Available online at www.derpharmachemica.com

ISSN 0975-413X
CODEN (USA): PCHHAX

Der Pharma Chemica, 2016, 8(18):168-170
(http://derpharmachemica.com/archive.html)

Studies on Quinoline Based Monoazo Disperse Dyes

***Jitendra H. Tandel and Arvind G. Mehta**

P.T. Sarvajanic College of Science, Surat-395001 (INDIA)
**B. P. Baria Science Institute, Navsari-396445 (INDIA)*

ABSTRACT

Fourteen 4-R-azo-3-[2-methyl-6-ethoxy-4-quinolinyl)amino]phenol disperse dyes II (a-n) were prepared by coupling of 3-[2-methyl-6-ethoxy-4-quinolinyl]aminophenol with various diazo components [R= a-n]. The synthesized compounds were characterized by elemental and spectral analysis and their dyeing performance on polyesters fabrics were assessed. The compounds when applied on polyesters fabrics gave brown, yellow and grey shades with poor to good light fastness, very good to excellent wash fastness and poor to excellent exhaustion.

Keywords: Dispersed dyes on polyesters, coupling reaction.

INTRODUCTION

Azo dyes account for more than half of the total disperses dyes and now a day cover virtually the whole of the spectrum. The use of heterocyclic diazo coupling components has made the production of brighter colors possible and has enabled the color changes to be extended. The dyes based on quinazoline ring system are reported to have excellent dyeing properties. The synthesis and application of azo disperse dyes derived from 4-hydroxy-1-methyl-2-oxoquinoline and 4-hydroxy-1-phenyl-2-quinoline [1] and N-[3-hydroxyphenyl]-8-quinoline sulfonamide [2] have been reported.

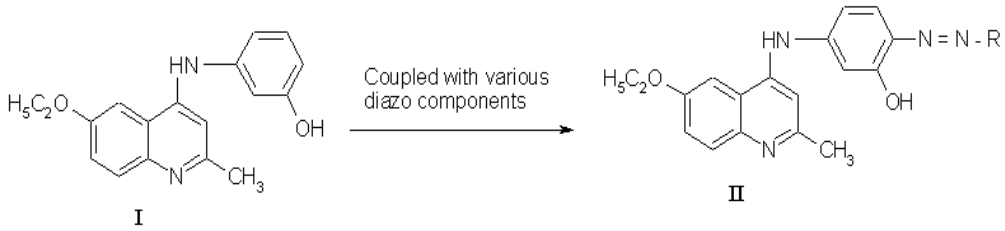
MATERIALS AND METHODS

Preparation of 3-[(2-methyl-6-ethoxy-4-quinolinyl)amino]phenol (I) [3]
A mixture of 2-methyl-6-ethoxy-4-chloroquinoline (0.01mole) and 3-aminophenol (0.01mole) was refluxed in glacial acetic acid (40ml) as a solvent on a sand bath using air condenser for four hours. The reaction mixture was cooled to room temperature and poured over ice and was neutralized with ammonia solution (20%). The product was filtered, washed with water, dried and crystallized from aqueous alcohol.

Preparation of 4-R-azo-3-[(2 methyl-6-ethoxy-4-quinolnyl)amino]phenol (ll a-n)
A clear solution of (I) (0.005 mole) in acetone (30 ml) and sodium hydroxide (15 ml, 10%) was cooled below 5^{o}C in an ice-bath. Well stirred diazo-solution was added to cooled reaction mixture drop wise over a period of 10-15 minutes, maintaining the pH between 7.5 to 8.0. The reation mixture was stirred for two hours at 0-5 ^{0}C . The reaction mixture was heated at 60 ^{0}C, and sodium chloride was added until the coupled mass was precipitated. It was stirred for an hour, filtered and washed with a small amount of sodium chloride solution (5% w/v). The dye was dried at 80 ^{0}C to 90 ^{0}C and extracted with DMF. A yellow dye thus obtained was filtered, washed with acetone and dried to 60^{0}C to get pure products(II a-n). yield 86 %, m.p. >300^{0} C. foun [Found :N,7.42 % ,$C_{27}H_{19}O_{11}N_4S_3Na_3$, required N,7.56 %] The adsorption spectra of compounds were recorded on Hitachi spectra photometer (model V–320) in DMF solution, infrared on FTIR model schemata 820I PC using KBR pellets. All compounds are obtained in good yield. The structure of III a – n was confirmed by their elemental analysis and IR spectra. The IR spectra of these compounds showed characteristic bands in cm^{-1} at 3379, 3459 (O–H and N–H stretching), 2950, 2889 (C–H aromatic and aliphatic stretching), 1244, 2810 (C–H stretching), 1491 (C–C stretching), 1244 (C– O – C stretching,

1454 (N = N stretching). The dyeing and fastness properties of these dyes on polyester have been evaluated. The percentage dye bath exhaustion was found to be 55-71%. All these dyes show shade variation from brown to yellow. Light fastness and wash fastness of the dyed patterns were found to be good to very good to excellent respectively.

Reaction scheme



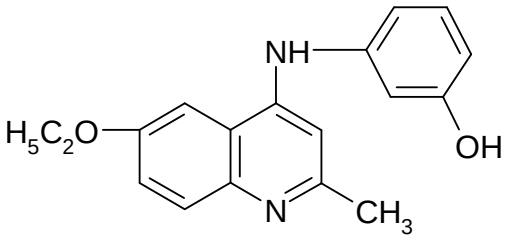
I II

For Compounds II a-n [4]

Where R=

a	2-Amino-5,6-dichloro-benzothiazole	h	6-Chloro-2,4-dinitroaniline
b	2-Amino-6-nitro-benzothiazole	i.	6-Bromo-2-cyano-4-nitroaniline
c	3-Chloro-4-fluoroaniline	j	4-Acetylamino-2-aminoanisole
d	4-Aminoacetanilide	k	2-Cyano-4-nitroaniline
e	4-Chloroaniline	i	2,6-Dibromo-p-nitroaniline
f	4-Chloro-2-nitroaniline	m.	3-Amino-sulphophenylphenol
g.	2,6-Dibromo-p-toluidine	n	5-nitro-2-methoxyaniline

Characteristic infrared absorption frequencies of :



O-H/N-H stretching vibration (cm^{-1})	3427
C-H stretching vibration (cm^{-1})	2950
C=C stretching vibration (cm^{-1})	1505
C-O stretching vibration (cm^{-1})	1244

RESULTS AND DISCUSSION

Monoazo disperse dyes using 3-[(2-methyl-6-ethoxy-4-quinolinyl)amino]phenol [5] as coupling component have been synthesized and their dyeing performance on polyester has been evaluated.

CONCLUSION

The overall evaluation of monoazo disperses dyes on polyester fabrics suggest that, the shade on fabrics, light fastness and wash fastness are good to excellent.

Acknowledgement
The authors are thankful to the principal, P. T. Sarvajanik College of Science, principal, B. P. Baria Science Institute, Navsari for providing research facilities and Atul Ltd., Atul for dyeing facilities.

REFERENCES

[1] H. T. Mehta, A. G. Mehta, *Asian J. Chem*., **2000**, 12, 2, 389.

[2] M. N. Vashi, A. G. Mehta, *Inst. Chemistry(India)*,**2004**,76, 2, 42.
[3] U. V. Malankar, K. R. Desai, *Oriental J. Chem*., **1994**,10, 2, 17.
[4] M. N. Vashi, A. G. Mehta,*Oriental J. Chem.,* **2002**,18, 2, 307.
[5] N. C. Patel, A. G. Mehta, *J.Ultra Science*., **2004,**16,1,147.