

DYEING AUXILIARY COMPOSITIONS

The present invention relates to a dyeing auxiliary composition and to a process for dyeing blends of cationic dyeable fibres and fibres dyeable with anionic or disperse dyestuffs, in the presence
5 of such a composition.

More particularly, the invention provides a composition comprising

- 10 A) 10 parts by weight of an anionic product obtained by addition of 5 to 20, preferably 10 to 15, mols of ethylene oxide to an aliphatic saturated or unsaturated alcohol of 10 to 24, preferably 12 to 20 carbon atoms, followed by carboxymethylation of the final hydroxy groups
- 15 B) 1 to 15 parts by weight of a cationic addition product of 50 to 150, preferably 100 to 130, mols of ethylene oxide to a fatty amino-(C₂₋₃) alkylene-amine
- C) 1 to 10 parts by weight of a non-ionic addition

product of 20 to 150, preferably 20 to 50 mols
of ethylene oxide to castor oil, or a non-ionic
sequenced addition product of 20 to 150 mols of
ethylene oxide and 1 to 10 mols of propylene oxide
5 to castor oil, and

D) 1 to 20 parts by weight of a N-(β -hydroxy-(C₂₋₄)
alkyl)-fatty acid amide.

Component A may be a mixture of ethoxylated alcohols.
Preferred component A is a mixture of oleyl
10 and cetyl alcohol ethoxylated with approximately
10 to 15 ethylene oxide units which is further
carboxymethylated. Anionic polyglycol ethers of
this type are commercially available or may
be obtained by carboxymethylation according to known
15 methods (e.g. employing chloroacetic acid or a salt
thereof) of the corresponding non-ionic polyglycol ethers.

Component B is preferably an addition
product of 100 to 130 mols of ethylene oxide
to tallow fatty amino-propylamine. The amino
20 group containing polyglycol ethers of type B are
known and commercially available.

When component C is a sequenced ethylene
oxide/propylene oxide addition product, it preferably
comprises a sequence of from 10 to 60 ethylene oxide
25 units, then from 1 to 10 propylene oxide units and

finally 10 to 90 ethylene oxide units. Preferred component C is a commercially available addition product of 25 to 35 mols of ethylene oxide to castor oil.

- 5 Component D is preferably a N-(β -hydroxy-(C₂₋₄)alkyl)amide of a fatty acid containing from 16 to 22 carbon atoms, more preferably N-(β -hydroxy-ethyl)-tallow acid amide.

 The weight ratio of components A:B:C:D
10 is preferably 10:1-10:1-10:1-15, more preferably 10:1.5-8:1.5-8:2-8, particularly 3:1:1:2.

 The four-component compositions of the invention are preferably formulated with water. Preferred aqueous compositions are those containing
15 20 to 50%, preferably 25 to 35%, by weight of the four components A, B, C and D.

 The aqueous compositions of the invention may be prepared according to known methods. Preferably, the components A, B, C, D are mixed together in any
20 order under heating to 90°C and stirred at this temperature until homogenization. Subsequently, demineralized water of 90°C is added to this mixture which is further stirred at this temperature until homogenization. Components A, B, C and D may

also be added with stirring to water heated to 90°C.

The compositions of the invention are useful dyeing or printing auxiliary agents. They are particularly suitable for dyeing in one bath
5 in one or two steps mixed textile substrates comprising cationic dyeable fibres and anionic or disperse dyeable fibres.

Accordingly, the present invention further
10 provides a process for dyeing in one bath or printing a mixed textile substrate comprising cationic dyeable fibres and anionic or disperse dyeable fibres, which process comprises using a dyebath containing in addition to the dyestuffs a composition as stated above.

15 Suitable mixed textile substrates are blends of cationic dyeable fibres, e.g. polyacrylonitrile or modified polyester or polyamide fibres, and of fibres dyeable with anionic or disperse dyestuffs such as natural or regenerated cellulosic fibres, e.g. cotton
20 or cellulose acetate, polyester or synthetic or natural polyamide fibres, e.g. wool or nylon.

The textile substrate may be in any conventional form e.g. yarn, filaments, wovens, plush fabrics, knitted goods.

25 Suitable anionic dyestuffs which may be used include reactive, direct, acid and metal

complex dyes. The preferred anionic dyestuffs are those having good solubility in cold water. In this regard, the particularly preferred anionic dyes are the following Colour Index dyes :

- 5 Acid Blue 227, 127:1
 Acid Yellow 127, 111, 129, 112, 218, 75
 Acid Orange 156
 Acid Red 249, 261, 263, 215, 11
 Reactive Yellow 69
10 Reactive Red 100

As regards the cationic dyestuff, such is preferably one easily formed into liquid or pseudo-liquid form, especially preferred being the following Colour Index dyes +

- 15 Basic Yellow 13, 82
 Basic Red 22
 Basic Blue 77, 141

The composition is preferably used in form of an aqueous preparation such as mentioned above. The amount of such an aqueous composition to be employed in the dyebath or printing paste depends on the blended substrate and the type of dyestuffs used. Satisfactory results are obtained when the aqueous composition is used in an amount
25 from 0.1 to 10%, preferably 1 to 5%, more preferably

1 to 3%, by weight based on the dry weight of the substrate to be dyed or printed.

The dyebath or printing paste may further contain conventional additives depending on the blended substrate to be dyed or printed, or the dyeing process used e.g. carboxylic acids of 1 to 5 carbon atoms to adjust the pH, sodium acetate, a tenside.

Dyeing in the presence of the composition according to the invention may be carried out in conventional manner, either in a long bath ratio (from 1:10 to 1:50) or in a short bath ratio (below 1:10). The dyeing process of the invention is effected in one bath according to the one- or two-step method. The dyeing temperature, the pH of the dyebath and, in the case of a two-step process, the addition order of the dyestuffs will depend on the nature of the mixed substrate. Dyeing is preferably carried out according to the exhaust method. Printing with a printing paste containing the composition of the invention may be carried out in known manner.

The compositions of the invention have a good dispersing and anti-precipitation power; therefore, they may be used universally, i.e. with various combinations of basic dyestuffs together with either disperse or reactive,

direct, acid or metal complex dyestuffs. Deep dark
tone-in-tone dyeings may be obtained with the process
of the invention, particularly deep black tones. The
fastness properties of the dyeings obtained are well
5 up to standard; particularly, the dyeings exhibit
excellent rubbing fastnesses, more particularly
in the case of polyacrylonitrile/wool blends.
Bath exhaustion is also good. Furthermore, the composi-
tions of the invention provide little or no foam, parti-
10 cularly at the dyeing temperatures.

The compositions of the invention are
particularly suitable for dichromatic or trichromatic
dyeing.

In the following Examples, the parts and
percentages are by weight unless otherwise stated,
15 and the temperatures are in degrees Centigrade.

Example 1

10 parts N-(β -hydroxy-ethyl)-tallow acid
amide (commercially available)

5 15 parts commercially available anionic product
obtained from approximately 12 mols of
ethylene oxide with a mixture of oleyl-
alcohol and cetylalcohol, followed by
carboxymethylation of the final hydroxy
groups

10 5 parts commercially available non ionic addition
product of approximately 32 mols of
ethylene oxide to castor oil (95%), and

15 10 parts commercially available cationic product
obtained from 120 mols ethylene oxide with
tallow fatty amino-propylamine (50%)

are mixed by stirring and heating to 90° until homo-
genization.

20 60 parts demineralized water heated to 90° are
slowly added with stirring to the resulting mixture and
the whole is then further stirred for approximately
10-15 minutes until homogenization. The mixture is then
cooled to 50° with stirring.

A light yellowish paste is obtained which

may be used as such as dyeing or printing auxiliary.

EXAMPLE 2

A wool polyacrylic mixed yarn (55% polyacrylonitrile and 45% wool) is washed for 20 minutes at 40-60°
5 with a non-ionic surfactant in a liquor to goods ratio of 15:1. After thorough rinsing, the yarn is dyed in a liquor to goods ratio of 15:1 in a bath obtained as follows:

A bath containing, per 1000 parts, 30 parts of the composition of Example 1 and 1 part of sodium acetate is
10 prepared and, after adjustment to pH 5 by addition of acetic acid, 2% of dyestuff C.I. Acid Black 218 are added thereto. The dyebath is heated over a period of 35 minutes from 60 to 95° and the yarn is dyed for 30 minutes at 95°. The dyebath is then cooled to 85° and
15 adjusted to pH 4.2-4.5 with formic acid. 1.5% of a cationic dyestuff mixture commercially available under the name Sandocryl Black B-BLN (Sandoz Switzerland) are added to the the same bath. Subsequently the dyebath is heated to 102° over a period of 10 to 15 minutes and the yarn is
20 dyed for 90 to 120 minutes at this temperature. After cooling to 70° over the course of 20 minutes, the yarn is rinsed warm and cold and post-treated for 20 minutes at about _____

50° with a bath containing, per 1000 parts, 0.5-1 part of a surfactant based on ethoxylated oleic alcohol and 20 parts of acetic acid 40%.

The resulting dyeings have excellent rubbing fastnesses.

EXAMPLE 3

Polyacrylonitrile/polyamide mixed knitted goods 50:50 are pre-treated as disclosed in Example 2 and then dyed with a bath prepared by adding, per 1000 parts, 20 parts of the composition of Example 1 and 1 part sodium acetate, adjusting to pH 5-5.6 with acetic acid and adding 0.35% of the dyestuff C.I. Acid Red 399 , 0.2% of the dyestuff C.I. Acid Brown 298 and 0.24% of the dyestuff C.I. Acid Blue 296.

The bath temperature is raised to 60° and then to 95° over a period of 40 minutes (1°/min). The substrate is dyed for 30 minutes at 95° and, after cooling to 80° the dyebath is adjusted to pH 4.5 with formic acid. 0.7% of dyestuff C.I. Basic Red 54 and 0.2% of dyestuff C.I. Basic Blue 41 are added to this bath which is then heated to the boil over the course of 20 minutes. The knitted substrate is further dyed at the boil for 60 to 90 minutes and, after cooling to 70° over a period of 20 minutes, rinsed

warm and then cold. Finally, the dyed substrate is treated for 20 minutes at 50° with a bath containing, per 1000 parts, 0.5-1 part of a surfactant based on ethoxylated oleyl alcohol and 10 parts of acetic acid 40% .

EXAMPLE 4

A polyacrylonitrile/cotton/viscose mixed plush fabric (48:40:12) is pre-washed in a liquor to goods ratio of 30:1 with a non-ionic surfactant (a commercially available higher alkylphenol and oleyl alcohol ethoxylated with 8-12 mols ethylene oxide). After thorough rinsing, the substrate is dyed with a bath prepared by adding, per 1000 parts, 20 parts of the composition of Example 1 and 1 part of sodium acetate, adjusting to pH 4.5 with acetic acid and addition of 0.38% of dyestuff C.I. Basic Yellow 82, 0.1% of dyestuff C.I. Basic Red 104 and 0.062 % of dyestuff C.I. Basic Blue 41.

The bath temperature is raised to 40° and then to boiling temperature over the course of 30 minutes. The substrate is dyed for 45-60 minutes at the boil and then the dyebath is cooled to 80°. After pH control(4.5), 1% of dyestuff C.I. Direct Orange 107, 0.33% of dyestuff C.I. Direct Red 220 and 0.065% of dyestuff C.I. Direct Blue 77 are added

to this bath. The substrate is dyed for 20 minutes at 80-85° and, after addition of 1.6 g/l of sodium sulphate, further dyed for 30 minutes. Subsequently a further 6.4 g/l of sodium sulphate is added to the
5 dyebath which is then cooled to 60° over a period of 20-30 minutes. After warm and cold rinsing, the resulting substrate is post-treated as disclosed in Example 3.

A beige dyed fabric with good fastnesses is thus obtained.

10 Example 5

A polyacrylonitrile/polyester mixed fabric (50% Dralon and 50% Diolen; Registered Trade Mark) is pre-washed according to the procedure of Example 2 for 20 minutes at 60°. After warm and cold rinsing, the fabric
15 is dyed in a liquor to goods ratio of 30:1 with a dyebath prepared as follows:

A bath containing, per 1000 parts, 15 parts of the composition of Example 1 and 1 part sodium acetate is prepared and adjusted to pH 5 with acetic acid. After
20 addition of 2 ml of a non-ionic commercially available surfactant based on polyglycol ether, the following dyestuffs are added to the bath :

0.3 % of dyestuff C.I. Disperse Yellow 64

1.5% of dyestuffs C.I. Disperse Blue 87, and

1.5% of dyestuffs C.I. Disperse Blue 183 and

26(1:1) .

5 The bath temperature is raised to 60° and
dyeing is carried out for 10 min. After addition of

0.035% of dyestuff C.I. Basic Yellow 64

0.24 % of dyestuff C.I. Basic Yellow 13

0.17 % of dyestuff C.I. Basic Blue 41

10 to the dyebath, the temperature of the same is raised
to 98° over the course of 30 minutes(0.5-1°/min) and then
to 108° over a period of 15 min. Dyeing is carried
out for 90 minutes at 108° and then the dyebath is cooled
to 60-70° over a period of 30 minutes. After thorough
15 warm and cold rinsing, the fabric is post-treated for
20 minutes at 60° in a bath containing, per 1000
parts, 1 part of the surfactant of Example 2 and 1
part of acetic acid.

EXAMPLE 6

20 A wool polyacrylic mixed yarn 50:50 is
dyed in a liquor to goods ratio of 20:1 with a bath
containing, per 1000 parts :

0.1 % of dyestuff C.I. Basic Yellow 82

0.05 % of dyestuff C.I. Basic Red 104

25 0.33 % of dyestuff C.I. Basic Blue 120

0.17 % of dyestuff C.I. Acid Red 118

0.18 % of dyestuff C.I. Acid Blue 82

1 part of sodium acetate, and

1 part of the composition of Example 1.

5 The bath is adjusted to pH 4.5 with acetic acid before the addition of the composition. The bath temperature is raised to 50° and then to 98° over the course of 40 min. The substrate is dyed for 45 minutes at this temperature. After cooling to 50°, the substrate
10 is rinsed warm and cold.

A violet dyed yarn is thus obtained.

CLAIMS

1. A composition comprising

- A) 10 parts by weight of an anionic product obtained by addition of 5 to 20 mols of ethylene oxide to
5 an aliphatic saturated or unsaturated alcohol of 10 to 24 carbon atoms or a mixture of such alcohols, followed by carboxymethylation of the final hydroxy groups
- B) 1 to 15 parts by weight of a cationic addition
10 product of 50 to 150 mols of ethylene oxide to fatty amino-(C₂₋₃)alkylene amine
- C) 1 to 10 parts by weight of a non-ionic addition
15 product of 20 to 150 mols of ethylene oxide to castor oil, or a non-ionic sequenced addition product of 20 to 150 mols of ethylene oxide and 1 to 10 mols of propylene oxide to castor oil, and
- D) 1 to 20 parts by weight of a N-(β-hydroxy-C₂₋₄ alkyl)-fatty acid amide.

0.17 % of dyestuff C.I. Acid Red 118

0.18 % of dyestuff C.I. Acid Blue 82

1 part of sodium acetate, and

1 part of the composition of Example 1.

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The bath is adjusted to pH 4.5 with acetic acid before the addition of the composition. The bath temperature is raised to 50° and then to 98° over the course of 40 min. The substrate is dyed for 45 minutes at this temperature. After cooling to 50°, the substrate is rinsed warm and cold.

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A violet dyed yarn is thus obtained.

CLAIMS

1. A composition comprising

A) 10 parts by weight of an anionic product obtained

by addition of 5 to 20 mols of ethylene oxide to

5 an aliphatic saturated or unsaturated alcohol of 10 to 24 carbon atoms or a mixture of such alcohols, followed by carboxymethylation of the final hydroxy groups

B) 1 to 15 parts by weight of a cationic addition

10 product of 50 to 150 mols of ethylene oxide to fatty amino-(C₂₋₃)alkylene amine

C) 1 to 10 parts by weight of a non-ionic addition

product of 20 to 150 mols of ethylene oxide to castor oil, or a non-ionic sequenced addition product
15 of 20 to 150 mols of ethylene oxide and 1 to 10 mols of propylene oxide to castor oil, and

D) 1 to 20 parts by weight of a N-(β-hydroxy-C₂₋₄ alkyl)-fatty acid amide.





2. A composition according to Claim 1, wherein component A) is a mixture of oleyl and cetyl alcohol ethoxylated with 10 to 15 ethylene oxide units and further carboxymethylated.

5 3. A composition according to Claim 1 or Claim 2, wherein component B) is an addition product of 100 to 130 mols of ethylene oxide to a fatty amino-(C₂₋₃)-alkylene amine.

10 4. A composition according to Claim 3, wherein component B) is an addition product of 100 to 130 mols of ethylene oxide to tallow fatty amino-propylamine.

5. A composition according to any one of the preceding claims, wherein component C) is an addition product of 20 to 50 mols of ethylene oxide to castor oil.

15 6. A composition according to Claim 5, wherein component C) is an addition product of 25 mols to 35 mols of ethylene oxide to castor oil.

20 7. A component according to any one of the preceding claims, wherein component D) is a N-[β-hydroxy-(C₂₋₄)alkyl]amide of a fatty acid containing from 16 to 22 carbon atoms.

8. A composition according to Claim 7, wherein component D) is N-(β-hydroxy-ethyl)tallow acid amide.

9. A composition according to any one of the



26

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preceding claims wherein the weight ratio of components A:B:C:D is 10:1-10:1-10:1-15.

10. A composition according to Claim 9, wherein the weight ratio is 3:1:1:2.

5 11. A composition according to any one of the preceding claims, in the form of an aqueous composition containing 20 to 50% by weight of the total of components A, B, C and D.

10 12. A composition according to Claim 11, in the form of an aqueous composition containing 25 to 35% by weight of the total of components A, B, C and D.

13. A composition substantially as described in Example 1.

15 14. A process for dyeing in one bath or printing a mixed textile substrate comprising cationic dyeable fibres and anionic or disperse dyeable fibres, which process comprises using a dyebath containing in addition to the dyestuffs a composition according to any one of claims 1 to 13.

20 15. A process according to Claim 14, in which the composition is used in an amount from 0.1 to 10% by weight based on the dry weight on the substrate.



27

16. A process according to Claim 15, in which the composition is used in an amount from 1 to 5% by weight based on the dry weight of the substrate.

17. A process according to any one of claims 14 to 16, in which the mixed substrate comprises fibres dyeable with cationic dyestuffs and fibres dyeable with disperse, reactive, acid, direct or metal complex dyestuffs.

18. A process according to Claim 17, in which the substrate comprises a blend of polyacrylonitrile fibres and fibres selected from natural or regenerated cellulosic, polyester and synthetic or natural polyamide fibres.

19. A process for one-bath dyeing of a mixed textile substrate substantially as described in any one of Examples 2 to 6.

20. A dyed or printed mixed textile substrate whenever obtained by a process according to any one of claims 14 to 19.

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