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(54) Title: DYEING OR LIGHTENING PROCESS AND INVERSE EMULSION FOR TREATING THE HAIR COMPRISING A PARTICULAR SOLVENT

(57) Abstract: One subject of the present invention is a process for dyeing and/or lightening human keratin fibres in which a water-in-oil inverse emulsion is applied to said fibres, said emulsion comprising: (a) at least 30% by weight of one or more liquid fatty substances; (b) one or more polyols or polyol (C₁-C₄)alkyl ethers having a Hansen δ_H parameter value of less than or equal to 25 MPa^{1/2} at 25°C that are different from the liquid fatty substances; and (c) one or more alkalizing agents, in the presence of a composition comprising one or more oxidizing agents and preferably hydrogen peroxide. It furthermore relates to a water-in-oil (W/O) inverse emulsion comprising: (a) at least 30% by weight of one or more liquid fatty substances; (b) one or more polyols or polyol (C₁-C₄)alkyl ethers having a Hansen δ_H parameter value of less than or equal to 25 MPa^{1/2} at 25°C that are different from the liquid fatty substances a); (c) one or more alkalizing agents; and (d) at least one oxidation dye and/or at least one direct dye. Another subject of the invention is constituted of two-compartment devices containing, in one compartment, an emulsion according to the invention and, in the other compartment, a composition comprising one or more oxidizing agents.



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DYEING OR LIGHTENING PROCESS AND INVERSE EMULSION FOR TREATING THE HAIR COMPRISING A PARTICULAR SOLVENT

The present invention relates to a process for dyeing or lightening hair, and also
5 to a composition for dyeing or lightening human keratin fibres in the form of a water-in-oil inverse emulsion.

The invention also relates to multi-compartment devices.

Among the methods for dyeing human keratin fibres, such as the hair, mention
may be made of oxidation dyeing or permanent dyeing. More particularly, this dyeing
10 method uses one or more oxidation dyes, usually one or more oxidation bases optionally combined with one or more couplers.

In general, oxidation bases are chosen from *ortho*- or *para*-phenylenediamines, *ortho*- or *para*-aminophenols and heterocyclic compounds. These oxidation bases are
colourless or weakly coloured compounds, which, when combined with oxidizing
15 products, can give access to coloured species.

The shades obtained with these oxidation bases are often varied by combining them with one or more couplers, these couplers being chosen especially from aromatic *meta*-diamines, *meta*-aminophenols, *meta*-diphenols and certain heterocyclic compounds, such as indole compounds.

20 The variety of molecules used as oxidation bases and couplers allows a wide range of colours to be obtained.

Direct dyeing or semi-permanent dyeing is also known. The process conventionally used in direct dyeing consists in applying to the keratin fibres direct dyes, which are coloured and colouring molecules that have affinity for the fibres, in
25 leaving them on for a time, and then in rinsing them off.

The direct dyes generally used are chosen from nitrobenzene, anthraquinone, nitropyridine, azo, methine, azomethine, xanthene, acridine, azine and triarylmethane direct dyes.

This type of process does not require the use of an oxidizing agent to develop
30 the colouration. However, it is not excluded to use one in order to obtain, along with the colouration, a lightening effect. Such a process is then referred to as direct dyeing or semi-permanent dyeing under lightening conditions.

Processes of permanent dyeing or semi-permanent dyeing under lightening conditions thus consist in using, along with the dye composition, an aqueous
35 composition comprising at least one oxidizing agent, under alkaline pH conditions in the vast majority of cases. The role of this oxidizing agent is, *inter alia*, to degrade the melanin of the hair, which, depending on the nature of the oxidizing agent present, leads to more or less pronounced lightening of the fibres. Thus, for relatively weak lightening, the oxidizing agent is generally hydrogen peroxide. When more substantial
40 lightening is desired, peroxygenated salts, for instance persulphates, are usually used, in the presence of hydrogen peroxide.

There is a need to have satisfactory efficacy for lightening and dyeing products, especially in terms of lightening power or dyeing strength and/or selectivity, while at the same time reducing the harmful effects associated with the simultaneous presence of alkaline agents and oxidizing agents such as hydrogen peroxide. These harmful effects mainly concern the degradation of the keratin fibres and the odours of the alkaline agents used, such as aqueous ammonia and amines.

It is thus sought to increase the effects of the alkaline agents and/or oxidizing agents in order to limit their concentrations, while at the same time having maximum dyeing or lightening efficacy.

The aim of the present invention is to obtain compositions for the oxidation dyeing or lightening of keratin fibres that are more satisfactory as regards these points.

This aim and others are achieved by the present invention, one subject of which is a process for dyeing or lightening human keratin fibres in which a water-in-oil inverse emulsion is applied to said fibres, said emulsion comprising:

- (a) at least 30% by weight of one or more liquid fatty substances;
 - (b) one or more polyols or polyol (C₁-C₄)alkyl ethers having a Hansen δ_H parameter value of less than or equal to 25 MPa^{1/2} at 25°C that are different from the liquid fatty substances; and
 - (c) one or more alkalizing agents,
- in the presence of a composition comprising one or more oxidizing agents and preferably hydrogen peroxide.

Another subject of the present invention is a water-in-oil (W/O) inverse emulsion comprising:

- (a) at least 30% by weight of one or more liquid fatty substances;
- (b) one or more polyols or polyol (C₁-C₄)alkyl ethers having a Hansen δ_H parameter value of less than or equal to 25 MPa^{1/2} at 25°C that are different from the liquid fatty substances a);
- (c) one or more alkalizing agents; and
- (d) at least one oxidation dye and/or at least one direct dye.

A subject of the invention is similarly a two-compartment device comprising, in one of the compartments, the inverse emulsion of the invention and, in the other compartment, a second composition containing one or more oxidizing agents.

Other features and advantages of the invention will emerge more clearly on reading the description and the examples that follow.

In the text hereinbelow, unless otherwise indicated, the limits of a range of values are included in that range.

The term "fatty substance" means an organic compound that is insoluble in water at ordinary temperature (25°C) and at atmospheric pressure (760 mmHg; i.e. 1.013×10⁵ Pa) (solubility of less than 5% and preferably of less than

1%, more preferably still of less than 0.1%). They have in their structure at least one hydrocarbon-based chain comprising at least 6 carbon atoms or a sequence of at least two siloxane groups. In addition, the fatty substances are soluble in organic solvents under the same temperature and pressure conditions, for instance
5 chloroform, ethanol or benzene. In the context of the invention, the fatty substances do not comprise any COOH or COO⁻ carboxylic acid functions.

The human keratin fibres treated via the process according to the invention are preferably the hair.

The inverse emulsion according to the invention is a water-in-oil (W/O) emulsion
10 comprising at least 30% by weight of one or more fatty substances that are liquid at 25°C and at atmospheric pressure.

The water-in-oil inverse emulsions according to the invention are true emulsions, and should be distinguished from microemulsions, which are thermodynamically stable systems, unlike true emulsions.

15 The size of the oil globules of the W/O emulsions of the invention is preferably between 10 nm and 100 µm and preferably between 200 nm and 50 µm.

This is the mean diameter D(3.2), which may be measured especially using a laser granulometer.

Preferably, the liquid fatty substances of the invention are chosen from liquid
20 hydrocarbons, liquid fatty alcohols, liquid fatty esters and silicone oils.

The term "liquid hydrocarbon" means a hydrocarbon composed solely of carbon and hydrogen atoms, which is liquid at ordinary temperature (25°C) and at atmospheric pressure (760 mmHg; i.e. 1.013×10⁵ Pa).

More particularly, the liquid hydrocarbons are chosen from:

- 25 - linear or branched, optionally cyclic, C₆-C₁₆ alkanes. Examples that may be mentioned include hexane, undecane, dodecane, tridecane, and isoparaffins, for instance isohexadecane, isododecane and isodecane,
- linear or branched hydrocarbons of mineral, animal or synthetic origin with more than 16 carbon atoms, such as volatile or non-volatile liquid paraffins and derivatives
30 thereof, petroleum jelly, liquid petroleum jelly, polydecenes, hydrogenated polyisobutene such as Parleam®, and squalane.

In one preferred variant the liquid hydrocarbon or hydrocarbons are selected from volatile or non-volatile liquid paraffins and their derivatives and liquid petroleum jelly.

The term "liquid fatty alcohol" means a non-glycerolated and non-
35 oxyalkylenated fatty alcohol that is liquid at ordinary temperature (25°C) and at atmospheric pressure (760 mmHg; i.e. 1.013×10⁵ Pa).

Preferably, the liquid fatty alcohols of the invention comprise from 8 to 30 carbon atoms.

The liquid fatty alcohols of the invention may be saturated or unsaturated.

The saturated liquid fatty alcohols are preferably branched. They may optionally comprise in their structure at least one aromatic or non-aromatic ring. They are preferably acyclic.

More particularly, the liquid saturated fatty alcohols of the invention are chosen
5 from octyldodecanol, isostearyl alcohol and 2-hexyldecanol.

Octyldodecanol is very particularly preferred.

These liquid unsaturated fatty alcohols have at least in their structure at least one double bond or one triple bond. Preferably, the fatty alcohols of the invention bear in their structure one or more double bonds. When several double bonds are
10 present, there are preferably 2 or 3 of them, and they may be conjugated or non-conjugated.

These unsaturated fatty alcohols may be linear or branched.

They may optionally comprise in their structure at least one aromatic or non-aromatic ring. They are preferably acyclic.

More particularly, the liquid unsaturated fatty alcohols of the invention are
15 selected from oleic (or oleyl) alcohol, linoleic (or linoleyl) alcohol, linolenic (or linolenyl) alcohol and undecylenic alcohol.

Oleyl alcohol is very particularly preferred.

A liquid fatty ester means a non-alkoxylated ester which is obtained from a fatty
20 acid and/or a fatty alcohol and which is liquid at ordinary temperature (25°C) and at atmospheric pressure (760 mmHg; i.e. 1.013×10^5 Pa).

The esters are preferably liquid esters of saturated or unsaturated, linear or branched C₁-C₂₆ aliphatic monoacids or polyacids and of saturated or unsaturated, linear or branched C₁-C₂₆ aliphatic monoalcohols or polyalcohols, the total number of
25 carbon atoms of the esters being greater than or equal to 10.

Preferably, for the esters of monoalcohols, at least one from among the alcohol and the acid from which the esters of the invention are derived is branched.

Among the monoesters of monoacids and of monoalcohols, mention may be made of ethyl palmitate, isopropyl palmitate, alkyl myristates such as isopropyl
30 myristate or ethyl myristate, isocetyl stearate, 2-ethylhexyl isononanoate, isodecyl neopentanoate and isostearyl neopentanoate.

Esters of C₄-C₂₂ dicarboxylic or tricarboxylic acids and of C₁-C₂₂ alcohols and esters of monocarboxylic, dicarboxylic or tricarboxylic acids and of non-sugar C₄-C₂₆ dihydroxy, trihydroxy, tetrahydroxy or pentahydroxy alcohols may also be used.

Mention may be made especially of: diethyl sebacate; diisopropyl sebacate; bis(2-ethylhexyl) sebacate; diisopropyl adipate; di-n-propyl adipate; dioctyl adipate; bis(2-ethylhexyl) adipate; diisostearyl adipate; bis(2-ethylhexyl) maleate; triisopropyl citrate; triisocetyl citrate; triisostearyl citrate; glyceryl trilactate; glyceryl trioctanoate; trioctyldodecyl citrate; trioleyl citrate; neopentyl glycol diheptanoate; diethylene glycol
40 diisononanoate.

The composition may also comprise, as liquid fatty ester, sugar esters and diesters of C₆-C₃₀ and preferably C₁₂-C₂₂ fatty acids. It is recalled that the term "sugar" means oxygen-bearing hydrocarbon-based compounds containing several alcohol functions, with or without aldehyde or ketone functions, and which comprise at least 4 carbon atoms. These sugars may be monosaccharides, oligosaccharides or polysaccharides.

Examples of suitable sugars that may be mentioned include sucrose (or saccharose), glucose, galactose, ribose, fucose, maltose, fructose, mannose, arabinose, xylose and lactose, and derivatives thereof, especially alkyl derivatives, such as methyl derivatives, for instance methylglucose.

The sugar esters of fatty acids may be chosen especially from the group comprising the esters or mixtures of esters of sugars described previously and of linear or branched, saturated or unsaturated C₆-C₃₀ and preferably C₁₂-C₂₂ fatty acids. If they are unsaturated, these compounds may have one to three conjugated or non-conjugated carbon-carbon double bonds.

The esters according to this variant may also be selected from monoesters, diesters, triesters, tetraesters and polyesters, and mixtures thereof.

These esters may be, for example, oleates, laurates, palmitates, myristates, behenates, cocoates, stearates, linoleates, linolenates, caprates and arachidonates, or mixtures thereof such as, especially, oleopalmitate, oleostearate and palmitostearate mixed esters.

More particularly, use is made of monoesters and diesters and especially sucrose, glucose or methylglucose monooleates or dioleates, stearates, behenates, oleopalmitates, linoleates, linolenates and oleostearates.

An example that may be mentioned is the product sold under the name Glucate® DO by the company Amerchol, which is a methylglucose dioleate.

Finally, natural or synthetic esters of monoacids, diacids or triacids with glycerol may also be used.

Among these, mention may be made of plant oils.

As oils of plant origin or synthetic triglycerides that may be used in the composition of the invention as liquid fatty esters, examples that may be mentioned include:

- triglyceride oils of plant or synthetic origin, such as liquid fatty acid triglycerides containing from 6 to 30 carbon atoms, for instance heptanoic or octanoic acid triglycerides, or alternatively, for example, sunflower oil, corn oil, soybean oil, marrow oil, grapeseed oil, sesame seed oil, hazelnut oil, apricot oil, macadamia oil, arara oil, castor oil, avocado oil, caprylic/capric acid triglycerides, for instance those sold by the company Stéarineries Dubois or those sold under the names Miglyol® 810, 812 and 818 by the company Dynamit Nobel, jojoba oil and shea butter oil.

Liquid fatty esters derived from monoalcohols will preferably be used as esters according to the invention.

Isopropyl myristate and isopropyl palmitate are particularly preferred.

The term "liquid silicone" means an organopolysiloxane that is liquid at ordinary temperature (25°C) and at atmospheric pressure (760 mmHg; i.e. 1.013×10^5 Pa).

Preferably, the silicone is chosen from liquid polydialkylsiloxanes, especially
 5 liquid polydimethylsiloxanes (PDMS) and liquid polyorganosiloxanes comprising at least one aryl group.

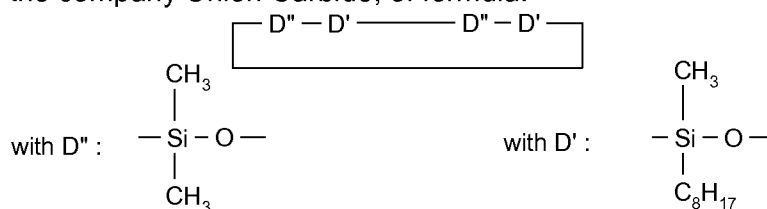
These silicones may also be organomodified. The organomodified silicones that may be used in accordance with the invention are liquid silicones as defined previously, comprising in their structure one or more organofunctional groups
 10 attached via a hydrocarbon-based group.

Organopolysiloxanes are defined in greater detail in Walter Noll's "Chemistry and Technology of Silicones" (1968), Academic Press. They may be volatile or non-volatile.

When they are volatile, the silicones are more particularly chosen from those
 15 having a boiling point of between 60°C and 260°C, and even more particularly from:

(i) cyclic polydialkylsiloxanes containing from 3 to 7 and preferably from 4 to 5 silicon atoms. These are, for example, octamethylcyclotetrasiloxane sold in particular under the name Volatile Silicone® 7207 by Union Carbide or Silbione® 70045 V2 by Rhodia, decamethylcyclopentasiloxane sold under the name Volatile Silicone® 7158
 20 by Union Carbide or Silbione® 70045 V5 by Rhodia, and dodecamethylcyclopentasiloxane sold under the name Silsoft 1217 by Momentive Performance Materials, and mixtures thereof.

Mention may also be made of cyclocopolymers of the dimethylsiloxane/methylalkylsiloxane type, such as Volatile Silicone® FZ 3109 sold by
 25 the company Union Carbide, of formula:



Mention may also be made of mixtures of cyclic polydialkylsiloxanes with organosilicon compounds, such as the mixture of octamethylcyclotetrasiloxane and tetratrimethylsilylpentaerythritol (50/50) and the mixture of
 30 octamethylcyclotetrasiloxane and oxy-1,1'-bis(2,2,2',2',3,3'-hexatrimethylsilyloxy)neopentane;

(ii) linear volatile polydialkylsiloxanes containing 2 to 9 silicon atoms and having a viscosity of less than or equal to 5×10^{-6} m²/s at 25°C. An example is decamethyltetrasiloxane sold in particular under the name SH 200 by the company
 35 Toray Silicone. Silicones belonging to this category are also described in the article published in Cosmetics and Toiletries, Vol. 91, Jan. 76, pp. 27-32, Todd & Byers

"Volatile Silicone Fluids for Cosmetics". The viscosity of the silicones is measured at 25°C according to ASTM standard 445 Appendix C.

Non-volatile polydialkylsiloxanes may also be used.

These non-volatile silicones are more particularly chosen from
5 polydialkylsiloxanes, among which mention may be made mainly of polydimethylsiloxanes containing trimethylsilyl end groups.

Among these polydialkylsiloxanes, mention may be made, in a non-limiting manner, of the following commercial products:

- the Silbione® oils of the 47 and 70 047 series or the Mirasil® oils sold by Rhodia, for
10 instance the oil 70 047 V 500 000;
- the oils of the Mirasil® series sold by the company Rhodia;
- the oils of the 200 series from the company Dow Corning, such as DC200 with a viscosity of 60 000 mm²/s;
- the Viscasil® oils from General Electric and certain oils of the SF series (SF 96, SF
15 18) from General Electric.

Mention may also be made of polydimethylsiloxanes containing dimethylsilanol end groups known under the name dimethiconol (CTFA), such as the oils of the 48 series from the company Rhodia.

Among the silicones containing aryl groups are polydiarylsiloxanes, especially
20 polydiphenylsiloxanes and polyalkylarylsiloxanes. Examples that may be mentioned include the products sold under the following names:

- . the Silbione® oils of the 70 641 series from Rhodia;
- . the oils of the series Rhodorsil® 70 633 and 763 from Rhodia;
- . the oil Dow Corning 556 Cosmetic Grade Fluid from Dow Corning;
- 25 . the silicones of the PK series from Bayer, such as the product PK20;
- . certain oils of the SF series from General Electric, such as SF 1023, SF 1154, SF 1250 and SF 1265.

The organomodified liquid silicones may especially contain polyethyleneoxy and/or polypropyleneoxy groups. Mention may thus be made of the silicone KF-
30 6017 proposed by Shin-Etsu, and the oils Silwet® L722 and L77 from the company Union Carbide.

Preferably, the concentration of liquid fatty substances in the compositions of the invention may range from 30% to 90%, preferably from 30% to 75%, more preferably still from 30% to 60%, better still from 30% to 55% and even better still
35 from 35% to 55% relative to the total weight of the composition.

The compositions of the invention may comprise one or more other, additional fatty substances which are solid at ambient temperature and at atmospheric pressure.

The additional fatty substances are selected more particularly from solid fatty alcohols, solid esters of fatty acids and/or fatty alcohols, non-silicone waxes and
40 silicones.

It is recalled that, for the purposes of the invention, fatty alcohols, esters and acids have more particularly at least one linear or branched, saturated or unsaturated hydrocarbon-based group containing 6 to 30 carbon atoms which is optionally substituted, more particularly by one or more hydroxyl groups (more particularly 1 to 4). If they are unsaturated, these compounds may have one to three conjugated or non-conjugated carbon-carbon double bonds.

The solid fatty alcohols which are suitable for implementing the invention are selected more particularly from saturated or unsaturated, linear or branched alcohols containing from 8 to 30 carbon atoms. Mention may be made, for example, of cetyl alcohol, stearyl alcohol and a mixture thereof (cetylstearyl alcohol).

As regards the additional esters of fatty acids and/or fatty alcohols, which are advantageously different from the triglycerides referred to above, mention may be made especially of solid esters derived from C₉-C₂₆ fatty acids and from C₉-C₂₆ fatty alcohols.

These esters include octyldodecyl behenate; isocetyl behenate; cetyl lactate; stearyl octanoate; octyl octanoate; cetyl octanoate; decyl oleate; myristyl stearate; octyl palmitate; octyl pelargonate; octyl stearate; alkyl myristates such as cetyl myristate, myristyl myristate and stearyl myristate; and hexyl stearate.

Still within the context of this variant, esters of C₄-C₂₂ dicarboxylic or tricarboxylic acids and of C₁-C₂₂ alcohols and esters of monocarboxylic, dicarboxylic or tricarboxylic acids and of C₂-C₂₆ dihydroxy, trihydroxy, tetrahydroxy or pentahydroxy alcohols may also be used.

Mention may be made especially of: diethyl sebacate; diisopropyl sebacate; diisopropyl adipate; di-*n*-propyl adipate; dioctyl adipate; dioctyl maleate.

Among all the additional esters mentioned above, it is preferred to use myristyl, cetyl or stearyl palmitates, alkyl myristates such as cetyl myristate, and stearyl myristyl myristate.

The (non-silicone) wax(es) are chosen especially from carnauba wax, candelilla wax, esparto grass wax, paraffin wax, ozokerite, plant waxes, for instance olive wax, rice wax, hydrogenated jojoba wax or the absolute waxes of flowers such as the essential wax of blackcurrant blossom sold by the company Bertin (France), animal waxes, for instance beeswaxes, or modified beeswaxes (cerabellina); other waxes or waxy starting materials that may be used according to the invention are especially marine waxes such as the product sold by the company Sophim under the reference M82, and polyethylene waxes or polyolefin waxes in general.

The additional silicones in accordance with the invention may be in the form of waxes, resins or gums.

The non-liquid additional silicone is preferably selected from polydialkylsiloxanes, especially polydimethylsiloxanes (PDMS), and organomodified polysiloxanes containing at least one functional group selected from poly(oxyalkylene) groups, amino groups and alkoxy groups.

The silicone gums that can be used in accordance with the invention are especially polydialkylsiloxanes and preferably polydimethylsiloxanes with high number-average molecular weights of between 200 000 and 1 000 000, used alone or as a mixture in a solvent. This solvent can be chosen from volatile silicones, polydimethylsiloxane (PDMS) oils, polyphenylmethylsiloxane (PPMS) oils, isoparaffins, polyisobutylenes, methylene chloride, pentane, dodecane and tridecane, or mixtures thereof.

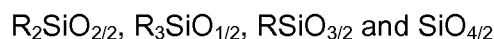
Products that can be used more particularly in accordance with the invention are mixtures such as:

- mixtures formed from a polydimethylsiloxane hydroxylated at the chain end, or dimethiconol (CTFA) and from a cyclic polydimethylsiloxane also known as cyclomethicone (CTFA), such as the product Q2 1401 sold by the company Dow Corning;

- mixtures formed from a polydimethylsiloxane gum with a cyclic silicone, such as the product SF 1214 Silicone Fluid from the company General Electric; this product is an SF 30 gum corresponding to a dimethicone, having a number-average molecular weight of 500 000, dissolved in the oil SF 1202 Silicone Fluid corresponding to decamethylcyclopentasiloxane;

- mixtures of two PDMSs with different viscosities, and more particularly of a PDMS gum and a PDMS oil, such as the product SF 1236 from the company General Electric. The product SF 1236 is a mixture of a gum SE 30 defined above with a viscosity of 20 m²/s and of an oil SF 96 with a viscosity of 5×10⁻⁶ m²/s. This product preferably comprises 15% of gum SE 30 and 85% of an oil SF 96.

The organopolysiloxane resins that can be used in accordance with the invention are crosslinked siloxane systems containing the following units:



in which R represents an alkyl containing 1 to 16 carbon atoms. Among these products, the ones that are particularly preferred are those in which R denotes a C₁-C₄ lower alkyl group, more particularly methyl.

Among these resins, mention may be made of the product sold under the name Dow Corning 593 or those sold under the names Silicone Fluid SS 4230 and SS 4267 by the company General Electric, which are silicones of dimethyl/trimethylsiloxane structure.

Mention may also be made of the trimethylsiloxysilicate type resins sold in particular under the names X22-4914, X21-5034 and X21-5037 by the company Shin-Etsu.

The additional organomodified silicones include the polyorganosiloxanes containing:

- polyethyleneoxy and/or polypropyleneoxy groups, optionally containing C₆-C₂₄ alkyl groups, such as (C₁₂) alkyl-methicone copolyol;

- substituted or unsubstituted amino groups, such as the products sold under the names Q2 8220 and Dow Corning 929 or 939 by the company Dow Corning. The substituted amine groups are, in particular, C₁-C₄ aminoalkyl groups;

- alkoxy groups, such as the product sold under the name Abil Wax® 2428, 2434 and 2440 by the company Goldschmidt.

According to one particular embodiment, the additional fatty substance(s) are not silicone-based.

More particularly, the solid additional fatty substance(s) are selected from fatty alcohols and esters or mixtures thereof, and preferably from solid fatty alcohols.

The composition according to the invention may have a content of additional fatty substances ranging from 0.1% to 40% by weight, even more preferentially from 0.5% to 25% by weight and better still from 1% to 20% by weight relative to the weight of the composition.

As indicated previously, the composition according to the invention comprises one or more polyols or polyol (C₁-C₄)alkyl ethers having a Hansen δ_H parameter value of less than or equal to 25 MPa^{1/2} at 25°C that are different from the liquid fatty substances a).

This or these solvent(s) are liquid at a temperature of 25°C and at atmospheric pressure. They are soluble in water to a concentration greater than or equal to 5% under the same conditions.

The organic solvent(s) having a value of the Hansen solubility parameter δ_H as defined previously are, for example, described in the reference work "Hansen solubility parameters: A User's Handbook" by Charles M. Hansen, CRC Press, 2000, pages 167 to 185, or in the second edition of the same work, 2007, pages 347 to 483 or else in the work "Handbook of Solubility Parameters and Other Cohesion Parameters", CRC Press, pages 95 to 121 and pages 177 to 185.

This value of the solubility parameter δ_H is linked to the formation of hydrogen bonds.

In particular, the work "Handbook of Solubility Parameters and Other Cohesion Parameters", CRC Press, pages 95 to 121 and pages 177 to 185, gives the equation $\delta_H = (\sum^z U_h/V)^{1/2}$

where

$^z U_h$ (in J.mol⁻¹) describes the contributions of the functional group considered in the solubility parameters linked to the hydrogen bonds (values in Table 14, page 183); this parameter $^z U_h$ is also described in the work "The relation between surface tension and solubility parameter in liquids", Bagda, E, Farbe Lack, 84, 212, 1978;

and V is the volume of the molecule.

The value of the solubility parameter δ_H is usually given for a temperature of 25°C.

Preferably, the polyols and polyol ethers are acyclic.

Preferably, the polyols are diols.

Preferably, the molecular weight of the polyols of the invention is less than 200.

Preferably, the polyols are selected from propylene glycol, 1,3-butanediol, 1,4-butanediol, diethylene glycol, dipropylene glycol, hexylene glycol, triethylene glycol, tripropylene glycol, 1,3-propanediol and neopentyl glycol and more preferably still from propylene glycol, 1,3-butanediol, 1,4-butanediol, dipropylene glycol, hexylene glycol, tripropylene glycol, 1,3-propanediol and neopentyl glycol.

Preferably, the polyol (C₁-C₄)alkyl ethers are chosen from butoxyethoxypropanol, diethylene glycol monoethyl ether, diethylene glycol monomethyl ether, dipropylene glycol monomethyl ether, ethylene glycol monobutyl ether, propylene glycol monomethyl ether, propylene glycol monoethyl ether, triethylene glycol monomethyl ether and tripropylene glycol monomethyl ether.

More preferably still, the polyols or polyol ethers are selected from polyols with no ether functions in their structure and more particularly from propylene glycol or hexylene glycol.

The composition according to the invention may have a content of polyols or polyol (C₁-C₄)alkyl ethers having a Hansen δH parameter value of less than or equal to 25 MPa^{1/2} at 25°C ranging from 0.05 to 40% by weight, more preferably still from 0.1 to 25% by weight, better still from 0.5 to 20% and even better still from 1 to 10% by weight relative to the weight of the composition.

The emulsion of the invention comprises one or more alkalinizing agents.

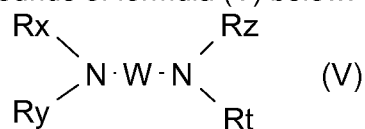
This agent may be chosen from mineral or organic or hybrid alkaline agents, or mixtures thereof.

The mineral alkaline agent(s) are preferably chosen from aqueous ammonia, alkali metal carbonates or bicarbonates such as sodium or potassium carbonates and sodium or potassium bicarbonates, sodium hydroxide or potassium hydroxide, or mixtures thereof.

The organic alkaline agent(s) are preferably chosen from organic amines with a pK_b at 25°C of less than 12, preferably less than 10 and even more advantageously less than 6. It should be noted that it is the pK_b corresponding to the function of highest basicity.

Hybrid alkaline agents that may be mentioned include the salts of the amines mentioned previously with acids such as carbonic acid or hydrochloric acid.

The organic alkaline agent(s) are chosen, for example, from alkanolamines, oxyethylenated and/or oxypropylenated ethylenediamines, amino acids and the compounds of formula (V) below:



in which W is a C₁-C₆ alkylene residue optionally substituted with a hydroxyl group or a C₁-C₆ alkyl radical; Rx, Ry, Rz and Rt, which may be identical or different, represent a hydrogen atom or a C₁-C₆ alkyl, C₁-C₆ hydroxyalkyl or C₁-C₆ aminoalkyl radical.

Examples of such amines that may be mentioned include 1,3-diaminopropane,
5 1,3-diamino-2-propanol, spermine and spermidine.

The term "alkanolamine" means an organic amine comprising a primary, secondary or tertiary amine function, and one or more linear or branched C₁-C₈ alkyl groups bearing one or more hydroxyl radicals.

Alkanolamines such as monoalkanolamines, dialkanolamines or
10 trialkanolamines comprising from one to three identical or different C₁-C₄ hydroxyalkyl radicals are in particular suitable for performing the invention.

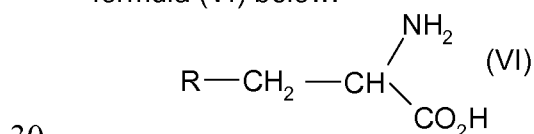
Among compounds of this type, mention may be made of monoethanolamine, diethanolamine, triethanolamine, monoisopropanolamine, diisopropanolamine, N-dimethylaminoethanolamine, 2-amino-2-methyl-1-propanol, triisopropanolamine, 2-
15 amino-2-methyl-1,3-propanediol, 3-amino-1,2-propanediol, 3-dimethylamino-1,2-propanediol and tris(hydroxymethylamino)methane.

More particularly, the amino acids that may be used are of natural or synthetic origin, in their L, D or racemic form, and comprise at least one acid function chosen more particularly from carboxylic acid, sulphonic acid, phosphonic acid or phosphoric
20 acid functions. The amino acids may be in neutral or ionic form.

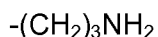
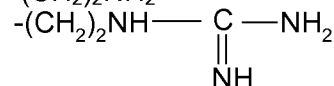
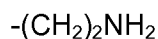
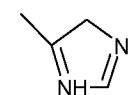
As amino acids that may be used in the present invention, mention may be made especially of aspartic acid, glutamic acid, alanine, arginine, ornithine, citrulline, asparagine, carnitine, cysteine, glutamine, glycine, histidine, lysine, isoleucine, leucine, methionine, N-phenylalanine, proline, serine, taurine, threonine, tryptophan,
25 tyrosine and valine.

Advantageously, the amino acids are basic amino acids comprising an additional amine function optionally included in a ring or in a ureido function.

Such basic amino acids are preferably chosen from those corresponding to formula (VI) below:



in which R denotes a group chosen from:



35 The compounds corresponding to formula (VI) are histidine, lysine, arginine, ornithine and citrulline.

The organic amine may also be chosen from organic amines of heterocyclic type. Besides histidine that has already been mentioned in the amino acids, mention may be made in particular of pyridine, piperidine, imidazole, triazole, tetrazole and benzimidazole.

5 The organic amine may also be chosen from amino acid dipeptides. As amino acid dipeptides that may be used in the present invention, mention may be made especially of carnosine, anserine and baleine.

10 The organic amine is chosen from compounds comprising a guanidine function. As amines of this type that may be used in the present invention, besides arginine, which has already been mentioned as an amino acid, mention may be made especially of creatine, creatinine, 1,1-dimethylguanidine, 1,1-diethylguanidine, glycyamine, metformin, agmatine, N-amidinoalanine, 3-guanidinopropionic acid, 4-guanidinobutyric acid and 2-([amino(imino)methyl]amino)ethane-1-sulphonic acid.

15 Mention may be made in particular of the use of guanidine carbonate or monoethanolamine hydrochloride as hybrid compounds.

The composition of the invention preferably contains one or more alkanolamines and/or one or more basic amino acids, more advantageously one or more alkanolamines.

20 More preferentially still, the organic amine is monoethanolamine.

According to one particular embodiment, the inverse emulsion contains, as alkaline agents, at least one organic amine, preferably at least one alkanolamine. When the emulsion contains several alkaline agents including an alkanolamine and aqueous ammonia or a salt thereof, the alkanolamine(s) are preferably in weight
25 majority relative to the amount of ammonia.

According to one embodiment of the present invention, the inverse emulsion does not contain any aqueous ammonia.

Advantageously, the emulsion according to the invention has a content of alkaline agent(s) ranging from 0.01% to 30% by weight and preferably from 0.1% to
30 20% by weight relative to the weight of said composition.

According to one particular embodiment, the liquid hydrocarbon(s)/alkalinizing agent(s) weight ratio is preferably greater than or equal to 5, better still greater than or equal to 10. Preferably, this ratio ranges from 5 to 40 and more preferably still from 5 to 25.

35 According to one variant, the inverse emulsion of the present invention comprises at least one oxidation dye and/or at least one direct dye.

The oxidation dyes are generally chosen from one or more oxidation bases optionally combined with one or more couplers.

By way of example, the oxidation bases are chosen from *para*-phenylenediamines, bis(phenyl)alkylenediamines, *para*-aminophenols, *ortho*-aminophenols and heterocyclic bases, and the addition salts thereof.
40

Among the *para*-phenylenediamines that may be mentioned, for example, are *para*-phenylenediamine, *para*-toluenediamine, 2-chloro-*para*-phenylenediamine, 2,3-dimethyl-*para*-phenylenediamine, 2,6-dimethyl-*para*-phenylenediamine, 2,6-diethyl-*para*-phenylenediamine, 2,5-dimethyl-*para*-phenylenediamine, N,N-dimethyl-*para*-phenylene diamine, N,N-diethyl-*para*-phenylenediamine, N,N-dipropyl-*para*-phenylene diamine, 4-amino-N,N-diethyl-3-methylaniline, N,N-bis(β -hydroxyethyl)-*para*-phenylenediamine, 4-N,N-bis(β -hydroxyethyl)amino-2-methylaniline, 4-N,N-bis(β -hydroxyethyl)amino-2-chloroaniline, 2- β -hydroxyethyl-*para*-phenylenediamine, 2-fluoro-*para*-phenylenediamine, 2-isopropyl-*para*-phenylenediamine, N-(β -hydroxy propyl)-*para*-phenylenediamine, 2-hydroxymethyl-*para*-phenylenediamine, N,N-dimethyl-3-methyl-*para*-phenylenediamine, N,N-(ethyl- β -hydroxyethyl)-*para*-phenylenediamine, N-(β,γ -dihydroxypropyl)-*para*-phenylenediamine, N-(4'-amino phenyl)-*para*-phenylenediamine, N-phenyl-*para*-phenylenediamine, 2- β -hydroxy ethyloxy-*para*-phenylenediamine, 2- β -acetylaminomethoxy-*para*-phenylenediamine, N-(β -methoxyethyl)-*para*-phenylenediamine, 4-aminophenylpyrrolidine, 2-thienyl-*para*-phenylenediamine, 2- β -hydroxyethylamino-5-aminotoluene, 3-hydroxy-1-(4'-amino phenyl)pyrrolidine, and their addition salts with an acid.

Among the *para*-phenylenediamines mentioned above, *para*-phenylenediamine, *para*-toluenediamine, 2-isopropyl-*para*-phenylenediamine, 2- β -hydroxyethyl-*para*-phenylenediamine, 2- β -hydroxyethyloxy-*para*-phenylenediamine, 2,6-dimethyl-*para*-phenylenediamine, 2,6-diethyl-*para*-phenylenediamine, 2,3-dimethyl-*para*-phenylenediamine, N,N-bis(β -hydroxyethyl)-*para*-phenylenediamine, 2-chloro-*para*-phenylenediamine and 2- β -acetylaminomethoxy-*para*-phenylenediamine, and the addition salts thereof with an acid, are particularly preferred.

The bisphenylalkylenediamines include, for example, N,N'-bis(β -hydroxyethyl)-N,N'-bis(4'-aminophenyl)-1,3-diaminopropanol, N,N'-bis(β -hydroxyethyl)-N,N'-bis(4'-aminophenyl)ethylenediamine, N,N'-bis(4'-aminophenyl)tetramethylenediamine, N,N'-bis(β -hydroxyethyl)-N,N'-bis(4'-aminophenyl)tetramethylenediamine, N,N'-bis(4'-methylaminophenyl)tetramethylenediamine, N,N'-bis(ethyl)-N,N'-bis(4'-amino-3'-methyl phenyl)ethylenediamine, 1,8-bis(2,5-diaminophenoxy)-3,6-dioxaoctane, and the addition salts thereof.

Among the *para*-aminophenols that may be mentioned, for example, are *para*-aminophenol, 4-amino-3-methylphenol, 4-amino-3-fluorophenol, amino-3-chlorophenol, 4-amino-3-hydroxymethylphenol, 4-amino-2-methylphenol, 4-amino-2-hydroxymethylphenol, 4-amino-2-methoxymethylphenol, 4-amino-2-aminomethyl phenol, 4-amino-2-(β -hydroxyethylaminomethyl)phenol and 4-amino-2-fluorophenol, and the addition salts thereof with an acid.

Among the *ortho*-aminophenols that may be mentioned, for example, are 2-aminophenol, 2-amino-5-methylphenol, 2-amino-6-methylphenol and 5-acetamido-2-aminophenol, and the addition salts thereof.

Among the heterocyclic bases that may be mentioned, for example, are pyridine derivatives, pyrimidine derivatives and pyrazole derivatives.

Among the pyridine derivatives that may be mentioned are the compounds described, for example, in patents GB 1 026 978 and GB 1 153 196, such as 2,5-diaminopyridine, 2-(4-methoxyphenyl)amino-3-aminopyridine, 3,4-diaminopyridine, and the addition salts thereof.

Other pyridine oxidation bases that are useful in the present invention are the 3-aminopyrazolo[1,5-a]pyridine oxidation bases or addition salts thereof described, for example, in patent application FR 2801308. Examples that may be mentioned include pyrazolo[1,5-a]pyrid-3-ylamine, 2-acetylaminopyrazolo[1,5-a]pyrid-3-ylamine, 2-morpholin-4-ylpyrazolo [1,5-a]pyrid-3-ylamine, 3-aminopyrazolo[1,5-a]pyridine-2-carboxylic acid, 2-methoxypyrazolo[1,5-a]pyrid-3-ylamine, (3-aminopyrazolo[1,5-a]pyrid-7-yl)methanol, 2-(3-aminopyrazolo[1,5-a]pyrid-5-yl)ethanol, 2-(3-aminopyrazolo[1,5-a]pyrid-7-yl)ethanol, (3-aminopyrazolo [1,5-a]pyrid-2-yl)methanol, 3,6-diaminopyrazolo[1,5-a]pyridine, 3,4-diaminopyrazolo[1,5-a]pyridine, pyrazolo [1,5-a]pyridine-3,7-diamine, 7-morpholin-4-ylpyrazolo[1,5-a]pyrid-3-ylamine, pyrazolo[1,5a]pyridine-3,5-diamine, 5-morpholin-4-ylpyrazolo[1,5-a]pyrid-3-ylamine, 2-[(3-aminopyrazolo[1,5-a]pyrid-5-yl)(2-hydroxyethyl)amino]ethanol, 2-[(3-aminopyrazolo [1,5-a]pyrid-7-yl)(2-hydroxyethyl)amino]ethanol, 3-aminopyrazolo[1,5-a]pyridin-5-ol, 3-aminopyrazolo[1,5-a]pyridin-4-ol, 3-aminopyrazolo[1,5-a]pyridin-6-ol and 3-aminopyrazolo[1,5-a]pyridin-7-ol, and the addition salts thereof.

Among the pyrimidine derivatives that may be mentioned are the compounds described, for example, in the patents DE 2359399; JP 88-169571; JP 05-63124; EP 0770375 or patent application WO 96/15765, such as 2,4,5,6-tetraaminopyrimidine, 4-hydroxy-2,5,6-triaminopyrimidine, 2-hydroxy-4,5,6-triaminopyrimidine, 2,4-dihydroxy-5,6-diaminopyrimidine, 2,5,6-triaminopyrimidine and their addition salts and their tautomeric forms, when a tautomeric equilibrium exists.

Among the pyrazole derivatives that may be mentioned are the compounds described in the patents DE 3843892, DE 4133957 and patent applications WO 94/08969, WO 94/08970, FR-A-2 733 749 and DE 195 43 988, such as 4,5-diamino-1-methylpyrazole, 4,5-diamino-1-(β -hydroxyethyl)pyrazole, 3,4-diaminopyrazole, 4,5-diamino-1-(4'-chlorobenzyl)pyrazole, 4,5-diamino-1,3-dimethylpyrazole, 4,5-diamino-3-methyl-1-phenylpyrazole, 4,5-diamino-1-methyl-3-phenylpyrazole, 4-amino-1,3-dimethyl-5-hydrazinopyrazole, 1-benzyl-4,5-diamino-3-methylpyrazole, 4,5-diamino-3-*tert*-butyl-1-methylpyrazole, 4,5-diamino-1-*tert*-butyl-3-methylpyrazole, 4,5-diamino-1-(β -hydroxyethyl)-3-methylpyrazole, 4,5-diamino-1-ethyl-3-methylpyrazole, 4,5-diamino-1-ethyl-3-(4'-methoxyphenyl)pyrazole, 4,5-diamino-1-ethyl-3-hydroxymethylpyrazole, 4,5-diamino-3-hydroxymethyl-1-methylpyrazole, 4,5-diamino-3-hydroxymethyl-1-isopropylpyrazole, 4,5-diamino-3-methyl-1-isopropylpyrazole, 4-amino-5-(2'-aminoethyl)amino-1,3-dimethylpyrazole, 3,4,5-triaminopyrazole, 1-methyl-3,4,5-triaminopyrazole, 3,5-diamino-1-methyl-4-methylaminopyrazole, 3,5-diamino-4-(β -

hydroxyethyl)amino-1-methylpyrazole, and their addition salts. 4,5-diamino-1-(β -methoxyethyl)pyrazole may also be used.

A 4,5-diaminopyrazole will preferably be used, and even more preferentially 4,5-diamino-1-(β -hydroxyethyl)pyrazole and/or a salt thereof.

5 Pyrazole derivatives that may also be mentioned include diamino-N,N-dihydropyrazolopyrazolones and especially those described in patent application FR-A-2 886 136, such as the following compounds and the addition salts thereof: 2,3-diamino-6,7-dihydro-1H,5H-pyrazolo[1,2-a]pyrazol-1-one, 2-amino-3-ethylamino-6,7-dihydro-1H,5H-pyrazolo[1,2-a]pyrazol-1-one, 2-amino-3-isopropylamino-6,7-dihydro-1H,5H-pyrazolo[1,2-a]pyrazol-1-one, 2-amino-3-(pyrrolidin-1-yl)-6,7-dihydro-1H,5H-pyrazolo[1,2-a]pyrazol-1-one, 4,5-diamino-1,2-dimethyl-1,2-dihydropyrazol-3-one, 4,5-diamino-1,2-diethyl-1,2-dihydropyrazol-3-one, 4,5-diamino-1,2-di-(2-hydroxyethyl)-1,2-dihydropyrazol-3-one, 2-amino-3-(2-hydroxyethyl)amino-6,7-dihydro-1H,5H-pyrazolo[1,2-a]pyrazol-1-one, 2-amino-3-dimethylamino-6,7-dihydro-1H,5H-pyrazolo[1,2-a]pyrazol-1-one, 2,3-diamino-5,6,7,8-tetrahydro-1H,6H-pyridazino[1,2-a]pyrazol-1-one, 4-amino-1,2-diethyl-5-(pyrrolidin-1-yl)-1,2-dihydropyrazol-3-one, 4-amino-5-(3-dimethylaminopyrrolidin-1-yl)-1,2-diethyl-1,2-dihydropyrazol-3-one, 2,3-diamino-6-hydroxy-6,7-dihydro-1H,5H-pyrazolo[1,2-a]pyrazol-1-one.

2,3-Diamino-6,7-dihydro-1H,5H-pyrazolo[1,2-a]pyrazol-1-one and/or a salt thereof will preferably be used.

4,5-Diamino-1-(β -hydroxyethyl)pyrazole and/or 2,3-diamino-6,7-dihydro-1H,5H-pyrazolo[1,2-a]pyrazol-1-one and/or a salt thereof will preferentially be used as heterocyclic bases.

The composition according to the invention may optionally comprise one or more couplers advantageously chosen from those conventionally used in the dyeing of keratin fibres.

Among these couplers, mention may be made especially of *meta*-phenylenediamines, *meta*-aminophenols, *meta*-diphenols, naphthalene-based couplers and heterocyclic couplers, and also the addition salts thereof.

30 Mention may be made, for example, of 1,3-dihydroxybenzene, 1,3-dihydroxy-2-methylbenzene, 4-chloro-1,3-dihydroxybenzene, 2,4-diamino-1-(β -hydroxyethyloxy)benzene, 2-amino-4-(β -hydroxyethylamino)-1-methoxybenzene, 1,3-diaminobenzene, 1,3-bis(2,4-diaminophenoxy)propane, 3-ureidoaniline, 3-ureido-1-dimethylaminobenzene, sesamol, 1- β -hydroxyethylamino-3,4-methylenedioxy benzene, α -naphthol, 2-methyl-1-naphthol, 6-hydroxyindole, 4-hydroxyindole, 4-hydroxy-N-methylindole, 2-amino-3-hydroxypyridine, 6-hydroxybenzomorpholine, 3,5-diamino-2,6-dimethoxypyridine, 1-N-(β -hydroxyethyl)amino-3,4-methylenedioxy benzene, 2,6-bis(β -hydroxyethylamino)toluene, 6-hydroxyindoline, 2,6-dihydroxy-4-methylpyridine, 1-H-3-methylpyrazol-5-one, 1-phenyl-3-methylpyrazol-5-one, 2,6-dimethylpyrazolo-[1,5-b]-1,2,4-triazole, 2,6-dimethyl-[3,2-c]-1,2,4-triazole and 6-

methylpyrazolo[1,5-a]-benzimidazole, the addition salts thereof with an acid, and mixtures thereof.

The addition salts of the oxidation bases and couplers that may be used in the context of the invention are especially selected from the addition salts with an acid
5 such as the hydrochlorides, hydrobromides, sulphates, citrates, succinates, tartrates, lactates, tosylates, benzenesulphonates, phosphates and acetates.

The oxidation base(s) each advantageously represent from 0.0001% to 10% by weight relative to the total weight of the emulsion, and preferably from 0.005% to 5% by weight relative to the total weight of the emulsion.

10 The content of coupler(s), if it (they) is (are) present, each advantageously represents from 0.0001% to 10% by weight relative to the total weight of the composition, and preferably from 0.005% to 5% by weight relative to the total weight of the emulsion.

The direct dyes that may be used are, for example, synthetic or natural dyes,
15 chosen from ionic or nonionic species, preferably cationic or nonionic species.

Examples of particularly suitable direct dyes that may be mentioned include nitrobenzene dyes; azo direct dyes; azomethine direct dyes; methine direct dyes; azacarbocyanin direct dyes, for instance tetraazacarbocyanins (tetraaza-pentamethines); quinone and in particular anthraquinone, naphthoquinone or benzo-
20 quinone direct dyes; azine direct dyes; xanthene direct dyes; triarylmethane direct dyes; indoamine direct dyes; indigoid direct dyes; phthalocyanine direct dyes, porphyrin direct dyes and natural direct dyes, alone or as mixtures. In particular, mention may be made of direct dyes from among: azo; methine; carbonyl; azine; nitro (hetero)aryl; tri(hetero)arylmethane; porphyrin; phthalocyanine and natural direct
25 dyes, alone or as mixtures.

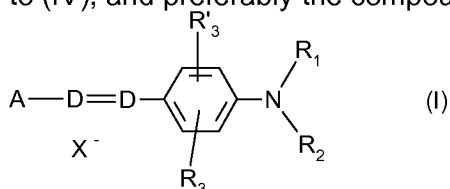
Among the benzene direct dyes that may be used according to the invention, mention may be made in a non-limiting manner of the following compounds:

- 1,4-diamino-2-nitrobenzene;
- 1-amino-2-nitro-4- β -hydroxyethylaminobenzene;
- 30 - 1-amino-2-nitro-4-bis(β -hydroxyethyl)aminobenzene;
- 1,4-bis(β -hydroxyethylamino)-2-nitrobenzene;
- 1- β -hydroxyethylamino-2-nitro-4-bis(β -hydroxyethylamino)benzene;
- 1- β -hydroxyethylamino-2-nitro-4-aminobenzene;
- 1- β -hydroxyethylamino-2-nitro-4-(ethyl)(β -hydroxyethyl)aminobenzene;
- 35 - 1-amino-3-methyl-4- β -hydroxyethylamino-6-nitrobenzene;
- 1-amino-2-nitro-4- β -hydroxyethylamino-5-chlorobenzene;
- 1,2-diamino-4-nitrobenzene;
- 1-amino-2- β -hydroxyethylamino-5-nitrobenzene;
- 1,2-bis(β -hydroxyethylamino)-4-nitrobenzene;
- 40 - 1-amino-2-tris(hydroxymethyl)methylamino-5-nitrobenzene;
- 1-hydroxy-2-amino-5-nitrobenzene;

- 1-hydroxy-2-amino-4-nitrobenzene;
- 1-hydroxy-3-nitro-4-aminobenzene;
- 1-hydroxy-2-amino-4,6-dinitrobenzene;
- 1- β -hydroxyethyloxy-2- β -hydroxyethylamino-5-nitrobenzene;
- 5 - 1-methoxy-2- β -hydroxyethylamino-5-nitrobenzene;
- 1- β -hydroxyethyloxy-3-methylamino-4-nitrobenzene;
- 1- β,γ -dihydroxypropyloxy-3-methylamino-4-nitrobenzene;
- 1- β -hydroxyethylamino-4- β,γ -dihydroxypropyloxy-2-nitrobenzene;
- 1- β,γ -dihydroxypropylamino-4-trifluoromethyl-2-nitrobenzene;
- 10 - 1- β -hydroxyethylamino-4-trifluoromethyl-2-nitrobenzene;
- 1- β -hydroxyethylamino-3-methyl-2-nitrobenzene;
- 1- β -aminoethylamino-5-methoxy-2-nitrobenzene;
- 1-hydroxy-2-chloro-6-ethylamino-4-nitrobenzene;
- 1-hydroxy-2-chloro-6-amino-4-nitrobenzene;
- 15 - 1-hydroxy-6-bis(β -hydroxyethyl)amino-3-nitrobenzene;
- 1- β -hydroxyethylamino-2-nitrobenzene; and
- 1-hydroxy-4- β -hydroxyethylamino-3-nitrobenzene.

Among the azo, azomethine, methine and tetraazapentamethine direct dyes that may be used according to the invention, mention may be made of the cationic dyes described in patent applications WO 95/15144, WO 95/01772 and EP 714 954; FR 2 189 006, FR 2 285 851, FR 2 140 205, EP 1 378 544 and EP 1 674 073.

Thus, mention may be made very especially of the following dyes of formulae (I) to (IV), and preferably the compounds of formulae (I), (II), (III) and (III'):



25 in which:

- D represents a nitrogen atom or a -CH group, preferably a nitrogen atom,
- R₁ and R₂, which are identical or different, represent a hydrogen atom; a C₁-C₄ alkyl radical which may be substituted with a -CN, -OH or -NH₂ radical, or form, with a carbon atom of the benzene ring, an optionally oxygen-containing or nitrogen-containing heterocycle which may be substituted with one or more C₁-C₄ alkyl radicals; a 4'-aminophenyl radical;
- 30 R₃ and R'₃, which are identical or different, represent a hydrogen atom or a halogen atom chosen from chlorine, bromine, iodine and fluorine, or a cyano, C₁-C₄ alkyl, C₁-C₄ alkoxy or acetyloxy radical;
- 35 X⁻ represents an anion preferably selected from chloride, methyl sulphate and acetate;

in which:

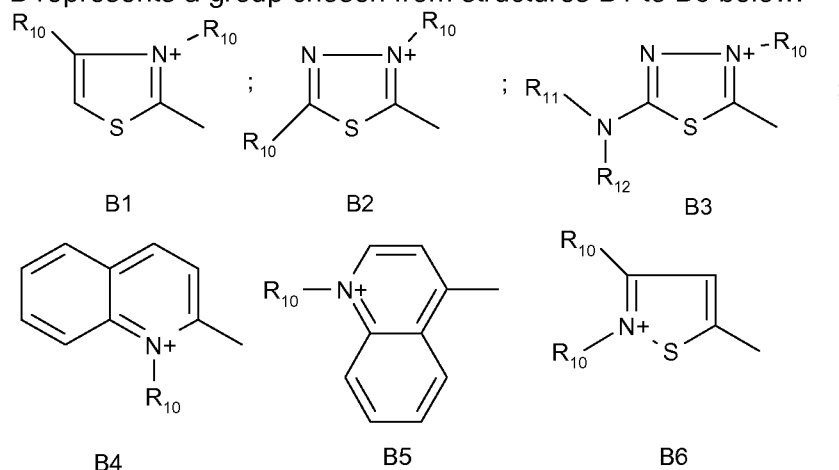
R_6 represents a hydrogen atom or a C_1 - C_4 alkyl radical;

R_7 represents a hydrogen atom, an alkyl radical which may be substituted with a -CN radical or with an amino group, a 4'-aminophenyl radical, or forms with R_6 a heterocycle optionally containing oxygen and/or nitrogen, which may be substituted with a C_1 - C_4 alkyl radical;

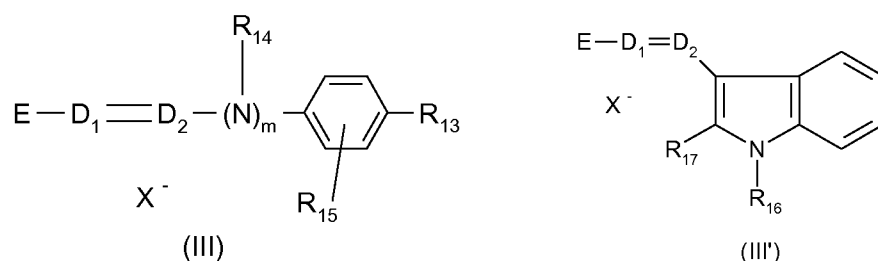
R_8 and R_9 , which may be identical or different, represent a hydrogen atom, a halogen atom such as bromine, chlorine, iodine or fluorine, a C_1 - C_4 alkyl or C_1 - C_4 alkoxy radical, or a -CN radical;

10 X^- represents an anion preferably selected from chloride, methyl sulphate and acetate;

B represents a group chosen from structures B1 to B6 below:



15 in which R_{10} represents a C_1 - C_4 alkyl radical, R_{11} and R_{12} , which may be identical or different, represent a hydrogen atom or a C_1 - C_4 alkyl radical;



in which:

20 R_{13} represents a hydrogen atom, a C_1 - C_4 alkoxy radical or a halogen atom such as bromine, chlorine, iodine or fluorine;

R_{14} represents a hydrogen atom or a C_1 - C_4 alkyl radical or forms, with a carbon atom of the benzene ring, a heterocycle which optionally contains oxygen and/or is substituted with one or more C_1 - C_4 alkyl groups;

25 R_{15} represents a hydrogen or halogen atom such as bromine, chlorine, iodine or fluorine;

R_{16} and R_{17} , which may be identical or different, represent a hydrogen atom or a C_1 - C_4 alkyl radical;

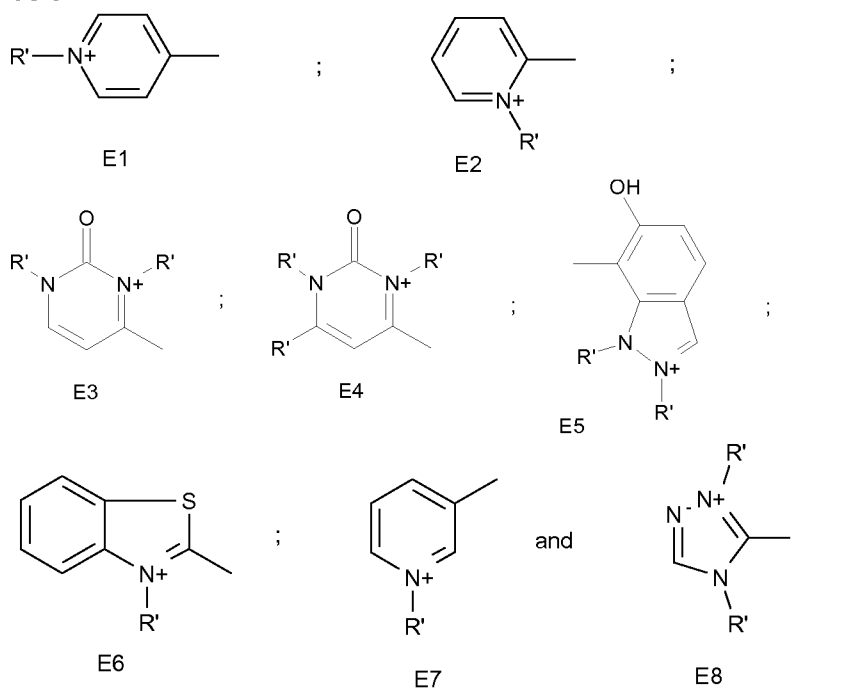
D_1 and D_2 , which may be identical or different, represent a hydrogen atom or a $-CH$ group;

5 $m = 0$ or 1 ,

it being understood that when R_{13} represents an unsubstituted amino group, then D_1 and D_2 simultaneously represent a $-CH$ group and $m = 0$;

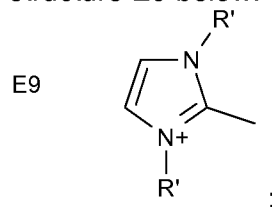
X^- represents an anion preferably selected from chloride, methyl sulphate and acetate;

10 E represents a group chosen from structures E1 to E8, and preferably E1, E2 and E7, below:



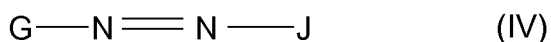
15 in which R' represents a C_1 - C_4 alkyl radical;

when $m = 0$ and D_1 represents a nitrogen atom, then E may also denote a group of structure E9 below:



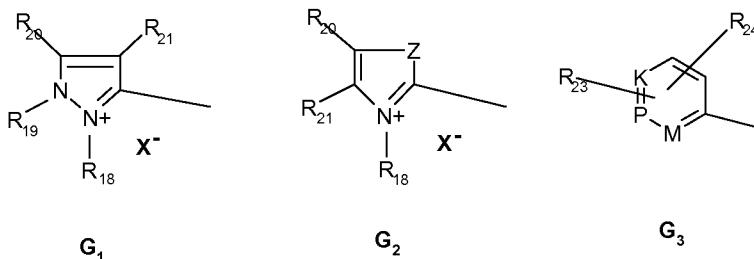
in which R' represents a C_1 - C_4 alkyl radical.

20



in which:

the symbol G represents a group chosen from the structures G_1 to G_3 below:



in which structures G_1 to G_3 :

R_{18} denotes a C_1 - C_4 alkyl radical, a phenyl radical which may be substituted with a C_1 - C_4 alkyl radical, or a halogen atom chosen from chlorine, bromine, iodine and fluorine;

5 R_{19} denotes a C_1 - C_4 alkyl radical or a phenyl radical;

R_{20} and R_{21} , which may be identical or different, represent a C_1 - C_4 alkyl radical, a phenyl radical, or form together in G_1 a benzene ring substituted with one or more C_1 - C_4 alkyl, C_1 - C_4 alkoxy or NO_2 radicals, or form together in G_2 a benzene ring optionally substituted with one or more C_1 - C_4 alkyl, C_1 - C_4 alkoxy or NO_2 radicals;

10 R_{20} may also denote a hydrogen atom;

Z denotes an oxygen or sulphur atom or a group $-NR_{19}$;

M represents a group $-CH$, $-CR$ (R denoting C_1 - C_4 alkyl) or $-NR_{22}(X^-)_r$;

15 K represents a group $-CH$, $-CR$ (R denoting C_1 - C_4 alkyl) or $-NR_{22}(X^-)_r$;

P represents a group $-CH$, $-CR$ (R denoting C_1 - C_4 alkyl) or $-NR_{22}(X^-)_r$; r denotes 0 or 1;

R_{22} represents an O^- atom, a C_1 - C_4 alkoxy radical or a C_1 - C_4 alkyl radical;

20 R_{23} and R_{24} , which may be identical or different, represent a hydrogen atom or a halogen atom chosen from chlorine, bromine, iodine and fluorine, a C_1 - C_4 alkyl or C_1 - C_4 alkoxy radical, or an $-NO_2$ radical;

X^- represents an anion preferably chosen from chloride, iodide, methyl sulphate, ethyl sulphate, acetate and perchlorate;

with the proviso that,

25 if R_{22} denotes O^- , then r denotes zero;

if K or P or M denote $-N(C_1-C_4)alkyl X^-$, then R_{23} or R_{24} is or is not other than a hydrogen atom;

if K denotes $-NR_{22}(X^-)_r$, then $M = P = -CH$, $-CR$;

if M denotes $-NR_{22}(X^-)_r$, then $K = P = -CH$, $-CR$;

30 if P denotes $-NR_{22}(X^-)_r$, then $K = M$ and denote $-CH$ or $-CR$;

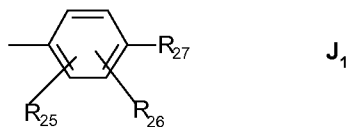
if Z denotes a sulphur atom with R_{21} denoting C_1 - C_4 alkyl, then R_{20} is other than a hydrogen atom;

if Z denotes $-NR_{22}$ with R_{19} denoting C_1 - C_4 alkyl, then at least one of the radicals R_{18} , R_{20} or R_{21} of the group of structure G_2 is other than a C_1 - C_4 alkyl radical;

35

the symbol J represents:

-(a) a group of structure J₁ below:



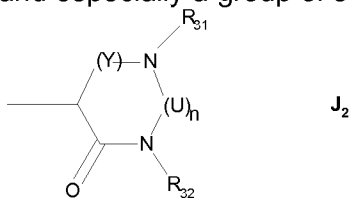
in which structure J₁:

- 5 R₂₅ represents a hydrogen atom, a halogen atom chosen from chlorine, bromine, iodine and fluorine, a C₁-C₄ alkyl or C₁-C₄ alkoxy radical, an -OH, -NO₂, -NHR₂₈, -NR₂₉R₃₀, or C₁-C₄ NHCOalkyl radical, or forms with R₂₆ a 5- or 6-membered ring optionally containing one or more heteroatoms chosen from nitrogen, oxygen and sulphur;
- 10 R₂₆ represents a hydrogen atom, a halogen atom chosen from chlorine, bromine, iodine and fluorine, a C₁-C₄ alkyl or C₁-C₄ alkoxy radical, or forms with R₂₇ or R₂₈ a 5- or 6-membered ring optionally containing one or more heteroatoms chosen from nitrogen, oxygen and sulphur;
- R₂₇ represents a hydrogen atom, an -OH radical, a -NHR₂₈ radical or a -NR₂₉R₃₀ radical;
- 15 R₂₈ represents a hydrogen atom, a C₁-C₄ alkyl radical, a C₁-C₄ monohydroxyalkyl radical, a C₂-C₄ polyhydroxyalkyl radical or a phenyl radical;
- R₂₉ and R₃₀, which may be identical or different, represent a C₁-C₄ alkyl radical, a C₁-C₄ monohydroxyalkyl radical or a C₂-C₄ polyhydroxyalkyl radical;

20

-(b) a 5- or 6-membered nitrogen-containing heterocyclic group, which may contain other heteroatoms and/or carbonyl groups and may be substituted with one or more C₁-C₄ alkyl, amino or phenyl radicals;

and especially a group of structure J₂ below:



25

in which structure J₂:

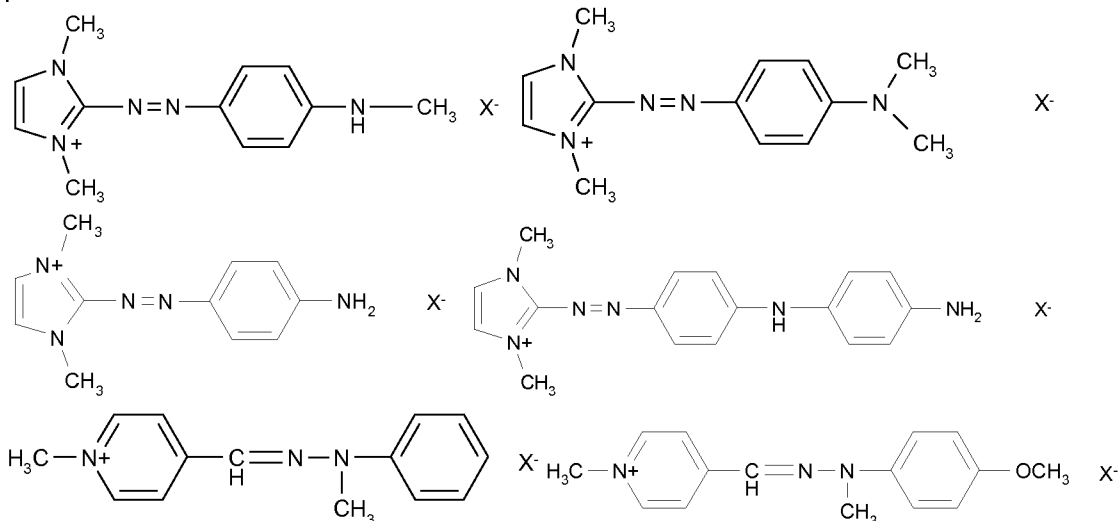
R₃₁ and R₃₂, which may be identical or different, represent a hydrogen atom, a C₁-C₄ alkyl radical or a phenyl radical;

Y denotes a -CO- radical or a $\text{—}\overset{\text{CH}_3}{\underset{|}{\text{C}}}=\text{}$ radical;

- 30 n = 0 or 1, with, when n denotes 1, U denoting a -CO- radical.

In structures (I) to (IV) defined above, the C₁-C₄ alkyl or alkoxy group preferably denotes methyl, ethyl, butyl, methoxy or ethoxy.

Among the compounds of formulae (I) and (III), the following compounds are preferred:



Among the azo direct dyes that may also be mentioned are the following dyes, described in the Colour Index International, 3rd edition:

- Disperse Red 17
- Basic Red 22
- 10 - Basic Red 76
- Basic Yellow 57
- Basic Brown 16
- Basic Brown 17
- Disperse Black 9.

- 15 Mention may also be made of 1-(4'-aminodiphenylazo)-2-methyl-4-bis(β -hydroxyethyl)aminobenzene.

Among the quinone direct dyes that may be mentioned are the following dyes:

- Disperse Red 15
- Solvent Violet 13
- 20 - Disperse Violet 1
- Disperse Violet 4
- Disperse Blue 1
- Disperse Violet 8
- Disperse Blue 3
- 25 - Disperse Red 11
- Disperse Blue 7
- Basic Blue 22
- Disperse Violet 15
- Basic Blue 99

30 and also the following compounds:

- 1-N-methylmorpholiniumpropylamino-4-hydroxyanthraquinone
- 1-aminopropylamino-4-methylaminoanthraquinone;

- 1-aminopropylaminoanthraquinone;
- 5- β -hydroxyethyl-1,4-diaminoanthraquinone;
- 2-aminoethylaminoanthraquinone; and
- 1,4-bis(β , γ -dihydroxypropylamino)anthraquinone.

5 Among the azine dyes that may be mentioned are the following compounds:

- Basic Blue 17
- Basic Red 2.

Among the triarylmethane dyes that may be used according to the invention, mention may be made of the following compounds:

- 10
- Basic Green 1
 - Basic Violet 3
 - Basic Violet 14
 - Basic Blue 7
 - Basic Blue 26

15 Among the indoamine dyes that can be used according to the invention, mention may be made of the following compounds:

- 2- β -hydroxyethylamino-5-[bis(β -4'-hydroxyethyl)amino]anilino-1,4-benzoquinone;
- 2- β -hydroxyethylamino-5-(2'-methoxy-4'-amino)anilino-1,4-benzoquinone;

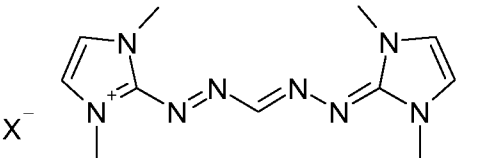
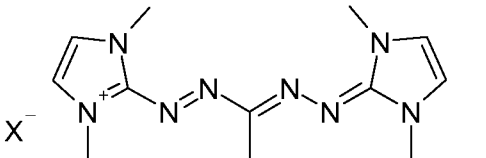
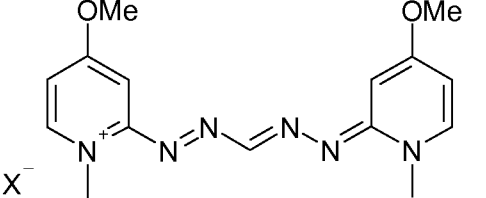
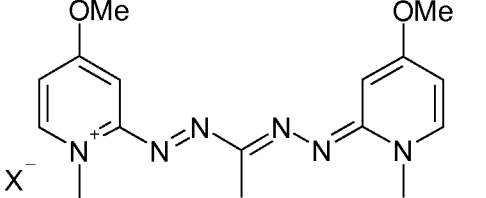
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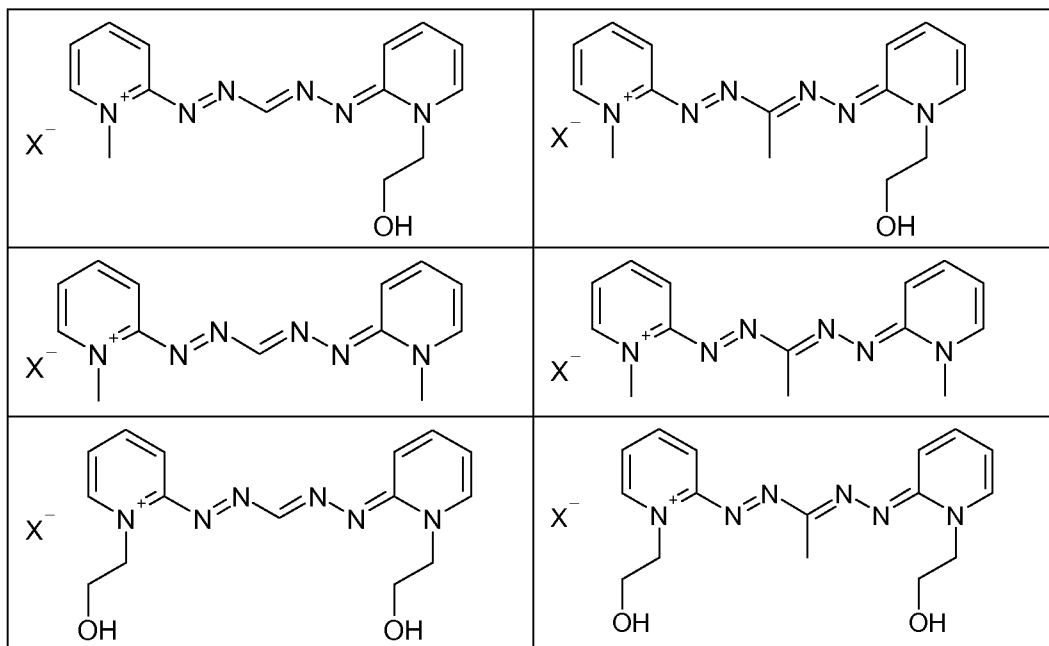
- 3-N-(2'-chloro-4'-hydroxy)phenylacetyl amino-6-methoxy-1,4-benzoquinone imine;
- 3-N-(3'-chloro-4'-methylamino)phenylureido-6-methyl-1,4-benzoquinone imine; and
- 3-[4'-N-(ethyl, carbamylmethyl)amino]phenylureido-6-methyl-1,4-benzoquinone

25

- imine.

The tetraazapentamethine dyes that can be used according to the invention include the following compounds appearing in the table below:



X⁻ represents an anion preferably chosen from chloride, iodide, methyl sulphate, ethyl sulphate, acetate and perchlorate.

Among the natural direct dyes that may be used according to the invention, mention may be made of lawsone, juglone, alizarin, purpurin, carminic acid, kermesic acid, purpurogallin, protocatechaldehyde, indigo, isatin, curcumin, spinulosin, apigenidin, haematoxylin, haematin, brasilin, brasilein and orceins. Extracts or decoctions containing these natural dyes, and in particular henna-based poultices or extracts, may also be used.

The direct dyes may be monochromophoric dyes (i.e. comprising only one dye) or polychromophoric, preferably di- or trichromophoric; the chromophores possibly being identical or different, and from the same or different chemical families. It should be noted that a polychromophoric dye comprises several radicals each derived from a molecule that absorbs in the visible region between 400 and 800 nm. Furthermore, this absorbance of the dye does not require any prior oxidation thereof, or combination with any other chemical species.

In the case of polychromophoric dyes, the chromophores are connected together by means of at least one linker, which may be cationic or non-cationic.

Preferably, the linker is a linear, branched or cyclic C₁-C₂₀ alkyl chain, optionally interrupted with at least one heteroatom (such as nitrogen or oxygen) and/or with at least one group comprising such an atom (CO, SO₂), optionally interrupted with at least one heterocycle that may or may not be fused to a phenyl nucleus and comprising at least one quaternized nitrogen atom engaged in said ring and optionally at least one other heteroatom (such as oxygen, nitrogen or sulphur), optionally interrupted with at least one substituted or unsubstituted phenyl or naphthyl group, optionally interrupted with at least one quaternary ammonium group substituted with

two optionally substituted C₁-C₁₅ alkyl groups; the linker not comprising any nitro, nitroso or peroxy groups.

If the heterocycles or aromatic nuclei (phenyl or naphthyl) are substituted, they are substituted, for example, with one or more C₁-C₈ alkyl radicals optionally substituted with a hydroxyl, C₁-C₂ alkoxy, C₂-C₄ hydroxyalkoxy, acetylamino or amino group substituted with one or two C₁-C₄ alkyl radicals, optionally bearing at least one hydroxyl group, or the two radicals possibly forming, with the nitrogen atom to which they are attached, a 5- or 6-membered heterocycle optionally comprising another heteroatom identical to or different from nitrogen; a halogen atom; a hydroxyl group; a C₁-C₂ alkoxy radical; a C₂-C₄ hydroxyalkoxy radical; an amino radical; an amino radical substituted with one or two identical or different C₁-C₄ alkyl radicals optionally bearing at least one hydroxyl group.

Among the polychromophoric dyes, mention may be made more particularly of symmetrical or non-symmetrical azo and/or azomethine (hydrazone) dichromophoric or trichromophoric dyes comprising, on the one hand, at least one optionally fused 5- or 6-membered aromatic heterocycle, comprising at least one quaternized nitrogen atom engaged in said heterocycle and optionally at least one other heteroatom (such as nitrogen, sulphur or oxygen), and, on the other hand, at least one optionally substituted phenyl or naphthyl group, optionally bearing at least one group OR with R representing a hydrogen atom, an optionally substituted C₁-C₆ alkyl radical, an optionally substituted phenyl nucleus, or at least one group N(R')₂ with R', which may be identical or different, representing a hydrogen atom, an optionally substituted C₁-C₆ alkyl radical or an optionally substituted phenyl nucleus; the radicals R' possibly forming, with the nitrogen atom to which they are attached, a saturated 5- or 6-membered heterocycle, or alternatively one and/or both the radicals R' may each form, with the carbon atom of the aromatic ring located ortho to the nitrogen atom, a saturated 5- or 6-membered heterocycle.

Aromatic cationic heterocycles that may preferably be mentioned include 5- or 6-membered rings containing 1 to 3 nitrogen atoms and preferably 1 or 2 nitrogen atoms, one being quaternized; said heterocycle moreover being optionally fused to a benzene nucleus. It should similarly be noted that the heterocycle may optionally comprise another heteroatom other than nitrogen, for instance sulphur or oxygen.

The bonding between the linker, as defined previously, and each chromophore generally takes place via a heteroatom substituent on the phenyl or naphthyl nucleus or via the quaternized nitrogen atom of the cationic heterocycle.

The dye may comprise identical or different chromophores.

As examples of such dyes, reference may be made especially to patent applications EP 1 637 566, EP 1 619 221, EP 1 634 926, EP 1 619 220, EP 1 672 033, EP 1 671 954, EP 1 671 955, EP 1 679 312, EP 1 671 951, EP 1 679 952, EP 1 679 971, WO 06/063 866, WO 06/063 867, WO 06/063 868, WO 06/063 869, EP

1 408 919, EP 1 377 264, EP 1 377 262, EP 1 377 261, EP 1 377 263, EP 1 399 425, EP 1 399 117, EP 1 416 909, EP 1 399 116 and EP 1 671 560.

It is also possible to use cationic direct dyes mentioned in patent applications: EP 1 006 153, which describes dyes comprising two chromophores of anthraquinone type connected via a cationic linker; EP 1 433 472, EP 1 433 474, EP 1 433 471 and EP 1 433 473, which describe identical or different dichromophoric dyes, connected via a cationic or non-cationic linker, and also EP 6 291 333, which especially describes dyes comprising three chromophores, one of them being an anthraquinone chromophore, to which are attached two chromophores of azo or diazacarbocyanin type or an isomer thereof.

When they are present, the direct dye(s) more particularly represent from 0.0001% to 10% by weight and preferably from 0.005% to 5% by weight relative to the total weight of the emulsion.

The composition according to the invention preferably comprises one or more surfactants.

Preferably, the surfactant(s) is (are) chosen from nonionic surfactants or from anionic surfactants.

The anionic surfactants are more especially chosen from the salts (in particular alkali metal salts, especially sodium salts, ammonium salts, amine salts, amino alcohol salts or alkaline-earth metal salts such as magnesium salts) of the following compounds:

- alkyl sulphates, alkyl ether sulphates, alkylamido ether sulphates, alkylaryl polyether sulphates, monoglyceride sulphates;
- alkylsulphonates, alkylamidesulphonates, alkylarylsulphonates, α -olefinsulphonates, paraffinsulphonates;
- alkyl phosphates, alkyl ether phosphates;
- alkylsulphosuccinates, alkyl ether sulphosuccinates, alkylamidesulphosuccinates; alkylsulphosuccinates;
- alkylsulphoacetates;
- acylsarcosinates; acylisethionates and N-acyltaurates;
- salts of fatty acids such as oleic acid, ricinoleic acid, palmitic acid or stearic acid, coconut oil acid or hydrogenated coconut oil acid;
- alkyl-D-galactoside uronic acid salts;
- acyllactylates;
- salts of polyoxyalkylenated alkyl ether carboxylic acids, of polyoxyalkylenated alkylaryl ether carboxylic acids or of polyoxyalkylenated alkylamido ether carboxylic acids, in particular those containing from 2 to 50 ethylene oxide groups;
- and mixtures thereof.

It should be noted that the alkyl or acyl radical of these various compounds advantageously contains from 6 to 24 carbon atoms and preferably from 8 to 24 carbon atoms, and the aryl radical preferably denotes a phenyl or benzyl group.

The nonionic surfactants are more particularly chosen from
5 monooxyalkylenated or polyoxyalkylenated, monoglycerolated or polyglycerolated nonionic surfactants. The oxyalkylene units are more particularly oxyethylene or oxypropylene units, or a combination thereof, preferably oxyethylene units.

Examples of oxyalkylenated nonionic surfactants that may be mentioned include:

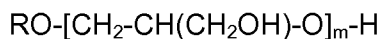
- 10 • oxyalkylenated (C₈-C₂₄)alkylphenols,
- saturated or unsaturated, linear or branched, oxyalkylenated C₈-C₃₀ alcohols,
- saturated or unsaturated, linear or branched, oxyalkylenated C₈-C₃₀ amides,
- esters of saturated or unsaturated, linear or branched, C₈-C₃₀ acids and of polyethylene glycols,
- 15 • polyoxyethylenated esters of saturated or unsaturated, linear or branched, C₈-C₃₀ acids and of sorbitol,
- saturated or unsaturated, oxyethylenated plant oils.

The surfactants feature a number of moles of ethylene oxide and/or of propylene oxide which preferably ranges from 1 to 100, more preferably still from 2 to
20 50 and preferably from 2 to 30.

In accordance with one preferred embodiment of the invention, the oxyalkylenated nonionic surfactants are selected from oxyethylenated C₈-C₃₀ alcohols containing from 1 to 100 mol of ethylene oxide.

As examples of monoglycerolated or polyglycerolated nonionic surfactants,
25 monoglycerolated or polyglycerolated C₈-C₄₀ alcohols are preferably used.

In particular, the monoglycerolated or polyglycerolated C₈-C₄₀ alcohols correspond to the following formula:



in which R represents a linear or branched C₈-C₄₀ and preferably C₈-C₃₀ alkyl or
30 alkenyl radical, and m represents a number ranging from 1 to 30 and preferably from 1 to 10.

As examples of compounds that are suitable in the context of the invention, mention may be made of lauryl alcohol containing 4 mol of glycerol (INCI name: Polyglyceryl-4 Lauryl Ether), lauryl alcohol containing 1.5 mol of glycerol, oleyl alcohol
35 containing 4 mol of glycerol (INCI name: Polyglyceryl-4 Oleyl Ether), oleyl alcohol containing 2 mol of glycerol (INCI name: Polyglyceryl-2 Oleyl Ether), cetearyl alcohol containing 2 mol of glycerol, cetearyl alcohol containing 6 mol of glycerol, oleocetyl alcohol containing 6 mol of glycerol, and octadecanol containing 6 mol of glycerol.

The alcohol may represent a mixture of alcohols in the same way that the value
40 of m represents a statistical value, which means that, in a commercial product, several species of polyglycerolated fatty alcohols may coexist in the form of a mixture.

Among the monoglycerolated or polyglycerolated alcohols, it is more particularly preferred to use the C₈/C₁₀ alcohol containing 1 mol of glycerol, the C₁₀/C₁₂ alcohol containing 1 mol of glycerol and the C₁₂ alcohol containing 1.5 mol of glycerol.

Preferably, the surfactant optionally present in the composition is a nonionic surfactant.

The surfactant content in the composition more particularly represents from 0.1% to 50% by weight and preferably from 0.5% to 30% by weight relative to the weight of the composition.

The composition may also contain various adjuvants conventionally used in compositions for dyeing or lightening the hair, such as anionic, cationic, nonionic, amphoteric or zwitterionic polymers or mixtures thereof; antioxidants; penetrants; sequestrants; fragrances; dispersants; film-forming agents; preserving agents; opacifiers.

The above adjuvants are generally present in an amount for each of them of between 0.01% and 20% by weight relative to the weight of the emulsion.

The composition may comprise one or more fumed silicas.

The fumed silicas may be obtained by high-temperature hydrolysis of a volatile silicon compound in an oxyhydric flame, producing a finely divided silica. This process makes it possible especially to obtain hydrophilic silicas having a large number of silanol groups at their surface. Such hydrophilic silicas are sold, for example, under the names Aerosil 130®, Aerosil 200®, Aerosil 255®, Aerosil 300® and Aerosil 380® by the company Degussa, and Cab-O-Sil HS-5®, Cab-O-Sil EH-5®, Cab-O-Sil LM-130®, Cab-O-Sil MS-55® and Cab-O-Sil M-5® by the company Cabot.

It is possible to chemically modify the surface of the silica via chemical reaction in order to reduce the number of silanol groups. It is especially possible to substitute silanol groups with hydrophobic groups: a hydrophobic silica is then obtained.

The hydrophobic groups may be:

- trimethylsiloxy groups, which are obtained especially by treating fumed silica in the presence of hexamethyldisilazane. Silicas thus treated are known as "Silica silylate" according to the CTFA (6th edition, 1995). They are sold, for example, under the references Aerosil R812® by the company Degussa and Cab-O-Sil TS-530® by the company Cabot.

- dimethylsilyloxy or polydimethylsiloxane groups, which are especially obtained by treating fumed silica in the presence of polydimethylsiloxane or dimethyldichlorosilane. Silicas thus treated are known as "Silica dimethyl silylate" according to the CTFA (6th edition, 1995). They are sold, for example, under the references Aerosil R972® and Aerosil R974® by the company Degussa, and Cab-O-Sil TS-610® and Cab-O-Sil TS-720® by the company Cabot.

The fumed silica preferably has a particle size that may be nanometric to micrometric, for example ranging from about 5 to 200 nm.

When it is present, the fumed silica represents from 1% to 30% by weight relative to the weight of the emulsion.

The emulsion may also comprise one or more organic thickeners.

5 These thickeners may be chosen from fatty acid amides (coconut diethanolamide or monoethanolamide, oxyethylenated alkyl ether carboxylic acid monoethanolamide), polymeric thickeners such as cellulose-based thickeners (hydroxyethyl cellulose, hydroxypropyl cellulose, carboxymethyl cellulose), guar gum and derivatives thereof (hydroxypropyl guar).

10 The content of organic thickener(s), if they are present, usually ranges from 0.01% to 20% by weight and preferably from 0.1% to 5% by weight relative to the weight of the emulsion.

The cosmetically acceptable medium of the composition according to the invention is a medium comprising water and/or one or more organic solvents.

15 Examples of organic solvents that may be mentioned include linear or branched and preferably saturated monoalcohols, comprising 2 to 6 carbon atoms, such as ethyl alcohol or isopropyl alcohol; aromatic alcohols such as benzyl alcohol or phenylethyl alcohol; polyols containing more than two hydroxyl functions, such as glycerol; polyol ethers, for instance ethylene glycol monomethyl, monoethyl or monobutyl ether, propylene glycol or ethers thereof, for instance propylene glycol monomethyl ether; and also diethylene glycol alkyl ethers, especially C₁-C₄ alkyl ethers, for instance diethylene glycol monoethyl ether or monobutyl ether, alone or as a mixture.

25 The organic solvents, when they are present, generally represent between 1% and 40% by weight relative to the total weight of the emulsion, and preferably between 5% and 30% by weight relative to the total weight of the emulsion.

The composition of the invention contains water. More preferably still, the water concentration may range from 10% to 70% and better still from 20% to 50% of the total weight of the emulsion.

30 The dyes or additives of the emulsion according to the invention may be dissolved or dispersed in one of the phases of the emulsion.

The emulsion according to the invention may be in various forms, such as in the form of liquids, milks or creams, or in any other form that is suitable for dyeing keratin fibres, and especially human hair.

35 Advantageously, the emulsion according to the invention is in the form of a milk or a cream.

The pH of the composition according to the invention is advantageously between 3 and 12 and preferably between 5 and 11. Preferably, between 7 and 11 limits included.

40 It may be adjusted to the desired value by means of acidifying or alkalinizing agents usually used in the dyeing of keratin fibres.

The alkalinizing agents are, for example, those described previously.

Examples of acidifying agents that may be mentioned include mineral or organic acids, for instance hydrochloric acid, orthophosphoric acid, carboxylic acids, for instance tartaric acid, citric acid or lactic acid, or sulphonic acids.

5 The inverse emulsion of the invention is preferably used as a mixture with an oxidizing composition.

The oxidizing composition comprises one or more oxidizing agents.

10 The oxidizing agent(s) is (are) preferably selected from the group formed by hydrogen peroxide, urea peroxide, alkali metal bromates or ferricyanides, persalts such as perborates and persulphates. One or more redox enzymes such as laccases, peroxidases and 2-electron oxidoreductases (such as uricase), optionally in the presence of the respective donor or cofactor thereof, may also be used as oxidizing agent.

Hydrogen peroxide is preferred.

15 The oxidizing composition is preferably an aqueous composition. In particular, it comprises more than 5% by weight of water, preferably more than 10% by weight of water and even more advantageously more than 20% by weight of water.

It may also comprise one or more organic solvents chosen from those listed previously; these solvents more particularly representing, when they are present, from 1% to 40% by weight and preferably from 5% to 30% by weight relative to the weight of the oxidizing composition.

20 The oxidizing composition also preferably comprises one or more acidifying agents. Among the acidifying agents, examples that may be mentioned include inorganic or organic acids, for instance hydrochloric acid, orthophosphoric acid, sulphuric acid, carboxylic acids, for instance acetic acid, tartaric acid, citric acid or lactic acid, and sulphonic acids.

Usually, the pH of the oxidizing composition, when it is aqueous, is less than 7.

30 Preferably, the oxidizing composition comprises hydrogen peroxide as oxidizing agent, in aqueous solution, the concentration of which varies, more particularly, from 0.1% to 50%, more particularly between 0.5% and 20% and more preferably still between 1% and 15% by weight relative to the weight of the oxidizing composition.

Preferably, the mixture of the inverse emulsion of the invention in the form of a W/O emulsion and of the oxidizing composition is an oil-in-water (O/W) direct emulsion.

35 This mixture is preferably produced extemporaneously, i.e. before its application to the dry or wet human keratin fibres.

After a leave-in time that varies from one minute to one hour, preferably from 5 minutes to 30 minutes, the human keratin fibres are optionally rinsed with water, optionally washed with a shampoo and then rinsed with water, before being dried or left to dry.

40 The mixing may be carried out on the hair by successively applying, optionally in a staggered manner, and without intermediate rinsing, the W/O emulsion of the

invention and the oxidizing composition. The order of application is irrelevant. The leave-in time of each of the two compositions may customarily vary from one minute to one hour and preferably from 5 minutes to 30 minutes. After the treatment, as in the preceding case, the human keratin fibres are optionally rinsed with water, optionally washed with a shampoo and then rinsed with water, before being dried or left to dry.

The temperature during the two processes described above is conventionally between room temperature (between 15 and 25°C) and 80°C and preferably between room temperature and 60°C.

According to one particular embodiment of the invention, after mixing together the emulsion of the invention and the oxidizing composition, the amount of liquid fatty substances in the ready-to-use composition is preferably at least 20% by weight of the total weight of the ready-to-use composition, preferably at least 30%.

The invention also relates to a two-compartment device containing, in one compartment, a W/O emulsion as described previously and, in the other compartment, a composition comprising one or more oxidizing agents.

The examples that follow serve to illustrate the invention without, however, being limiting in nature.

EXAMPLES

EXAMPLE 1

Composition 1 below according to the invention was prepared (the amounts are expressed in g)

Composition 1

N,N-Bis(2-hydroxyethyl)- <i>p</i> -phenylenediamine sulphate, 1 H ₂ O	0.124
2-Methyl-1,3-dihydroxybenzene (2-methylresorcinol)	0.276
1-β-Hydroxyethyloxy-2,4-diaminobenzene dihydrochloride	0.0138
1,3-Dihydroxybenzene (resorcinol)	0.414
1-Methyl-2,5-diaminobenzene	0.744
1-Hydroxy-3-aminobenzene	0.124
Ethyl alcohol	3.0
Monoethanolamine	4.0
Hydroxyethyl cellulose (MW: 1 300 000)	0.44
L-Ascorbic acid	0.09
Liquid petroleum jelly	51
Oxyethylenated stearyl alcohol (20 EO)	5

Sodium metabisulphite	0.245
Diethylenediaminetetraacetic acid, tetrasodium salt as a 40% aqueous solution	0.35
2-Octyldodecanol (octyldodecanol)	9
Propylene glycol	4.42
Water	qs 100

The oxidizing composition (composition 2) was prepared.

Composition 2

Diethylenediaminetetraacetic acid, tetrasodium salt	0.11
Hydrogen peroxide (aqueous 50% solution)	12
Sodium stannate	0.04
Tetrasodium pyrophosphate	0.03
Tetramethylhexamethylenediamine/1,3-dichloro-propylene polycondensate (aqueous 40% solution; hexadimethrine chloride)	0.1
Polydimethyldiallylammonium chloride (aqueous 40% solution, polyquaternium-6)	0.2
Glycerol	0.5
Cetylstearyl alcohol	8
Oxyethylenated cetylstearyl alcohol (33 EO)	1.4
Oxyethylenated rapeseed acid amide (4 EO)	1.3
Vitamin E: DL- α -tocopherol	0.1
Phosphoric acid	qs pH 2.2
Water	qs 100

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Mode of application

The two compositions listed above were mixed weight for weight at the time of use.

10 The resulting mixture was then applied to locks of natural grey hair containing 90% grey hairs, at a rate of 10 g of mixture per 1 g of hair.

The mixture was left in at room temperature for 30 minutes.

The hair was then rinsed, washed with a standard shampoo and dried.

Chestnut locks with good intensity were obtained.

15 Identical results were obtained by replacing, weight for weight, the propylene glycol with hexylene glycol or dipropylene glycol or with a mixture of 2.24 g of propylene glycol plus 1.09 g of hexylene glycol and 1.09 g of dipropylene glycol.

EXAMPLE 2

Composition 3 below according to the invention was prepared (the amounts are expressed in g)

5

Composition 3

Ethyl alcohol	2.6
Monoethanolamine	4.1
Distearyldimethylammonium-modified hectorite	1.4
Ethylene oxide/propylene oxide condensate (13 EO/30 PO/13 EO)	9
L-Ascorbic acid	0.25
Liquid petroleum jelly	54
Oxyethylenated oleyl alcohol (10 EO)	4.3
Propylene carbonate	0.47
Diethylenediaminetetraacetic acid, tetrasodium salt as a 40% aqueous solution	0.5
2-Octyldodecanol (octyldodecanol)	9.3
Propylene glycol	1.86
Dipropylene glycol	0.9
Hexylene glycol	0.9
Fragrance	qs
Water	qs 100

Mode of application

Composition 3 listed above was mixed weight for weight at the time of use with the oxidizing composition 2.

10

The resulting mixture was then applied to locks of natural chestnut hair, at a rate of 10 g of mixture per 1 g of hair.

The mixture was left in at room temperature for 30 minutes.

The hair was then rinsed, washed with a standard shampoo and dried.

15

Dark blonde locks were obtained, which demonstrates a powerful lightening effect.

CLAIMS

1. Process for dyeing or lightening human keratin fibres, characterized in that a water-in-oil inverse emulsion is applied to said fibres, said emulsion comprising:
 - 5 (a) at least 30% by weight of one or more liquid fatty substances;
 - (b) one or more polyols or polyol (C₁-C₄)alkyl ethers having a Hansen δ_H parameter value of less than or equal to 25 MPa^{1/2} at 25°C that are different from the liquid fatty substances; and
 - (c) one or more alkalinizing agents,
- 10 in the presence of a composition comprising one or more oxidizing agents and preferably hydrogen peroxide.
2. Process according to the preceding claim, characterized in that the mixture of the water-in-oil inverse emulsion and of the oxidizing composition is applied, the mixture being produced extemporaneously.
- 15 3. Process according to either of Claims 1 and 2, characterized in that the liquid fatty substances are chosen from liquid hydrocarbons, liquid fatty alcohols, liquid fatty esters and silicone oils, and preferably from liquid hydrocarbons, liquid fatty alcohols and liquid fatty esters.
4. Process according to any one of the preceding claims, characterized in that the
20 liquid fatty substance(s) is (are) liquid hydrocarbons chosen from linear or branched, optionally cyclic, C₆-C₁₆ alkanes, linear or branched hydrocarbons of mineral, animal or synthetic origin with more than 16 carbon atoms, and preferably from liquid paraffins and petroleum jelly.
5. Process according to any one of the preceding claims, characterized in that the
25 liquid fatty substances are liquid fatty alcohols chosen from saturated or unsaturated, linear or branched fatty alcohols and more particularly from octyldodecanol, isostearyl alcohol, 2-hexyldecanol, oleic (or oleyl) alcohol, linoleic (or linoleyl) alcohol, linolenic (or linolenyl) alcohol and undecylenic alcohol.
- 30 6. Process according to any one of the preceding claims, characterized in that the liquid fatty substances are liquid fatty esters resulting from monoalcohols and more particularly from isopropyl myristate or palmitate.
7. Process according to any one of the preceding claims, characterized in that the
35 concentration of liquid fatty substances ranges from 30% to 90% by weight, preferably from 30% to 75% by weight and more preferably still from 30% to 60% by weight relative to the total weight of the emulsion.
8. Process according to any one of the preceding claims, characterized in that the polyols are diols.
9. Process according to any one of the preceding claims, characterized in that the
40 polyol(s) is (are) chosen from propylene glycol, 1,3-butanediol, 1,4-butanediol, diethylene glycol, dipropylene glycol, hexylene glycol, triethylene glycol,

tripropylene glycol, 1,3-propanediol and neopentyl glycol and preferably from propylene glycol or hexylene glycol.

10. Process according to any one of the preceding claims, characterized in that the polyol (C₁-C₄)alkyl ether(s) is (are) chosen from butoxyethoxypropanol, diethylene glycol monoethyl ether, diethylene glycol monomethyl ether, dipropylene glycol monomethyl ether, ethylene glycol monobutyl ether, propylene glycol monomethyl ether, propylene glycol monoethyl ether, triethylene glycol monomethyl ether and tripropylene glycol monomethyl ether.
11. Process according to any one of the preceding claims, characterized in that the content of polyols or polyol (C₁-C₄)alkyl ethers having a Hansen δ_H parameter value of less than or equal to 25 MPa^{1/2} at 25°C represents from 0.05 to 40% by weight, more preferably still from 0.1 to 25% by weight, better still from 0.5 to 20% and even better still from 1 to 10% by weight relative to the weight of the emulsion.
12. Process according to any one of the preceding claims, characterized in that it comprises, as alkalinizing agents, one or more compounds chosen from mineral alkaline agents such as aqueous ammonia, alkali metal carbonates or bicarbonates, sodium or potassium hydroxides, organic alkaline agents such as organic amines with a pK_b at 25°C of less than 12, and hybrid alkaline agents such as the salts of the abovementioned amines with acids such as carbonic acid or hydrochloric acid, or mixtures thereof.
13. Process according to the preceding claim, characterized in that the organic amine is an alkanolamine, a basic amino acid, preferably monoethanolamine.
14. Process according to any one of the preceding claims, characterized in that the composition resulting from the mixing of the emulsion according to any one of Claims 1 to 13 with a composition comprising the oxidizing agent(s) is an O/W emulsion.
15. Water-in-oil inverse emulsion comprising:
 - (a) at least 30% by weight of one or more liquid fatty substances;
 - (b) one or more polyols or polyol (C₁-C₄)alkyl ethers having a Hansen δ_H parameter value of less than or equal to 25 MPa^{1/2} at 25°C that are different from the liquid fatty substances;
 - (c) one or more alkalinizing agents; and
 - (d) at least one oxidation dye and/or at least one direct dye.
16. Two-compartment device containing, in one compartment, an inverse emulsion defined according to any one of Claims 1 to 13 and, in the other compartment, a composition comprising one or more oxidizing agents.