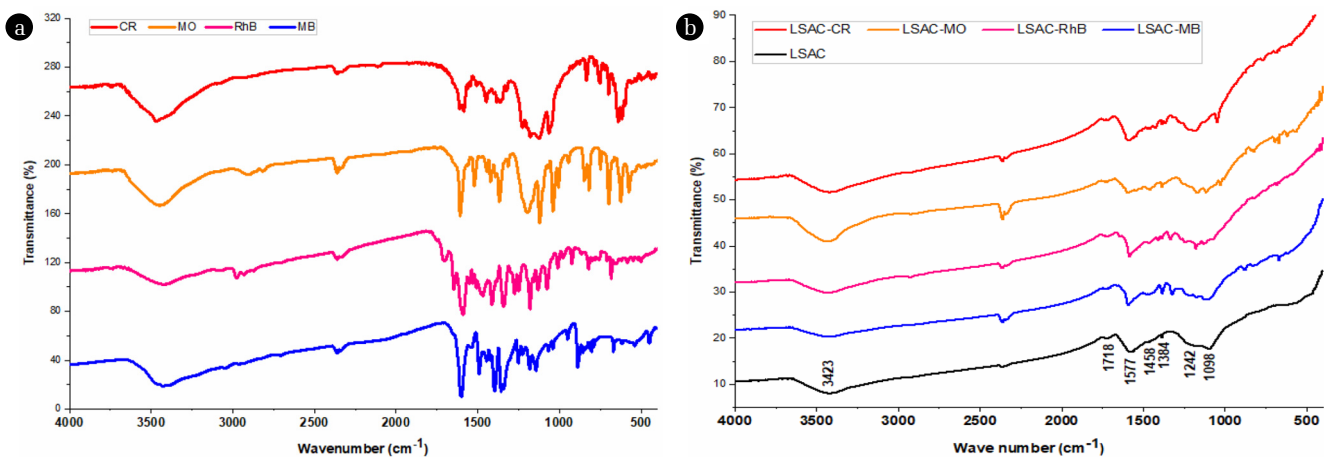


Fig. S4. FT-IR spectra of a) pure MB, RhB, MO and CR dyes; b) longan seed-derived LSAC before and after adsorption of MB, RhB, MO and CR.

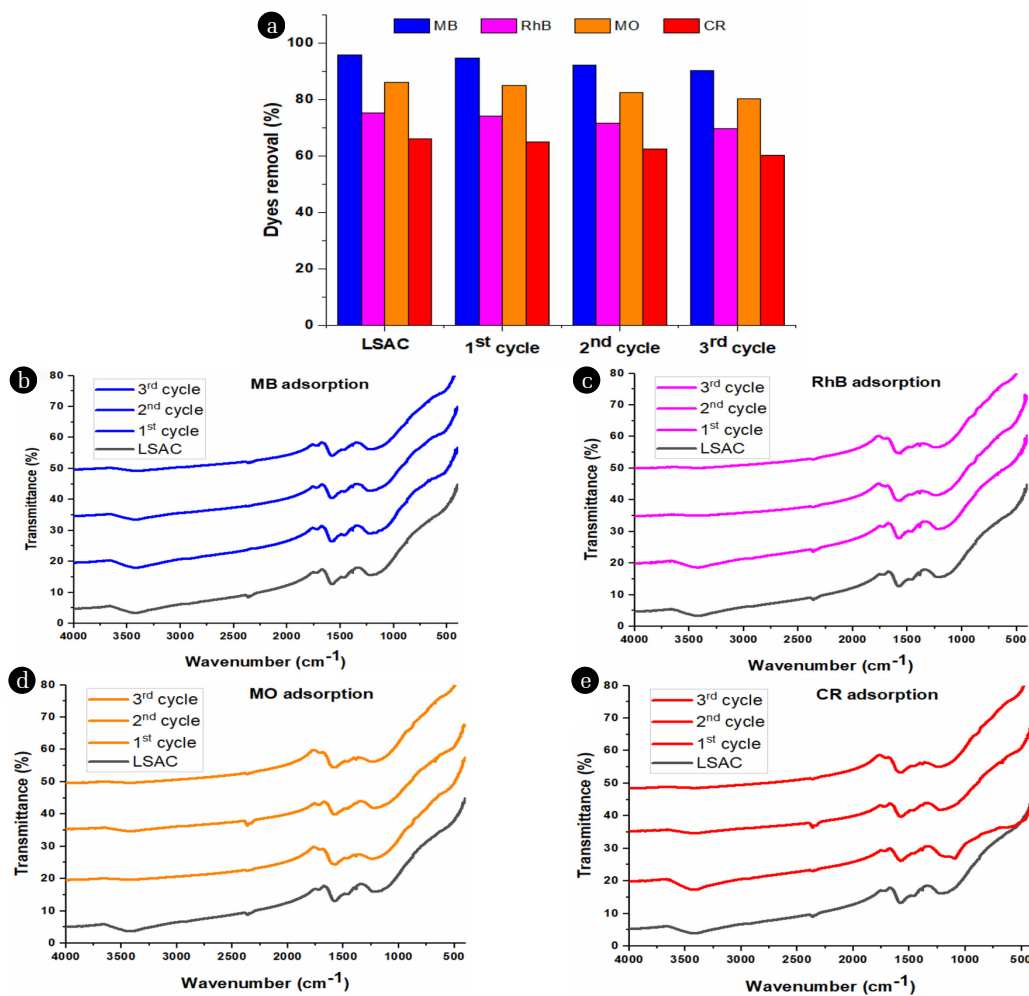


Fig. S5. a) Reusability of LSAC for MB, RhB, MO and CR dyes removal; b), c), d) and e) FT-IR spectra of LSAC after three cycles of MB, RhB, MO and CR adsorption, respectively.

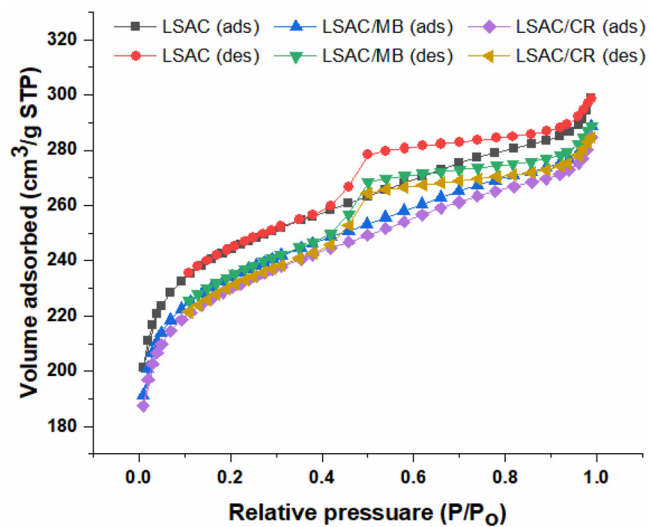


Fig. S6. Nitrogen adsorption-desorption isotherms of LSAC samples before and after three cycles of MB (LSAC/MB) and CR (LSAC/CR) adsorption.