Supplementary material

Montmorillonite-Based Natural Adsorbent from Colombia for the Removal of Organic Pollutants from Water: Isotherms, Kinetics, Nature of Pollutants, and Matrix Effects

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Table S1. Chemical composition of fresh urine and textile wastewater.

Fresh Urine		**Textile wastewater**	
Concentration [mg L^{-1}]		**Concentration [mg L^{-1}]**	
Urea	16000	Dye	Required concentration
Na_2SO_4	2300	NaCl	1500
NH_4Cl	1800	Na_2CO_3	500
NaH_2PO_4	2900	$NaHCO_3$	500
KCl	4200	NaOH	500
$MgCl_2•6H_2O$	790	H_2SO_4	800
$CaCl_2•2H_2O$	680	Starch	500
NaOH	120		

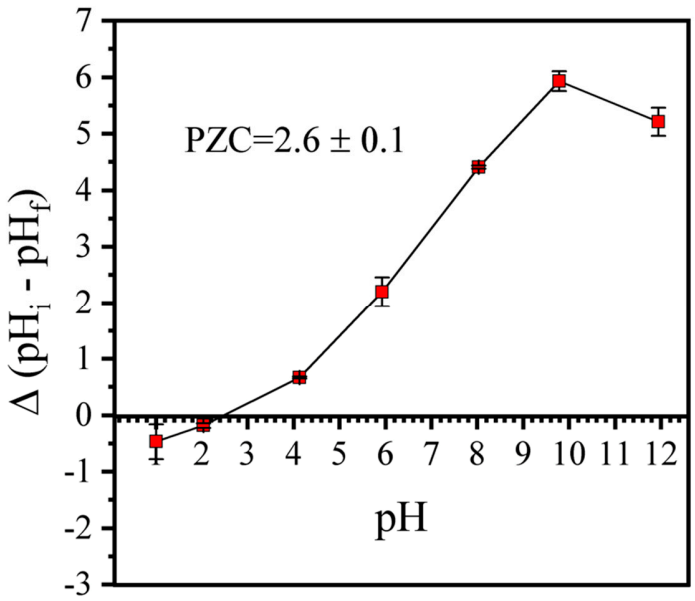

Figure S1. Determination of PZC value of MMT

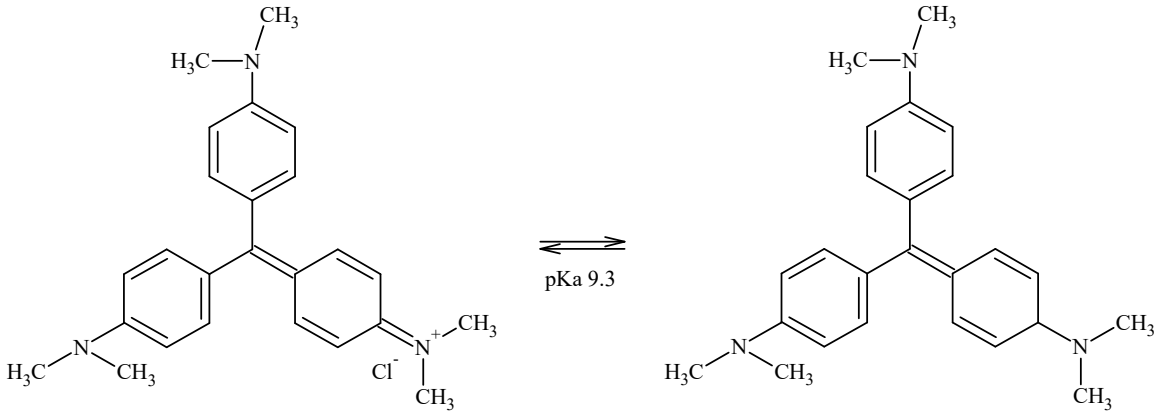

Figure S2. Structure CV

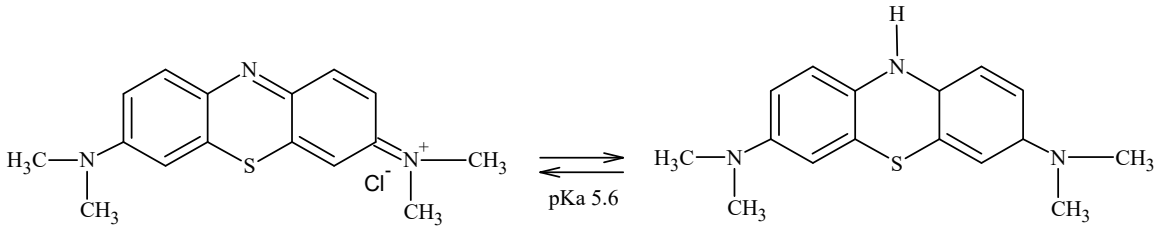

Figure S3. Structure MB

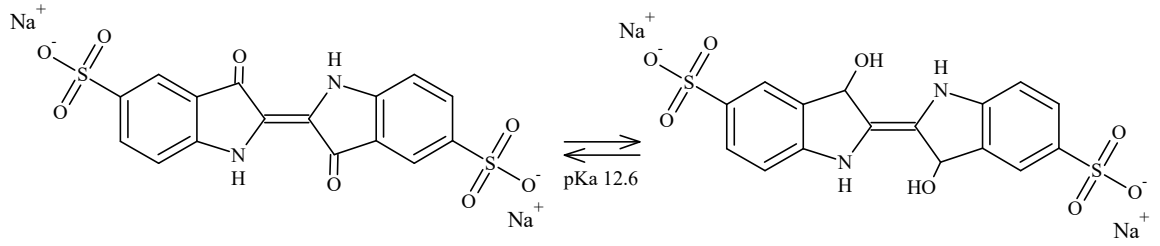

Figure S4. Structure IC

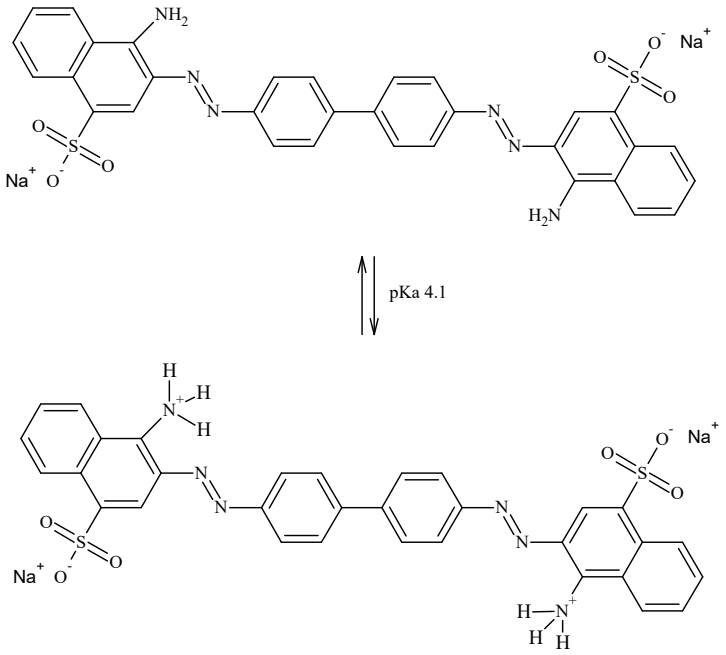

Figure S5. Structure CR

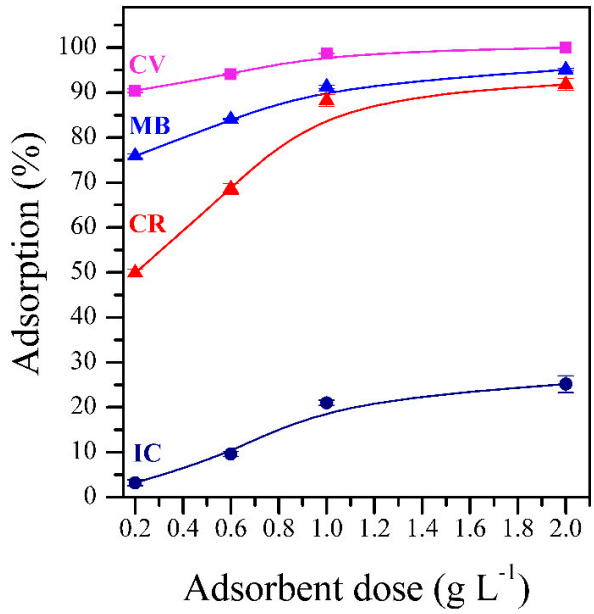

Figure S6. Effect of MMT dose in the adsorption percentage of CV, MB, CR and IC after 60 min. Conditions: Dyes concentration 1.23 x 10^{-2} mmol L^{-1}, adsorbent dose 0.2 – 2 g L^{-1}, particle size <200 µm, pH: IC: 5.7; CR: 6.5; MB: 5.6; CV: 7.3, temperature 25°C, stirring rate 200 rpm.

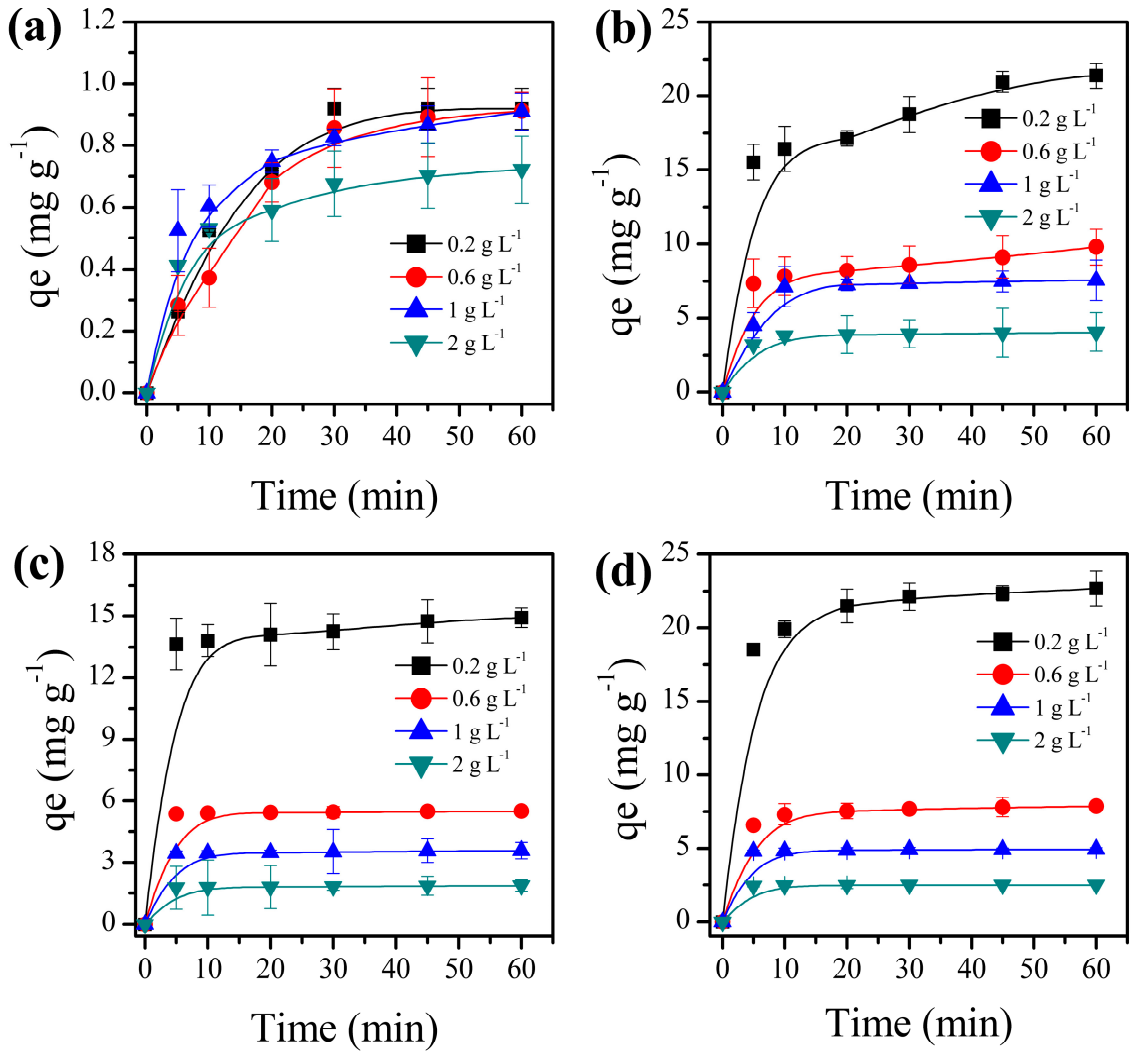

Figure S7. IC, CR, MB and CV removal in distilled water using different doses of MMT. Conditions: dyes concentration 1.23 x 10^{-2} mmol L^{-1} (IC: 5.74 mg L^{-1}, CR: 8.57 mg L^{-1}, MB: 3.93 mg L^{-1} and CV: 4.85 mg L^{-1}), adsorbent dose 0.2 - 2 g L^{-1}, particle size <200 µm, pH: IC: 5.7; CR: 6.5; MB: 5.6; CV: 7.3, temperature 25°C, stirring rate 200 rpm.

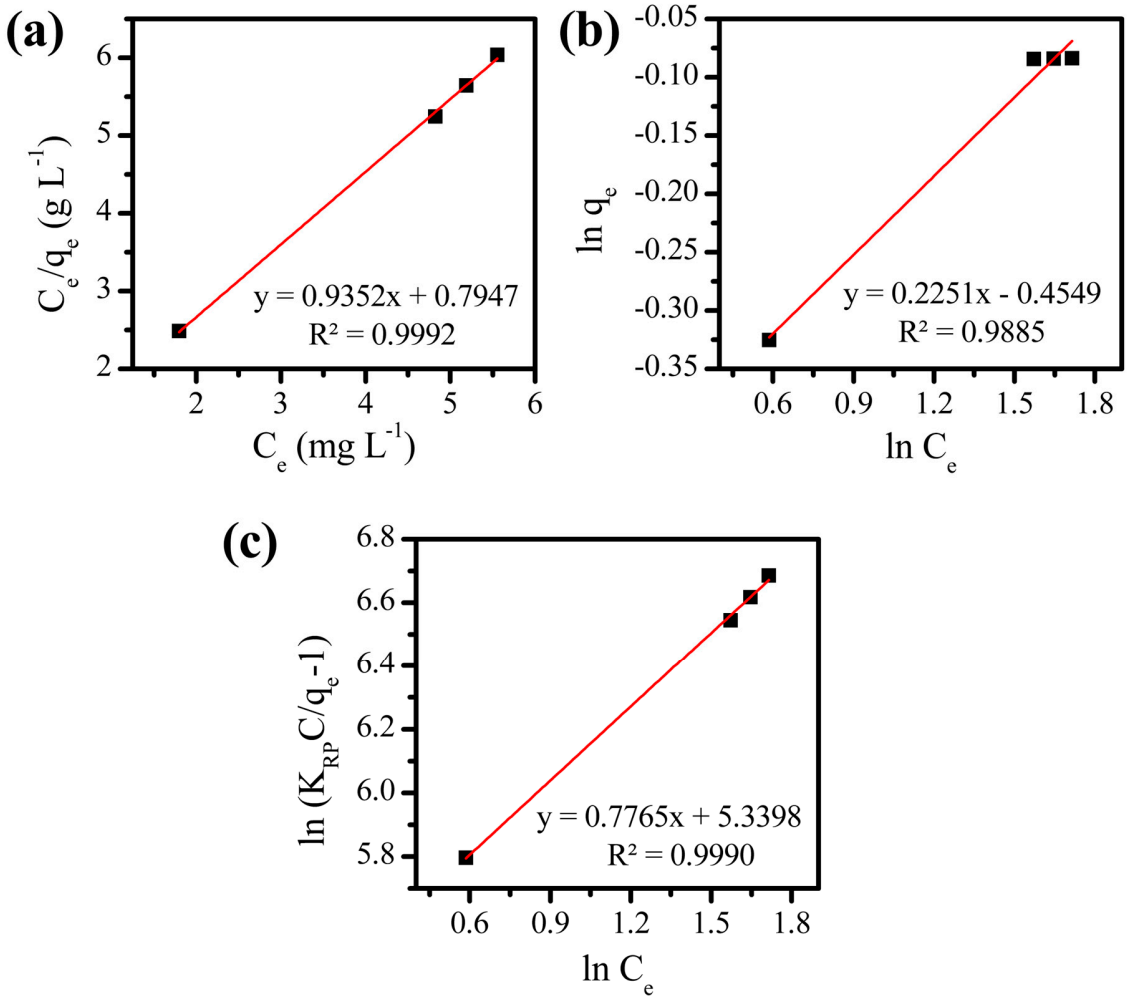

Figure S8. Adsorption isotherms for IC removal in distilled water using MMT as an adsorbent. (a) Langmuir model; (b) Freundlich model; (c) Redlich-Peterson model. Conditions: dye concentration 1.23 x 10^{-2} mmol L^{-1} (5.74 mg L^{-1}), adsorbent dose 0.2 - 2 g L^{-1}, particle size <200 µm, pH: 5.7, temperature 25°C, stirring rate 200 rpm, time 60 min.

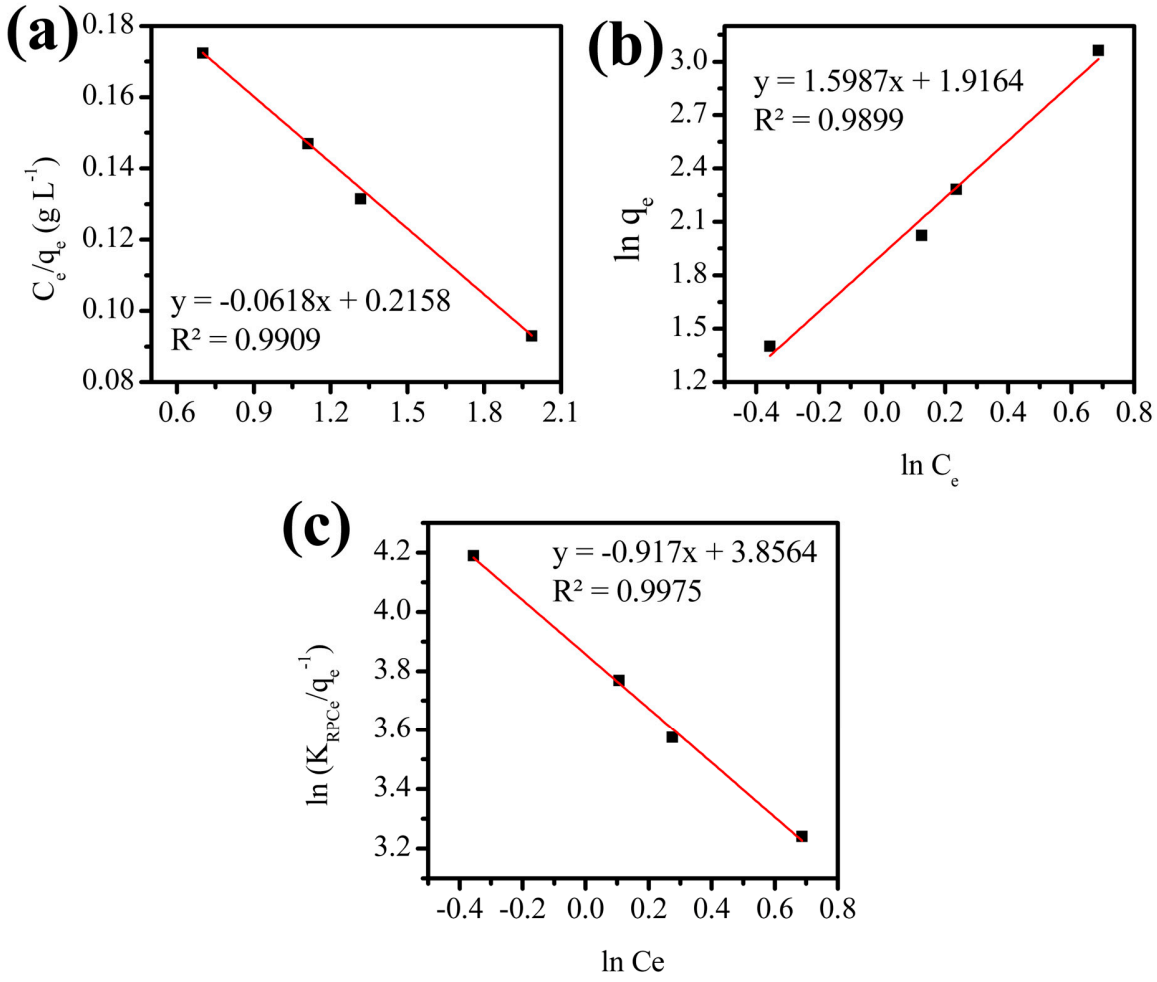

Figure S9. Adsorption isotherms for CR removal in distilled water using MMT as an adsorbent. (a) Langmuir model; (b) Freundlich model; (c) Redlich-Peterson model. Conditions: dye concentration 1.23 x 10^{-2} mmol L^{-1} (8.57 mg L^{-1}), adsorbent dose 0.2 - 2 g L^{-1}, particle size <200 µm, pH: 6.5, temperature 25°C, stirring rate 200 rpm, time 60 min.

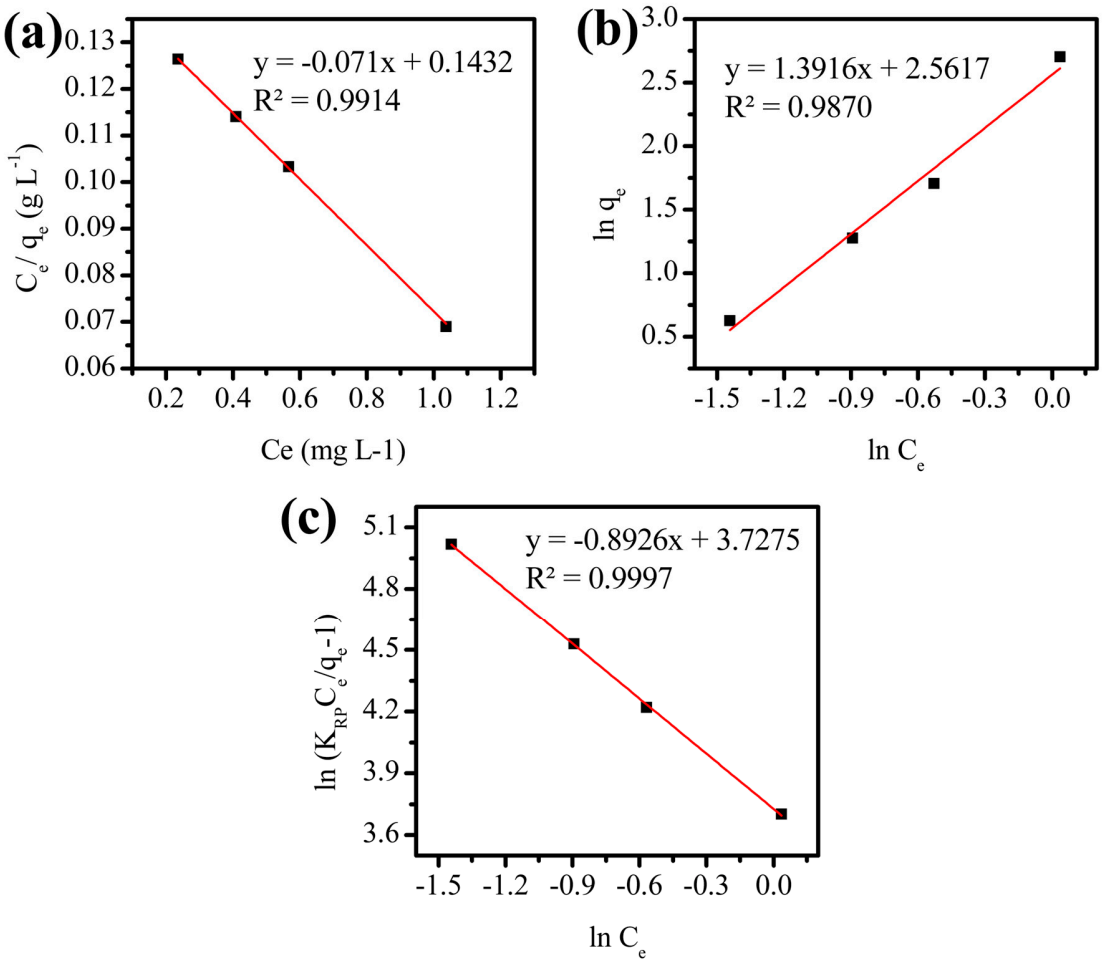

Figure S10. Adsorption isotherms for MB removal in distilled water using MMT as an adsorbent. (a) Langmuir model; (b) Freundlich model; (c) Redlich-Peterson model. Conditions: dye concentration 1.23 x 10^{-2} mmol L^{-1} (3.93 mg L^{-1}), adsorbent dose 0.2-2 g L^{-1}, particle size <200 µm, pH: 5.6, temperature 25°C, stirring rate 200 rpm, time 60 min.

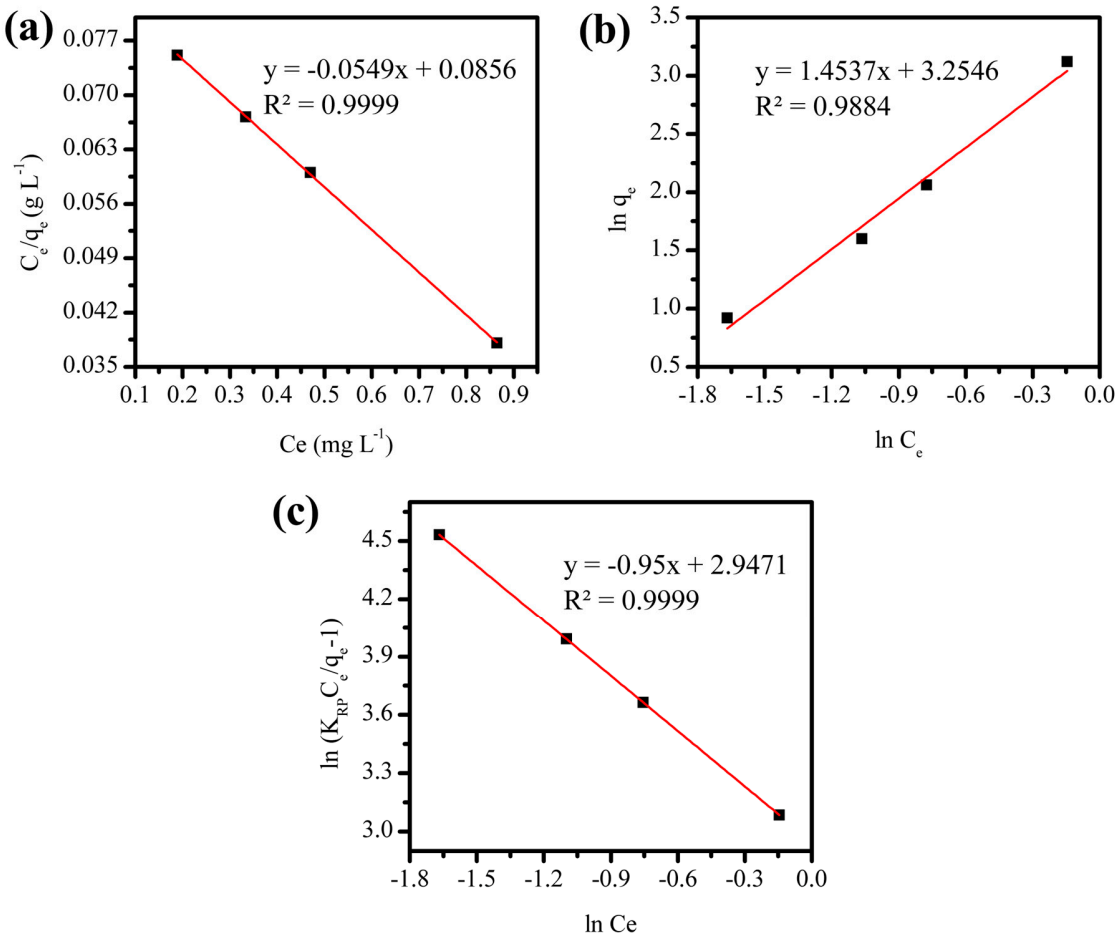

Figure S11. Adsorption isotherms for CV removal in distilled water using MMT as an adsorbent. (a) Langmuir model; (b) Freundlich model; (c) Redlich-Peterson model. Conditions: dye concentration 1.23 x 10^{-2} mmol L^{-1} (4.85 mg L^{-1}), adsorbent dose 0.2 - 2 g L^{-1}, particle size <200 µm, pH: 7.3, temperature 25°C, stirring rate 200 rpm, time 60 min.

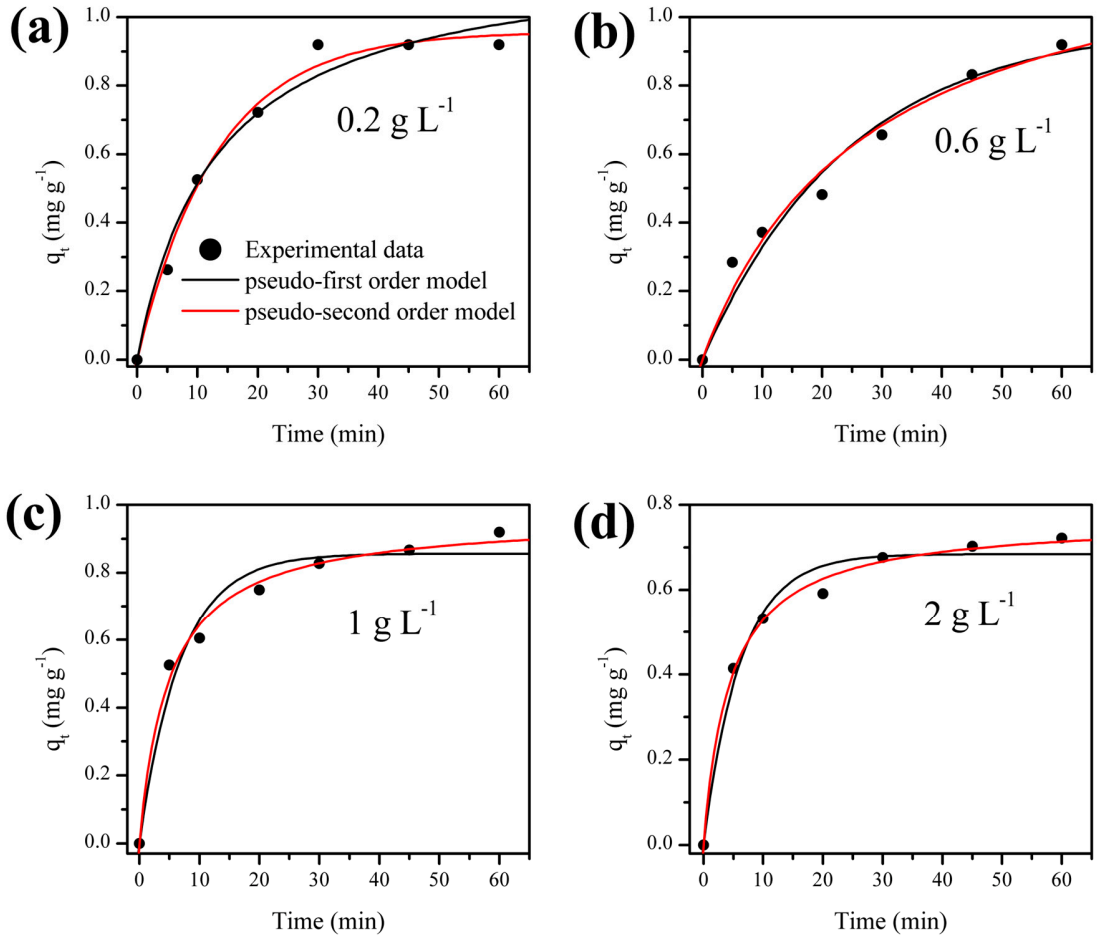

Figure S12. Kinetics of pseudo-first order model and pseudo-second order model for IC removal in distilled water using MMT as an adsorbent. (a) 0.2 g L^{-1}; (b) 0.6 g L^{-1}; (c) 1 g L^{-1}; (d) 2 g L^{-1}. Conditions: dye concentration 1.23 x 10^{-2} mmol L^{-1} (5.74 mg L^{-1}), particle size <200 µm, pH: 5.7, temperature 25°C, stirring rate 200 rpm, time 60 min.

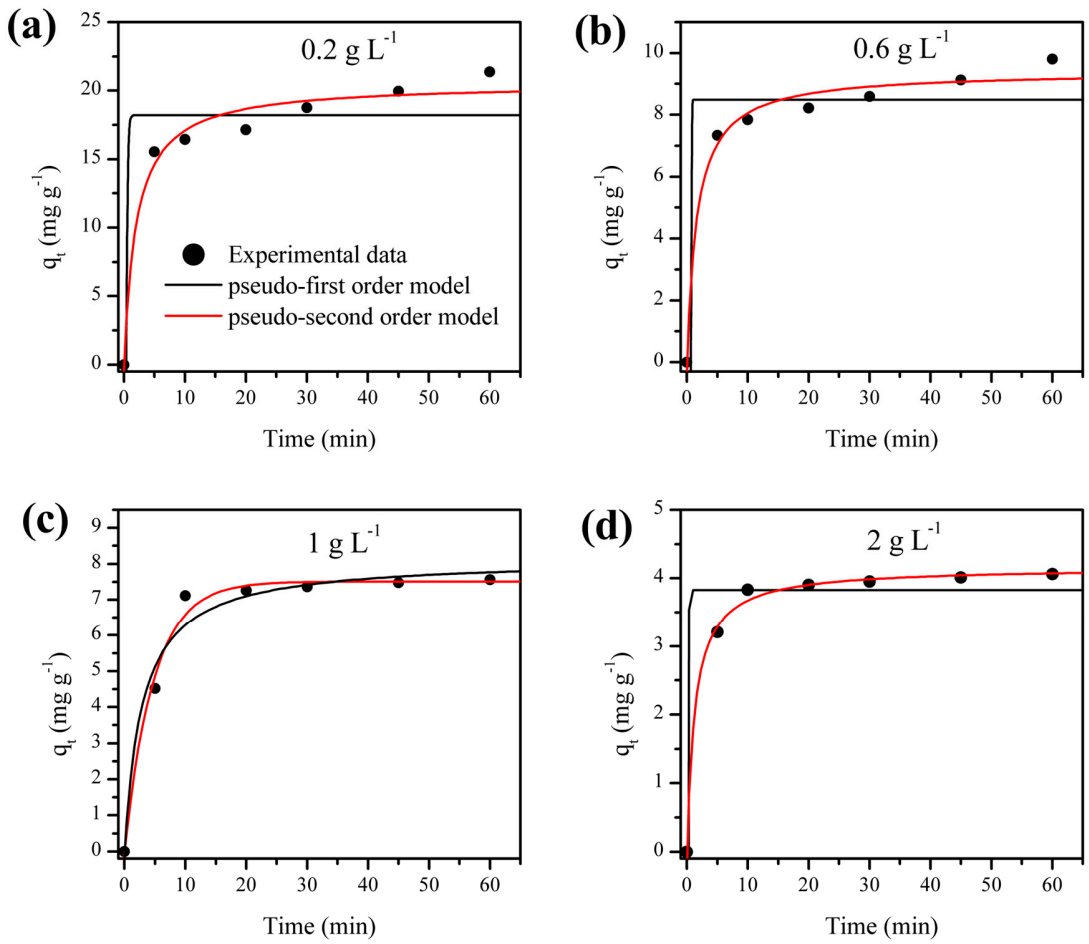

Figure S13. Kinetics of pseudo-first order model and pseudo-second order model for CR removal in distilled water using MMT as an adsorbent. (a) 0.2 g L^{-1}; (b) 0.6 g L^{-1}; (c) 1 g L^{-1}; (d) 2 g L^{-1}. Conditions: dye concentration 1.23 x 10^{-2} mmol L^{-1} (8.57 mg L^{-1}), particle size <200 µm, pH: 6.5, temperature 25°C, stirring rate 200 rpm, time 60 min.

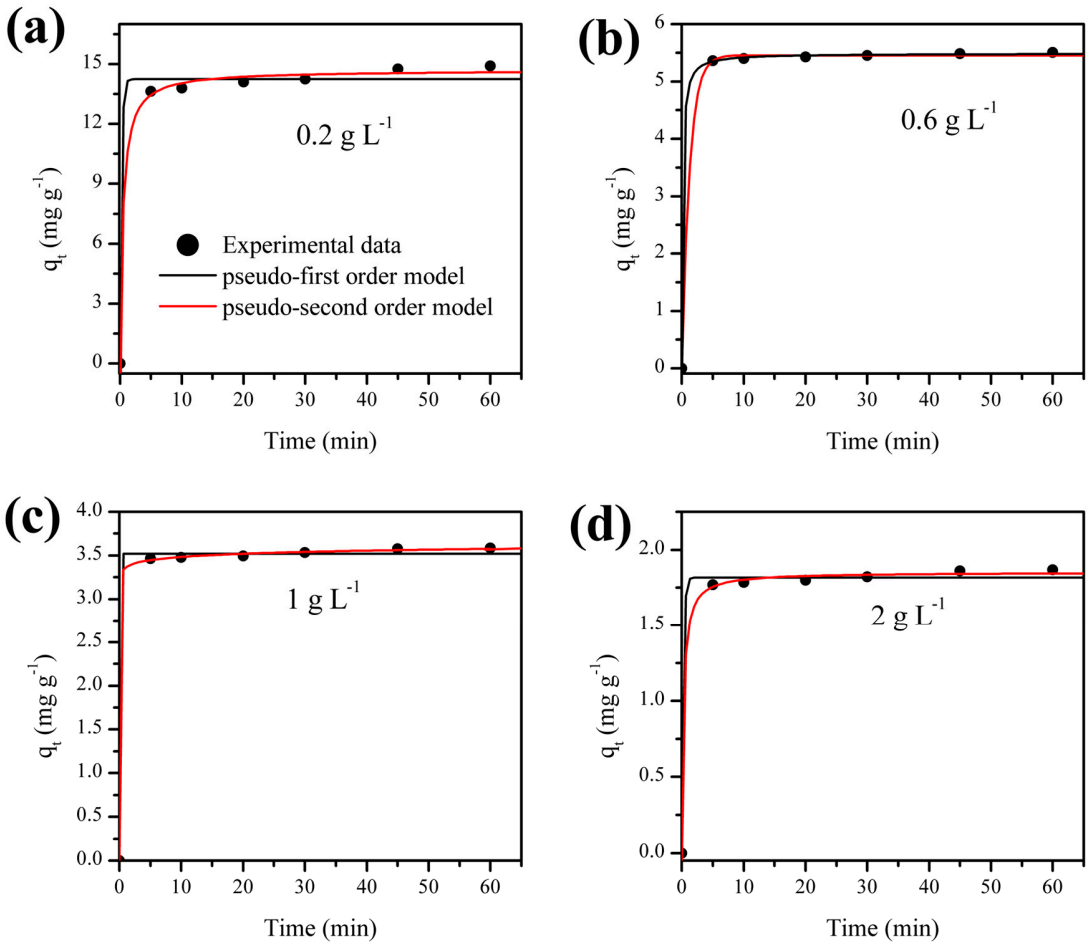

Figure S14. Kinetics of pseudo-first order model and pseudo second-order model for MB removal in distilled water using MMT as an adsorbent. (a) 0.2 g L^{-1}; (b) 0.6 g L^{-1}; (c) 1 g L^{-1}; (d) 2 g L^{-1}. Conditions: dye concentration 1.23 x 10^{-2} mmol L^{-1} (3.93 mg L^{-1}), particle size <200 µm, pH: 5.6, temperature 25°C, stirring rate 200 rpm, time 60 min.

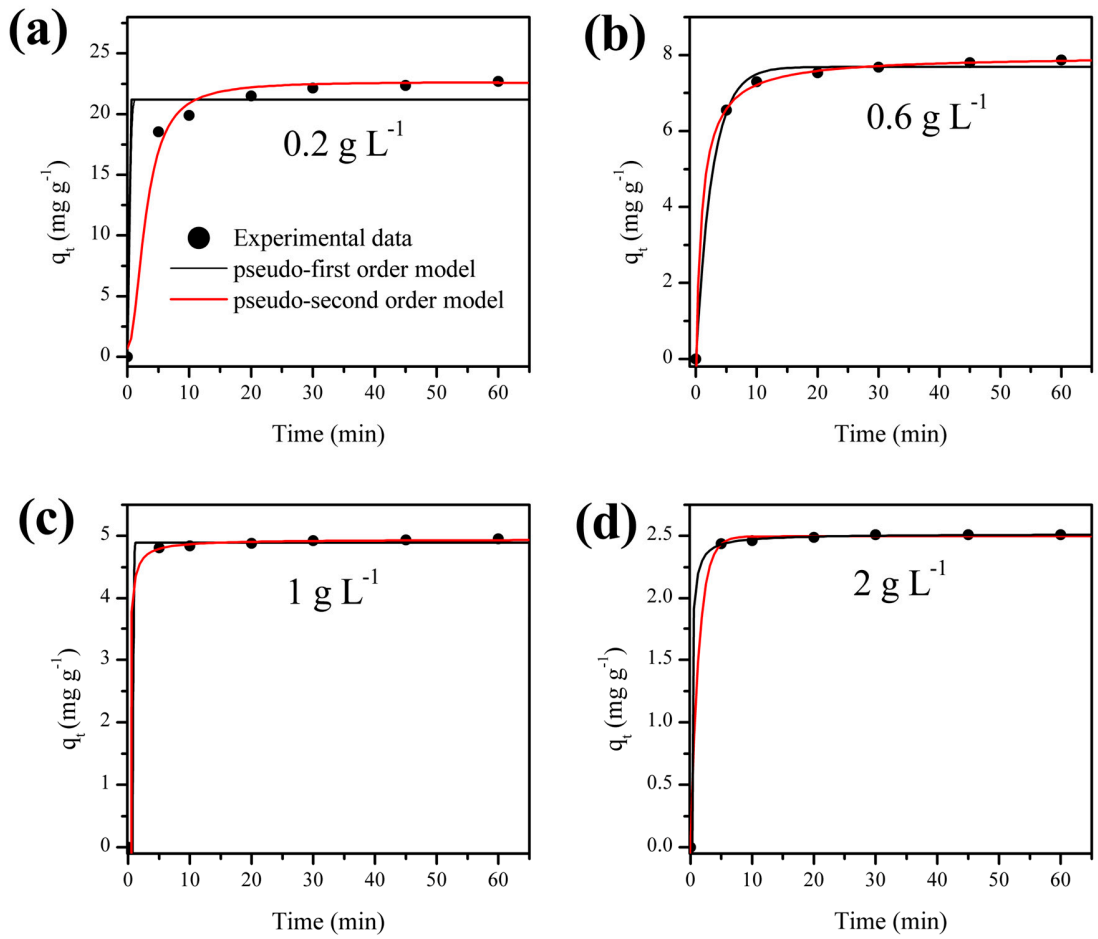

Figure S15. Kinetics of pseudo-first order model and pseudo-second order model for CV removal in distilled water using MMT as an adsorbent. (a) 0.2 g L^{-1}; (b) 0.6 g L^{-1}; (c) 1 g L^{-1}; (d) 2 g L^{-1}. Conditions: dye concentration 1.23 x 10^{-2} mmol L^{-1} (4.85 mg L^{-1}), particle size <200 µm, pH: 7.3, temperature 25°C, stirring rate 200 rpm, time 60 min.