

Supporting information for:

Enhancement of trihalomethane adsorption capacity using chitosan-modified coconut shell activated carbon: adsorption characteristics and mechanism

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Contents

Text S1. Effect of the ratio for CS to CAC.

Table S1. Features of CAC used for the experiments.

Table S2. GC-ECD conditions.

Fig. S1. Effect of the ratio for CS to CAC on adsorption capacity and removal efficiency of THMs.

Fig. S2. The result of the point of zero charge detection of CS/CAC adsorbent.

Fig. S3. Langmuir isotherm model for THMs adsorption onto CS/CAC: (A) TCM, (B) BDCM, (C) DBCM, and TBM.

Fig. S4. Freundlich isotherm model for THMs adsorption onto CS/CAC: (A) TCM, (B) BDCM, (C) DBCM, and TBM.

Fig. S5. Temkin isotherm model for THMs adsorption onto CS/CAC: (A) TCM, (B) BDCM, (C) DBCM, and TBM.

Fig. S6. Pseudo-first-order kinetics model of adsorption of THMs onto CS/CAC: (A) TCM, (B) BDCM, (C) DBCM, and TBM.

Fig. S7. Pseudo-second-order kinetics model of adsorption of THMs onto CS/CAC: (A) TCM, (B) BDCM, (C) DBCM, and TBM.

Fig. S8. Elovich kinetics model of adsorption of THMs onto CS/CAC: (A) TCM, (B) BDCM, (C) DBCM, and TBM.

Fig. S9. Effect of generation cycles on adsorption capacity of THMs on CS/CAC.

Text S1. Effect of the ratio for CS to CAC.

Fig.S1 shows the effect of CS to CAC weight percentage on THMs uptake. The THMs removal rate of CS/10CAC was the highest. The highest adsorption capacity and removal rate of TCM, BDCM, DBCM, and TBM were 31.59 $\mu\text{g/g}$ and 53.88%, 29.37 $\mu\text{g/g}$ and 48.20%, 26.38 $\mu\text{g/g}$ and 42.94%, and 25.64 $\mu\text{g/g}$ and 38.09%, respectively, CS/7CAC showed slightly lower THMs uptake and removal. CS/CAC was the lowest adsorption capacity and removal rate of TCM, BDCM, DBCM, and TBM were 22.02 $\mu\text{g/g}$ and 37.55%, 19.59 $\mu\text{g/g}$ and 32.16%, 16.86 $\mu\text{g/g}$ and 27.45%, and 15.67 $\mu\text{g/g}$ and 23.29%, respectively. This proves that the ratio of CS to CAC is crucial in the adsorption of THMs. Considering the cost and adsorption capacity comprehensively, the weight percentage of CS and CAC in the experiment was selected as 1:10.

Table S1. Features of CAC used for the experiments.

Features	CAC
Diameter	30-60 mesh
Iodine number (mg/g)	>1015
BET surface area (m ² /g)	1254
BET surface area after loaded CS (m ² /g)	968

Table S2. GC-ECD conditions.

Measurement conditions	
Sample volume	1 μ L
Sampling mode	No shunt, 40 mL/min after 0.5 min
Injector temperature	200 °C
Order	HP-5(30 m \times 0.25 mm \times 0.25 μ m)
Detector temperature	300°C
Carrier gas	N ₂
Tail blow N ₂ flow	30 mL/min
Column flow rate	1.0 mL/min
Furnace program	36°C,5 min 10°C/min to 70°C,3.5 min Rise at 20 °C / min to 200 °C and run at 200 °C for 3 min
Total time	21 min

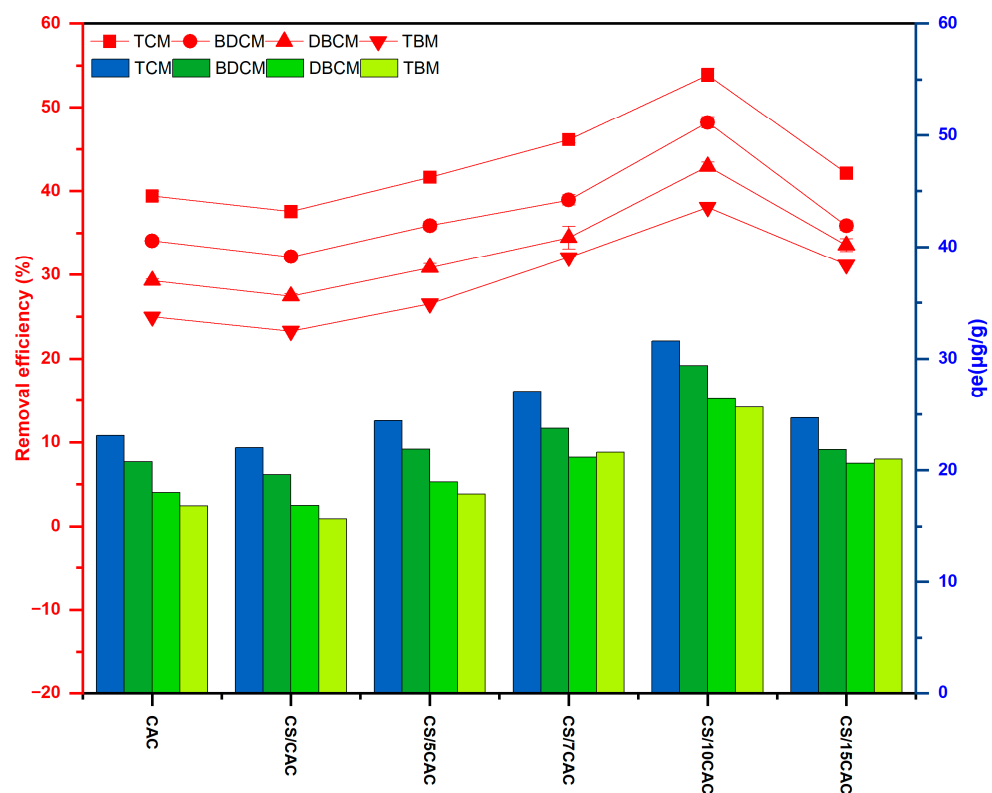


Fig. S1. Effect of the ratio for CS to CAC on adsorption capacity and removal efficiency of THMs.

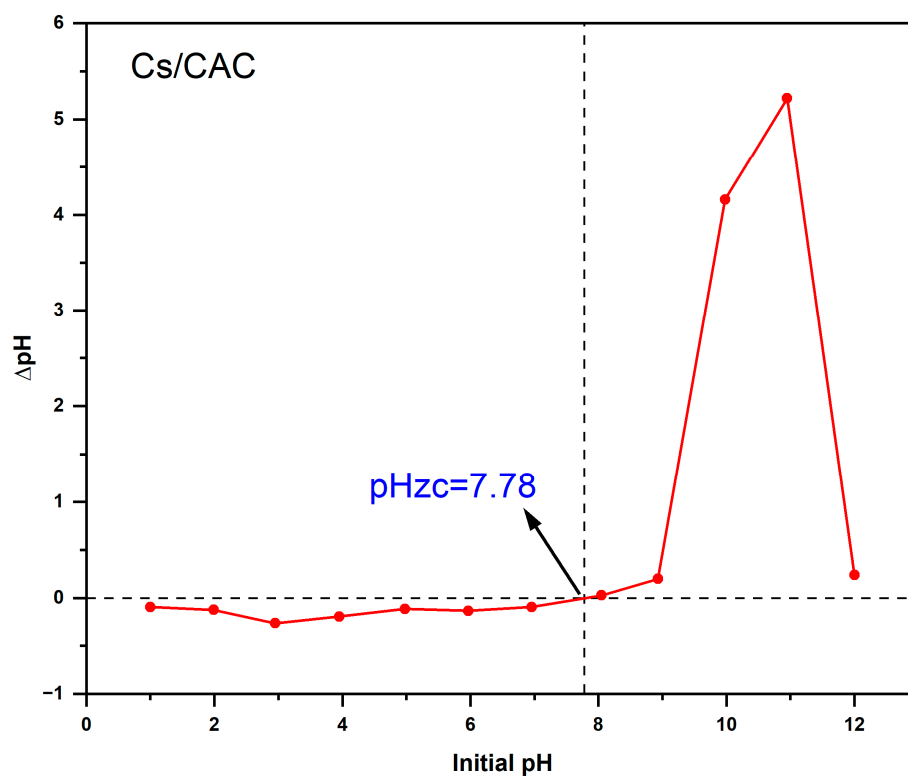


Fig. S2. The result of the point of zero charge detection of CS/CAC adsorbent.

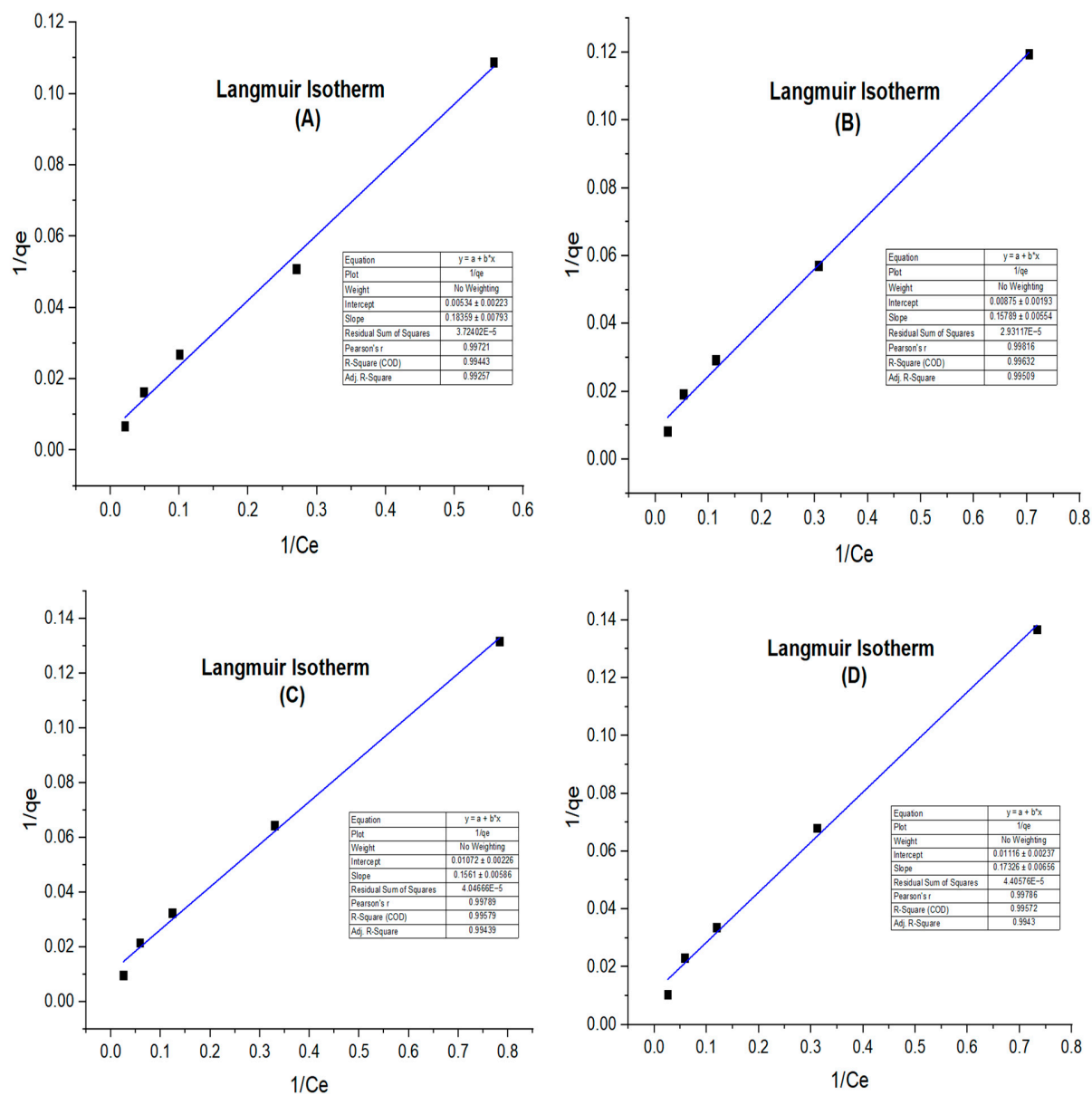


Fig. S3. Langmuir isotherm model for THMs adsorption onto CS/CAC: (A) TCM, (B) BDCM, (C) DBCM, and TBM.

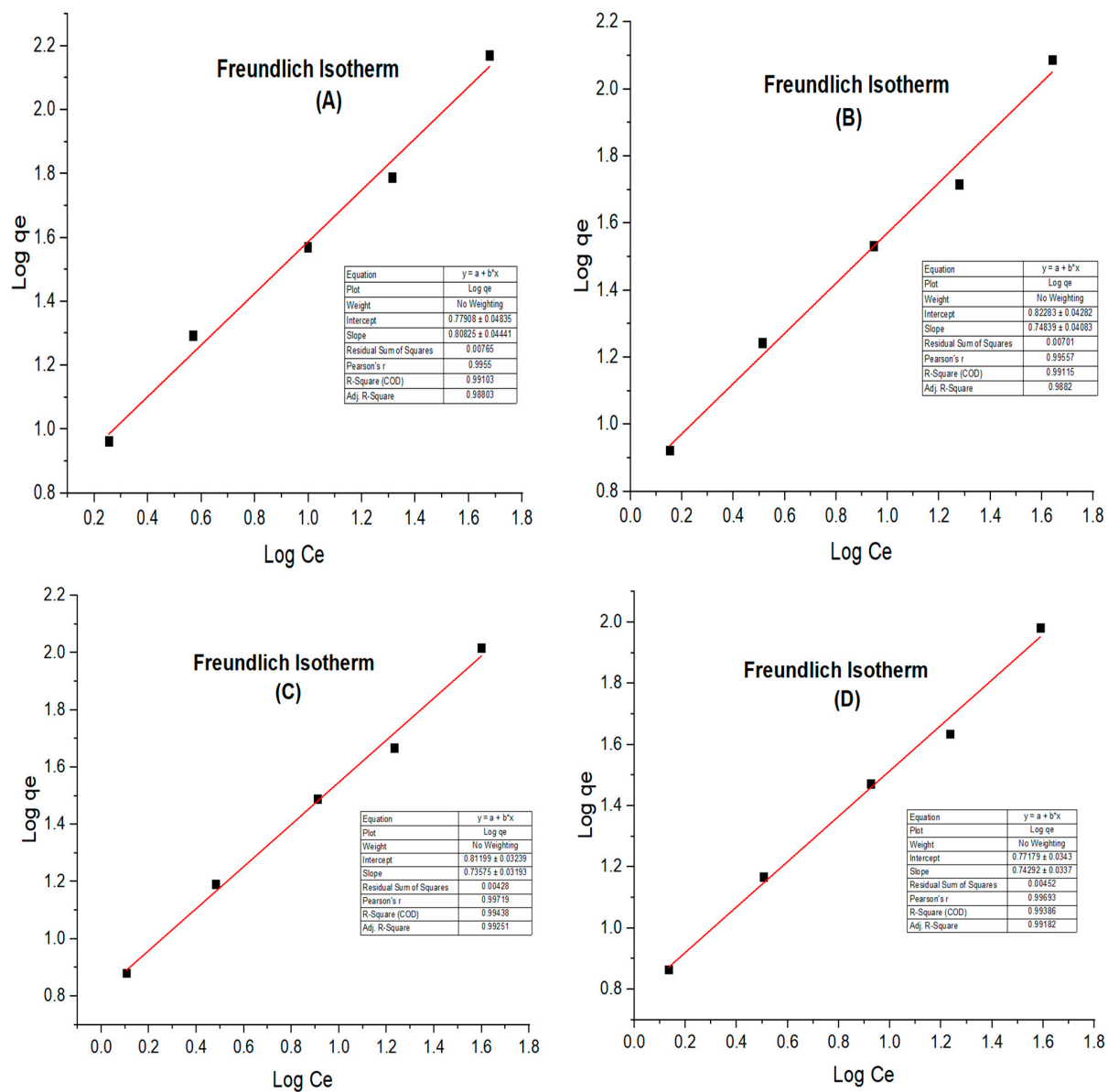


Fig. S4. Freundlich isotherm model for THMs adsorption onto CS/CAC: (A) TCM, (B) BDCM, (C) DBCM, and TBM.

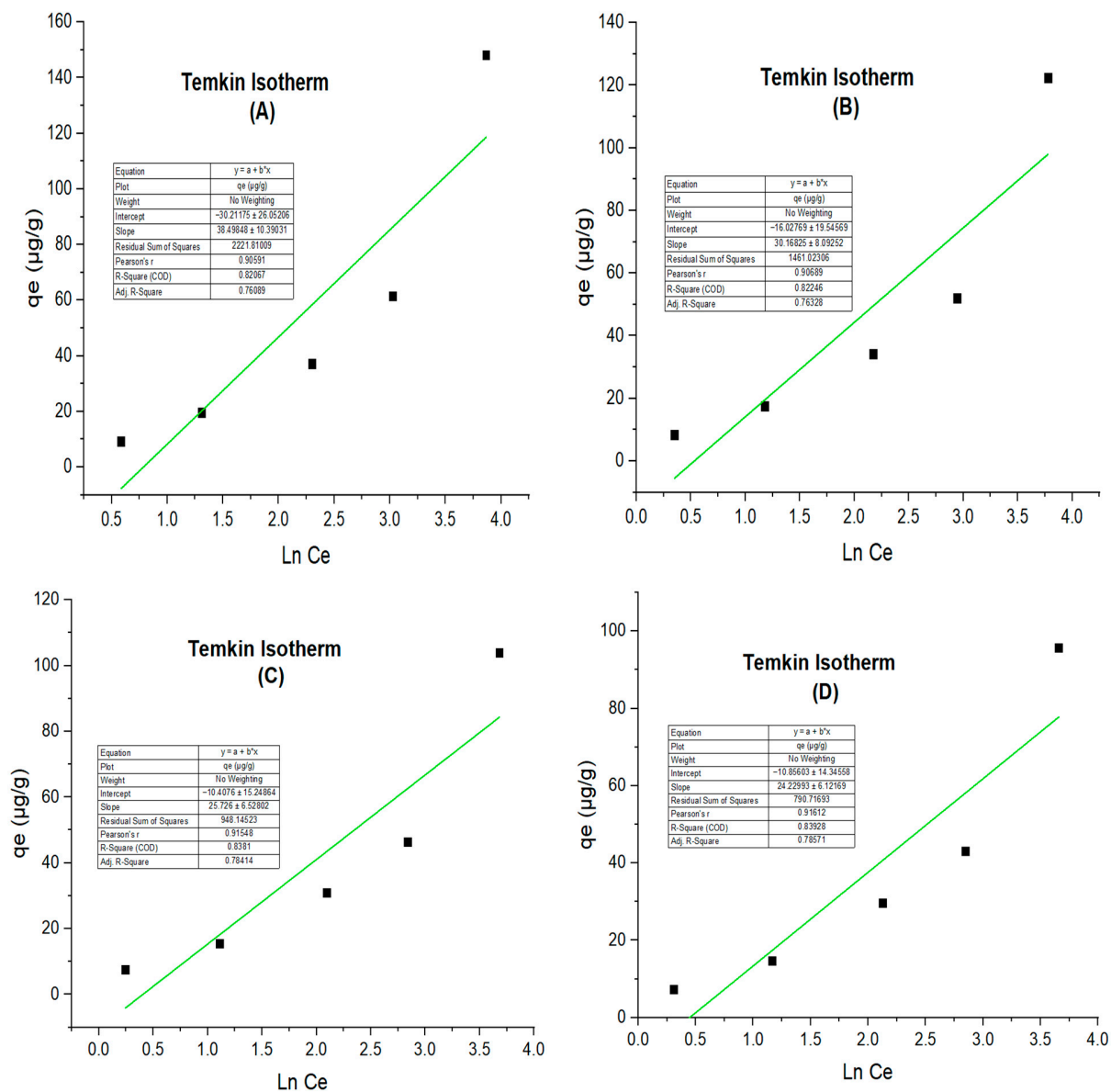


Fig. S5. Temkin isotherm model for THMs adsorption onto CS/CAC: (A) TCM, (B) BDCM, (C) DBCM, and TBM.

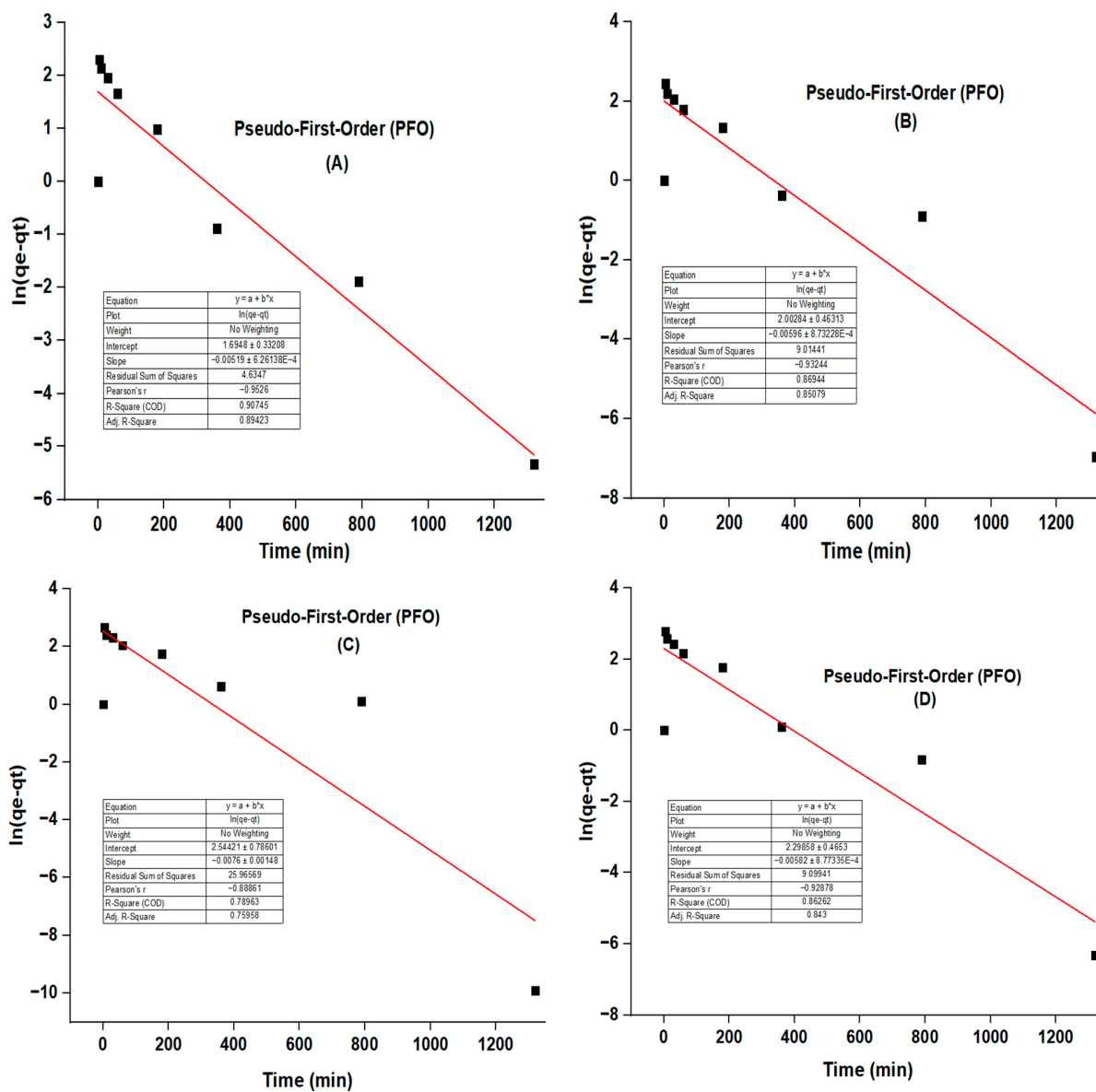


Fig. S6. Pseudo-first-order kinetics model of adsorption of THMs onto CS/CAC: (A) TCM, (B) BDCM, (C) DBCM, and TBM.

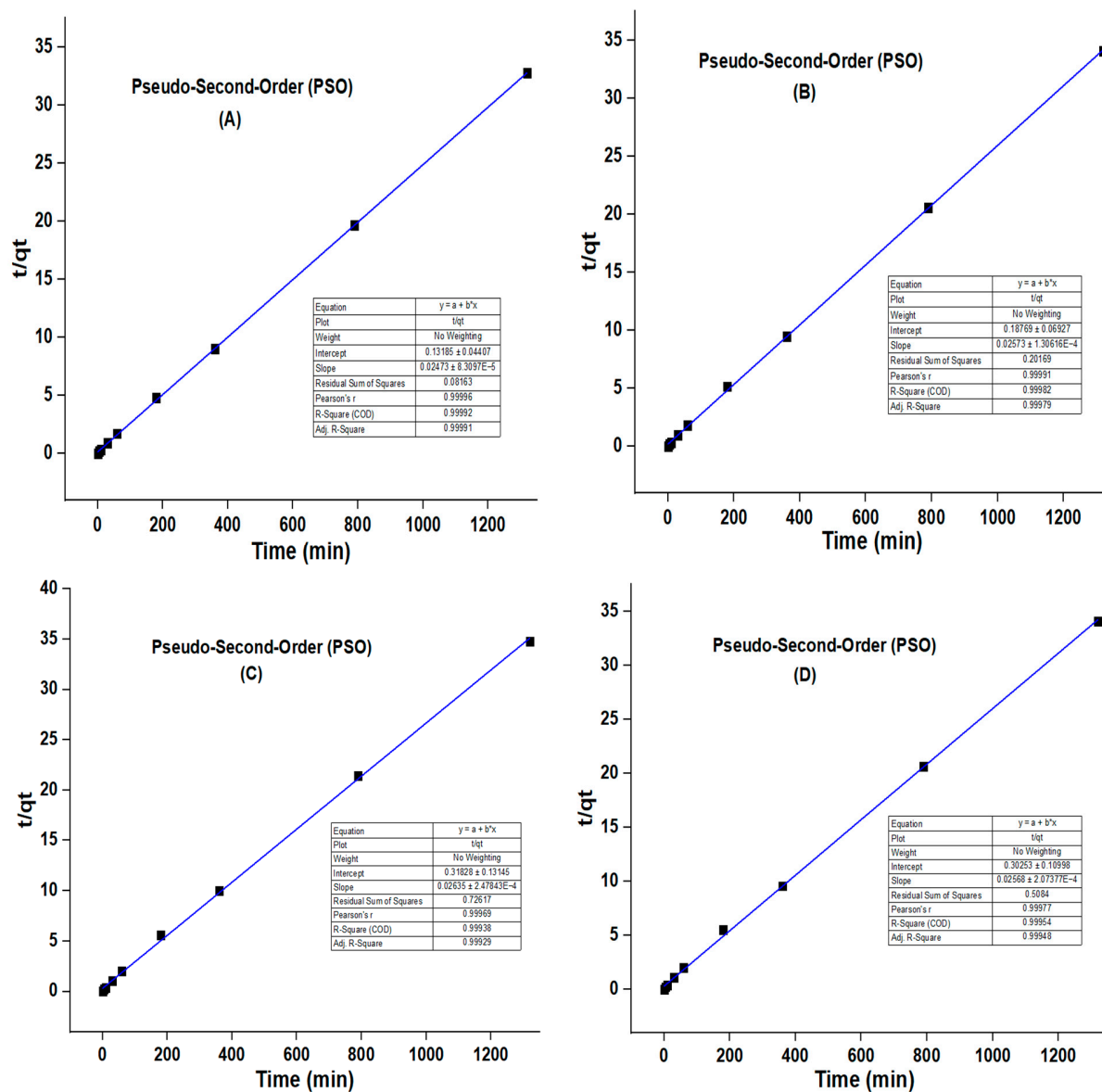


Fig. S7. Pseudo-second-order kinetics model of adsorption of THMs onto CS/CAC: (A) TCM, (B) BDCM, (C) DBCM, and TBM.

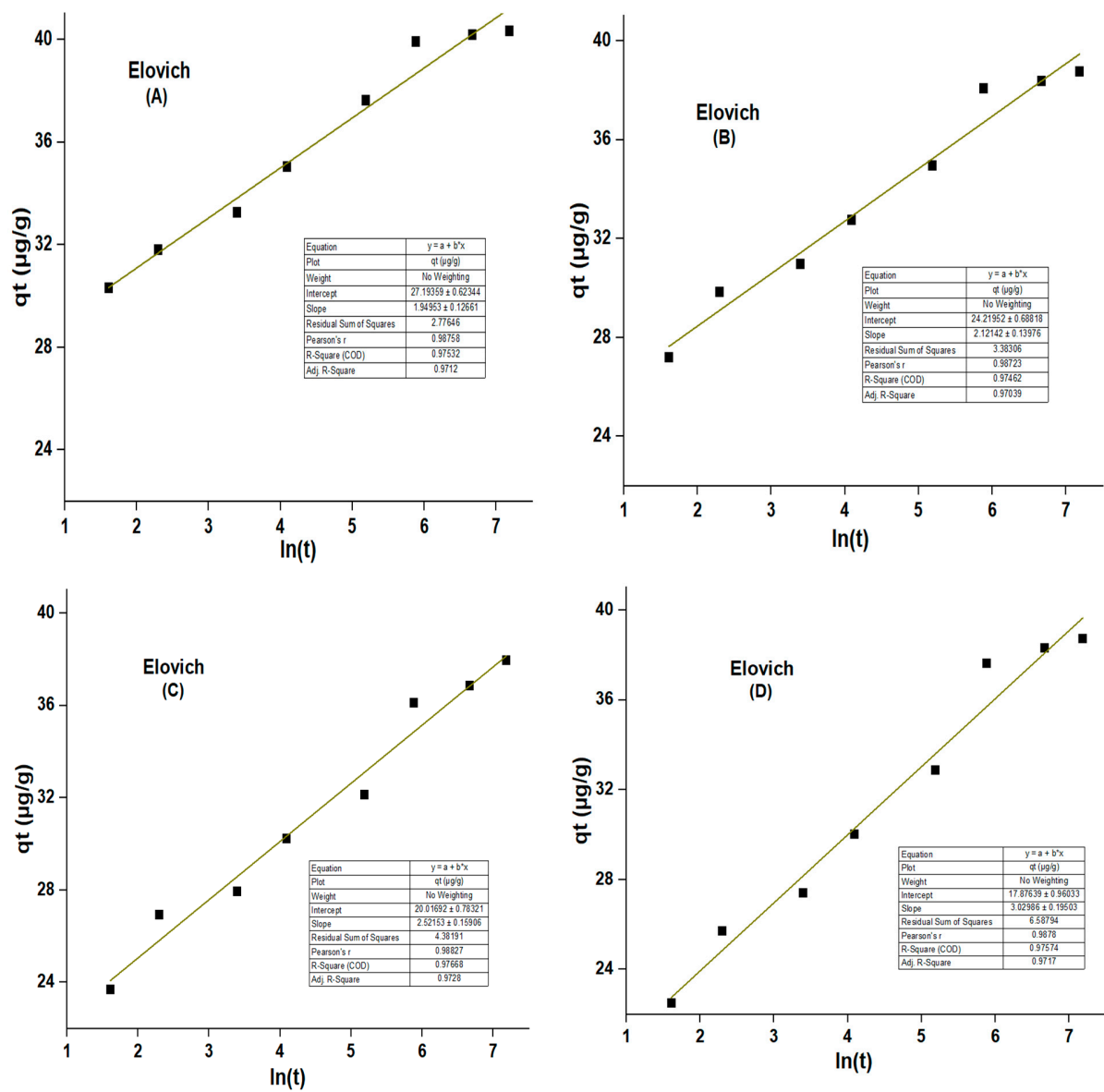


Fig. S8. Elovich kinetics model of adsorption of THMs onto CS/CAC: (A) TCM, (B) BDCM, (C) DBCM, and TBM.

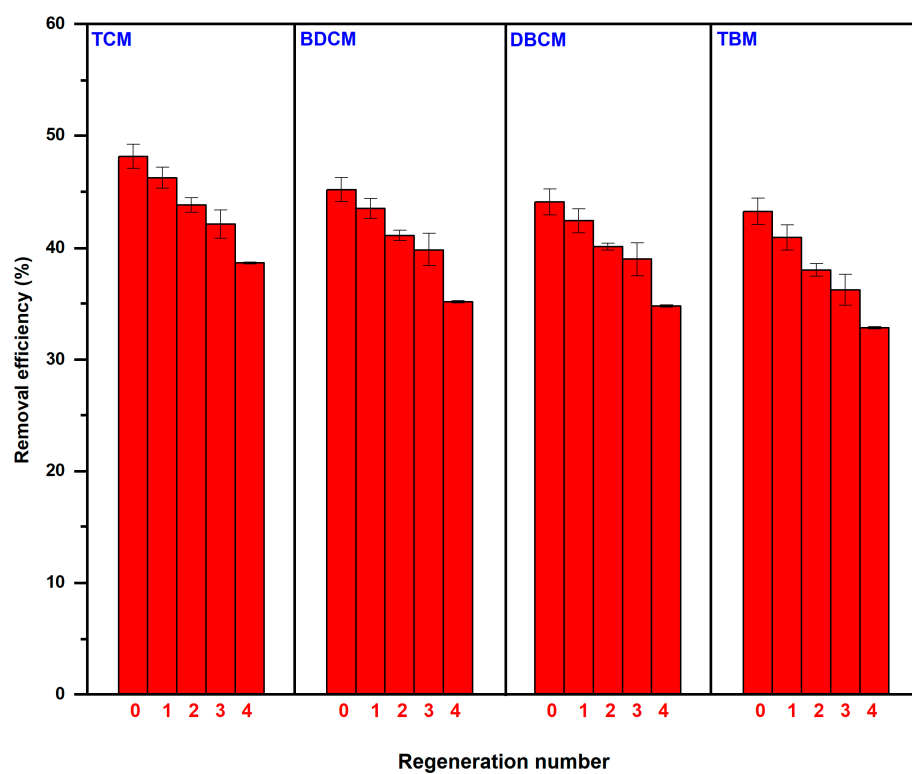


Fig. S9. Effect of generation cycles on adsorption capacity of THMs on CS/CAC.