Abbreviation I,II and III

Sr. No	Title	Page No
Chapter I	General Introduction	1-35
1.1	Introduction	3
1.2	Introduction of reactive dyes	4
1.2.1	Historical Evolution	5
1.3	Classification of Reactive dyes	9
1.4	The Composition of Reactive dyes	10
1.5	Different Reactive system	13
1.6	Application of Reactive dyes	22
1.6.1	Exhaust dyeing process	22
1.6.2	Pad Batch semicontinuous dyeing process	23
1.6.3	Continuous process of dyeing	24
1.6.3.1	Pad-Dry-Pad-Steam	24
1.6.3.2	Pad steam dyeing method	24
1.6.3.3	Wet on Wet method	25
1.6.3.4	Pad-Dry-Cure method	25
1.6.4	Printing	25
1.7	Literature review	26
1.8	References	32-35
Chapter II	Experimental	36-74
2.1	Preparation of bi-functional reactive dyes (Series-I)	38-47
2.2	Preparation of bi-functional reactive dyes (Series -II)	47-52
2.3	Preparation of bi-functional reactive dyes (Series- III)	52-58
2.4	Preparation of bi-functional reactive dyes (Series-IV)	58-64
2.5	Preparation of bi-functional reactive dyes(Series-V)	64-68
2.6	Preparation of hot brand reactive dyes (Series -VI)	68-73
2.7	References	73-74
Chapter III	Characterization	75-96
3.1	Thin Layer Chromatography	76
3.2	Ultraviolet(UV) and Visible Spectroscopy	76
3.3	IR Spectra	77
3.3.1	Characterisation of IR Spectra	82
3.4	Nuclear Magnetic Resonance Spectroscopy	88
3.4.1	Chemical shift	89
3.4.2	Multiplicity Assessment Procedures	89
3.4.3	NMR spectra Characteristics	89
3.5	References	95
Chapter IV	Application	97-148
4.1	Application of Reactive dyes	98
4.1.1	Application on cotton	99
4.1.1.1	Exhaust dyeing process and several parameter study	100

4.1.2	Cold Pad Batch	109
4.1.3	Printing	113
4.2	Antibacterial activity	118
4.3	Fastness properties study of Cotton dyed fabric	119
4.4	Application of Reactive dyes on Silk and fastness study	126
4.5	Application of Reactive dyes on Wool and fastness study	128
4.6	Thermogravimetric Analysis	138
4.7	Moisture content Analysis	141
4.8	Multifibre staining	141
4.9	Solubility	143
4. 10	Stability of Reactive dyes	143
4.11	Overall Evaluation of Reactive dyes	144
4.12	References	146
	Summary	149-152
	List of publication and conferences	153-154
	Shade card	155-157

ABBREVIATION

Manufacturing Companies

AAP : American Aniline Products Inc.

ACC : Augusta Products Inc.

ACNA : Aziende Colori Naizionali Affini A.C.N.A., Milan, Italy.

BASF : Badische Anilin and Soda-Fabric A.G.,

Ludiwigshafen/Rhein.

BrC : British Celanese Ltd., Londen, England.

BDC : British Dyestuff Corporation, Huddersified and

Manchester.

CGY : Ciba-Geigy Ltd., Basel, Switzerland.

CIBA : CIBA Ltd., Basel, Switzerland.

DuP : E.I. Du Pont de Nemours and Co., Wilmington,

Delaware.

EKCo. : Eastman Kodak Co., Rochester, New York.

G (GAF) : General Aniline & Film Corporation, New York.

GY : J.R. Geigy S.A., Basle, Switzerland.

ICI : Imperial Chemical Industries Ltd., Manchester, England.

KYK : Nippon Kayaku Co. Ltd., Tokyo, Japan.

MCI : Mitsubishi Chemical Industries Ltd., Tokyo, Japan.

SDC : Society of Dyers and Colourists.

Patents

USP : United State Patent.

FIAT : Field Intelligence Agency Technical Report

FP : French Patent

BP : British Patent

CIBA : CIBA Ltd, Basle, Switzerland

Bep : Belgian Patent

BASF : Badische Aniline- und Soda-Fabrik, Ludwigshafen

DBP : Deutsche Bundes Patent

IG: I.G. farbenindustries A.G., Frankfurt G. Main, Germany

FBy : Farbenfabriken Bayer A.G. Leverkusen, Germany

G : General Aniline and Film Corporation, New York

FH : Farbwerke Hoechst A.G., Frankfurt Main Hoechst, Germany

ICI : Imperial Chemical Industries Ltd. Manchester, England.

S : Sandoz Ltd. Basle, Switzerland Patent

Gy : J.R. Geigy S.A., Basle, Switzerland

GP : German Patent

General Abbreviations

Be' : Baume

Conc. : Concentrated

DMF : Dimethyl Formamide

DMSO-*d*₆ : Deutrated Dimethylsulphoxide

D₂O : Deuterium Oxide

IR : Infrared

Mole. Wt. (M): Molecular Weight (in grams)

R_f Retention factor

w/v : Weight by volume

v/v : Volume by volume

TLC : Thin Layer Chromatography

⁰Tw : A degree Twaddle

UV : Ultraviolet

 $\lambda_{max} \hspace{1.5cm} : Wavelength \ at \ maximum \ absorbance$

 ε_{max} : Molar extinction coefficient (maximum value)

Ш

OD :Optical Density

TGA : Thermogravimetric analysis

CIE : Commission Internationale d'Eclairage

L* : The lightness coordinate

a* : The red/green coordinate

b* : The yellow/blue coordinate

C* : The brighter/duller coordinate

H* : The hue angle coordinate

Glossary

1. All the temperatures are expressed in Celsius (°C).

- 2. All the melting points reported are incorrect and have been recorded by capillary method.
- 3. Room temperature or laboratory temperature, wherever mentioned in the present work, normally corresponds to 27-30°C.
- 4. TLC was performed on E-Merck pre-coated on Silica gel-G F₂₅₄ plates and the spots were rendered visible by exposing to UV light and iodine.
- The Visible Spectra were recorded on UV Spectrophotometer SS
 5100A Premier Color scan DyStar India Pvt Ltd. Ankleshwar.
- The Infra-red Spectra were recorded on Perkin-Elemer Spectro 400 IR Spectrophotometer in KBR, at Ribosome Research Center Pvt. Ltd, Kim.
- The NMR spectra were recorded on BRUKER AVANCE II 400 MHz NMR Spectrometer from Central Instrumental Facility, Savita Phule University Pune and Ribosome Research Center Pvt. Ltd, Kim.
- 8. Colorimetric data (L*, a*, b*, C*, H* and K/S) were recorded on Reflectance Data color 400 TM spectrophotometer, DyStar India Pvt Ltd. Ankleshwar.

- 9. Dyeing and CPB application carry out on RB electronics IR dyeing machine and Padding mangal.
- 10. The light fastness was assessed in accordance with BS: 1006-1978. The rubbing fastness test was carried out with a Crock meter (Atlas) in accordance with AATCC-1961, and the wash fastness test in accordance with IS: 7651979.
- 11. Chlorinated fastness test ISO105 E03 test method was used.
- 12. Perspiration fastness test ISO105 E04 test method was used,
- 13. The fabric like Silk, Wool and Cotton were purchased from Kiran Threads, Vapi.