Green Modification of Iron Oxide Nanoparticles with *Achillea wilhelmsii* and Investigation of Their Performance for Methylene Blue Adsorption

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Table S1

Antioxidant activity of *Achillea wilhelmsii C. Koch* extract at different concentration

Achillea wilhelmsii C. Koch aqueous extract (mg/mL)	% DPPH radical scavenging effect
50	27.04± 0.75
100	59.39± 1.01
150	79.52± 2.17

Table S2. Comparison of the adsorption capacity (q_e) of the Aw-Fe_3O_4 NPs to that of already known Fe_3O_4 NPs adsorbent.

Adsorbent	Particles size (nm)	Surface area (m^2/g)	Organic dye	Adsorption capacity (mg/g)	references
Alg–Fe3O4	12	-	Malachite green	13.76	[1]
Fe3O4@PDA	340	-	Methylene blue	10	[2]
Fe_3O_4@GTPs NPs	13.5	-	Methylene blue	7.25	[3]
Z. a. Fe_3O_4 NPs	17	-	Methylene blue	3.55	[4]
Fe-AC	-	940.132	Methylene Blue	370.4	[5]
Fe_3O_4-AC	-	389.23	Malachite green	311.40	[6]
Coal fly ash	-	2.6991	Methylene Blue	0.12	[7]
γ-Fe_2O_3	38–45	81.61	Malachite green	227.3	[8]
Fe_3O_4	10	170	Methylene Blue	185.5	[9]
Aw-Fe_3O_4 NPs	18	32.63	Methylene blue	7.91	This work

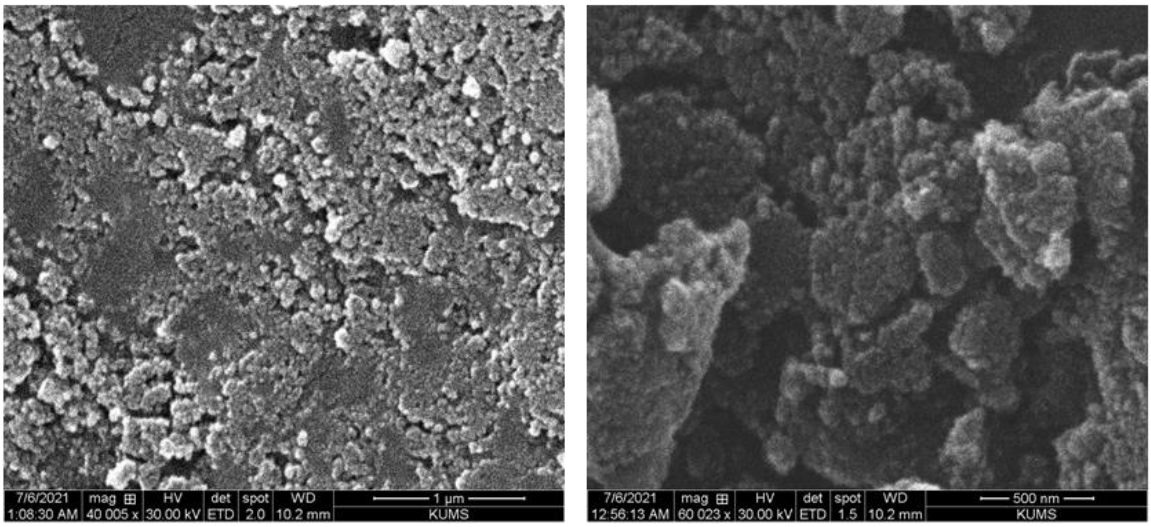

Fig. S1. SEM images of Aw-Fe_3O_4 NPs

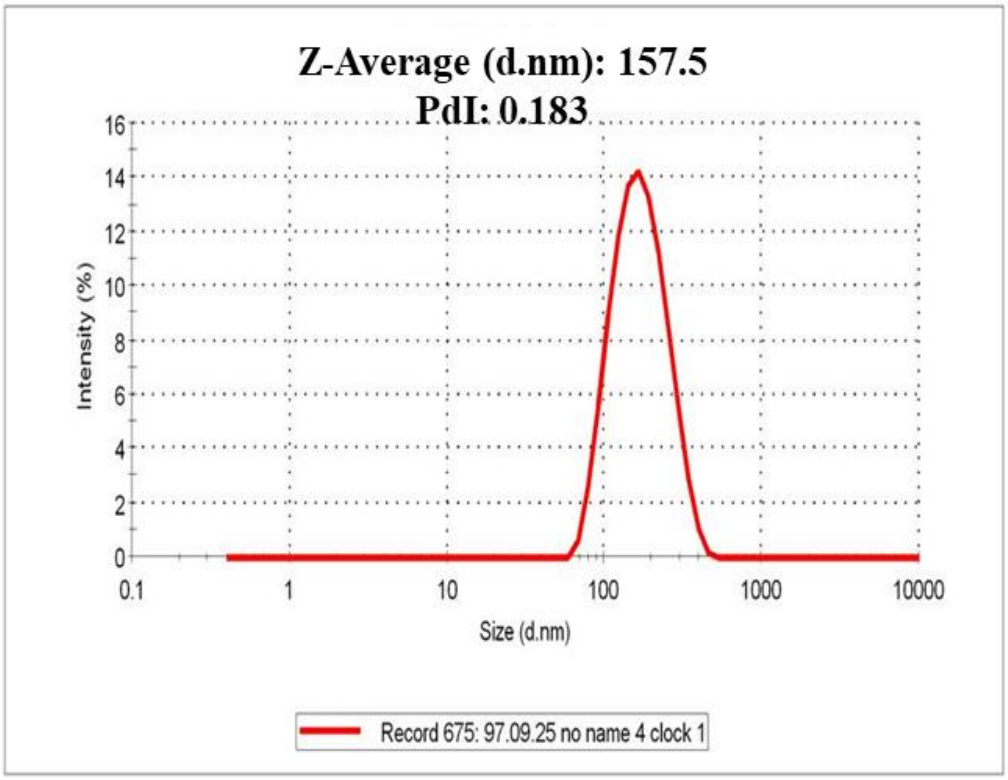

Fig. S2. Dynamic light scattering (DLS) of the Aw-Fe_3O_4 NPs.

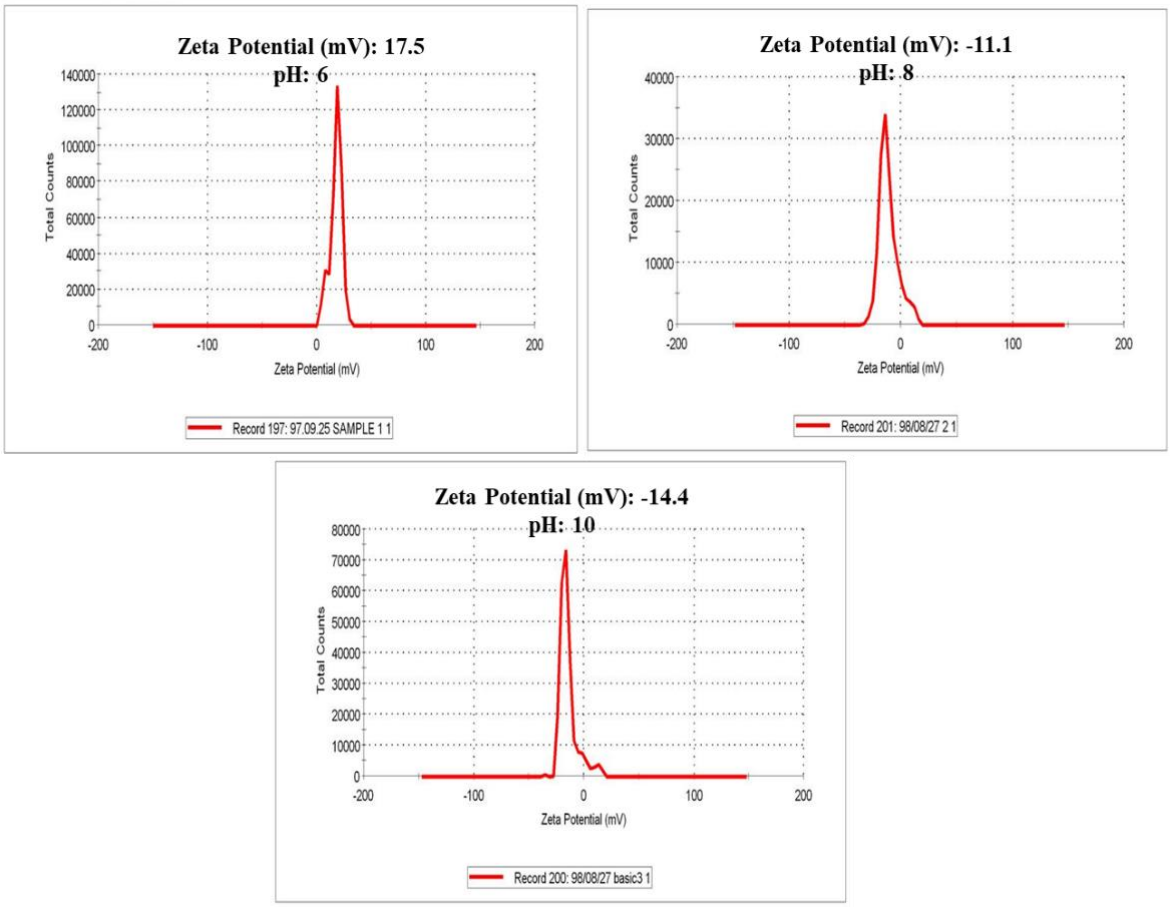

Fig. S3. Zeta potential analysis of the Aw-Fe_3O_4 NPs at; pH: 6, pH: 8, pH: 10.

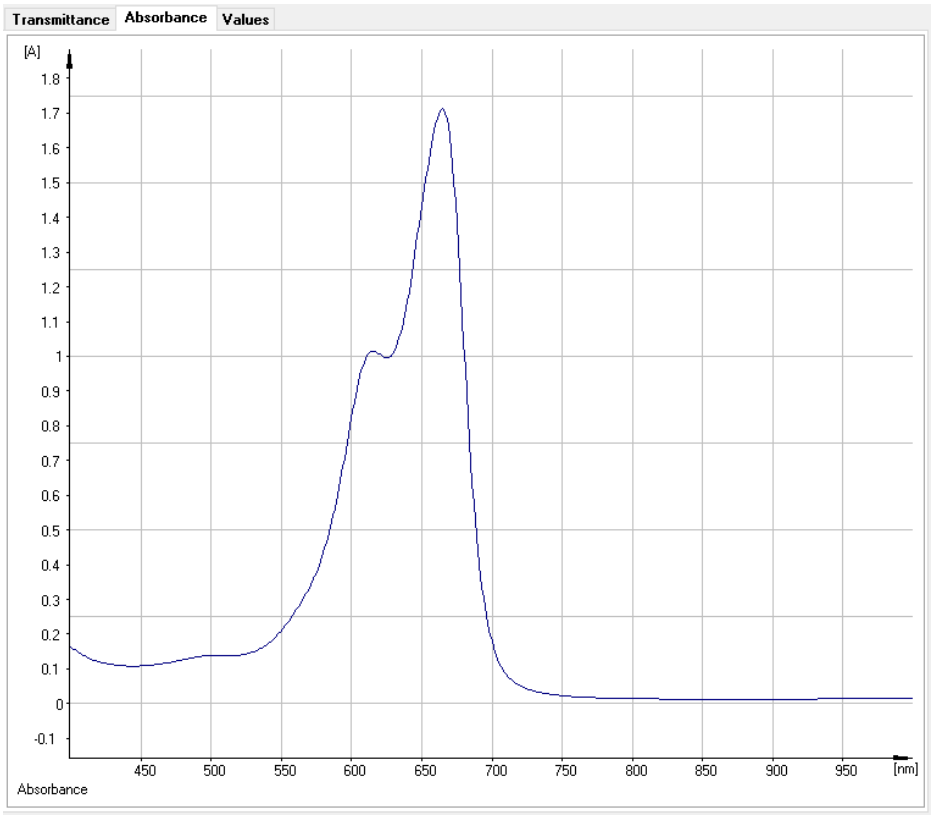

Fig. S4. The UV-vis spectra of MB (30 ppm).

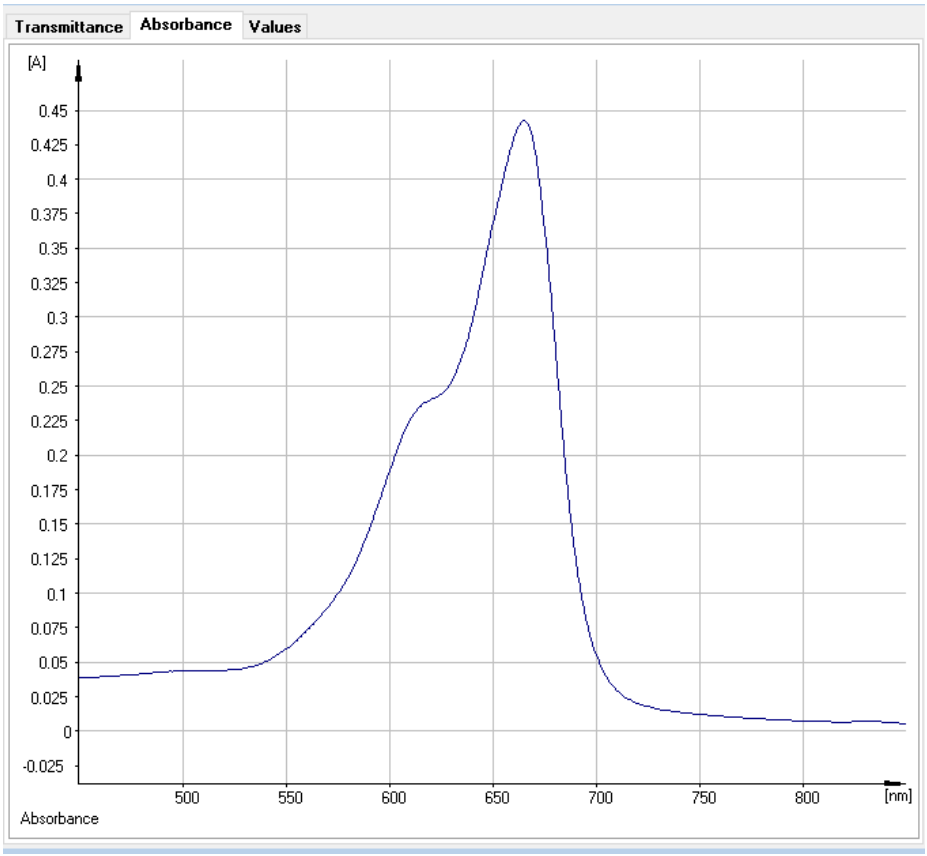

Fig. S5. The UV-vis spectra of MB after exposure to Aw-Fe_3O_4 NPs (pH 11, 30 ppm, 120 min).

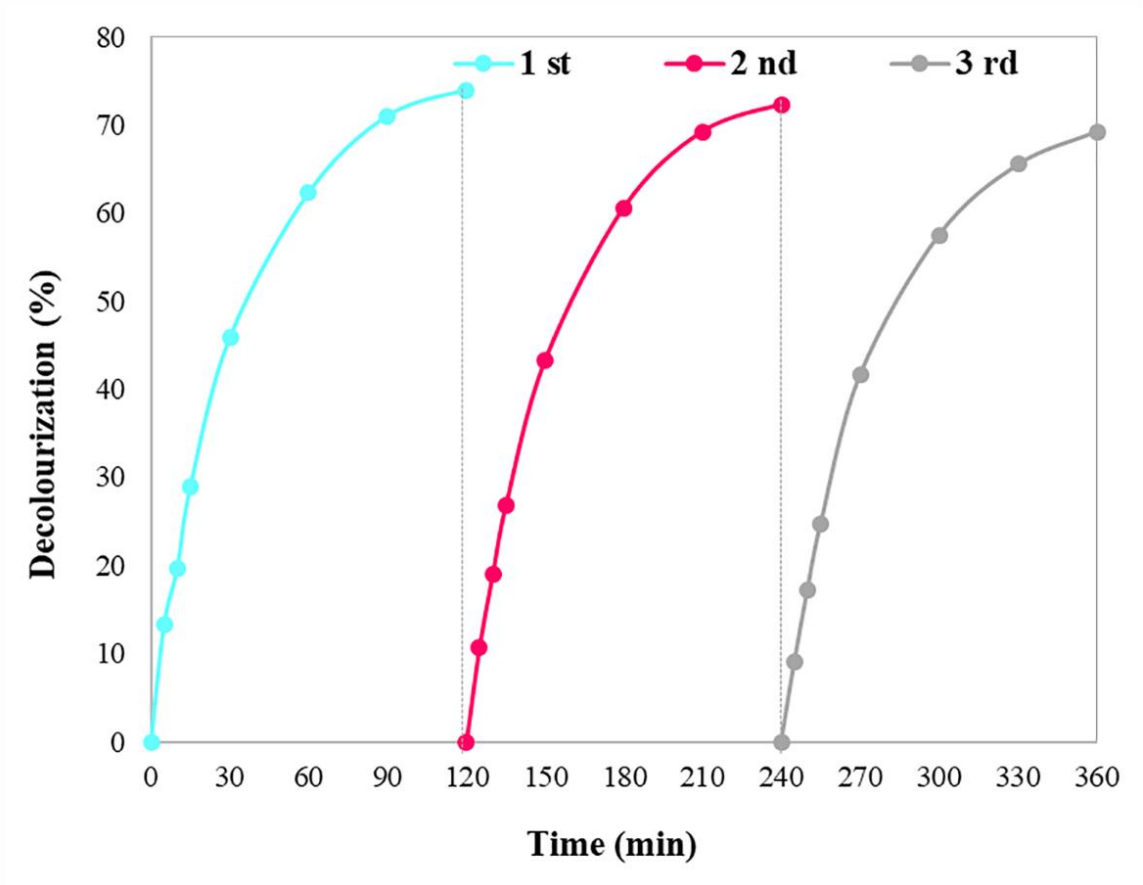

Fig S6. Catalytic reusability of the Aw-Fe_3O_4 NPs for adsorption of MB for three cycling runs.

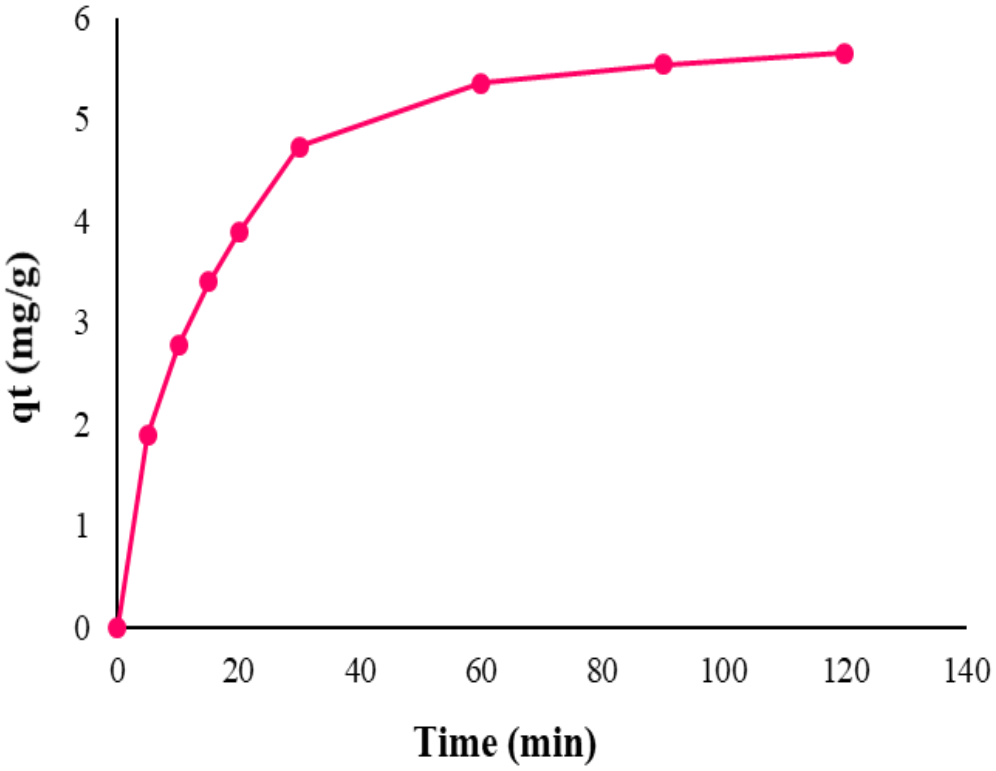

Fig S7. Effect of contact time on the adsorption of MB on Aw-Fe_3O_4 NPs.

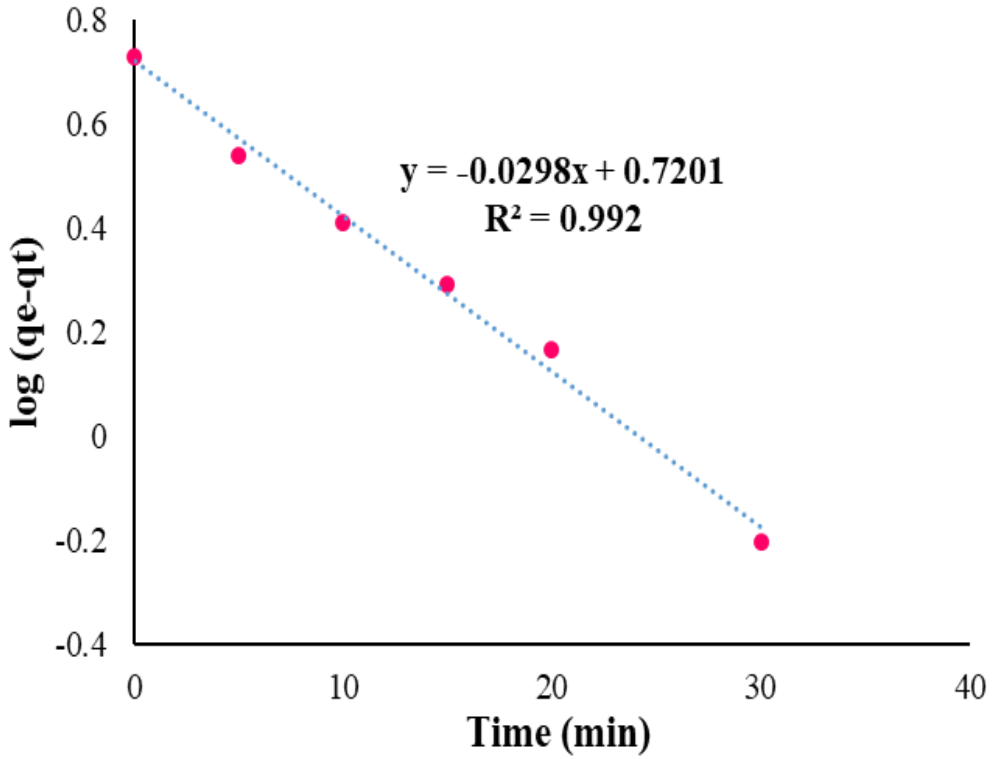

Fig S8. Pseudo-first order plots for the adsorption of MB onto the Aw-Fe_3O_4 NPs.

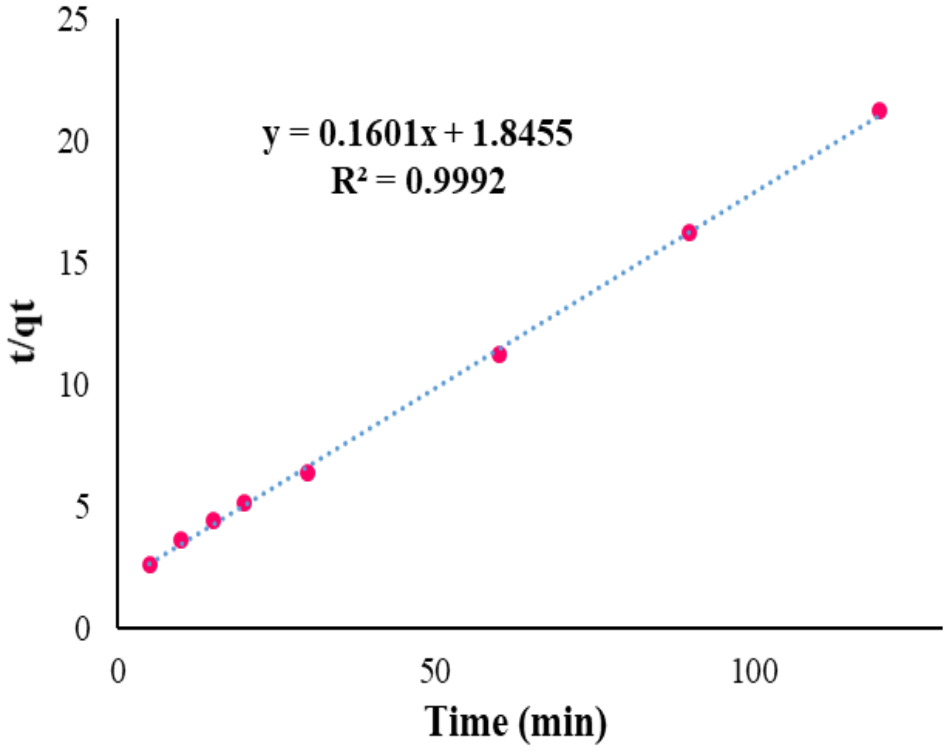

Fig S9. Pseudo-second order plots for the adsorption of MB onto the Aw-Fe_3O_4 NPs.

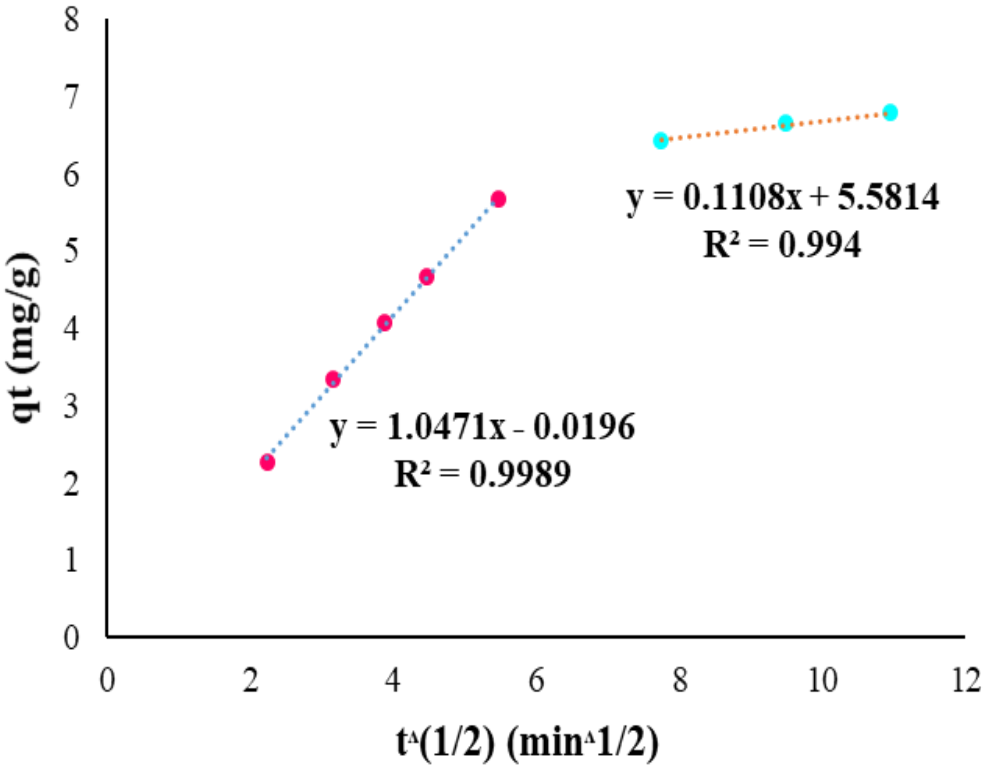

Fig S10. Intraparticle diffusion plots for the adsorption of MB onto the Aw-Fe_3O_4 NPs.

Reference

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