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BRIGHTENING COMPOSITIONS

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This invention relates to compositions containing an optical brightener which are highly effective for brightening and whitening fabrics, particularly nitrogenous materials such as nylon and wool.

Chemical bleaching to whiten or brighten nitrogenous materials, either in the form of natural animal fibers, such as wool or silk, or synthetic fibers, such as the polyamides, of which nylon is an example, cannot ordinarily be employed because of the deleterious effect on the fabric or relative inefficacy of such bleaching procedure.

The application to the fabric of a suitable fluorescent compound which, by virtue of its bluish fluorescence, counteracts the dull, yellowish cast of the fabric, is a logical solution to the problem of improving the whiteness and brightness of the fabric. However, proper selection and satisfactory application of the optical brightener pose a number of problems. The fluorescent compound must be compatible with and non-injurious to the fabric and must impart adequate fluorescence. It must be compatible with the cleansing detergents employed as the washing medium. It must have an affinity for the fabric and must be applied in a solution which either does not inhibit such affinity or preferably enhances such affinity. Furthermore, when applied to the fabric, the fluorescent compound must be evenly and uniformly distributed since, otherwise, the appearance of the treated fabric is spotty and non-uniform.

To obtain the desired uniform, level distribution, the optical brightener must be dispersed in solution. Where the brightener is water-insoluble, this requirement poses the additional problem of solubilization. For practical reasons of economy and ultimate mode of application, the brightening composition must be packaged and sold in highly concentrated form. Therefore, solubilization of a water-insoluble fluorescent compound must be sufficiently great to permit its incorporation in the concentrate in such large amounts that subsequent dilution with large quantities of rinse or wash water will not reduce the concentration of the brightener to such low levels as to render it ineffective.

The object of this invention is to provide optical brightener compositions in which a water-insoluble fluorescent compound is solubilized in very high, effective concentration.

Another object is to provide optical brightener compositions which promote the affinity of the fluorescent compound for the fabric and its even, uniform distribution so that the treated fabric is substantially free of blotchiness and spottiness.

Still another object is to provide optical brightener compositions which also possess detergent properties so that the composition can be effectively employed both as a cleansing and brightening agent.

The optical brighteners which I have found to be particularly suitable for my purpose are water-insoluble di-lower-alkylamino coumarin compounds, wherein the di-lower-alkylamino group is attached to the benzene

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nucleus, which exhibit blue to violet fluorescence. Preferably, the compound contains also a lower-alkyl nuclear substituent such as methyl, ethyl, propyl and butyl. Particularly effective are compounds wherein the lower-alkyl nuclear substituent is attached to the lactone ring as, for example, in the 4 position. Examples of suitable amino-coumarin derivatives include dimethylamino-coumarin, diethylamino-coumarin, 4-methyl-7-dimethylamino-coumarin, 4-methyl-7-diethylamino-coumarin and other positional isomeric forms. These amino-coumarin compounds possess good affinity for nitrogenous materials, both natural, such as wool and silk, and synthetic, such as the polyamides as, for example, nylon. They impart excellent fluorescence in the blue to violet range and, therefore, when properly applied, serve as excellent whiteners and brighteners for such fabrics. They also impart substantial whitening and brightening effect to non-nitrogenous materials such as cottons and other cellulosic fabrics.

As aforementioned, for optimum results, the fluorescent amino-coumarin should be dispersed in solution and the solvent or dispersing agent should be able both to carry substantial amounts of the brightener in the concentrate, and to promote level distribution on and affinity of the brightener for the fabric.

I have discovered that pine oil is an excellent solvent for the aforescribed fluorescent amino-coumarins and that fabrics treated with aqueous dispersions of amino coumarin-pine oil solutions exhibit excellent, uniform, non-spotty fluorescence. The pine oil apparently promotes affinity of the fluorescent compound for the fabric.

Solubility of the amino-coumarin compounds in pine oil is very high. Up to 1 part of 4-methyl-7-diethylamino-coumarin, for example, will dissolve in 2.7 parts of pine oil, namely, up to 37% by weight of the pine oil. Thus exceedingly large concentrations of the fluorescent compound can be incorporated into a concentrate so that it can be diluted with large amounts of wash or rinse water and still retain highly effective concentrations of the amino-coumarin with consequent superior whitening and brightening of the fabric.

The amino-coumarin-pine oil solutions can be employed per se to impart fluorescence to fabrics. In some special cases where an exceedingly high fluorescence is wanted, this may be desirable. For ordinary use as a whitening and brightening agent, such treatment is generally undesirable both for economic reasons of cost and because the imparted fluorescence may be excessive unless concentration of the amino-coumarin is greatly reduced in the solution.

I have found that the amino-coumarin-pine oil solutions can be dispersed or emulsified in water with the aid of a suitable surface-active agent and that fabrics treated with such aqueous dispersions or emulsions exhibit excellent, even, non-blotchy, non-spotty fluorescence.

Any water-soluble surface-active agent which is compatible with and preferably soluble in the pine oil and which serves to disperse the amino-coumarin-pine oil solution in water in the form of finely divided droplets is suitable for my purpose. The surface-active agent may be non-ionic as, for example, condensation products of an alkyl phenol, a higher fatty acid or higher fatty alcohol with ethylene or propylene oxide, or anionic as for example, the water-soluble salts, such as the alkali metal salts, of sulfated condensation products of alkyl phenol, higher fatty acid or higher fatty alcohol with ethylene oxide, the water-soluble fatty acid soaps, such as sodium or potassium oleate, palmitate or stearate, the alkali metal sulfated fatty alcohols such as sodium lauryl sulfate, alkali metal alkaryl sulfonates such as alkyl ben-

zene or naphthalene sulfonates, sulfonated vegetable oils such as sulfonated castor oil and sulfonated coconut oil, alkali metal salts of sulfosuccinic acid and the like.

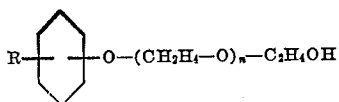
The amount of surface-active dispersing or emulsifying agent is not critical except that it should be present in amount sufficient to disperse the amino-coumarin-pine oil solution in water. The amount required to accomplish this will vary to some extent with the particular surface-active agent and can readily be determined by any one skilled in the art.

In many cases, it will be desirable to incorporate considerable amounts of the surface-active agents with the amino-coumarin-pine oil solution because of their detergent or cleansing action. This possesses the advantage of combining both brightening and cleansing properties in a single composition. The amount of surface-active emulsifying agent incorporated for this purpose can be as high as the degree of detergency desired.

In some instances, the surface-active agent serves not only to disperse the pine oil in aqueous emulsion but also to carry some of the amino-coumarin into solution. This increased solubilization of the amino-coumarin, which may be due to appreciable solubility of the optical brightener in the surface-active agent or a co-solvent effect, makes possible the preparation of concentrates containing even larger amounts of the brightening agent than can be carried by the pine oil alone.

I have found a water-soluble, non-ionic alkylphenoxy-polyoxyethylene-ethanol to be especially satisfactory as the surface-active dispersing agent because of its excellent dispersing action on the pine oil; because it promotes affinity of the optical brightener for the treated fabric; because of its good detergent properties and because it increases solubilization of the amino-coumarin. The amino-coumarin dissolves in the alkylphenoxy-polyoxyethylene-ethanol in appreciable amounts. For example, about 1 part of 4-methyl-7-diethylamino-coumarin will dissolve in about 6 parts of t-octylphenoxy-polyoxyethylene-ethanol having an average of 10 to 11 oxyethylene groups. Although this is less than half the solubility of the optical brightener in pine oil, the addition of the alkylphenoxy-polyoxyethylene non-ionic can appreciably increase the amount of the non-ionic carried in solution. When a concentrate comprising the amino coumarin, pine oil and the alkyl-phenoxy-polyoxyethylene-ethanol dispersing agent is dispersed in water, a portion of the optical brightener is carried into aqueous solution by the water-soluble dispersing agent and the remainder is carried in the pine oil in aqueous emulsion.

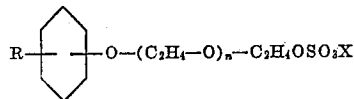
The alkylphenoxy-polyoxyethylene-ethanol non-ionic, surface-active dispersing agent can be characterized by the following formula:



wherein R is an alkyl group such as propyl, butyl, hexyl, octyl, nonyl, decyl, dodecyl and the like, which may be straight or branched chain; and n is a digit indicating the number of oxyethylene groups. The number of oxyethylene groups should be sufficient to confer substantial water-solubility to the compound. To a considerable extent, this is determined by the size of the alkyl substituent on the phenyl group, the larger the alkyl group, the more oxyethylene units being required generally to impart water-solubility. The number of oxyethylene groups can vary, for example, from a few as 6 or 8 to as many as 30 to 40 or more. In general, I prefer to employ alkylphenoxy derivatives in which the alkyl group contains at least about 8 carbons and is preferably branched chain, e.g. iso- or tertiary-. Such derivatives are generally substantially water soluble when they contain about 10 or more oxyethylene groups.

Other surface-active agents which I have found to be

especially satisfactory, because they are excellent dispersing agents for the pine oil, have good detergent properties and, in addition, carry appreciable amounts of the amino-coumarin into solution, comprise the water-soluble salts, such as the sodium salts, of sulfated alkyl-aryloxy-polyoxyethylene ethanol, namely compounds having the following formula:



wherein R is an alkyl group such as propyl, butyl, hexyl, octyl, nonyl, decyl, dodecyl, and the like, which may be straight or branched chain; X is NH_4 or alkali metal such as Na or K; and n is a digit indicating the number of oxyethylene groups. The sodium salt of isobutylphenoxy penta-oxyethylene sulfate is an example of such an anionic dispersing agent which is excellent for my purpose.

The brightening compositions of my invention can be prepared in the form of liquid concentrates by incorporating the surface-active dispersing agent into the pine oil, either in the minimum amount required to disperse the amino-coumarin-pine oil solution in water or in larger amounts sufficient to impart substantial detergency to the composition and dissolving the amino-coumarin, in any desired amount up to the limit of its solubility, in the mixture of surface-active dispersing agent and pine oil. The concentrate is then employed in the usual fashion by addition of a small amount to the wash or rinse water in which the fabric or clothes are immersed.

Where the liquid concentrate contains the maximum amount of the amino-coumarin, namely an amount substantially up to the limit of its solubility, a few drops as, for example 3 or 4, in the wash water is generally adequate for satisfactory brightening. Excessive amounts may impart an undesirable blue tinge to the fabric. To minimize over dose by the household user, it may be desirable to reduce the concentration of the amino-coumarin in the concentrate by increasing the proportion of pine oil or surface-active, dispersing agent or by incorporating water in any suitable amount, as, for example, sufficient so that the consumer can employ an easily measurable quantity such as 1 or 2 teaspoons per gallon of water.

When water is added to the amino-coumarin solution, the surface-active dispersing agent, as aforementioned, serves to emulsify the amino-coumarin-pine oil solution thereby carrying it into fine aqueous dispersion. Although the emulsion may separate after prolonged standing, it is readily re-formed by shaking or stirring.

Fabrics immersed in wash or rinse water containing the dispersed amino-coumarin-pine oil solution have imparted to them a uniform even fluorescence which greatly enhances brightness and whiteness. The pine oil distributes the amino-coumarin uniformly over the fabric and apparently promotes the affinity of the optical brightener for the material.

The amino-coumarin-pine oil solutions are particularly advantageous for use in the preparation of solid detergent and brightening compositions. Since the aforescribed amino-coumarin compounds are water-insoluble, simple admixture with a solid detergent is ineffective in so far as producing uniform whitening or brightening of the washed fabric is concerned. The insoluble coumarin either sediments in the wash water or deposits on the fabric in the form of discrete, solid particles. It is essential, therefore, for effective application of the amino-coumarin, that the fluorescent compound be dispersed in solution for even, uniform distribution on the fabric.

I have discovered that the amino-coumarin-pine oil solutions aforescribed can be incorporated with a comminuted solid detergent in controlled amounts to form a solid free-flowing mixture. When the solid detergent

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mixture is dissolved in water for the washing operation, the pine oil, which carries the amino-coumarin in solution, distributes the fluorescent compound evenly and uniformly over the treated fabric. The pine oil is finely dispersed in the wash water by virtue of its dispersion on the comminuted detergent particles and the surface action of the detergent itself.

Any suitable solid detergent may be employed as cleansing agent and carrier for the optical brightener which has good detergent properties. Such detergents include, for example, soaps, namely alkali metal salts of the higher fatty acids, inorganic salts such as the alkali metal phosphates, polyphosphates, silicates, carbonates, and the like, synthetic organic detergents, which can be of the anionic type such as the water-soluble salts of alkyl and alkaryl sulfates and sulfonates such as sodium lauryl sulfate, sodium dodecylbenzene sulfonate, sodium alkyl-naphthalene sulfonate and the like, water-soluble sulfated salts of condensation products of alkylphenol, higher fatty alcohols and higher fatty acids with ethylene oxide, etc., of the non-ionic type such as condensation products of the condensation product of ethylene oxide with a condensate of propylene oxide and propylene glycol, organic phosphates, polyhydric esters of higher fatty acids, and the like, of the cationic type such as long chain secondary amines and quaternary ammonium salts and the like. The solid detergents can be used alone or combined with other solid detergents in any desired formulation.

The solid brightening and cleansing compositions of my invention are easily and conveniently prepared by admixing the solution of the amino-coumarin in the pine oil with the solid detergent component which is in a comminuted state such as flakes, granules or powder with agitation in any desired fashion. The mixing can be and is generally carried out at ordinary room temperature. Not only is this method of incorporating the optical brightener into the solid detergent easy and economical since it does not require expensive equipment but it minimizes any deleterious effect which an alkaline solid detergent might have on the optical brightener.

Although a solid detergent composition which has substantially lost its free-flowing properties because of addition of the amino-coumarin solution in such large amounts as to cause tackiness of the solid detergent particles does not thereby lose its efficacy as a brightening and cleansing agent, the loss of the free-flowing properties is disadvantageous for consumer use because of such difficulties as measurement and ease of removal from the package. Lumpiness due to agglomeration of the particles also reduces ease of solution in the wash water and may thereby cause spottiness and non-uniform distribution of the optical brightener. I prefer, therefore, to incorporate only such amounts of solution as will permit retention by the solid detergent of its free-flowing properties.

One of the important advantages of the use of pine oil as solvent and distributing agent for the amino-coumarin stems from its high solubilizing effect on the optical brightener. Because of the large concentration of optical brightener which the pine oil can carry in solution, substantial amounts of the fluorescent compound can be introduced into the solid detergent in an amount of liquid which is so small as not to impair the free-flowing properties of the comminuted solid detergent.

The quantity of amino-coumarin solution which can be absorbed by the comminuted solid detergent without loss of its free-flowing characteristics varies to some extent with the particular solid detergent employed, the degree of comminution and the contours of the particles. I have, in some cases, successfully incorporated the amino-coumarin solution in amounts as high as 15% without substantial loss of free-flowing properties. In general, I prefer to employ up to about 5 to 7.5% of the solution. The amount of liquid incorporated in the solid

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detergent can be minimized by employing a substantially saturated solution, namely, a solution containing the maximum amount of the amino-coumarin which the pine oil will dissolve.

The solid detergent compositions of my invention can readily be formulated by dissolving the amino-coumarin in an amount which will provide the desired concentration in a given quantity of total mix in the pine oil and then admixing the solution with the solid comminuted detergent in an amount such that the detergent retains its free-flowing properties. The solubility of the amino-coumarin in the pine oil is so high as to provide free-flowing solid detergent compositions which impart excellent fluorescence to the treated fabrics. The solid detergent compositions can be employed in the usual amounts used in ordinary household washing procedures as, for example, about 1 to 4 teaspoons per gallon of water.

To obtain fluorescence on the fabric under normal conditions of use, namely, a concentrate to be employed at a dilution of about 1 to 4 teaspoons per gallon of water, it is generally desirable to incorporate at least about 0.1% by weight of the amino-coumarin in either the liquid or solid concentrate and I prefer to employ at least about 0.3 to 0.4% and preferably more as, for example, up to 1% or higher. It will be understood, of course, that the concentrates, either liquid or solid, can be packaged in any desired degree of dilution with respect to the amino-coumarin by addition of water or increased amounts of pine oil, surface-active dispersing agent or solid detergent. Such diluted compositions would simply be employed in larger amounts for a given quantity of wash or rinse water. Therefore, the foregoing expressed concentrations are not critical but merely describe preferred embodiments. As aforementioned, the amount of amino-coumarin in the composition is critical only in so far as sufficient should be present to impart fluorescence to the treated fabric.

If desired, a surface-active dispersing agent can be incorporated into the amino-coumarin-pine oil solution prior to incorporation of the solution into the solid detergent. This can be advantageous where the surface-active dispersing agent serves to increase the detergency of the solid composition as a whole. In some cases, also, selection of a suitable surface-active dispersing agent will aid the solid detergent in dispersing the pine oil solution in the wash or rinse water. Since addition of a surface-active dispersing agent to the amino-coumarin-pine oil solution will, unless incorporated in very small amount, appreciably increase the amount of solution to be absorbed by the solid detergent and, thereby, have the effect of reducing the amino-coumarin concentration, it is generally desirable that the surface-active dispersing agent have some solubilizing effect on the amino-coumarin such as the aforesaid alkylphenoxypolyoxyethylene-ethanol non-ionics and the anionic water-soluble salts of a sulfate ester of an alkylphenoxypolyoxyethylene-ethanol.

Example I

The following solutions were prepared:

A.

16 oz. 4-methyl-7-diethylamino-coumarin
32 oz. pine oil
32 oz. t-octylphenoxy-polyoxyethylene-ethanol having an average of 10 to 11 oxyethylene groups

B.

5 oz. 4-methyl-7-diethylamino-coumarin
16 oz. pine oil
32 oz. polyethylene glycol monolaurate (water-soluble)

C.

10 oz. 4-methyl-7-diethylamino-coumarin
32 oz. pine oil

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32 oz. polyethylene glycol monolaurate (water-soluble)

D.

6 oz. 4-methyl-7-diethylamino-coumarin

16 oz. pine oil

32 oz. polyoxyethylene ether of lauryl alcohol (water-soluble)

E.

12 oz. 4-methyl-7-diethylamino-coumarin

32 oz. pine oil

32 oz. polyoxyethylene ether of lauryl alcohol (water-soluble)

F.

12 oz. 4-methyl-7-diethylamino-coumarin

16 oz. pine oil

32 oz. Triton X-771, 30% solution of sodium salt of alkylphenoxy-polyoxyethylene sulfate in isopropanol and water

G.

8 oz. 4-methyl-7-diethylamino-coumarin

16 oz. pine oil

32 oz. sodium lauryl sulfate

A few drops of each of the foregoing solutions were added to 1 gallon of water. A piece of white nylon tricot was immersed for about 5 minutes in each of the water dispersions and then dried. In each case the cloth was of enhanced whiteness and, when examined under ultra-violet exhibited good, even, uniform fluorescence.

Example II

Water was added to the solutions of Example I in amounts sufficient to bring concentration of the amino-coumarin down to about 1 to 2% by weight of the total mix. The pine oil solution in each case dispersed in the water in the form of a fine emulsion. In some cases the emulsion separated after standing for a period of from several hours to several days but redispersed upon shaking or stirring.

1 to 2 teaspoons of the foregoing aqueous concentrates when diluted with about 1 gallon of water gives immersed nylon fabrics enhanced whiteness and good, even, uniform fluorescence.

Example III

A solution comprising 26 oz. 4-methyl-7-diethylamino-coumarin dissolved in 96 oz. pine oil were admixed with 100 lbs. granular sodium tripolyphosphate. The solid detergent absorbed the pine oil solution without loss of its free-flowing properties. 1 teaspoon of the resulting solid detergent composition dissolved in ½ gallon of water imparted enhanced whiteness and excellent uniform fluorescence to white nylon tricot swatches.

Example IV

A solution comprising 16 oz. 4-methyl-7-diethylamino-coumarin dissolved in 32 oz. pine oil and 32 oz. t-octylphenoxy-polyoxyethylene-ethanol having an average of 10 to 11 oxyethylene groups was admixed with a granular low titer, low melting point, cold water soap, the solution being added in an amount comprising about 5% by weight on the soap. The resulting solid detergent composition retained its free-flowing properties. 1 teaspoon dissolved in ½ gallon of water imparted enhanced whiteness and excellent, uniform fluorescence to white nylon tricot swatches.

Example V

A solution comprising 16 oz. 4-methyl-7-diethylamino-coumarin dissolved in 32 oz. pine oil and 32 oz. t-octylphenoxy-polyoxyethylene-ethanol having an average of 10 to 11 oxyethylene groups was admixed with 100 lbs. granular sodium tripolyphosphate and 35 lbs. powdered sodium alkylaryl sulfate to form a free-flowing solid detergent composition. 1 teaspoon dissolved in ½ gal-

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lon of water imparted enhanced whiteness and excellent uniform fluorescence to white nylon tricot swatches.

Other amino-coumarin compounds as aforescribed and particularly the 4-lower-alkyl-7-di-lower-alkylamino-coumarins, such as 4-methyl-7-dimethyl-amino-coumarin can be substituted for the 4-methyl-7-diethylamino-coumarin of the foregoing examples with excellent results.

Although this invention has been described with reference to illustrative embodiments thereof, it will be apparent to those skilled in the art that it may be embodied in other forms but within the scope of the appended claims.

I claim:

1. A brightening composition for fabrics consisting essentially of a solution of a water-insoluble amino-coumarin compound exhibiting blue to violet fluorescence and selected from the group consisting of a di-lower-alkylamino-coumarin and a di-lower-alkylamino-coumarin having a lower-alkyl nuclear substituent, said amino group being attached to the benzene nucleus, in pine oil, the coumarin compound being present in an amount sufficient to produce fluorescence on the material being treated.

2. The composition of claim 1 in which the amino-coumarin is a 4-lower-alkyl-7-di-lower-alkylamino-coumarin.

3. The composition of claim 1 wherein the solution in addition contains a surface-active, dispersing agent in an amount sufficient to disperse the pine oil in water.

4. The composition of claim 3 in which the amino-coumarin is a 4 - lower - alkyl - 7 - di - lower - alkylamino-coumarin.

5. The composition of claim 4 in which the surface-active, dispersing agent is selected from the group consisting of a water soluble non-ionic alkylphenoxy-polyoxyethylene-ethanol and water soluble salts of alkylphenoxy-polyoxyethylene sulfate.

6. The composition of claim 4 in which the amino-coumarin is 4-methyl-7-diethylamino-coumarin.

7. The composition of claim 4 in which the amino-coumarin is 4-methyl-7-dimethyl-amino-coumarin.

8. A solid, comminuted detergent and brightener composition for fabrics consisting essentially of a comminuted solid detergent having absorbed thereon a solution of a water-insoluble amino-coumarin compound exhibiting blue to violet fluorescence and selected from the group consisting of a di-lower-alkylamino-coumarin and a di-lower-alkylamino-coumarin having a lower-alkyl nuclear substituent, said amino group being attached to the benzene nucleus, in pine oil, the coumarin compound being present in an amount sufficient to produce fluorescence on the material being treated and the pine oil being present in an amount sufficient to dissolve the amino-coumarin.

9. The composition of claim 8 in which the solid, comminuted composition is substantially free-flowing.

10. The composition of claim 9 in which the amino-coumarin is a 4-lower-alkyl-7-di-lower alkylamino-coumarin.

11. The composition of claim 10 in which the amino-coumarin is 4-methyl-7-dimethylamino-coumarin.

12. The composition of claim 10 in which the amino-coumarin is 4-methyl-7-diethylamino-coumarin.

13. The composition of claim 10 which contains in addition a surface-active, dispersing agent, the pine oil and said surface-active dispersing agent being present in amount sufficient to dissolve the amino-coumarin.

14. The composition of claim 10 in which the surface-active, dispersing agent is selected from the group consisting of a water-soluble non-ionic alkylphenoxy-polyoxyethylene-ethanol and water-soluble salts of alkylphenoxy-polyoxyethylene sulfate.

15. The composition of claim 13 in which the amino-coumarin is 4-methyl-7-diethylamino-coumarin.

16. A process for making a solid, comminuted, sub-

stantially free flowing detergent and brightener composition which comprises dissolving a water-insoluble amino-coumarin compound exhibiting blue to violet fluorescence and selected from the group consisting of a di-lower-alkyl-amino-coumarin and a di-lower-alkylamino-coumarin 5 having a lower-alkylamino nuclear substituent, said amino group being attached to the benzene nucleus, in pine oil and admixing the resulting solution with a solid, comminuted, substantially free-flowing detergent, the amount of pine oil solution being such that the solid, comminuted detergent absorbs said solution and substantially retains its free-flowing properties, the amino-coumarin being added in an amount sufficient to produce fluorescence on the material being treated.

17. The process of claim 16 in which the amino-coumarin is a 4 - lower - alkyl - 7 - di - lower - alkylamino-coumarin. 15

18. The process of claim 16 in which the solution of amino-coumarin in pine oil contains in addition a surface-active, dispersing agent. 20

19. The process of claim 17 in which the amino-coumarin is 4-methyl-7-diethyl-amino-coumarin.

20. The process of claim 18 in which the surface-active, dispersing agent is selected from the group consisting of a water-soluble non-ionic alkylphenoxy-polyoxyethylene-ethanol and water-soluble salts of alkylphenoxy-polyoxyethylene sulfate.

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