CHAPTER 4

RESULTS

4.1 Calibration Dyeings

The results of measuring reflectance and the calculated K/S values using Equation 2.28 for single dye are shown in Tables 4.1 , 4.2 , 4.3 , 4.4 , 4.5 and 4.6 . The reflectance and K/S function of the white fabric is shown in Table 4.7 .

Tables 4.8 to 4.13 show the calibration factors, $(K/S)^{2.15}/c$, at various wavelengths and concentrations. The (K/S) values are given by

$$(K/S) = K/S_{substrate+colorant} - K/S_{substrate} \quad (4.1)$$

The average values of the calibration factors at constant wavelength of various concentrations was calculated and are presented in Table 4.14 .

Table 4.1 The reflectances and K/S functions of Procion Blue MX-4GD

λ (nm)		% Cancentration								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
420	%R	59.75	53.52	44.45	38.41	34.49	31.70	30.07	28.76	27.19
	K/S	0.1355	0.2019	0.3470	0.4947	0.6221	0.7360	0.8135	0.8824	0.9747
500	%R	61.15	54.63	45.55	39.47	35.58	32.81	31.18	29.87	28.36
	K/S	0.1234	0.1885	0.3255	0.4637	0.5830	0.6876	0.7598	0.8235	0.9050
540	%R	55.30	48.46	39.56	33.88	30.50	28.12	26.82	25.77	24.62
	K/S	0.1806	0.2739	0.4618	0.6449	0.7920	0.9188	0.9986	1.0691	1.1544
620	%R	46.27	39.13	30.97	26.47	24.11	22.54	21.85	21.22	20.64
*	K/S	0.3119	0.4733	0.7695	1.0216	1.1938	1.3310	1.3980	1.4628	1.5256
660	%R	51.54	44.33	35.32	30.11	27.04	25.01	23.89	23.00	22.12
	K/S	0.2276	0.3493	0.5922	0.8112	0.9841	1.1243	1.2128	1.2890	1.3710

* wavelength of maximum absorption

Table 4.2 The reflectances and K/S functions of Procion Yellow MX-8G

λ (nm)		% concentration								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
420	%R	47.78	41.30	32.36	26.31	23.90	22.06	21.03	20.58	19.68
*	K/S	0.2854	0.4170	0.7070	1.0323	1.2120	1.3770	1.4827	1.5324	1.6394
520	%R	83.77	84.19	83.05	82.15	81.26	79.95	79.85	79.48	78.74
	K/S	0.0158	0.0148	0.0173	0.0194	0.0216	0.0251	0.0254	0.0265	0.0287
660	%R	86.25	86.42	85.79	86.06	85.89	85.90	85.36	86.16	85.83
	K/S	0.0110	0.0107	0.0118	0.0113	0.0116	0.0116	0.0126	0.0111	0.0117

* wavelength of maximum absorption.

Table 4.3 The reflectances and K/S functions of Procion Blue MX-G

λ (nm)		% concentration								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
420	%R	70.43	68.86	65.52	62.61	59.11	57.14	55.58	53.68	52.26
	K/S	0.0623	0.0704	0.0908	0.1116	0.1414	0.1607	0.1775	0.1997	0.2184
520	%R	70.33	67.15	61.21	56.63	53.22	50.64	48.84	47.33	45.31
	K/S	0.0626	0.0804	0.1229	0.1661	0.2058	0.2406	0.2682	0.2934	0.3298

Table 4.3 Cont'd

λ (nm)		% concentration								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
540	%R	67.09	63.28	56.50	51.91	48.25	45.57	43.84	42.40	40.33
	K/S	0.0807	0.1065	0.1675	0.2229	0.2775	0.3247	0.3598	0.3910	0.4414
620	%R	53.93	48.26	40.60	36.09	32.90	30.61	29.30	28.33	26.74
	K/S	0.1968	0.2774	0.4350	0.5663	0.6840	0.7865	0.8530	0.9065	1.0036
660	%R	51.57	45.71	38,04	33.54	30.55	28.33	27.15	26.30	24.80
*	K/S	0.2275	0.3228	0.5048	0.6584	0.7895	0.9064	0.9775	1.0330	1.1400

* wavelength of maximum absorption

Table 4.4 The reflectances and K/S functions of Procion Yellow MX-3R

λ (nm)		% concentration								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
420	%R	47.57	41.81	32.67	27.54	24.66	22.59	21.68	20.84	20.02
*	K/S	0.2886	0.4050	0.6942	0.9536	1.1512	1.3260	1.4150	1.5036	1.5976
500	%R	61.27	56.53	47.09	40.93	36.85	33.51	31.94	30.38	28.51
	K/S	0.1224	0.1671	0.2972	0.4264	0.5415	0.6596	0.7254	0.7980	0.8964
520	%R	70.05	66.51	57.90	51.81	47.39	43.72	41.86	39.90	37.48
	K/S	0.0640	0.0843	0.1531	0.2239	0.2922	0.3626	0.4038	0.4530	0.5216

Table 4.4 Cont'd

λ (nm)		% concentration								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
540	%R	76.09	74.07	67.50	62.18	58.08	54.39	52.57	50.51	47.88
	K/S	0.0375	0.0454	0.0782	0.1151	0.1513	0.1912	0.2143	0.2428	0.2834
620	%R	83.75	84.56	85.26	85.27	84.90	83.64	83.02	83.03	82.21
	K/S	0.0158	0.0137	0.0128	0.0128	0.0134	0.0160	0.0174	0.0173	0.0193
660	%R	84.03	85.32	85.80	85.96	85.72	84.76	84.33	84.63	83.83
	K/S	0.0151	0.0126	0.0118	0.0115	0.0118	0.0137	0.0145	0.0139	0.0156

* wavelength of maximum absorption

Table 4.5 The reflectances and K/S functions of Procion Orange MX-2R

λ (nm)		% concentration								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
420	%R	54.91	48.18	39.32	33.06	28.60	26.96	25.81	24.42	23.35
	K/S	0.1852	0.2784	0.4684	0.6776	0.8910	0.9894	1.0663	1.1694	1.2580
500	%R	44.80	37.99	30.23	25.62	23.07	22.18	21.61	20.98	20.53
*	K/S	0.3400	0.5063	0.8055	1.0796	1.2827	1.3650	1.4220	1.4878	1.5384
540	%R	52.83	45.88	37.25	31.44	27.73	26.24	25.27	24.22	23.31
	K/S	0.2107	0.3194	0.5285	0.7474	0.9422	1.0366	1.1051	1.1854	1.2612

Table 4.5 Cont'd

λ (nm)		% concentration								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
620	%R	85.35	84.60	84.67	83.81	83.10	82.98	82.68	81.42	80.93
	K/S	0.0126	0.0140	0.0139	0.0157	0.0172	0.0174	0.0181	0.0212	0.0225

* wavelength of maximum absorption

Table 4.6 The reflectances and K/S functions of Procion Red MX-5B

λ (nm)		% concentration								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
420	%R	62.73	56.72	48.25	41.70	37.43	33.87	32.05	30.81	28.85
	K/S	0.1108	0.1651	0.2775	0.4080	0.5231	0.6452	0.7205	0.7766	0.8775
500	%R	46.73	40.21	32.10	27.07	24.43	22.73	21.90	21.45	20.74
	K/S	0.3034	0.4447	0.7180	0.9828	1.1686	1.3133	1.3930	1.4380	1.5146
540	%R	43.11	36.76	29.34	24.94	22.86	21.52	20.91	20.55	20.06
*	K/S	0.3757	0.5442	0.8510	1.1222	1.3016	1.4310	1.4959	1.5360	1.5928
620	%R	79.44	79.33	78.65	75.37	73.08	70.78	69.11	67.44	65.33
	K/S	0.0266	0.0269	0.0289	0.0402	0.0496	0.0603	0.0690	0.0786	0.0920
660	%R	78.95	79.93	83.10	82.98	80.65	80.45	79.93	79.06	79.52
	K/S	0.0280	0.0252	0.0172	0.0174	0.0232	0.0237	0.0252	0.0277	0.0263

* wavelength of maximum absorption

Table 4.7 The reflectances and K/S functions of white fabric

λ (nm)	%R	K/S
420	80.35	0.0242
500	84.73	0.0137
520	84.79	0.0136
540	84.95	0.0133
620	85.85	0.0117
660	86.08	0.0112

Table 4.8 The calibration factors of Procion Blue MX-4GD

λ (nm)		% concentration (c)								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
420	(K/S)	0.1113	0.1777	0.3228	0.4705	0.5980	0.7118	0.7893	0.8582	0.9505
	$(K/S)^{2.15}$	0.0089	0.0244	0.0880	0.1977	0.3310	0.4815	0.6013	0.7199	0.8966
	$(K/S)^{2.15}/c$	0.0890	0.1220	0.1760	0.1977	0.2207	0.2408	0.2405	0.2400	0.2241
500	(K/S)	0.1096	0.1748	0.3118	0.4500	0.5693	0.6739	0.7461	0.8098	0.8913
	$(K/S)^{2.15}$	0.0086	0.0235	0.0816	0.1796	0.2978	0.4280	0.5327	0.6353	0.7808
	$(K/S)^{2.15}/c$	0.0860	0.1176	0.1632	0.1796	0.1985	0.2140	0.2131	0.2118	0.1952

Table 4.8 Cont'd

λ (nm)		% concentration (c)								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
540	(K/S)	0.1673	0.2606	0.4485	0.6316	0.7787	0.9055	0.9853	1.0558	1.1411
	$(K/S)^{2.15}$	0.0214	0.0555	0.1783	0.3724	0.5840	0.8078	0.9686	1.1238	1.3281
	$(K/S)^{2.15}/c$	0.2140	0.2775	0.3567	0.3724	0.3893	0.4039	0.3874	0.3746	0.3320
620	(K/S)	0.3002	0.4616	0.7578	1.0099	1.1821	1.3193	1.3863	1.4511	1.5139
	$(K/S)^{2.15}$	0.0752	0.1897	0.5508	1.0215	1.4328	1.8144	2.0183	2.2266	2.4390
*	$(K/S)^{2.15}/c$	0.7520	0.9485	1.1016	1.0215	0.9552	0.9072	0.8073	0.7422	0.6097
660	(K/S)	0.2164	0.3381	0.5809	0.8000	0.9729	1.1131	1.2016	1.2778	1.3598
	$(K/S)^{2.15}$	0.0372	0.0971	0.3111	0.6189	0.9426	1.2590	1.4841	1.6938	1.9362
	$(K/S)^{2.15}/c$	0.3720	0.4856	0.6222	0.6189	0.6284	0.6295	0.5936	0.5646	0.4840

Table 4.9 The calibration factors of Procion Yellow MX-8G

λ (nm)		% concentration (c)								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
420	(K/S)	0.2612	0.3928	0.6828	1.0081	1.1878	1.3528	1.4585	1.5082	1.6152
*	$(K/S)^{2.15}$	0.0558	0.1341	0.4403	1.0175	1.4478	1.915	2.2512	2.4194	2.803
	$(K/S)^{2.15}/c$	0.5580	0.6710	0.8810	1.0175	0.9650	0.9580	0.9005	0.8060	0.7010
520	(K/S)	0.0021	0.0012	0.0037	0.0058	0.0080	0.0115	0.0118	0.0128	0.0151
	$(K/S)^{2.15}$	0.0000	0	0	0	0	0	0	0	0
	$(K/S)^{2.15}/c$	0	0	0	0	0	0	0	0	0
660	(K/S)	-0.0002	-0.0006	0.0006	0.0000	0.0004	0.0004	0.0013	-0.0001	0.0005
	$(K/S)^{2.15}$	0.0000	0	0	0	0	0	0	0	0
	$(K/S)^{2.15}/c$	0	0	0	0	0	0	0	0	0

Table 4.10 The calibration factors of Procion Blue MX-G

λ (nm)		% concentration (c)								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
420	(K/S)	0.0381	0.0462	0.0666	0.0874	0.1172	0.1365	0.1533	0.1755	0.1942
	$(K/S)^{2.15}$	0.0009	0.0013	0.0029	0.0053	0,0099	0.0138	0.0177	0.0237	0.0295
	$(K/S)^{2.15}/C$	0.0090	0.0067	0.0059	0.0053	0.0066	0.0069	0.0071	0.0079	0.0074
520	(K/S)	0.0489	0.0668	0.1093	0.1524	0.1922	0.2269	0.2546	0.2798	0.3162
	$(K/S)^{2.15}$	0.0015	0.0029	0.0086	0.0175	0.0288	0.0412	0.0528	0.0647	0.0841
	$(K/S)^{2.15}/C$	0.0150	0.0148	0.0171	0.0175	0.0192	0.0206	0.0211	0.0216	0.0210
540	(K/S)	0.0674	0.0932	0.1542	0.2096	0.2642	0.3114	0.3465	0.3777	0.4281
	$(K/S)^{2.15}$	0.0030	0.0061	0.0179	0.0347	0.0572	0.0814	0.1124	0.1233	0.1614
	$(K/S)^{2.15}/C$	0.0300	0.0305	0.0358	0.0347	0.0381	0.0407	0.0409	0.0411	0.0403
620	(K/S)	0.1851	0.2657	0.4233	0.5546	0.6723	0.7748	0.8413	0.8948	0.9919
	$(K/S)^{2.15}$	0.0266	0.0579	0.1575	0.2815	0.4258	0.5778	0.6897	0.7874	0.9826
	$(K/S)^{2.15}/C$	0.2660	0.2890	0.3150	0.2815	0.2839	0.2889	0.2759	0.2625	0.2457
660 *	(K/S)	0.2163	0.3116	0.4936	0.6472	0.7783	0.8952	0.9663	1.0218	1.1288
	$(K/S)^{2.15}$	0.0372	0.0815	0.2191	0.3923	0.5833	0.7881	0.9289	1.0474	1.2974
	$(K/S)^{2.15}/C$	0.3720	0.4074	0.4382	0.3923	0.3889	0.3940	0.3715	0.3491	0.3243

Table 4.11 The calibration factors of Procion Yellow MX-3R

λ (nm)		% concentration (c)								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
420	(K/S)	0.2644	0.3809	0.6700	0.9294	1.1279	1.3018	1.3908	1.4794	1.5734
*	$(K/S)^{2.15}$	0.0573	0.1255	0.4228	0.8544	1.2932	1.7630	2.0325	2.3210	2.6498
	$(K/S)^{2.15}/C$	0.5730	0.6270	0.8450	0.8540	0.8620	0.8810	0.8130	0.7740	0.6620
500	(K/S)	0.1087	0.1533	0.2835	0.4127	0.5278	0.6459	0.7117	0.7843	0.8827
	$(K/S)^{2.15}$	0.0085	0.0177	0.0665	0.1491	0.2531	0.3907	0.4813	0.5931	0.7646
	$(K/S)^{2.15}/C$	0.0847	0.0887	0.1330	0.1491	0.1687	0.1950	0.1920	0.1970	0.1911
520	(K/S)	0.0504	0.0707	0.1395	0.2103	0.2786	0.3489	0.3902	0.4394	0.5079
	$(K/S)^{2.15}$	0.0016	0.0034	0.0145	0.0349	0.0641	0.1040	0.1322	0.1706	0.2330
	$(K/S)^{2.15}/C$	0.0162	0.0167	0.0289	0.0349	0.0427	0.0519	0.0529	0.0569	0.0583
540	(K/S)	0.0242	0.0321	0.0649	0.1017	0.1380	0.1779	0.2001	0.2295	0.2701
	$(K/S)^{2.15}$	0.0003	0.0006	0.0028	0.0073	0.0141	0.0244	0.0317	0.0422	0.0599
	$(K/S)^{2.15}/C$	0.0030	0.0031	0.0056	0.0073	0.0094	0.0122	0.0127	0.0141	0.0149
620	(K/S)	0.0041	0.0019	0.0011	0.0010	0.0017	0.0043	0.0056	0.0056	0.0076
	$(K/S)^{2.15}$	0.0000	0	0	0	0	0	0	0	0
	$(K/S)^{2.15}/C$	0	0	0	0	0	0	0	0	0

Table 4.11 Cont'd

λ (nm)		% concentration (c)								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
640	(K/S)	0.0039	0.0014	0.0006	0.0002	0.0006	0.0024	0.0033	0.0027	0.0044
	$(K/S)^{2.15}$	0.0000	0	0	0	0	0	0	0	0
	$(K/S)^{2.15}/c$	0	0	0	0	0	0	0	0	0

Table 4.12 The calibration factors of Procion Orange MX-2R

λ (nm)		% concentration (c)								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
420	(K/S)	0.1610	0.2542	0.4442	0.6534	0.8668	0.9652	1.0421	1.1452	1.2338
	$(K/S)^{2.15}$	0.0197	0.0526	0.1747	0.4006	0.7354	0.9270	1.0928	1.3385	1.5710
	$(K/S)^{2.15}/c$	0.1970	0.2630	0.3490	0.4006	0.4900	0.4630	0.4370	0.4460	0.3930
500	(K/S)	0.3263	0.4926	0.7918	1.0659	1.2689	1.3513	1.4083	1.4741	1.5247
	$(K/S)^{2.15}$	0.0899	0.2182	0.6053	1.1470	1.6689	1.9103	2.0877	2.3030	2.4760
*	$(K/S)^{2.15}/C$	0.8990	1.0910	1.2110	1.1470	1.1126	0.9550	0.8350	0.7680	0.6190
540	(K/S)	0.1974	0.3061	0.5152	0.7341	0.9289	1.0233	1.0918	1.1721	1.2479
	$(K/S)^{2.15}$	0.0305	0.0784	0.2403	0.5140	0.8533	1.0507	1.2078	1.4069	1.6098
	$(K/S)^{2.15}/C$	0.3050	0.3920	0.4800	0.5140	0.5690	0.5250	0.4830	0.4690	0.4020

Table 4.12 Cont'd

λ (nm)		% concentration (c)								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
620	(K/S)	0.0009	0.0014	0.0021	0.0036	0.0055	0.0057	0.0068	0.0095	0.0108
	$(K/S)^{2.15}$	0.0000	0	0	0	0	0	0	0	0
	$(K/S)^{2.15}/C$	0	0	0	0	0	0	0	0	0

Table 4.13 The calibration factors of Procion Red MX-5B

λ (nm)		% concentration (c)								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
420	(K/S)	0.0866	0.1409	0.2533	0.3838	0.4989	0.6210	0.6963	0.7524	0.8533
	$(K/S)^{2.15}$	0.0052	0.0148	0.0522	0.1276	0.2243	0.3591	0.4592	0.5425	0.7110
	$(K/S)^{2.15}/C$	0.0520	0.0740	0.1044	0.1276	0.1495	0.1795	0.1837	0.1808	0.1777
500	(K/S)	0.2897	0.4309	0.7043	0.9691	1.1549	1.2996	1.3793	1.4243	1.5009
	$(K/S)^{2.15}$	0.0697	0.1637	0.4706	0.9347	1.3628	1.7566	1.9964	2.1391	2.3941
	$(K/S)^{2.15}/C$	0.6970	0.8185	0.9412	0.9347	0.9086	0.8783	0.7986	0.7130	0.5985
540	(K/S)	0.3624	0.5309	0.8377	1.1089	1.2721	1.4177	1.4826	1.5227	1.5795
*	$(K/S)^{2.15}$	0.1128	0.2563	0.6833	1.2488	1.6777	2.1179	2.3318	2.4695	2.6718
	$(K/S)^{2.15}/C$	1.1280	1.2815	1.3670	1.2488	1.1185	1.0589	0.9330	0.8232	0.6680

Table 4.13 Cont'd

λ (nm)		% concentration (c)								
		0.1	0.2	0.5	1.0	1.5	2.0	2.5	3.0	4.0
620	(K/S)	0.0149	0.0152	0.0172	0.0285	0.0379	0.0486	0.0573	0.0669	0.0803
	$(K/S)^{2.15}$	0.0001	0.00012	0.0002	0.0005	0.0009	0.0015	0.0021	0.0029	0.0044
	$(K/S)^{2.15}/c$	0.0010	0.0006	0.0003	0.0005	0.0006	0.0007	0.0009	0.0009	0.0011
660	(K/S)	0.0168	0.0139	0.0059	0.0062	0.0120	0.0125	0.0139	0.0165	0.0151
	$(K/S)^{2.15}$	0.00015	0.0001	0	0	0	0	0	0	0
	$(K/S)^{2.15}/c$	0.0015	0.0005	0	0	0	0	0	0	0

Table 4.14 The Calibration factors (constants) of each dyestuffs at any wavelengths, using for calculation.

λ (nm) / Dyes	420	500	520	540	620	660
4GD	0.2500	0.195	-	0.3200	0.8867*	0.5950
G	0.0067	-	0.0200	0.0390	0.2760	0.3720*
8G	0.7010*	-	0	-	-	0
3R	0.7500*	0.1750	0.0583	0.0108	0	0
2R	0.4180	0.7500*	-	0.5250	0	-
5B	0.1650	0.7100	-	0.8500*	0	0

4.2 Standard Dyeings

The results of reflectance measurement and the calculated $(K/S)^{2.15}$ values of the standard dyeing are presented in Tables 4.15 and 4.16 for pairs of dyestuffs and three dyestuff mixtures respectively.

Table 4.15 Reflectances, K/S, (K/S) and $(K/S)^{2.15}$ values of each pair of dyestuffs

λ (nm)		% concentration 0.5 3.5	1.5 2.5	2.0 2.0	2.5 1.5	3.5 0.5	A B
420	%R	22.57	21.56	21.29	20.98	20.16	
	K/S	1.3280	1.4270	1.4551	1.4882	1.5808	
*	(K/S)	1.3038	1.4028	1.4309	1.4640	1.5566	3R
...	$(K/S)^{2.15}$	1.7690	2.0704	2.1606	2.2695	2.5894	2R
500	%R	20.89	21.82	22.61	23.46	25.74	
	K/S	1.4981	1.4010	1.3241	1.2486	1.0712	
	(K/S)	1.4844	1.3873	1.3104	1.2349	1.0575	
...	$(K/S)^{2.15}$	2.3378	2.0214	1.7881	1.5739	1.1276	
420	%R	26.79	23.05	22.23	21.26	20.40	
	K/S	1.0006	1.2845	1.3603	1.4594	1.5530	3R
	(K/S)	0.9818	1.2603	1.3361	1.4352	1.5288	5B
...	$(K/S)^{2.15}$	0.9613	1.6445	1.8645	2.1746	2.4909	
540	%R	20.89	21.79	22.90	24.10	30.60	
	K/S	1.4981	1.4040	1.2980	1.2030	0.7870	
	(K/S)	1.4848	1.3907	1.2847	1.1897	0.7737	
	$(K/S)^{2.15}$	2.3393	2.0321	1.7136	1.4527	0.5759	

Table 4.15 Cont 'd

λ (nm)		% concentration					
		0.5 3.5	1.5 2.5	2.0 2.0	2.5 1.5	3.5 0.5	A B
420	%R	24.58	22.23	21.46	20.86	20.15	
	K/S	1.1574	1.3603	1.4370	1.5014	1.5820	
	(K/S)	1.1332	1.3361	1.4128	1.4772	1.5578	
	$(K/S)^{2.15}$	1.3085	1.8645	2.1023	2.3137	2.5937	3R
620	%R	20.79	21.83	22.72	24.10	31.76	4GD
	K/S	1.5091	1.4000	1.3142	1.1950	0.7330	
	(K/S)	1.4974	1.3883	1.3025	1.1833	0.7213	
	$(K/S)^{2.15}$	2.3822	2.0246	1.7651	1.4359	0.4954	
500	%R	25.59	23.35	22.59	21.92	21.06	
	K/S	1.0817	1.2755	1.3260	1.3910	1.4794	
	(K/S)	1.0679	1.2618	1.3123	1.3773	1.4657	
	$(K/S)^{2.15}$	1.1519	1.6486	1.7937	1.9902	2.2749	2R
620	%R	20.73	21.71	22.76	23.87	31.80	4GD
	K/S	1.5157	1.4120	1.3106	1.2144	0.7310	
	(K/S)	1.5040	1.4003	1.2989	1.2027	0.7193	
	$(K/S)^{2.15}$	2.4048	2.0624	1.7546	1.4871	0.4924	
540	%R	20.56	21.15	21.51	21.86	23.27	
	K/S	1.5348	1.4700	1.4320	1.3970	1.2647	
	(K/S)	1.5215	1.4567	1.4187	1.3837	1.2514	
	$(K/S)^{2.15}$	2.4653	2.2451	2.1211	2.0102	1.6195	4GD
620	%R	31.31	24.17	22.74	21.82	20.80	5B
	K/S	0.7535	1.1894	1.3124	1.4010	1.5080	
	(K/S)	0.7418	1.1777	1.3007	1.3893	1.4963	
	$(K/S)^{2.15}$	0.5261	1.4214	1.7598	2.0277	2.3784	

Table 4.15 Cont'd

λ (nm)		% concentration					
		0.5 3.5	1.5 2.5	2.0 2.0	2.5 1.5	3.5 0.5	A B
540	%R	20.54	21.49	22.26	23.60	29.54	
	K/S	1.5372	1.4340	1.3576	1.2370	0.8400	
	$(K/S)^{2.15}$	1.5239	1.4207	1.3443	1.2237	0.8267	
	$(K/S)^{2.15}$	2.4737	2.1275	1.8891	1.5434	0.6642	G
660	%R	41.03	30.98	29.10	27.68	25.91	5B
	K/S	0.4241	0.7690	0.8640	0.9452	1.0597	
	$(K/S)^{2.15}$	0.4129	0.7578	0.8528	0.9339	1.0485	
	$(K/S)^{2.15}$	0.1493	0.5508	0.7100	0.8634	1.1071	
420	%R	20.30	21.91	23.15	25.00	34.06	
	K/S	1.5650	1.3920	1.2755	1.1250	0.6394	
	$(K/S)^{2.15}$	1.5408	1.3678	1.2513	1.1008	0.6152	
	$(K/S)^{2.15}$	2.5332	1.9609	1.6194	1.2294	0.3519	G
660	%R	39.82	29.66	27.79	26.32	25.29	8G
	K/S	0.4546	0.8340	0.9386	1.0316	1.1037	
	$(K/S)^{2.15}$	0.4434	0.8228	0.9274	1.0204	1.0925	
	$(K/S)^{2.15}$	0.1739	0.6574	0.8250	1.0443	1.2094	
420	%R	20.36	21.44	22.81	24.11	32.49	
	K/S	1.5578	1.4390	1.3061	1.1942	0.7014	
	$(K/S)^{2.15}$	1.5336	1.4148	1.2819	1.1700	0.6772	
	$(K/S)^{2.15}$	2.5078	2.1087	1.7057	1.4016	0.4326	G
660	%R	42.03	31.77	30.13	27.96	26.29	3R
	K/S	0.3998	0.7325	0.8105	0.9284	1.0336	
	$(K/S)^{2.15}$	0.3886	0.7212	0.7993	0.9172	1.0224	
	$(K/S)^{2.15}$	0.1310	0.4953	0.6177	0.8303	1.0487	

Table 4.15 Cont'd

λ (nm)		% concentration					
		0.5 3.5	1.5 2.5	2.0 2.0	2.5 1.5	3.5 0.5	A B
420	%R	19.91	19.92	19.90	19.85	19.94	
	K/S	1.6108	1.6096	1.6120	1.6180	1.6072	
	(K/S)	1.5866	1.5854	1.5878	1.5938	1.5830	
	$(K/S)^{2.15}$	2.6979	2.6935	2.7022	2.7242	2.6847	3R
520	%R	57.27	46.72	43.92	41.47	38.84	8G
	K/S	0.1594	0.3036	0.3576	0.4129	0.4818	
	(K/S)	0.1458	0.2900	0.3440	0.3993	0.4682	
	$(K/S)^{2.15}$	0.0159	0.0698	0.1008	0.1389	0.1956	
500	%R	20.59	20.51	20.57	20.55	20.71	
	K/S	1.5312	1.5408	1.5336	1.5360	1.5179	
	(K/S)	1.5175	1.5271	1.5199	1.5223	1.5042	
	$(K/S)^{2.15}$	2.4514	2.4848	2.4597	2.4681	2.4054	2R
540	%R	20.11	20.44	20.79	21.10	22.46	5B
	K/S	1.5868	1.5486	1.5091	1.4750	1.3386	
	(K/S)	1.5735	1.5353	1.4958	1.4617	1.3253	
	$(K/S)^{2.15}$	2.6501	2.5137	2.3767	2.2617	1.8322	

* see Equation 4.I

Table 4.16 Reflectances, K/S, (K/S) and $(K/S)^{2.15}$ values of each three dyestuff mixtures.

λ (nm)		% concentration					
		0.5 1.0 2.5	1.0 2.5 0.5	1.5 1.0 1.5	2.0 1.5 0.5	2.5 0.5 1.0	A B C
420	%R	23.25	21.11	22.81	22.08	23.66	
	K/S	1.2665	1.4740	1.3061	1.3750	1.2324	
*	(K/S)	1.2423	1.4498	1.2819	1.3508	1.2082	
	$(K/S)^{2.15}$	1.5944	2.2224	1.7057	1.9089	1.5018	

Table 4.16 Cont'd

λ (nm)		% concentration					
		0.5 1.0 2.5	1.0 2.5 0.5	1.5 1.0 1.5	2.0 1.5 0.5	2.5 0.5 1.0	A B C
500	%R	25.80	24.66	23.32	22.76	22.14	
	K/S	1.0670	1.1512	1.2604	1.3106	1.3690	
	(K/S)	1.0533	1.1375	1.2467	1.2969	1.3553	2R 3R
	(K/S) 2.15	1.1180	1.3191	1.6064	1.7487	1.9224	4GD
620	%R	22.02	32.73	24.26	32.68	26.85	
	K/S	1.3810	0.6915	1.1822	0.6938	0.9965	
	(K/S)	1.3693	0.6798	1.1705	0.6821	0.9848	
	(K/S) 2.15	1.9655	0.4361	1.4028	0.4393	0.9676	
500	%R	23.58	21.35	21.91	21.21	21.55	
	K/S	1.2386	1.4485	1.3920	1.4639	1.4280	
	(K/S)	1.2249	1.4348	1.3783	1.4502	1.4143	
	(K/S) 2.15	1.5466	2.1731	1.9933	1.2236	2.1069	
540	%R	22.36	21.01	22.04	21.66	22.82	2R
	K/S	1.3480	1.4849	1.3790	1.4170	1.3052	5B
	(K/S)	1.3347	1.4716	1.3657	1.4037	1.2919	4GD
	(K/S) 2.15	1.8602	2.2948	1.9544	2.0732	1.7343	
620	%R	21.90	31.89	23.72	31.80	26.38	
	K/S	1.3930	0.7274	1.2264	0.7310	1.0274	
	(K/S)	1.3813	0.7157	1.2147	0.7193	1.0157	
	(K/S) 2.15	2.0027	0.4871	1.5192	0.4924	1.0340	
420	%R	21.38	26.30	23.72	27.49	26.50	
	K/S	1.4452	1.0330	1.2264	0.9566	1.0190	
	(K/S)	1.4210	1.0088	1.2022	0.9324	0.9948	
	(K/S) 2.15	2.1286	1.0191	1.4858	0.8603	0.9889	

Table 4.16 Cont'd

λ (nm)		% concentration					
		0.5 1.0 2.5	1.0 2.5 0.5	1.5 1.0 1.5	2.0 1.5 0.5	2.5 0.5 1.0	A B C
620	%R	26.00	21.70	24.79	22.53	25.78	
	K/S	1.0530	1.4130	1.1408	1.3320	1.0684	
	(K/S)	1.0413	1.4013	1.1291	1.3203	1.0567	
	$(K/S)^{2.15}$	1.0909	2.0656	1.2983	1.8174	1.1259	G
660	%R	28.43	23.11	26.04	23.46	25.78	4GD
	K/S	0.9012	1.2791	1.0502	1.2486	1.0684	3R
	(K/S)	0.8900	1.2679	1.0389	1.2374	1.0572	
	$(K/S)^{2.15}$	0.7783	1.6657	1.0856	1.5808	1.1269	
420	%R	25.14	20.47	21.86	20.45	20.97	
	K/S	1.1148	1.5453	1.3970	1.5475	1.4893	
	(K/S)	1.0906	1.5211	1.3728	1.5233	1.4651	
	$(K/S)^{2.15}$	1.2050	2.4641	1.9764	2.4717	2.2732	
520	%R	45.42	47.77	42.74	42.87	39.68	3R
	K/S	0.3276	0.2856	0.3838	0.3806	0.4586	8G
	(K/S)	0.3139	0.2720	0.3702	0.3670	0.4450	G
	$(K/S)^{2.15}$	0.0828	0.0608	0.1180	0.1159	0.1754	
660	%R	27.61	40.53	32.08	42.12	35.63	
	K/S	0.9494	0.4364	0.7190	0.3976	0.5818	
	(K/S)	0.9382	0.4252	0.7078	0.3864	0.5706	
	$(K/S)^{2.15}$	0.8717	0.1590	0.4756	0.1294	0.2992	
540	%R	21.32	24.32	22.70	25.57	24.65	
	K/S	1.4518	1.1774	1.3160	1.0831	1.1520	
	(K/S)	1.4385	1.1641	1.3027	1.0698	1.1387	
	$(K/S)^{2.15}$	2.1852	1.3863	1.7657	1.1561	1.3221	

Table 4.16 Cont'd.

λ (nm)		% concentration					
		0.5 1.0 2.5	1.0 2.5 0.5	1.5 1.0 1.5	2.0 1.5 0.5	2.5 0.5 1.0	A B C
620	%R	25.66	21.66	24.28	22.67	25.77	G
	K/S	1.0768	1.4170	1.1806	1.3187	1.0691	4GD
	(K/S)	1.0651	1.4053	1.1689	1.3070	1.0574	5B
	$(K/S)^{2.15}$	1.1452	2.0783	1.3987	1.7782	1.1275	
660	%R	28.12	23.07	25.42	23.70	25.74	
	K/S	0.9188	1.2827	1.0944	1.2280	1.0712	
	(K/S)	0.9076	1.2715	1.0832	1.2168	1.0599	
	$(K/S)^{2.15}$	0.8118	1.6759	1.1874	1.5247	1.1334	

4.3 Predicted Concentrations

The predicted concentrations using modified equation based on Equation 2.38 are shown in Tables 4.17 and 4.18 for two color mixtures and three color mixtures respectively.

Table 4.17 The two color predicted concentrations

Dyes	% concentration					
A B	0.5 3.5	1.5 2.5	2.0 2.0	2.5 1.5	3.5 0.5	STD
3R	0.714	1.446	1.784	2.134	3.005	
2R	2.950	2.358	1.968	1.601	0.802	
3R	0.678	1.671	2.048	2.530	3.187	
5B	2.743	2.369	1.990	1.677	0.637	
3R	0.849	1.725	2.139	2.545	3.272	
4GD	2.686	2.283	1.991	1.619	0.559	

Table 4.17 Cont'd

Dyes	% concentration					
A B	0.5 3.5	1.5 2.5	2.0 2.0	2.5 1.5	3.5 0.5	STD
2R	0.831	1.593	1.877	2.217	2.889	
4GD	2.712	2.326	1.979	1.677	0.555	
4GD	0.593	1.603	1.985	2.287	2.682	
5B	2.677	2.038	1.748	1.504	0.895	
G	0.401	1.481	1.909	2.321	2.976	
5B	2,892	2.435	2.135	1.709	0.645	
G	0.468	1.767	2.218	2.807	3.251	
8G	3.609	2.780	2.289	1.727	0.471	
G	0.352	1.331	1.660	2.232	2.819	
3R	3.341	2.799	2.259	1.849	0.552	
3R	0.273	1.198	1.729	2.383	3.355	
8G	3.459	2.561	2.005	1.337	0.240	
2R	0.763	1.237	1.523	1.858	2.809	
5B	2.646	2.193	1.855	1.513	0.420	

Table 4.18 The three color predicted concentrations

Dyes	% concentration					
A B C	0.5 1.0 2.5	1.0 2.5 0.5	1.5 1.0 1.5	2.0 1.5 0.5	2.5 0.5 1.0	STD
2R	0.679	1.124	1.521	1.894	2.181	
3R	1.008	2.173	0.899	1.325	0.423	
4GD	2.217	0.492	1.582	0.495	1.091	

Table 4.I8 Cont'd

Dyes	% concentration					
A	0.5	1.0	1.5	2.0	2.5	STD
B	1.0	2.5	1.0	1.5	0.5	
C	2.5	0.5	1.5	0.5	1.0	
2R	0.501	0.950	1.556	1.708	2.384	
5B	1.029	1.906	0.693	1.175	0.129	
4GD	2.258	0.549	1.713	0.555	1.166	
G	0.248	1.497	1.148	1.933	1.988	
4GD	1.153	1.863	1.107	1.448	0.651	
3R	2.451	0.724	1.602	0.647	1.084	
3R	0.617	0.897	1.586	1.868	2.732	
8G	1.036	2.551	1.110	1.524	0.312	
G	2.343	0.427	1.278	0.348	0.804	
G	0.233	1.506	1.332	1.774	2.017	
4GD	1.219	1.875	1.163	1.453	0.644	
5B	2.101	0.856	1.578	0.732	1.220	

4.4 Predicted Dyeings

The results of reflectance measurement and the calculated $(K/S)^{2.15}$ values of the predicted dyeing are presented in Tables 4.19 and 4.20 for pairs of dyestuffs and three dyestuff mixtures respectively. The concentrations of the dyestuff mixtures correspond to those in Tables 4.17 and 4.18

Table 4.19 Reflectances, K/S, (K/S) and $(K/S)^{2.15}$ values of each pair of dyestuffs

λ (nm)		The concentrations correspond to Table 4.17					
420	%R	23.47	21.95	21.66	21.40	20.51	
	K/S	1.2477	1.388	1.417	1.443	1.5408	
	(K/S)	1.2235	1.3638	1.3928	1.4188	1.5166	
	$(K/S)^{2.15}$	1.5430	1.9486	2.0388	2.1215	2.4484	3R
500	%R	21.99	22.54	23.07	23.81	25.33	2R
	K/S	1.384	1.331	1,2827	1.2192	1.1009	
	(K/S)	1.3703	1.3173	1.2690	1.2055	1.0872	
	$(K/S)^{2.15}$	1.9685	1.8084	1.6689	1.4945	1.1968	
420	%R	26.34	22.69	22.09	21.26	20.64	
	K/S	1.0302	1.3169	1.374	1.4584	1.5256	
	(K/S)	1.0060	1.2927	1.3498	1.4342	1.5014	
	$(K/S)^{2.15}$	1.0130	1.7368	1.9059	2.1713	2.3960	3R
540	%R	21.52	22.00	22.86	23.56	29.15	5B
	K/S	1.431	1.383	1.3016	1.2402	0.861	
	(K/S)	1.4177	1.3697	1.2883	1.2269	0.8477	
	$(K/S)^{2.15}$	2.1179	1.9667	1.7240	1.5521	0.7010	
420	%R	24.17	22.17	21.58	21.31	20.44	
	K/S	1.1894	1.366	1.425	1.4529	1.5486	
	(K/S)	1.1652	1.3418	1.4008	1.4287	1.5244	3R
	$(K/S)^{2.15}$	1.3892	1.8817	2.0641	2.1535	2.4756	4GD

Table 4.I9 Cont'd

λ (nm)		The concentrations correspond to Table 4.17					
620	%R	21.68	22.42	23.02	24.48	31.38	
	K/S	1.4150	1.3422	1.2872	1.1646	0.7500	
	(K/S)	1.4003	1.3305	1.2755	1.1529	0.7383	
	$(K/S)^{2.15}$	2.0719	1.8477	1.6874	1.3578	0.5208	
500	%R	25.83	23.79	23.26	22.87	22.18	
	K/S	1.0649	1.2208	1.2656	1.3007	1.3650	
	(K/S)	1.0512	1.2071	1.2519	1.2869	1.3513	
	$(K/S)^{2.15}$	1.1133	1.4988	1.6209	1.7202	1.9103	2R
620	%R	21.72	22.03	22.65	23.60	31.23	4GD
	K/S	1.4110	1.3800	1.3205	1.2370	0.7575	
	(K/S)	1.3993	1.3683	1.3088	1.2253	0.7458	
	$(K/S)^{2.15}$	2.0592	1.9624	1.7835	1.6478	0.5323	
540	%R	21.05	21.42	21.69	21.97	22.97	
	K/S	1.4805	1.4410	1.4140	1.3860	1.2971	
	(K/S)	1.4672	1.4277	1.4007	1.3727	1.2838	
	$(K/S)^{2.15}$	2.2800	2.1501	2.0636	1.9760	1.7110	4GD
620	%R	29.82	23.65	22.60	22.38	21.77	5B
	K/S	0.8260	1.2325	1.3196	1.3460	1.4060	
	(K/S)	0.8143	1.2208	1.3079	1.3343	1.3943	
	$(K/S)^{2.15}$	0.6429	1.5356	1.7809	1.8590	2.0434	
540	%R	21.18	21.69	22.20	23.17	27.99	
	K/S	1.4670	1.4140	1.3630	1.2737	0.9266	
	(K/S)	1.4537	1.4007	1.3497	1.2604	0.9133	
	$(K/S)^{2.15}$	2.2352	2.0636	1.9055	1.6447	0.8228	

Table 4.I9 Cont'd

λ (nm)		The concentrations correspond to Table 4.17					
660	%R	43.89	32.53	30.54	29.12	26.74	
	K/S	0.3583	0.6998	0.7900	0,8628	1.0036	G
	(K/S)	0.3471	0.6886	0.7788	0.8516	0.9924	5B
	$(K/S)^{2.15}$	0.1028	0.4483	0.5841	0.7079	0.9836	
420	%R	20.35	21.52	22.79	24.60	35.47	
	K/S	1.5599	1.4310	1.3079	1.1560	0.5869	
	(K/S)	0.5348	1.4068	1.2837	1.1378	0.5627	
	$(K/S)^{2.15}$	2.5120	2.0831	1.7109	1.3050	0.2905	G
660	%R	39.76	28.54	28.06	26.20	26.00	8G
	K/S	0.4559	0.8946	0.9224	1.0390	1.0530	
	(K/S)	0.4447	0.8831	0.9112	1.0278	1.0418	
	$(K/S)^{2.15}$	0.1751	0.7659	0.8187	1.0606	1.0919	
420	%R	20.53	21.14	22.21	23.59	31.89	
	K/S	1.5334	1.4710	1.3621	1.2378	0.7274	
	(K/S)	1.5142	1.4468	1.3379	1.2136	0.7032	
	$(K/S)^{2.15}$	2.4401	2.2125	1.8699	1.5163	0.4691	G
660	%R	46.03	32.82	32.38	30.24	27.66	3R
	K/S	0.3164	0.6472	0.7060	0.8050	0.9464	
	(K/S)	0.3052	0.6359	0.6948	0.7938	0.9352	
	$(K/S)^{2.15}$	0.0779	0.3779	0.4570	0.6086	0.8658	
420	%R	20.09	20.06	20.00	20.02	20.19	
	K/S	1.5892	1.5928	1.6000	1.5976	1.5772	
	(K/S)	1.5650	1.5686	1.5758	1.5734	1.5530	
	$(K/S)^{2.15}$	2.6195	2.6325	2.6585	2.6498	2.5765	

Table 4.19 Cont'd

λ (nm)		The concentration correspond to Table 4.17					
520	%R	62.74	48.30	44.66	41.79	38.52	
	K/S	0.11068	0.2770	0.3428	0.4053	0.4904	3R
	(K/S)	0.0971	0.2634	0.3292	0.3917	0.4768	8G
	$(K/S)^{2.15}$	0.0066	0.0568	0.0917	0.1333	0.2034	
500	%R	21.66	21.47	21.59	21.67	21.89	
	K/S	1.4170	1.4360	1.4240	1.4160	1.3940	
	(K/S)	1.4033	1.4223	1.4103	1.4023	1.3803	
	$(K/S)^{2.15}$	2.0718	2,1326	2.0941	2.0686	1.9995	2R
540	%R	21.03	21.20	21.64	22.08	24.24	5B
	K/S	1.4827	1.4650	1.4190	1.3750	1.1838	
	(K/S)	1.4694	1.4517	1.4057	1.3617	1.1705	
	$(K/S)^{2.15}$	2.2874	2.2286	2.0795	1.9421	1.4028	

Table 4.20 Reflectances, K/S , (K/S) and $(K/S)^{2.15}$ values of each three dyestuff mixtures

λ (nm)		The concentrations correspond to Table 4.18					
420	%R	23.21	21.11	23.14	22.22	24.73	
	K/S	1.2701	1.474	1.2764	1.3612	1.1456	
	(K/S)	1.2459	1.4498	1.2522	1.3370	1.1214	
	$(K/S)^{2.15}$	1.6044	2.2224	1.6219	1.8672	1.2794	
500	%R	25.68	24.55	23.87	23.17	23.20	
	K/S	1.0754	1.1595	1.2144	1.2737	1.2710	2R
	(K/S)	1.0617	1.1458	1.2007	1.2600	1.2573	3R
	$(K/S)^{2.15}$	1.1373	1.3399	1.4817	1.6435	1.6359	4GD

Table 4.20 Cont'd

λ (nm)		The concentrations correspond to Table 4.18					
620	%R	22.41	31.70	23.82	31.27	26.03	
	K/S	1.3431	0.7360	1.2184	0.7555	1.0509	
	(K/S)	1.3314	0.7243	1.2067	0.7438	1.0392	
	$(K/S)^{2.15}$	1.8504	0.4998	1.4977	0.5292	1.0862	
500	%R	24.12	22.43	23.19	22.24	22.70	
	K/S	1.1934	1.3413	1.2719	1.3594	1.3160	
	(K/S)	1.1797	1.3276	1.2582	1.3457	1.3023	
	$(K/S)^{2.15}$	1.4265	1.8389	1.6385	1.8933	1.7644	
540	%R	22.79	22.01	23.33	22.74	24.55	
	K/S	1.3079	1.3820	1.2596	1.3124	1.1595	2R
	(K/S)	1.2946	1.3687	1.2463	1.2991	1.1462	5B
	$(K/S)^{2.15}$	1.7421	1.9636	1.6054	1.7552	1.3409	4GD
620	%R	22.26	29.81	23.71	29.98	25.36	
	K/S	1.3576	0.8265	1.2272	0.8180	1.0988	
	(K/S)	1.3459	0.8148	1.2155	0.8063	1.0871	
	$(K/S)^{2.15}$	1.8939	0.6438	1.5213	0.6294	1.1967	
420	%R	21.31	26.09	23.02	27.21	25.61	
	K/S	1.4529	1.0467	1.2872	0.9734	1.0803	
	(K/S)	1.4287	1.0225	1.2630	0.9492	1.0561	
	$(K/S)^{2.15}$	2.1535	1.0490	1.6521	0.8940	1.1246	
620	%R	25.45	22.65	24.45	23.31	25.74	
	K/S	1.0920	1.3205	1.1670	1.2612	1.0712	G
	(K/S)	1.0803	1.3088	1.1553	1.2495	1.0595	4GD
	$(K/S)^{2.15}$	1.1806	1.7835	1.3639	1.6143	1.1323	3R

Table 4.20 Cont'd

λ (nm)		The concentrations correspond to Table 4.18					
660	%R	28.27	24.20	26.10	24.64	26.32	
	K/S	0.9098	1.1870	1.0460	1.1528	1.0316	
	(K/S)	0.8986	1.1758	1.0348	1.1416	1.0203	
	$(K/S)^{2.15}$	0.7945	1.4164	1.0762	1.3293	1.0443	
420	%R	24.24	20.31	21,28	20.09	20.72	
	K/S	1.1838	1.5638	1.4562	1.5892	1.5168	
	(K/S)	1.1596	1.5396	1.4320	1.5650	1.4926	
	$(K/S)^{2.15}$	1.3749	2.5289	2.1642	2.6195	2.3659	
520	%R	43.71	48.21	41.07	41.83	38.37	3R
	K/S	0.3628	0.2779	0.4229	0.4044	0.4949	8G
	(K/S)	0.3492	0.2643	0.4093	0.3908	0.4813	G
	$(K/S)^{2.15}$	0.1041	0.0572	0.1465	0.1326	0.2076	
660	%R	27,38	41.24	32.54	42.47	36.37	
	K/S	0.9632	0.4188	0.6994	0.3896	0.5569	
	(K/S)	0.9520	0.4076	0.6882	0.3784	0.5457	
	$(K/S)^{2.15}$	0.8996	0.1452	0.4477	0.1237	0.2719	
540	%R	21.97	24.18	22.94	24.99	24.57	
	K/S	1,3860	1.1886	1.2944	1.1258	1.1581	
	(K/S)	1.3727	1.1753	1.2811	1.1125	1.1448	
	$(K/S)^{2.15}$	1.9759	1.4152	1.7033	1.2576	1.3374	
620	%R	25.26	22.41	24.32	23.25	26.00	
	K/S	1.1058	1.3431	1.1774	1.2665	1.0530	G
	(K/S)	1.0941	1.3314	1.1657	1.2548	1.0413	4GD
	$(K/S)^{2.15}$	1.2133	1.8504	1.3905	1.6290	1.0909	5B
660	%R	28.17	23.78	25.07	24.46	26.71	
	K/S	0.9158	1.2216	1.0621	1.1662	1.0054	
	(K/S)	0.9046	1.2104	1.0509	1.1550	0.9942	
	$(K/S)^{2.15}$	0.8060	1.5075	1.1125	1.3631	0.9875	

4.5 Corrected Concentrations

The values of $K/S^{2.15}$, the difference between $K/S^{2.15}$ values of the standard and the predicted dyeings, are shown in Tables 4.21 and 4.22 for two color and three color mixtures respectively. The values of $(K/S)^{2.15}$ are in section 4.2 and 4.4

The concentration difference, Δc , to be used for concentration correction, were calculated using modified equation based on Equation 2.36. The values of $\Delta K/S^{2.15}$ in Tables 4.21 and 4.22 were used, and the calculated results are presented in Tables 4.23 and 4.24

Tables 4.25 and 4.26 give the corrected concentrations which are obtained by adding Δc in Tables 4.21 and 4.22 to The predicted concentrations in Tables 4.17 and 4.18 respectively.

Table 4.2I The $\Delta K/S^{2.15}$ values of two color mixtures

λ (nm)	$\Delta K/S^{2.15}$ The concentrations correspond to Table 4.17					
420	0.2260	0.1218	0.1218	0.1480	0.1409	3R
500	0.3693	0.2129	0.1192	0.0795	-0.0692	2R
420	-0.0517	-0.0922	-0.0413	0.0032	0.0949	3R
540	0.2214	0.0654	-0.0103	-0.0994	-0.1250	5B
420	-0.0807	-0.0171	0.0382	0.1602	0.1181	3R
620	0.3103	0.1769	0.0777	0.0781	-0.0254	4GD
500	0.0386	0.1498	0.1728	0.2700	0.3647	2R
620	0.3456	0.1000	-0.0289	-0.0607	-0.0398	4GD
540	0.1853	0.0950	0.0574	0.0342	-0.0915	4GD
620	-0.1168	-0.1142	-0.0210	-0.1687	0.3350	5B
540	0.2385	0.0639	-0.0163	-0.1012	-0.1586	G
660	0.0465	0.1025	0.1259	0.1555	0.1234	5B
420	0.0212	-0.1222	0.0915	-0.0756	0.0614	G
660	-0.0011	-0.1085	0.0063	-0.0163	0.1175	8G
420	0.0677	-0.1039	0.1642	-0.1147	-0.0365	G
660	0.0531	0.1174	0.1607	0.2217	0.1829	3R
420	0.0783	0.0610	0.0437	0.0744	0.1082	3R
520	0.0093	0.0130	0.0091	0.0056	-0.0078	8G
550	0.3795	0.3522	0.3656	0.3994	0.4059	2R
540	0.3626	0.2851	0.2972	0.3196	0.4294	5B

Table 4.22 The $\Delta K/S^{2.15}$ values of three color mixtures

λ (nm)	$\Delta K/S^{2.15}$ The concentrations correspond to Table 4.18					
420	-0.0099	0	0.0838	0.0417	0.2224	2R 3R 4GD
500	-0.0192	-0.0208	0.1247	0.1052	0.2865	
620	0.1151	-0.0637	-0.0949	-0.0899	-0.1186	
500	0.1201	0.3341	0.3548	0.3303	0.3425	2R 5B 4GD
540	0.1181	0.3312	0.3490	0.3180	0.3034	
620	0.1087	-0.1566	-0.0021	-0.1370	-0.1626	
420	-0.0249	-0.0299	-0.1663	-0.0337	-0.1357	G 4GD 3R
620	-0.0897	0.2821	-0.0656	0.2031	-0.0064	
660	-0.0163	0.2493	0.0094	0.2515	0.0826	
420	-0.1699	-0.0649	-0.1878	-0.1478	-0.0927	3R 8G G
520	-0.0278	0.0138	0.0279	0.0057	0.0274	
660	-0.0213	0.0036	-0.0284	-0.0168	-0.0322	
540	0.2093	-0.0288	0.0623	-0.1015	-0.0153	G 4GD 5B
620	-0.0681	0.2279	0.0082	0.1492	0.0366	
660	0.0057	0.1684	0.0748	0.1616	0.1459	

Table 4.23 The concentration differences of two color mixtures

Dyes	Δc				
	The concentrations correspond to Table 4.17				
3R	0.031	0.005	0.085	0.159	0.275
2R	0.485	0.283	0.139	0.069	-0.156
3R	-0.126	-0.140	-0.053	0.030	0.095
5B	0.262	0.079	-0.011	-0.117	-0.149
3R	-0.224	-0.089	0.022	0.184	0.167
4GD	0.350	0.199	0.088	0.088	-0.029
2R	-0.050	0.170	0.239	0.378	0.498
4GD	0.390	0.113	-0.032	-0.068	-0.045
4GD	-0.132	-0.129	-0.024	0.190	0.378
5B	0.268	0.160	0.076	-0.031	-0.250
G	0.125	0.275	0.338	0.418	0.332
5B	0.275	0.063	-0.035	-0.138	-0.202
G	-0.003	-0.292	0.017	-0.044	0.316
8G	0.030	-0.172	-0.131	-0.107	0.084
G	0.143	0.316	0.432	0.596	0.492
3R	0.089	-0.141	-0.223	-0.158	-0.053
3R	0.159	0.224	0.156	0.096	-0.134
8G	-0.058	-0.152	-0.104	0.003	0.298
2R	0.246	0.366	0.377	0.425	0.152
5B	0.275	0.109	0.117	0.113	0.411

Table 4.24 The concentration differences of three color mixtures

Dyes	Δc				
	The concentrations correspond to Table 4.18				
2R	-0.053	-0.017	0.184	0.168	0.447
3R	-0.027	0.033	0.045	-0.004	0.125
4GD	0.130	-0.012	-0.107	-0.101	-0.134
2R	0.097	0.144	0.286	0.172	0.002
5B	0.033	0.367	0.203	0.326	0.531
4GD	0.123	-0.177	-0.002	-0.154	-0.183
G	0.235	0.321	0.285	0.617	0.466
4GD	-0.174	0.218	-0.162	0.037	-0.152
3R	0.023	-0.116	-0.170	-0.063	-0.134
3R	-0.339	0.050	-0.514	-0.293	-0.578
8G	0.121	-0.146	0.281	0.102	0.185
G	-0.075	0.037	0.015	0.015	0.074
G	0.275	0.083	0.371	0.329	0.649
4GD	-0.163	0.231	-0.106	0.066	-0.161
5B	0.295	-0.125	0.096	-0.159	0.013

Table 4.25 The corrected concentrations of two color mixtures.

Dyes	% concentration					
A B	0.5 3.5	1.5 2.5	2.0 2.0	2.5 1.5	3.5 0.5	STD
3R	0.745	1.451	1.869	2.293	3.280	
2R	3.435	2.641	2.107	1.670	0.646	
3R	0.552	1.531	1.995	2.560	3.282	
5B	3.005	2.448	1.979	1.560	0.488	
3R	0.625	1.636	2,161	2.729	3.439	
4GD	3.036	2.482	2.079	1.707	0.530	
2R	0.781	1.763	2.116	2.595	3.387	
4GD	3.102	2.439	1.947	1.609	0.510	
4GD	0.461	1.474	1.961	2.477	3.060	
5B	2.945	2.198	1.824	1.473	0.645	
G	0,526	1.756	2.247	2.739	3.308	
5B	3.167	2.498	2.100	1.571	0.443	
G	0.465	1.475	2.235	2.763	3.567	
8G	3.639	2.608	2.158	1.620	0.555	
G	0.495	1.647	2.092	2.828	3.311	
3R	3.430	2.658	2.036	1.691	0.499	
3R	0.432	1.422	1.885	2.479	3.221	
8G	3.401	2.409	1.901	1.340	0.538	
2R	1.009	1.603	1.900	2.283	2.961	
5B	2.921	2.302	1.972	1.626	0.831	

Table 4.26 The corrected concentrations of three color mixtures

Dyes	% concentration					
A	0.5	I.0	I.5	2.0	2.5	
B	I.0	2.5	I.0	I.5	0.5	STD
C	2.5	0.5	I.5	0.5	I.0	
2R	0.626	I.I07	I.705	2.062	2.628	
3R	0.98I	2.206	0.944	I.32I	0.548	
4GD	2.347	0.480	I.475	0.394	0.957	
2R	0.598	I.094	I.842	I.880	2.386	
5B	I,062	2.273	0.896	I.50I	0.660	
4GD	2.38I	0.372	I.7II	0.40I	0.983	
G	0.483	I.8I8	I.433	2,550	2.454	
4GD	0.979	2.08I	0.945	I.485	0.499	
3R	2.474	0.608	I.432	0.584	0.950	
3R	0.278	0.947	I.072	I.575	2.I54	
8G	I.I57	2.405	I.39I	I.626	0.797	
G	2.268	0.464	I.293	0.363	0.878	
G	0.508	I.589	I.703	2.I03	2.666	
4GD	I.056	2.I06	I.057	I.5I9	0.483	
5B	2.396	0.73I	I.674	0.573	I.233	

4.6 Total Differences

The total color differences of standard and predicted concentrations, and those of standard and corrected concentrations are shown in Tables 4.27 and 4.[illegible].

Table 4.27 The total differences of two color mixtures.

Dyes	ΔE									
	The corresponding concentrations are in Tables 3.2 , 4.17 and 4.25									
	PRED.	COR.	PRED.	COR.	PRED.	COR.	PRED.	COR.	PRED.	COR.
3R 2R	6.4	5.4	4.0	2.8	3.7	5.3	2.5	3.1	4.4	2.5
3R 5B	3.8	8.1	2.0	1.6	1.2	1.3	1.2	0.9	3.6	2.5
3R 4GD	4.3	1.1	2.2	1.2	0.9	2.3	1.4	2.7	1.7	1.9
2R 4GD	3.2	2.3	2.2	1.4	2.9	2.8	5.1	5.6	7.9	9.9
4GD 5B	7.7	5.2	3.2	3.2	1.6	2.6	1.7	1.3	5.9	1.9
G 5B	3.6	6.9	2.2	6.0	3.5	3.9	3.4	6.2	6.0	3.3
G 8G	0.4	1.1	3.4	1.5	1.3	3.5	1.7	0.9	1.7	2.0
G 3R	8.1	2.7	4.5	2.7	8.0	2.4	5.9	2.4	5.3	0.8
3R 8G	10.4	1.0	4.8	0.7	3.8	2.3	1.3	1.2	1.4	2.1
2R 5B	4.3	4.3	4.7	2.3	5.8	0.8	6.2	2.2	8.0	10.0

Table 4.28 The total differences of three color mixtures.

Dyes	ΔE									
	The corresponding concentrations are in Tables 3.3, 4.I8 and 4.26									
	PRED.	COR.	PRED.	COR.	PRED.	COR.	PRED.	COR.	PRED.	COR.
2R 3R 4GD	I.9	I.I	2.4	5.4	3.8	3.5	5.8	I.9	7.3	4.8
2R 5B 4GD	I.3	0.8	I0.7	2.6	6.I	5.I	I0.9	I.9	9.7	5.2
G 4GD 3R	I.8	2.6	4.7	0.7	2.0	I.9	2.6	0.9	3.I	I.5
3R 8G G	2.2	4.7	I.0	4.3	4.2	5.8	I.I	3.4	3.5	2.3
G 4GD 5B	4.2	4.4	4.6	2.5	0.6	I.4	4.8	I.0	2.0	I.6