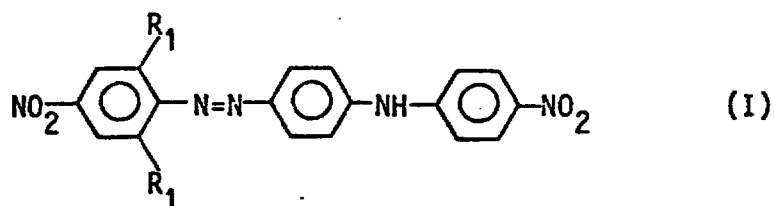


DISPERSE DYE COMPOSITIONS

The invention relates to disperse dye compositions which remain stable during dyeing. It has, up until now, been difficult to prepare compositions of disperse dyes giving a yellow to yellow-brown nuance at high dye concentrations and at the same time producing a stable dispersion in the dyebath. Such dispersions should remain stable under dyeing conditions so that dyestuff is not separated by filtration effects during dyeing, for example in cross wound spool dyeing. For the preparation of such highly concentrated dispersions the choice of the dyestuffs in the mixture becomes important.

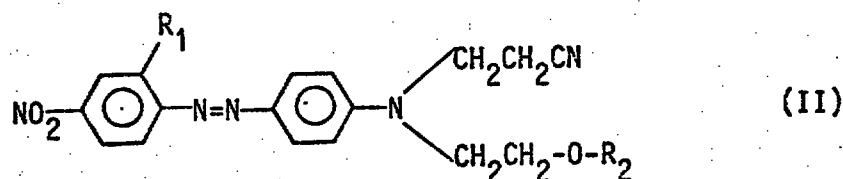
The invention provides a disperse dye composition comprising

- a) 20-55 % by weight of a dyestuff of formula I



in which R_1 is halogen;

- b) 5 to 40 % by weight of at least one dyestuff of formula II



in which R_1 is as above defined and R_2 is hydrogen, $-\text{CO}(\text{C}_{1-4}\text{alkyl})$ or $-\text{CO}-\text{C}_6\text{H}_5$; and

c) 30 to 60 % by weight of one or more dispersing agents and any other additives that may be present;

components a), b) and c) forming 100 % dry weight of the composition (when the dyestuffs I and II are in pure form).

Where any symbol appears more than once in a formula the significances are independent of one another. By the term halogen is meant chlorine, bromine and iodine.

The composition may be prepared as a solid form or as a liquid concentrate, 40 to 60 % by weight of concentrate being water in aqueous dispersion form.

Preferably R_1 is chlorine or bromine, more preferably chlorine.

Preferably R_2 is hydrogen, $-\text{CO}-\text{CH}_3$, $-\text{CO}-\text{C}_2\text{H}_5$, $-\text{CO}-\text{CH}_2\text{CH}-\text{CH}_3$ or $-\text{CO}-\text{C}_6\text{H}_5$, more preferably R_2 is hydrogen, COCH_3 or propionyl most preferably hydrogen or $-\text{COCH}_3$.

Preferably in a disperse dye compositions according to the invention one or two compounds of formula II are present.

Preferably the disperse dye composition according to the invention comprises 30 to 55 % by weight of component a), 5 to 30 % by weight of component b) and 35 to 50 % by weight of component c)

with the proviso that the sum of components a) and b) is 50 to 65 % by weight.

More preferably the disperse dye composition according to the invention comprises 35 to 55 % by weight of component a), 5 to 25 % by weight of component b) and 35 to 50 % by weight of component c).

The compounds of formula I and II per se are known and may be prepared according to known methods.

Dispersing agents of component c) are those generally known for use in disperse dye compositions, for example ligninsulphonate or synthetic products.

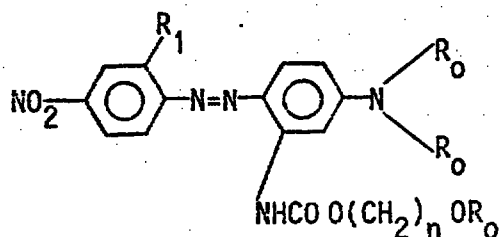
Examples of dispersing agents used can be found in British Patent 1,114,433. Amongst these are anionic or non-ionic dispersants, often in the form of mixtures of two or more. Known anionic dispersants suitable for use in the composition of the invention are for example condensates from naphthalene sulphonic acids and formaldehyde (especially dinaphthylmethanedisulphonates), esters of sulphonated succinic acid, Turkey red oil and alkali metal salts of sulphuric acid esters of fatty alcohols, for example sodium lauryl sulphate, sodium cetyl sulphate, sulphite cellulose waste liquor or alkali metal salts thereof, soaps or alkali metal sulphates of monoglycerides of fatty acids. Examples of known and particularly suitable non-ionic dispersants are the adducts of 3 to 40 mols of ethylene oxide with alkyl phenols, fatty alcohols or fatty amines and neutral sulphuric esters thereof.

Examples of the compounds that may make up component c) in addition to the dispersing agents are water-soluble salts (which also have a buffering effect); one or more further dyestuffs to control the nuance (these dyes will make up 0.5 to 2 % by weight of the total composition if present): agents to dissolve

hard water deposits; and agents to prevent the composition from foaming (if the composition is in liquid form) or from forming dust (if the composition is in solid form).

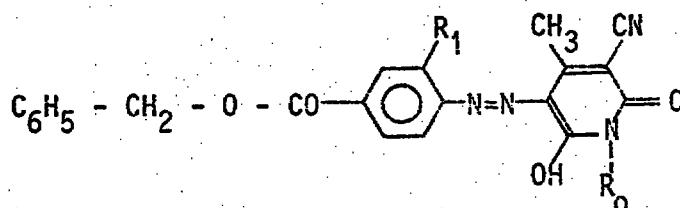
Examples of dyestuffs of component c) are as follows:

1)



where R_0 is C_{1-4} alkyl, n is a number from 1 to 4 and R_1 is defined above;

2)



where R_1 to R_0 are as defined above.

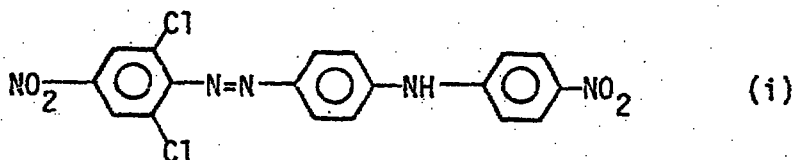
The dyes of the disperse dye composition according to the invention exhaust extremely well from aqueous dispersion on textile material of fully synthetic or semi synthetic hydrophobic high molecular weight fibres. Particularly preferred fibres for dyeing, printing or padding with the dyes of a disperse dye composition according to the invention are linear aromatic polyesters, cellulose triacetate, cellulose 2¹/₂ acetate and synthetic polyamides.

Dyeing, padding or printing can be carried out according to British Patent 1,114,433.

In the following Examples all parts and percentages are by weight and all temperatures are in °C unless indicated to the contrary.

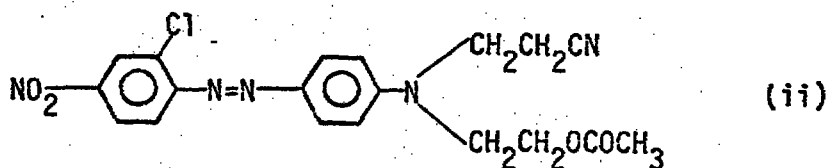
EXAMPLE 1

80 Parts of a dyestuff of the formula (i)



as component a)

40 parts of a dyestuff of the formula (ii)



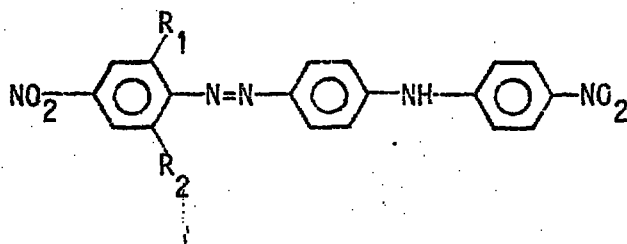
as component b)

and 80 parts of a mixture of commercial ligninsulphonate as component c) in 100 to 200 parts water with 600 parts by volume of siliquarzite beads are placed in a 1500 cc beacker and are stirred for about 6 hours at 2000-2500 turns per minute with a two plate stirrer. The mixture is then thinned with about 200 parts water and filtered through a glass filtering flask under vacuum. The resulting disperse dye composition remaining on the siliquarzite beads is washed into the flask with a little water. The so-formed dispersion is then brought to a pH 8 with addition of phosphoric acid and then atomised (with a laboratory spray drier - air temperature 130° and inner temperature 55-60°). The disperse dye composition has a good dispersion stability in water.

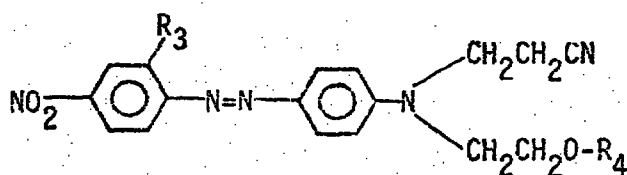
EXAMPLES 2 to 14

According to the method of Example 1 further disperse dye compositions according to the invention may be formed as set out in the Table below. In the Table

Compounds of formula Ia are of the formula

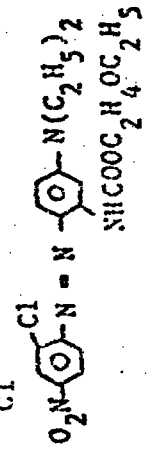


and compounds of formula II are of the formula

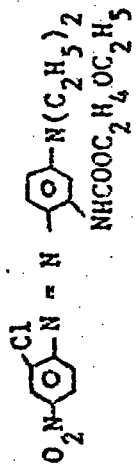
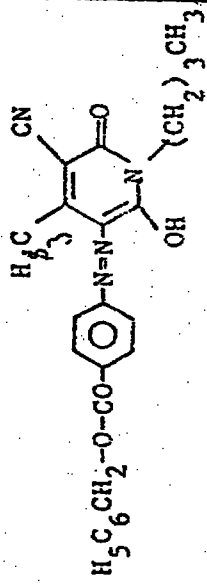


TABLE

Ex. No.	Formula Ia			Parts	Formula II		Dispersing Agent
	Parts	R ₁	R ₂		R ₃	R ₄	
2	50	Cl	Cl	10	Br	H	40
3	50	Cl	Cl	10	Cl	H	40
4	40	Cl	Cl	10	Cl	H	40
5	40	Cl	Br	20	Cl	do.	40
6	35	Br	Br	10 10 5	Br Cl Br	do. -COCH ₂ CH ₃ H	40
7	45	Cl	Cl	10	Cl	H	45
8	40	Cl	Cl	22	Cl	-CO-C ₆ H ₅	38
9	40	Cl	Cl	22	Cl	-COCH ₂ CH(CH ₃) ₂	38
10	45	Cl	Cl	9 1	Cl	H	45



T A B L E (Cont.)

Ex. No.	Formula Ia			Parts	Formula II		Dispersing Agent
	Parts	R ₁	R ₂		R ₃	R ₄	
11	49	Cl	Cl	9 1	Cl	-COCH ₃ 	41
12	45,2	Cl	Cl	9,8	Cl	-COCH ₃	45
13	35,9	Cl	Cl	19	Cl	do.	45,1
14	35	Cl	Cl	19 1	Cl	do. 	45

Dyeing Procedure

10 Parts of the disperse dye composition of Example 1 are dispersed in 1000 parts of water and this is then introduced into 13,000 parts of a circulating liquor at 60° in a dyeing autoclave. The liquor comprises 30 parts of ammonium sulphate and 0.3 parts of formic acid to buffer the solution.

A cross wound spool that has been precleaned and pressed (the spool having 1000 parts of PE Yarn on a plastic frame) is then immersed in the liquor and then the dyeing autoclave is closed and the liquor is then heated from 60 to 130°C over 35 minutes. After 15 minutes at 130° the autoclave is cooled to 80° and then the liquor is drained. The dyed spool is washed thoroughly with cold water, rinsed and dried.

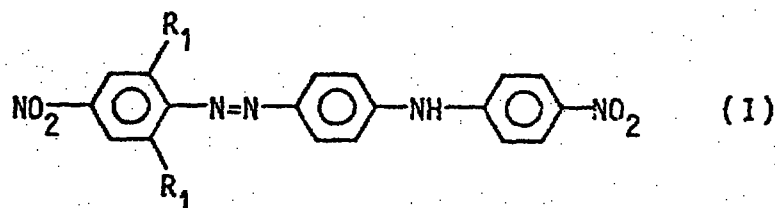
An approximately 2/1 standard depth of dyeing, level and pure is obtained having a yellow nuance and free of side products. The dyeing so produced has very good wet fastness and rubbing properties. The backwater is practically colourless and as the dyeing apparatus shows no retention of dye it is immediately free for further use.



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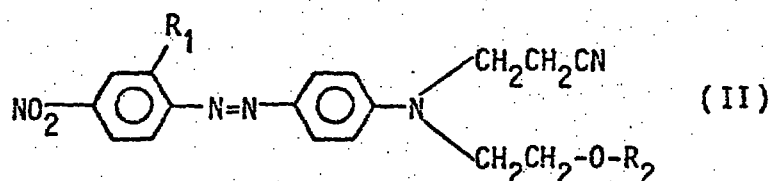
CLAIMS

1. A disperse dye composition comprising
a) 20 to 55 % by weight of a dyestuff of formula I



in which R_1 is halogen,

- b) 5 to 40 % by weight of a dyestuff of formula II



in which R_1 is as above defined and R_2 is hydrogen, $-\text{CO}(\text{C}_{1-4})\text{alkyl}$ or $\text{CO}-\text{C}_6\text{H}_5$; and

- c) 30 to 60 % by weight of one or more dispersing agents and any other additives that may be present,

components a), b) and c) forming 100 % dry weight of the composition.

2. A disperse dye composition as claimed in Claim 1, in which R_1 is chlorine or bromine.

3. A disperse dye composition as claimed in Claim 1 or



Claim 2, in which R_2 is hydrogen, $-\text{COCH}_3$, $-\text{COC}_2\text{H}_5$, $-\text{COCH}_2\text{CHCH}_3$ or $-\text{COC}_6\text{H}_5$.

4. A disperse dye composition as claimed in Claim 3, in which R_2 is hydrogen or $-\text{COCH}_3$.

5. A disperse dye composition as claimed in any one of the preceding claims in which 30 to 55 % by weight of component a), 5 to 30 % by weight of component b) and 35 to 50 % by weight of component c) are present, with the proviso that the sum of components a) and b) is 50 to 65 %.

6. A disperse dye composition as claimed in any one of the preceding claims, in which component c) includes an anionic or non-ionic dispersant.

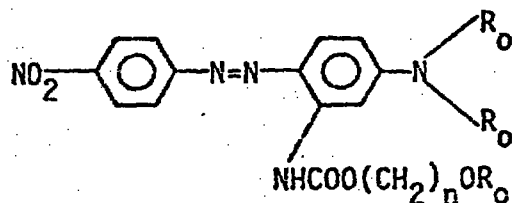
7. A disperse dye composition as claimed in Claim 6, in which component c) includes one or more dispersants selected from condensates from naphthalene sulphonic acids and formaldehyde, esters of sulphonated succinic acid, Turkey red oil and alkali metal salts of sulphuric acid esters of fatty alcohols, sulphite cellulose waste liquor or alkali metal salts thereof, soaps or alkali metal sulphates of monoglycerides of fatty acids, adducts of 3 to 40 mols of ethylene oxide with alkyl phenols, fatty alcohols or fatty amines and neutral sulphuric esters thereof.

8. A disperse dye composition as claimed in any one of the preceding claims in which component c) includes in addition to the dispersing agents one or more of water soluble salts 0.5 to 2 % by weight of the total composition of one or more further dyestuffs, agents to dissolve hard water deposits and agents to prevent the composition from foam when the composition is in liquid form or agents to prevent dust formation when the composition is in solid form.

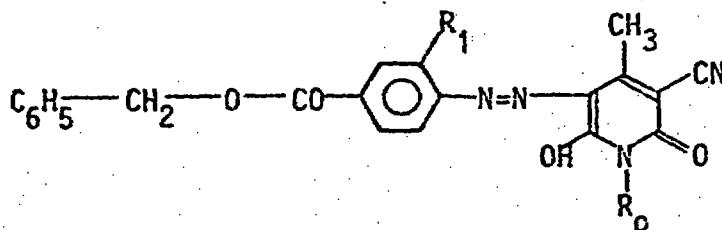
9. A disperse dye composition as claimed in Claim 8 including



in component c) a dyestuff of the formula



where R_0 is C_{1-4} alkyl, n is a number from 1 to 4 and R_1 is halogen, and/or a dyestuff of the formula



where R_1 and R_0 are as defined above.

10. A process for dyeing a substrate comprising contacting the substrate with a disperse dye composition as claimed in any one of the preceding claims.

11. A substrate when dyed with a disperse dye composition as claimed in any one of Claims 1 to 9.

12. A disperse dye composition as claimed in Claim 1 substantially as herein described with reference to any one of Examples 1 to 14.

13. A process as claimed in Claim 10 substantially as herein described with reference to the dyeing Example.