

Table 1: Experimental data for two-phase pseudo-first order kinetics for metabolically inactive adsorbents.

Adsorbent	SS	BB	S&S	Cons	PB	KP
Best-fit values						
Q_t (mg/g)	58.04	54.62	50.55	51.16	31.15	23.14
PercentFast	48.71	62.60	94.02	40.31	54.99	84.33
$Q_{e,fast}$ (mg/g)	28.27	34.19	47.53	20.62	17.13	19.51
$Q_{e,slow}$ (mg/g)	29.77	20.43	3.02	30.54	14.02	3.63
k_{fast} (1/min)	0.08431	2.491	0.5131	0.5131	0.1485	0.6623
k_{slow} (1/min)	0.01362	0.0601	0.05683	0.208	0.007895	0.1018
Ratio of rate constant	6.192	41.45	9.029	5.354	18.81	6.504
Goodness of Fit						
R^2	0.9997	0.9992	1	0.9929	0.9854	0.9863
SSE	0.7998	1.835	0.01289	16.53	10.33	5.946
Sy.x	0.5163	0.6772	0.06555	2.033	1.607	1.408
RMSE	0.3651	0.5529	0.04635	1.537	1.215	1.09

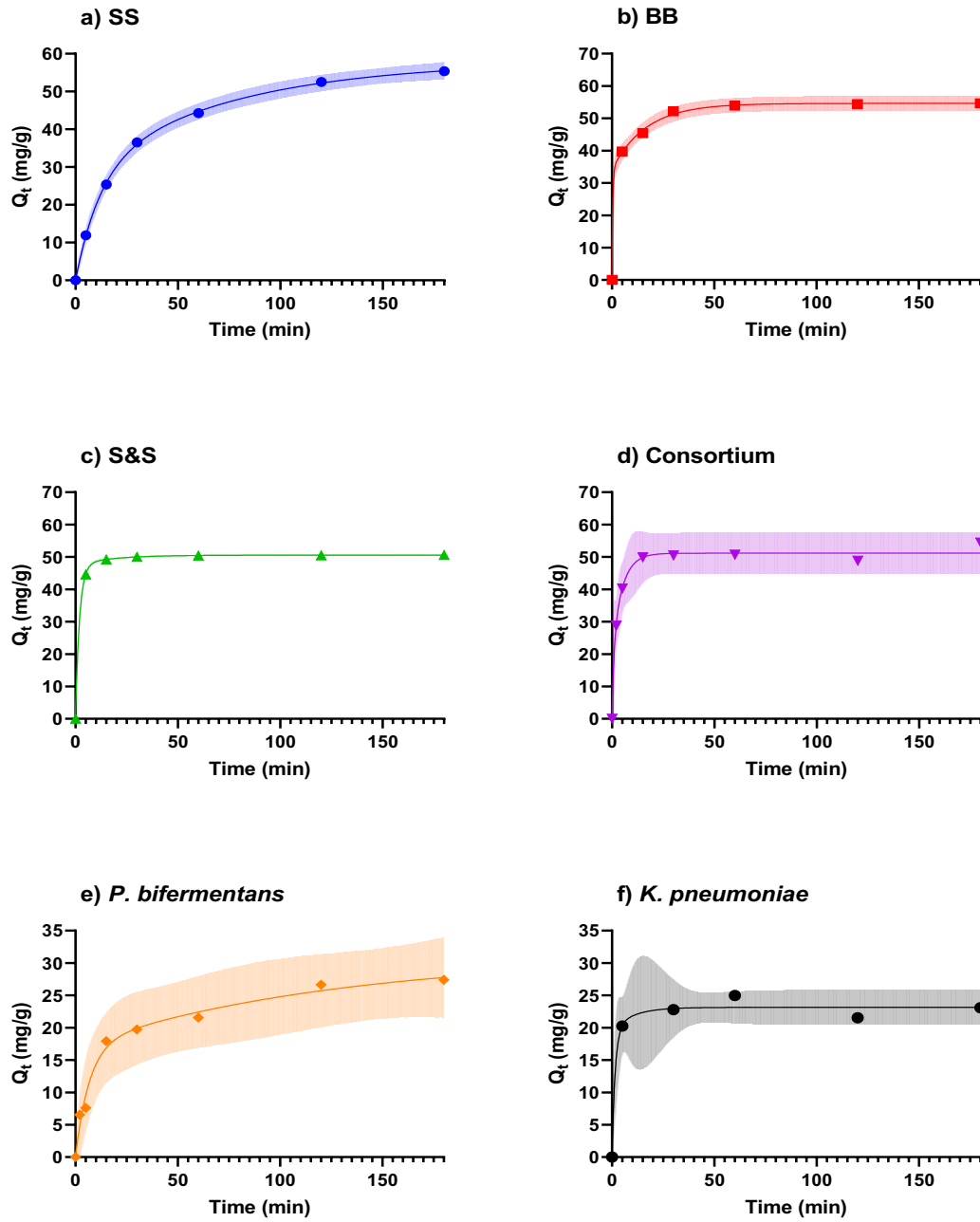


Figure 1: Two-phase pseudo-first-order kinetics of Pb(II) onto metabolically inactive (a) sewage sludge, (b) bran-based filler bacteria, (c) salt-and-starch based filler bacteria, (d) consortium, (e) *P. biferrmentans*, and (f) *K. pneumoniae*.

Table 2: Experimental data for pseudo-second order kinetics for metabolically inhibited adsorbents.

Adsorbents	SS	BB	S&S	Cons	PB	KP
Best-fit values						
Q_t (mg/g)	61.58	55.13	51.01	52.82	27.94	23.33
K_2 (g/mg min)	0.0007604	0.008506	0.02839	0.01198	0.003404	0.05887
Goodness of Fit						
R^2	0.9993	0.9955	0.9998	0.9912	0.977	0.9853
SSE	1.781	10.47	0.3723	20.52	16.25	6.408
Sy.x	0.5968	1.447	0.2729	1.849	1.646	1.266
RMSE	0.5448	1.321	0.2491	1.712	1.524	1.132

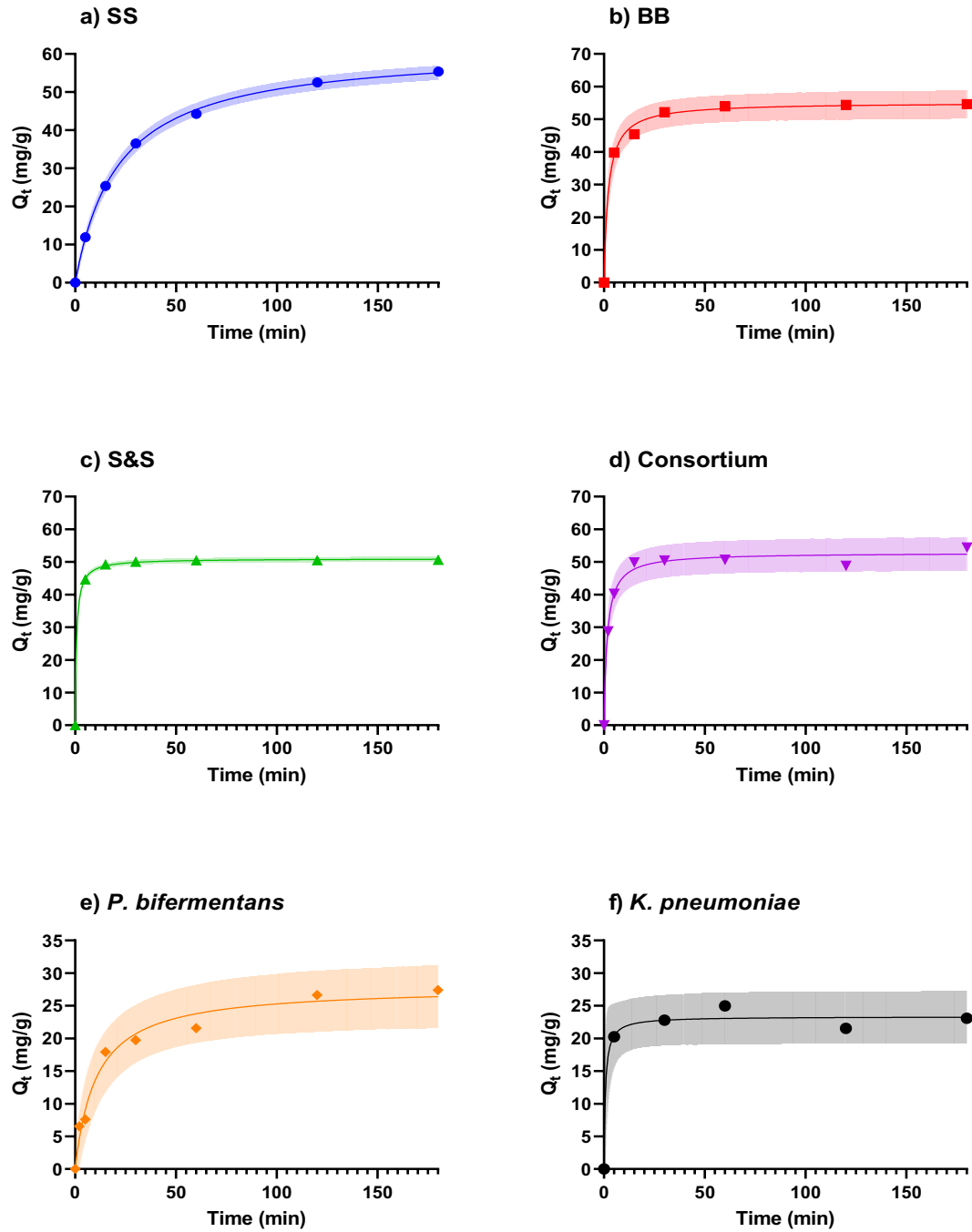


Figure 2: Pseudo-second-order kinetics of Pb(II) onto metabolically inactive (a) sewage sludge, (b) bran-based filler bacteria, (c) salt-and-starch based filler bacteria, (d) consortium, (e) *P. bifermentans*, and (f) *K. pneumoniae*.

Table 3: Experimental data of pseudo-first order kinetics of the metabolically inhibited adsorbents.

Adsorbents	SS	BB	S&S	Cons	PB	KP
Best-fit values						
Q_t (mg/g)	52.96	52.53	50.17	50.71	24.92	23.10
k_1 (1/min)	0.0396	0.2635	0.439	0.3729	0.0749	0.4195
Goodness of Fit						
R^2	0.9891	0.9791	0.9995	0.9876	0.9494	0.9862
SSE	28.51	48.88	1.147	28.88	35.79	6.002
Sy.x	2.388	3.127	0.479	2.194	2.442	1.225
RMSE	2.18	2.854	0.4373	2.031	2.261	1.096

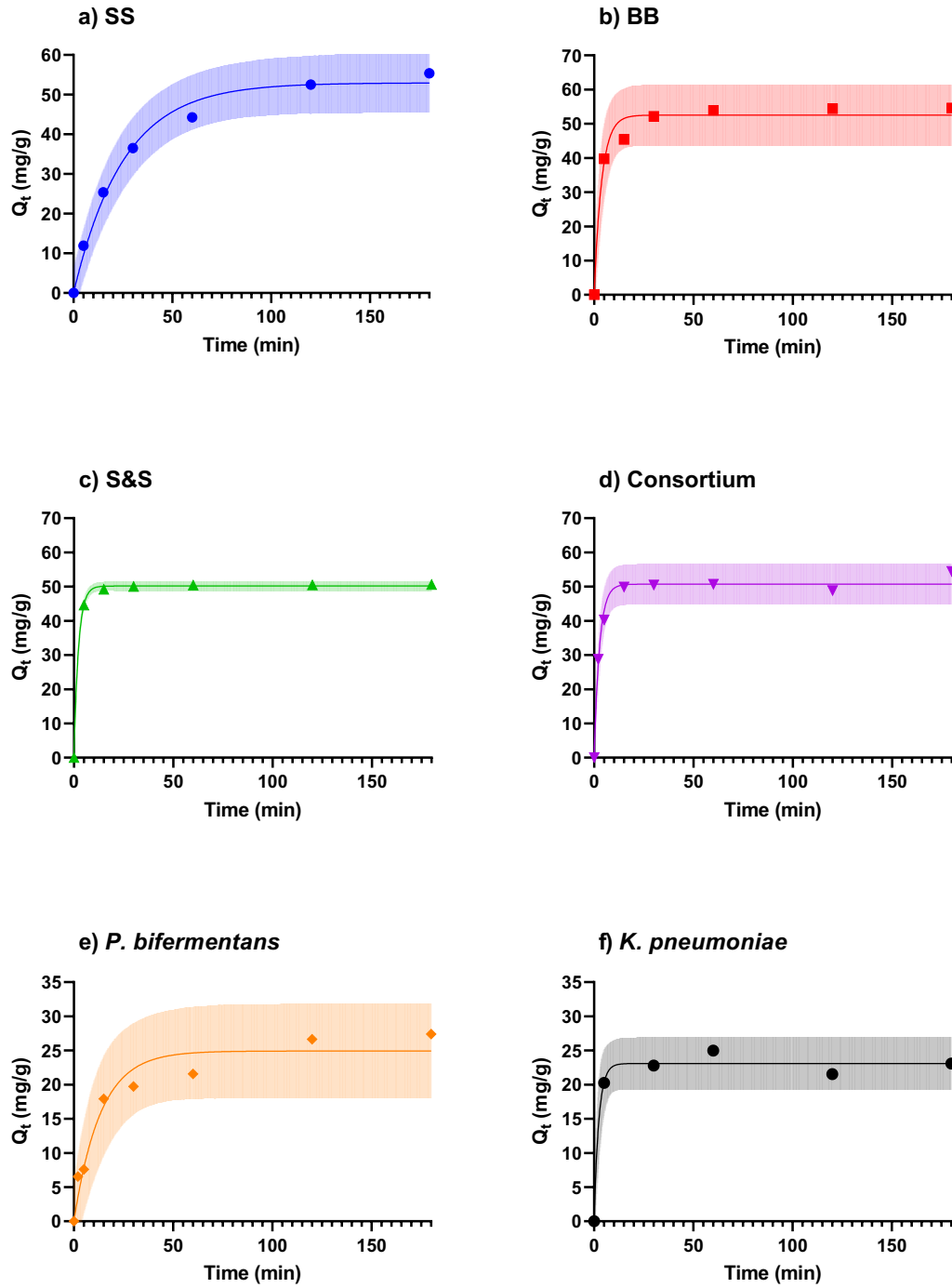


Figure 3: Pseudo-first-order kinetics of Pb(II) onto metabolically inactive (a) sewage sludge, (b) bran-based filler bacteria, (c) salt-and-starch based filler bacteria, (d) consortium, (e) *P. bifermentans*, and (f) *K. pneumoniae*.

Table 4: Experimental data for Crank mass transfer model for metabolically inactive adsorbents.

Adsorbents	SS	BB	S&S	Cons	PB	KP
Best-fit values						
Q_t (mg/g)	58.16	53.42	50.21	51.18	27	23.10
k	2.57×10^{-5}	2.4×10^{-4}	5.69×10^{-4}	3.5×10^{-4}	4.54×10^{-5}	5.4×10^{-4}
De (m^2/s)	2.57×10^{-13}	2.4×10^{-12}	5.69×10^{-12}	3.5×10^{-12}	4.54×10^{-13}	5.4×10^{-12}
Goodness of Fit						
R^2	0.9915	0.9879	0.9996	0.9929	0.9765	0.9862
SSE	22.11	28.28	0.9465	16.68	16.63	6.002
Sy.x	2.103	2.378	0.4351	1.667	1.665	1.225
RMSE	1.92	2.171	0.3972	1.544	1.541	1.096

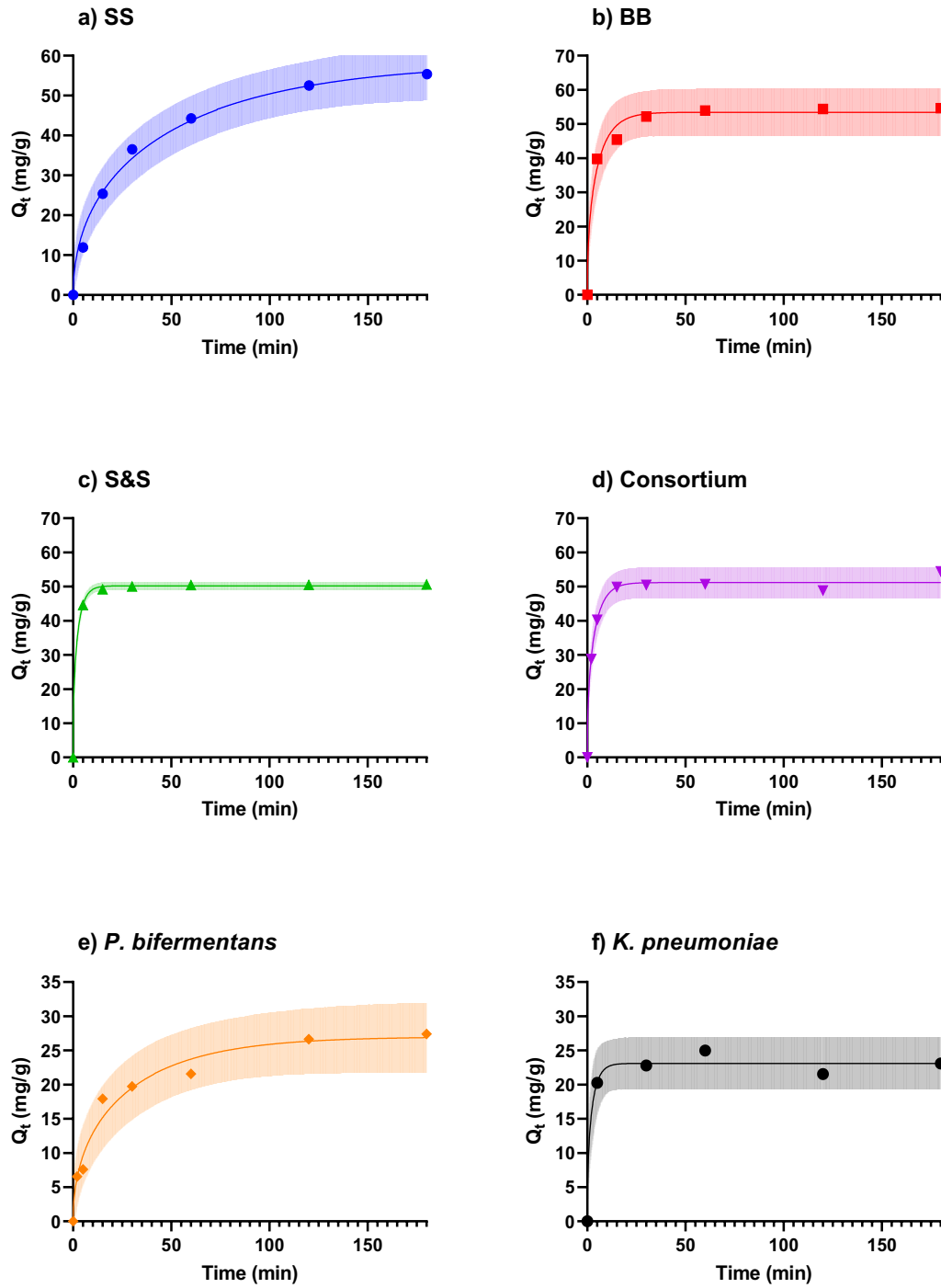


Figure 4: Cranks mass transfer model of Pb(II) onto metabolically inactive (a) sewage sludge, (b) bran-based filler bacteria, (c) salt-and-starch based filler bacteria, (d) consortium, (e) *P. bifermentans*, and (f) *K. pneumoniae*.