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Adsorption Kinetics and Isotherms Studies of Acid Azo Dye Based on Anthranilic Acid and B-Naphthol on Jute Fabric

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TABLE 1. **Absorption maximum of 2-hydroxynaphthazobenzoic acid at λ_{max}=488 nm on bleached jute fabric at different concentrations *viz* 2, 4, 6, 8, 10 (%, owf).**

Time	(2%, owf)	(4%, owf)	(6%, owf)	(8%, owf)	(10%, owf)
0	0.0377	0.2017	0.4163	0.5481	0.7384
30	0.0366	0.1914	0.3816	0.4872	0.6327
60	0.0348	0.1800	0.3526	0.4295	0.5597
90	0.0330	0.1681	0.3221	0.3887	0.5005
120	0.0310	0.1552	0.2943	0.3483	0.4497
150	0.0293	0.1444	0.2659	0.3188	0.4005
180	0.0272	0.1333	0.2401	0.2802	0.3584
210	0.0255	0.1207	0.2189	0.2524	0.3172
240	0.0235	0.1103	0.2014	0.2223	0.2877
270	0.0212	0.0992	0.1820	0.2027	0.2628
300	0.0193	0.0902	0.1631	0.1822	0.2428
330	0.0176	0.0818	0.1494	0.1682	0.2302
360	0.0163	0.0739	0.1424	0.1611	0.2273

TABLE 2. **Absorption maximum of 2-hydroxynaphthazobenzoic acid at λ_{max}=488 nm on unbleached jute fabric at different concentrations *viz* 2, 4, 6, 8, 10 (%, owf).**

Time	(2%, owf)	(4%, owf)	(6%, owf)	(8%, owf)	(10%, owf)
0	0.096	0.1428	0.3089	0.4423	0.4975
30	0.0938	0.1378	0.2951	0.4185	0.4599
60	0.0926	0.1344	0.2862	0.3971	0.4348
90	0.0916	0.1319	0.2769	0.3799	0.4108
120	0.0896	0.1288	0.2638	0.3605	0.3914
150	0.0872	0.1252	0.2509	0.3409	0.3712
180	0.0846	0.1208	0.2363	0.3245	0.3489

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210	0.0834	0.1169	0.2206	0.3024	0.3265
240	0.0815	0.1119	0.2085	0.2839	0.3014
270	0.0797	0.1053	0.1941	0.2631	0.2811
300	0.0778	0.0993	0.1848	0.2469	0.2667
330	0.0751	0.0937	0.1784	0.2337	0.2555
360	0.0746	0.0899	0.1715	0.2314	0.2504

TABLE 3. **Efficiency of 2-hydroxynaphthazobenzoic acid of bleached jute fabric at different concentrations *viz* 2, 4, 6, 8 and 10 (%, owf).**

Time	**2 (%, owf)**	**4 (%, owf)**	**6 (%, owf)**	**8 (%, owf)**	**10 (%, owf)**
0	0.00	0.00	0.00	0.00	0.00
30	2.99	5.12	8.35	11.11	14.31
60	7.69	10.75	15.3	21.64	24.20
90	12.46	16.65	22.63	29.08	32.22
120	17.69	23.03	29.31	36.45	39.10
150	22.38	28.39	36.14	41.84	45.76
180	27.78	33.88	42.33	48.88	51.46
210	32.33	40.16	47.42	53.95	57.04
240	37.73	45.31	51.63	59.44	61.04
270	43.77	50.80	56.29	63.02	64.41
300	48.95	55.28	60.82	66.76	67.12
330	53.45	59.43	64.11	69.31	68.82
360	56.83	63.36	65.80	70.61	69.22

TABLE 4. **Efficiency of 2-hydroxynaphthazobenzoic acid of unbleached jute fabric at different concentrations *viz* 2, 4, 6, 8 and 10 (%, owf).**

Time (min)	**2 (%, owf)**	**4 (%, owf)**	**6 (%, owf)**	**8 (%, owf)**	**10 (%, owf)**
0	0.00	0.00	0.00	0.00	0.00
30	2.29	3.50	4.47	5.38	7.56
60	3.54	5.88	7.35	10.22	12.60
90	4.58	7.63	10.36	14.11	17.43
120	6.67	9.80	14.60	18.49	21.33
150	9.17	12.32	18.78	22.93	25.39
180	11.88	15.41	23.50	26.63	29.87
210	15.21	18.14	28.59	31.63	34.37
240	18.23	21.64	32.50	35.81	39.42
270	23.23	26.26	37.16	40.52	43.50
300	28.33	30.46	41.47	44.18	46.39
330	32.08	34.38	45.48	47.16	48.64
360	35.83	37.04	47.62	48.77	49.01

TABLE 5. **Adsorption of 2-hydroxynaphthazobenzoic acid in aqueous medium on bleached jute fabric at different concentrations *viz* 2, 4, 6, 8 and 10 (%, owf).**

Time	Qe (Mg/g, 2%)	Qe (Mg/g, 4%)	Qe (Mg/g, 6%)	Qe (Mg/g, 8%)	Qe (Mg/g, 10%)
0	0.00	0.00	0.00	0.00	0.00
30	0.48	1.64	4.01	7.11	11.83
60	1.23	3.44	7.35	13.85	20.01
90	1.99	5.33	10.86	18.61	26.63
120	2.83	7.37	14.07	23.33	32.32
150	3.58	9.08	17.35	26.77	37.83
180	4.44	10.84	20.32	31.28	42.54
210	5.17	12.85	22.76	34.53	47.15
240	6.04	14.50	24.78	38.04	50.46
270	7.00	16.25	27.02	40.33	53.25
300	7.83	17.69	29.19	42.73	55.48
330	8.55	19.02	30.77	44.36	56.89
360	9.09	20.27	31.58	45.19	57.22

TABLE 6. **Adsorption of 2-hydroxynaphthazobenzoic acid in aqueous medium on unbleached jute fabric at different concentrations *viz* 2, 4, 6, 8 and 10 (%, owf).**

Time	Q_e (Mg/g, 2%)	Q_e (Mg/g, 4%)	Q_e (Mg/g, 6%)	Q_e (Mg/g, 8%)	Q_e (Mg/g, 10%)
0	0.00	0.00	0.00	0.00	0.00
30	0.39	0.95	1.94	2.93	6.05
60	0.61	1.60	3.20	5.56	10.08
90	0.78	2.08	4.51	7.67	13.94
120	1.14	2.67	6.35	10.06	17.06
150	1.57	3.35	8.17	12.47	20.31
180	2.03	4.19	10.23	14.49	23.90
210	2.60	4.93	12.44	17.21	27.50
240	3.12	5.89	14.15	19.48	31.53
270	3.98	7.14	16.17	22.04	34.80
300	4.85	8.29	18.05	24.03	37.11
330	5.49	9.35	19.79	25.66	38.91
360	6.14	10.08	20.72	26.53	39.20

TABLE 7. **Rate of adsorption of 2-hydroxynaphthazobenzoic acid on bleached fabric at different concentrations *viz* 2, 4, 6, 8 and 10 (%, owf).**

Time	Log (C) 2%	Log (C) 4%	Log (C) 6%	Log (C) (8%)	Log (C) (10%)
0	0.7494	1.0607	1.2114	1.3732	1.3945
30	0.7362	1.0379	1.1735	1.3221	1.3274
60	0.7147	1.0113	1.1393	1.2673	1.2741
90	0.6916	0.9816	1.1000	1.2240	1.2256
120	0.6649	0.9470	1.0608	1.1763	1.1791

150	0.6394	0.9157	1.0166	1.1379	1.1288
180	0.6081	0.8810	0.9723	1.0818	1.0805
210	0.5798	0.8377	0.9322	1.0364	1.0275
240	0.5437	0.7986	0.8959	0.9813	0.9851
270	0.4994	0.7527	0.8520	0.9412	0.9458
300	0.4575	0.7112	0.8045	0.8949	0.9114
330	0.4173	0.6689	0.7664	0.8602	0.8883
360	0.3846	0.6247	0.7454	0.8414	0.8828

TABLE 8. **Rate of adsorption of 2-hydroxynaphthazobenzoic acid on unbleached fabric at different concentrations *viz* 2, 4, 6, 8 and 10 (%, owf)**

Time	**Log (C) (2%)**	**Log (C) (4%)**	**Log (C) (6%)**	**Log (C) (8%)**	**Log (C) (10%)**
0	0.7850	0.9645	1.2833	1.3726	1.4886
30	0.7750	0.9491	1.2635	1.3486	1.4544
60	0.7694	0.9382	1.2502	1.3258	1.4300
90	0.7647	0.9301	1.2358	1.3066	1.4054
120	0.7551	0.9197	1.2148	1.2838	1.3844
150	0.7433	0.9074	1.1930	1.2595	1.3614
180	0.7301	0.8919	1.1669	1.2381	1.3345
210	0.7134	0.8776	1.1371	1.2075	1.3056
240	0.6976	0.8586	1.1126	1.1801	1.2709
270	0.6702	0.8322	1.0815	1.1470	1.2406
300	0.6404	0.8068	1.0507	1.1194	1.2178
330	0.6170	0.7816	1.0198	1.0956	1.1991
360	0.5924	0.7636	1.0025	1.0822	1.1961