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PATENT SPECIFICATION

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(54) DEODORANT DETERGENT COMPOSITION

(71) We, UNILEVER LIMITED, a British company, of Unilever House, Blackfriars, London EC4, England, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to deodorant compositions for use in suppressing human body malodour.

Background of the Invention

It has long been recognised that the development of body malodours is at least partly due to bacterial action on the products of the sweat glands. Washing with a detergent, for instance in the form of a personal washing bar such as a soap bar, removes malodorous products and reduces the concentration of bacteria on the skin. Complete elimination of bacteria cannot usually be achieved by this means and for this reason it has also been customary to incorporate germicides into detergent compositions for personal washing in the belief that growth of those skin microflora that contribute to body malodour can be inhibited and the production of malodorous substances suppressed by them. Such germicides are at least partly effective in reducing or retarding the development of body malodour, but they do not completely solve the problem, possibly because there are other causes of malodour development on the skin which are unrelated to the proliferation of bacteria.

The limited effectiveness of germicides in a soap bar in combating the problem of body malodour can be demonstrated by determining the reduction in the intensity of body malodour obtained when standard soap bars containing different levels of germicide are compared by a test based on that devised by Whitehouse and Carter as published in The Proceedings of the Scientific Section of the Toilet Goods Association, Number 48, December 1967 at pages 31—37 under the title "Evaluation of Deodorant Toilet Bars".

The test described in that publication was modified in three ways: firstly a 0 to 5 instead of a 0 to 10 grading scale was employed, secondly grading of odour intensity was performed 5 hours after treatment instead of 24 hours, and thirdly, the concentration of deodorant perfume incorporated in the test detergent product was 1.5% by weight of the product. This test is referred to herein as the modified Whitehouse and Carter test.

By employing this modified test using, for example the germicide 3,4,4'-trichlorocarbanilide instead of deodorant perfume, it has been possible to demonstrate that the maximum reduction in odour intensity obtainable (i.e. the numerical difference between the scores attributed to the test soap bar with germicide and the control soap bar without germicide, hereinafter referred to as the odour reduction value) is not greater than about 0.4, irrespective of the amount of the germicide in the test soap bar.

Typical results are summarised in the following Table:

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TABLE 1

The effect of 3,4,4'-trichloro-carbanilide on the reduction of odour intensity when tested against control soap bars containing no germicide

	Wt. % germicide in soap bar	Odour Reduction Value	
5	0.16	0.10	5
	0.25	0.14	
	0.5	0.22	
	0.75	0.27	
10	1.0	0.30	10
	2.0	0.37	

Similar results are obtained if a mixture of two or more germicides, for example, 3,4,4' - trichloro - carbanilide and 3,5,4' - tribromo - salicylanilide, are tested in the same way: the maximum odour reduction value obtainable is still only about 0.4.

Summary of the Invention

Perfumes have been used as odour maskants since ancient times, and it is customary to incorporate perfumes into detergent compositions for personal washing such as soap bars, though these perfumes are in general ineffective in preventing the development of malodour.

It has now been discovered that certain combinations of perfume materials, hereinafter referred to as deodorant perfumes, when incorporated into detergent compositions containing a conventional germicide for personal washing provide a more effective means for inhibiting malodour development than the use of such a germicide only, in that the odour reduction value, as measured according to the modified Whitehouse and Carter test, can exceed 0.4. This effect is clearly not solely one of odour masking, since in many instances there is no detectable smell of the perfume on the treated skin after a few hours. Accordingly, the use of deodorant perfumes and germicides in deodorant compositions represents a new operative principle.

In the course of attempts to characterise this new principle, many hundreds of known perfume materials have been screened. Hundreds of formulations made by blending materials have been examined, including a number of commercial perfumes whose formulations are not fully known (being confidential to the perfumery house in question offering the perfume for sale). No commercial perfume has been found that is capable of giving a germicide-containing soap bar malodour-inhibiting property attributable to a mixture of germicide and deodorant perfume. This supports the view that a new principle of an entirely unexpected kind has been discovered.

In its widest aspect, the invention provides a deodorant detergent composition comprising from 1 to 99% by weight of a detergent active compound, from 0.1 to 10% by weight of a deodorant perfume, and from 0.1 to 5% by weight of a deodorant other than deodorant perfume, the composition having an odour reduction value in the range of from 0.50 to 3.5 as measured by the modified Whitehouse and Carter test.

The invention also provides a process for preparing a deodorant detergent composition which process comprises mixing from 0.1 to 10% by weight of a deodorant perfume and from 0.1 to 5% by weight of a deodorant other than a deodorant perfume and from 1 to 99% by weight of a detergent-active compound to provide a deodorant detergent composition having an odour reduction value within the range of from 0.50 to 3.5 as measured by the modified Whitehouse and Carter test.

The invention furthermore provides a method for suppressing body malodour, particularly of human origin, which comprises applying to the skin or hair an effective amount of a deodorant detergent composition, said composition comprising from 1 to 99% by weight of a detergent active compound, from 0.1 to 10% by weight of a deodorant perfume, and from 0.1 to 5% by weight of a deodorant other than a deodorant perfume, the composition having an odour reduction value within the range of from 0.50 to 3.5 as measured by the modified Whitehouse and Carter test.

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Detergent Active Compound

Detergent active compounds suitable for use in deodorant detergent compositions of the invention can be any of the usual compounds which are anionic, nonionic, cationic, amphoteric or zwitterionic in character.

Examples of detergent-active compounds are compounds commonly used as surface-active agents given in the well-known textbooks "Surface Active Agents", Volume I by Schwartz & Perry and "Surface Active Agents and Detergents", Volume II by Schwartz, Perry and Berch.

The amount of detergent-active compound that can be incorporated into deodorant detergent compositions according to the invention is from about 1% to about 99% by weight. The preferred amount will depend on the nature of the composition (i.e. whether it is liquid or solid and whether it comprises soaps or non-soap detergents or both).

It can be stated generally that the preferred amount of detergent active compound to be employed is within the range of from about 5 to about 95% by weight.

When the deodorant detergent composition is a soap bar it is usually convenient to employ from about 75 to 95% by weight of soap in the bar.

Examples of other deodorant detergent compositions of the invention are non-soap detergent bars, liquid soaps, foam bath and shower products, shampoos, soap, non-soap detergent and nonionic fabric washing powders and liquids, and fabric rinse conditioners.

Deodorant Perfume

The essential materials required for the formulation of deodorant perfumes that are operative according to the new principle are those that depress the partial vapour pressure of morpholine by at least 10% more than that required by Raoult's Law, as determined by the following test, which is designated "The Morpholine Test".

The Morpholine Test

In this test the capacity of a perfume material to depress the partial vapour pressure of morpholine more than that required by Raoult's Law is measured. Substances that undergo chemical reaction with morpholine are to be regarded as excluded from the test, even though they will generally depress the partial vapour pressure of morpholine by at least the defined amount, since not all such substances are operative according to the new principle. It is to be understood, however, that such substances can be included in the formulation of the deodorant perfume and can function as "essential materials", provided that, when included, the composition has the ability to reduce odour intensity by at least 0.50 as herein defined.

The morpholine test is carried out in the following manner:

Into a sample bottle of capacity 20 ml is introduced morpholine (1 g) the bottle fitted with a serum cap and then maintained at 37°C for 30 minutes for equilibrium to be reached. The gas in the headspace of the bottle is analysed by piercing the serum cap with a capillary needle through which nitrogen at 37°C is passed to increase the pressure in the bottle by a standard amount and then allowing the excess pressure to inject a sample from the headspace into gas chromatograph apparatus, which analyses it and provides a chromatographic trace curve with a peak due to morpholine, the area under which is proportional to the amount of morpholine in the sample.

The procedure is repeated under exactly the same conditions using instead of morpholine alone, morpholine (0.25 g) and the perfume material to be tested (1 g); and also using the perfume material (1 g) without the morpholine to check whether it gives an interference with the morpholine peak (which is unusual).

The procedure is repeated until reproducible results are obtained. The areas under the morpholine peaks are measured and any necessary correction due to interference by the material is made.

A suitable apparatus for carrying out the above procedure is a Perkin-Elmer Automatic GC Multifrac F40 for Head Space Analysis. Further details of this method are described by Kolb in "CZ-Chemie-Technik", Vol. 1, No. 2, 87-91 (1972) and by Jentsch et al in "Z. Anal. Chem." 236, 96-118 (1968).

The measured areas representing the morpholine concentration are proportional to the partial vapour pressure of the morpholine in the bottle headspace. If A is the area under the morpholine peak when only morpholine is

(12)

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tested and A' is the area due to morpholine when a perfume material is present, the relative lowering of partial vapour pressure of morpholine by the perfume material is given by $1-A'/A$.

According to Raoult's Law, if at a given temperature the partial vapour pressure of morpholine in equilibrium with air above liquid morpholine is p , the partial vapour pressure p' exerted by morpholine in a homogeneous liquid mixture of morpholine and perfume material at the same temperature is $pM/(M+PC)$, where M and PC are the molar concentrations of morpholine and perfume material. Hence, according to Raoult's Law the relative lowering of morpholine partial vapour pressure $(p-p')/p$, is given by $1-M/(M+PC)$, which under the circumstances of the test is $87/(87+m/4)$, where m is the molecular weight of the perfume material.

The extent to which the behaviour of the mixture departs from the Raoult's Law is given by the ratio

$$\frac{1-A'/A}{87/(87+m/4)}$$

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The above ratio, which will be referred to as the Raoult variance ratio, is calculated from the test results. Where a perfume material is a mixture of compounds, a calculated or experimentally determined average molecular weight is used for m . A perfume material that depresses the partial vapour pressure of morpholine by at least 10% more than that required by Raoult's Law is one in which the Raoult variance ratio is at least 1.1.

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Deodorant perfumes can be incorporated in deodorant detergent compositions according to the invention, at a concentration of from about 0.1 to about 10%, preferably from 0.5 to 5% and most preferably from 1 to 3% by weight.

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It is apparent that if less than 0.1% of a deodorant perfume is employed, then use of the detergent composition containing also a deodorant substance other than a deodorant perfume is unlikely to result in a significant reduction in odour intensity beyond that attributable to the other deodorant substance. If more than 10% of a deodorant perfume is employed, then the deodorant detergent composition might further reduce odour intensity beyond that observed at the 10% level, but use of a composition containing such a high level of perfume could be unpleasant for the user in that it is "over-perfumed".

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Deodorants other than Deodorant Perfumes

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Deodorant substances other than deodorant perfumes which are suitable for use in detergent compositions of the invention are germicides and other substances which are capable of effective a reduction in odour intensity when tested according to the modified Whitehouse and Carter method.

Examples of germicides that can be used are:

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2,2'-methylene bis (3,4,6-trichlorophenol)

2,4,4'-trichlorocarbanilide

3,4,4'-trichlorocarbanilide

2,5,4'-tribromosalicylanilide

3-trifluoromethyl-4,4'-dichlorocarbanilide

2,4,4'-trichloro-2'-hydroxydiphenyl ether

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Other germicides well known for use in detergent products can also be used.

Further examples of other deodorant substances that can be used are zinc oxide, and zinc salts such as zinc ricinoleate, antioxidants, such as butylated hydroxy anisole and butylated hydroxy toluene, citrate esters such as acetyl tributyl citrate and diols such as 2-ethyl-1,3-hexane diol.

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The deodorant detergent composition according to the invention can comprise from 0.1 to 5%, preferably from 0.5 to 3% by weight of deodorant substances other than deodorant perfumes.

Other Detergent Adjuncts

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Deodorant detergent compositions of the invention can contain other detergent composition ingredients (adjuncts), for instance sequestrants, builders, superfatting agents, such as free long-chain fatty acids, lather boosters, such as coconut monoethanolamide; lather controllers; inorganic salts such as sodium and magnesium sulphates; moisturisers; plasticizers and thickeners; opacifiers; colourants; and fluorescers. Examples of such other detergent adjuncts are given in

McCutcheon's "Functional Materials" 1977 Annual published by MC Publishing Co., New Jersey.

5 The total amount of detergent adjunct that can be incorporated into the deodorant detergent composition according to the invention will normally form the balance of the composition after accounting for the detergent-active compound, the deodorant perfume and other deodorant substance. The detergent adjuncts will accordingly form from 0 to 98.8% by weight of the composition. 5

Odour Reduction Value

10 It is a feature of the invention that the deodorant detergent composition has an odour reduction value within the range of from 0.50 and 3.5 as determined by the modified Whitehouse and Carter test. Preferably, the odour reduction value is at least 0.70, more preferably at least 0.80, and most preferably at least 1.00. 10

15 Although the minimum amount of both the deodorant perfume and the other deodorant substance each comprises at least 0.1% by weight of the deodorant detergent composition, it is their combined effect that enables the detergent composition to reduce body odour intensity by at least 0.50, that distinguishes the invention from the known effect of germicide alone referred to hereinbefore. 15

20 Accordingly, if either of the deodorants is employed at a concentration of 0.1%, it may be necessary to ensure that the other is present at a concentration higher than this minimum level in order to provide a detergent composition having an odour reduction value of at least 0.50. 20

25 Although the modified Whitehouse and Carter method referred to herein is used to assess the reduction in odour intensity when the detergent composition is a soap bar, it is to be understood that this method can be adapted to assess the reduction in odour intensity obtainable when other types of detergent composition are used, and that similar odour reduction values will generally be obtained. 25

Process for Preparing Deodorant Detergent Compositions

30 The process for preparing deodorant detergent compositions comprises mixing with from 1 to 99% by weight of a detergent-active compound, from 0.1 to 10% by weight of a deodorant perfume, and from 0.1 to 5% by weight of another deodorant to provide a deodorant detergent composition which has an odour reduction value of at least 0.50 as measured by the modified Whitehouse and Carter test. The selection of detergent active compounds and detergent adjuncts and their respective amounts employed in the process of the invention will depend upon the nature of the required detergent composition (e.g. solid or liquid) and the purpose for which it is required (e.g. for personal washing or shampooing). 30 35

40 The invention in particular provides a process for making soap tablets which comprises mixing with detergent active compounds, detergent adjuncts, a deodorant perfume and a germicide or a mixture of germicides and/or another deodorant such as zinc oxide. 40

45 Usually it is convenient to add the deodorant perfume and other deodorant substance to the detergent composition at a stage towards the end of its manufacture so that loss of any volatile ingredients such as may occur during a heating step is minimised. 45

50 It is furthermore usual to incorporate the deodorant perfume and other deodorant substances in such a manner that they are thoroughly mixed with the other ingredients and are uniformly distributed throughout the detergent composition. It is however also possible, particularly with solid products such as marbled soap bars and speckled or spotted solid or liquid products, to provide detergent compositions where the deodorant perfume and/or the deodorant other than deodorant perfume is not uniformly and homogeneously mixed with the other ingredients of the detergent composition, and is concentrated in the marbled bands or the speckled or spotted parts of such products. 50

Examples of the Invention

55 The invention is illustrated by the following Examples, in which all parts and percentages are by weight. 55

Example 1

60 In this example the combined effect of a deodorant perfume and zinc oxide as another deodorant substance together incorporated in a soap bar was evaluated by the modified Whitehouse and Carter test described above. 60

Soap bars for use as control bars and also as a basis for incorporation of the deodorant perfume and zinc oxide had the following constituents:

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		%	
	Sodium soap (containing 4 parts tallow fatty acid to 1 part coconut fatty acid)	87.84	
5	Ethylene diamine tetracetic acid	0.03	
	1-hydroxyethane-1,1-diphosphonic acid	0.02	5
	Butylated hydroxy toluene	0.11	
	Water	12	

10 Test soap bars were prepared by the addition of 1.5 parts of a deodorant perfume and 0.9 parts zinc oxide to 97.6 parts of the above soap base.
The formulation of the deodorant perfume was as follows: 10

Deodorant Perfume Formulation I

		Parts	
	Amber AB 358	3.0	
15	iso-Amyl salicylate	5.0	
	Benzyl salicylate	4.0	15
	Bergamot AB 430	15.0	
	o-t-Butylcyclohexyl acetate	0.5	
	Cedar atlas oil	5.0	
20	Citronellol	7.0	
	Citronella oil	16.1	20
	Citronellyloxyacetaldehyde	0.5	
	Geranium base 76	4.0	
	1,3,4,6,7,8 - Hexahydro - 4,6,6,7,8,8 - hexamethyl cyclopenta - p - 2 - benzopyran	10.0	
25	Hexyl aldol	0.7	25
	Jasmin AB 284	12.0	
	LRG 201	5.0	
	Nonanolide-1:4	0.2	
30	Opoponax resinoid	1.7	
	Orange oil sweet	8.0	30
	10-Undecen-1-al	0.30	
	Vetyvert oil	2.0	
		100.00	

35 The results of the modified Whitehouse and Carter test were as follows: 35

	Control bar	Test bar
Average scores	2.78	1.85

40 The reduction in odour intensity of the test soap bars containing as deodorants 1.5% of the designated deodorant perfume and 0.9% zinc oxide was the difference between these two scores, which was 0.93. This was well in excess of 0.50 which defines the lower limit of reduction of odour intensity (odour reduction value) of compositions of the invention. 40

Example 2

45 In this example the combined effect of a deodorant perfume and the germicide, 3,4,4'-trichlorocarbanilide, as another deodorant substance together incorporated in a soap bar prepared as described in Example 1 was evaluated by the modified Whitehouse and Carter test. 45

Test soap bars were prepared by the addition of 1.5 parts of a deodorant perfume and 0.75 parts of 3,4,4'-trichlorocarbanilide to 97.75 parts of the soap base.
The formulation of the deodorant perfume was as follows:

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Deodorant Perfume Formulation 2

		Parts	
	6-Acetyl-1,1,3,4,4,6-hexamethyl-tetrahydro naphthalate	3.00	
	Bergamot base 37	20.00	
5	Carvacrol	3.50	5
	Citronellyl acetate	5.00	
	Dipropylene glycol	4.75	
	Geranyl nitrile	1.50	
	Indole	1.00	
10	Lemongrass oil	3.00	10
	Lime AB 402	10.00	
	Lavandin oil	4.00	
	1-Menthol	8.00	
15	3a-Methyl-dodecahydro-6,6,9a-trimethyl naphtho - 2(2,1-b) - furan	0.25	15
	β -Methyl naphthyl ketone	5.00	
	β -Naphthol methyl ether	9.00	
	Neroli base 78	6.00	
20	Pomeransol AB 314	6.00	20
	Petitgrain oil (terpeneless)	4.00	
	Orange oil sweet	5.00	
	Thyme oil red	1.00	
		100.00	

25	The results of the modified Whitehouse and Carter test were as follows:			
		Control Bar	Test bar	
	Average scores	2.97	2.45	25

30 The reduction in odour intensity of the test soap bars containing as deodorants 1.5% of the designated perfume and 0.75% 3,4,4'-trichlorocarbanilide was the difference between these two scores, which was 0.52. This was above 0.50 which defines the lower limit of reduction of odour intensity (odour reduction value) of compositions of the invention. 30

Example 3

35 In this example the combined effect of a deodorant perfume and the germicide, 2,4,4'-trichloro-2'-hydroxydiphenyl ether, as another deodorant substance together incorporated in a soap bar prepared as described in Example 1 was evaluated by the modified Whitehouse and Carter test. 35

Test soap bars were prepared by the addition of 1.5 parts of a deodorant perfume and 0.25 parts of 2,4,4'-trichloro-2'-hydroxydiphenyl ether to 98.25 parts of the soap base.

40 The formulation of the deodorant perfume was as follows: 40

Deodorant Perfume Formulation 3

		Parts	
	p-t-Amylcyclohexanone	5.00	
	Benzoin Siam resinoid	5.00	
45	Bergamot AB 430	15.00	45
	Coumarin	4.00	
	Diethyl phthalate	4.35	
	Geranium oil	5.00	
	Hercolyn D	12.25	
50	1,3,4,6,7,8 - Hexahydro - 4,6,6,7,8,8 - hexamethyl cyclopenta - γ - 2 - benzopyran	3.00	50
	Lavandin oil	10.00	
	α -iso-Methyl ionone	12.00	
	Mousse de chene yugo	1.25	
55	Musk ambrette	3.00	55
	Pimento leaf oil	10.00	
	Rosenta AB 380	10.00	
	Rose-D-oxide	0.15	
		100.00	

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The results of the modified Whitehouse and Carter test were as follows:

	Control Bar	Test Bar
Average scores	3.28	2.78

The reduction in odour intensity of the test soap bars containing as deodorants 1.5% of the designated perfume and 0.25% 2,4,4' - trichloro - 2' - hydroxydiphenyl ether was the difference between these two scores, which was 0.50. This defines the lower limit of reduction of odour intensity (odour reduction value) of compositions of the invention.

Example 4

In this example the combined effect of a deodorant perfume and the germicide, 2,4,4' - trichloro - 2' - hydroxydiphenyl ether and 3,4,4' - trichlorocarbanilide, as other deodorant substances together incorporated in a soap bar prepared as described in Example 1 was evaluated by the modified Whitehouse and Carter test.

Test soap bars were prepared by addition of 1.5 parts of a deodorant perfume, 0.5 parts of 2,4,4' - trichloro - 2' - hydroxydiphenyl ether and 1.5 parts of 3,4,4' - trichlorocarbanilide to 92.5 parts of the soap base together with 4 parts of polyethylene glycol 1000.

The formulation of the deodorant perfume was as follows:

Deodorant Perfume Formulation 4

	Parts	
Bergamot AB 430	8.00	
p-t-Butylcyclohexyl acetate	4.30	
Citronella oil	6.00	
Diethyl phthalate	8.25	25
Ethyl vanillin	0.20	
iso-Eugenol	5.00	
Green Herbal AB 502	15.00	
2-n-Heptylcyclopentanone	0.50	
Indole	1.50	30
Inonyl formate	5.00	
LRG 201	1.25	
α -iso-Methyl ionone	5.00	
β -Naphthol methylether	7.50	
Nonanediol-1:3-diacetate	4.00	35
Patchouli oil	7.00	
Phenylethyl phenyl acetate	5.00	
Rosenta AB 380	6.00	
Sandalone	4.00	
Tetrahydro muguol	6.00	40
p-Undecalactone	0.50	
	100.00	

The results of the modified Whitehouse and Carter test were as follows:

	Control Bar	Test Bar
Average scores	3.22	2.10

The reduction in odour intensity of the test soap bars containing as deodorants 1.5% of the designated perfume and 0.5% 2,4,4' - trichloro - 2' - hydroxydiphenyl ether and 1.5% 3,4,4' - trichlorocarbanilide was the difference between these two scores, which was 1.12. This was well in excess of 0.50 which defines the lower limit of reduction of odour intensity (odour reduction value) of compositions of the invention.

Example 5a

In this example the combined effect of a deodorant perfume and acetyltributyl citrate as another deodorant substance together incorporated in a soap bar prepared as described in Example 1 was evaluated by the modified Whitehouse and Carter test.

Test soap bars were prepared by the addition of 1.5 parts of a deodorant perfume and 0.75 parts of acetyltributyl citrate to 97.75 parts of the soap base.

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The formulation of the deodorant perfume was as follows:

Deodorant Perfume Formulation 5

		Parts	
5	6-Acetyl-1,1,3,4,4,6-Hexamethyl tetrahydro naphthalate	2.5	
	p-t-Amylcyclohexanone	0.06	5
	Benzyl Salicylate	15.0	
	Bergamot AB 430	15.0	
	Cinnamic Alcohol	5.0	
	Diethyl Phthalate	8.04	
10	Dimethyl benzyl carbinyl acetate	2.5	10
	Dimyrcetol	16.0	
	Dipropylene glycol	14.25	
	Geraniol	5.0	
	Isobutyl phenyl acetate	5.0	
15	3a - methyl - dodecahydro - 6,6,9a - trimethyl - naphtho - 2(2,1-b)furan	0.75	15
	Methyl Salicylate	0.5	
	Mousse de Chene Yougo	6.0	
	Nonanolide-1:4	0.2	
20	Pelargene	4.0	20
	Trichloromethyl phenyl carbinyl acetate	0.2	
		100.00	

The results of the modified Whitehouse and Carter test were as follows:

	Control Bar	Test Bar	
25	Average scores	3.26	25
		2.54	

The reduction in odour intensity of the test soap bars containing as deodorants 1.5% of the designated perfume and 0.75% acetyltributyl citrate as another deodorant substance was the difference between these two scores, which was 0.72. This was well in excess of 0.50 which defines the lower limit of reduction of odour intensity (odour reduction value) of compositions of the invention.

Example 5b

In this example the combined effect of a deodorant perfume and ethyl hexane diol as another deodorant substance together incorporated in a soap bar prepared as described in Example 1 was evaluated by the modified Whitehouse and Carter test.

Test soap bars were prepared by the addition of 1.5 parts of a deodorant perfume and 1 part of 2-ethyl-1,3-hexane diol to 97.5 parts of the soap base.

The formulation of the deodorant perfume was the same as that used in Example 5a.

	Control Bar	Test Bar	
40	Average scores	3.02	40
		2.39	

The reduction in odour intensity of the test soap bars containing as deodorants 1.5% of the designated perfume and 1% 2-ethyl-1,3-hexane diol as another deodorant substance was the difference between these two scores, which was 0.63. This was well in excess of 0.50 which defines the lower limit of reduction of odour intensity (odour reduction value) of compositions of the invention.

Example 6

In this example the combined effect of a deodorant perfume and butylated hydroxytoluene as another deodorant substance together incorporated in a soap bar prepared as described in Example 1 was evaluated by the modified Whitehouse and Carter test.

The test soap bars were prepared by addition of 1.5 parts of a deodorant perfume and 1 part of butylated hydroxytoluene to 97.5 parts of the soap base.

55	The formulation of the deodorant perfume was as follows:		55

Deodorant Perfume Formulation 6

		Parts	
	Benzyl Propionate	4.0	
	Bergamot Oil	15.0	
5	o-t-Butylcyclohexyl acetate	2.0	5
	p-t-Butyl- α -methyl hydrocinnamic aldehyde	15.0	
	Clove Leaf Oil	10.0	
	Diethyl Phthalate	9.25	
	Dimethyl benzyl carbinyl acetate	5.0	
10	Inonyl acetate	10.0	10
	Iso-Butyl Benzoate	5.0	
	LRG-201	1.25	
	3a - Methyl - dodecahydro - 6,6,9a - trimethyl - naphtho - 2(21-b) - furan	0.5	
15	Neroli Oil	3.0	15
	Petitgrain Oil	10.0	
	Phenyl ethyl alcohol	10.0	
		100.00	

20	The results of the modified Whitehouse and Carter test were as follows:			20
	Average scores	Control Bar 2.97	Test Bar 2.17	

25 The reduction in odour intensity of the test soap bars containing as deodorants 1.5% of the designed perfume and 1% butylated hydroxytoluene as another deodorant substance was the difference between these two scores, which was 0.80. This was well in excess of 0.50 which defines the lower limit of reduction of odour intensity (odour reduction value) of compositions of the invention.

30 The following glossary provides further information, including the suppliers' names, which will aid identification of some of the aforementioned perfume components and ingredients.

30 All materials which are classified by a name and number are obtainable from Proprietary Perfumes Limited.

35 Dimyrcetol—Dimyrcetol (IFF)
Hercolyn D (Trade Mark)—Tetrahydro abietate+dihydro abietate (HP)
LRG 201—Oakmoss speciality (RB)
Pelargene—Pelargene (PPL)
Rose-D-Oxide—Rose oxide synthetic (PPL)
Sandalone—Sandalone (PPL)

Perfume Houses

40 HP—Hercules Powder Co.
IFF—International Flavour & Fragrances Inc.
RB—Roure Bertrand
PPL—Proprietary Perfumes Limited.

WHAT WE CLAIM IS:—

45 1. A deodorant detergent composition comprising from 1 to 99% by weight of a detergent active compound, from 0.1 to 10% by weight of a deodorant perfume as herein defined and from 0.1 to 5% by weight of a deodorant other than a deodorant perfume as herein defined, the composition having an odour reduction value within the range of from 0.50 to 3.5 as measured by the modified Whitehouse and Carter test.

50 2. A composition according to claim 1 which has an odour reduction value of at least 0.70.

3. A composition according to claim 1 which has an odour reduction value of at least 0.80.

55 4. A composition according to claim 1 which has an odour reduction value of at least 1.00.

5. A composition according to any preceding claim in which the deodorant other than a deodorant perfume is a germicide.

6. A composition according to claim 5, in which the germicide is 3,4,4'-trichlorocarbanilide.

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Deodorant Perfume Formulation 6

		Parts	
	Benzyl Propionate	4.0	
	Bergamot Oil	15.0	
5	o-t-Butylcyclohexyl acetate	2.0	5
	p-t-Butyl- α -methyl hydrocinnamic aldehyde	15.0	
	Clove Leaf Oil	10.0	
	Diethyl Phthalate	9.25	
	Dimethyl benzyl carbinyl acetate	5.0	
10	Inonyl acetate	10.0	10
	Iso-Butyl Benzoate	5.0	
	LRG-201	1.25	
	3a - Methyl - dodecahydro - 6,6,9a - trimethyl - naphtho - 2(21-b) - furan	0.5	
15	Neroli Oil	3.0	15
	Petitgrain Oil	10.0	
	Phenyl ethyl alcohol	10.0	
		100.00	

20	The results of the modified Whitehouse and Carter test were as follows:			20
		Control Bar	Test Bar	
	Average scores	2.97	2.17	

25 The reduction in odour intensity of the test soap bars containing as deodorants 1.5% of the designed perfume and 1% butylated hydroxytoluene as another deodorant substance was the difference between these two scores, which was 0.80. This was well in excess of 0.50 which defines the lower limit of reduction of odour intensity (odour reduction value) of compositions of the invention. 25

The following glossary provides further information, including the suppliers' names, which will aid identification of some of the aforementioned perfume components and ingredients.

30 All materials which are classified by a name and number are obtainable from Proprietary Perfumes Limited. 30

Dimyrcetol—Dimyrcetol (IFF)
Hercolyn D (Trade Mark)—Tetrahydro abietate+dihydro abietate (HP)
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35 Pelargene—Pelargene (PPL) 35
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Perfume Houses
HP—Hercules Powder Co.
40 IFF—International Flavour & Fragrances Inc. 40
RB—Roure Bertrand
PPL—Proprietary Perfumes Limited.

WHAT WE CLAIM IS:—
1. A deodorant detergent composition comprising from 1 to 99% by weight of a
45 detergent active compound, from 0.1 to 10% by weight of a deodorant perfume as
herein defined and from 0.1 to 5% by weight of a deodorant other than a deodorant
perfume as herein defined, the composition having an odour reduction value within
the range of from 0.50 to 3.5 as measured by the modified Whitehouse and Carter
test.
50 2. A composition according to claim 1 which has an odour reduction value of
at least 0.70.
3. A composition according to claim 1 which has an odour reduction value of
at least 0.80.
55 4. A composition according to claim 1 which has an odour reduction value of
at least 1.00. 55
5. A composition according to any preceding claim in which the deodorant
other than a deodorant perfume is a germicide.
6. A composition according to claim 5, in which the germicide is 3,4,4'-
trichlorocarbaniide.



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7. A composition according to claim 5, in which the germicide is 2,4,4' - trichloro - 2' - hydroxydiphenyl ether.
8. A composition according to any of claims 1 to 4, in which the deodorant other than a deodorant perfume is zinc oxide or a zinc salt.
- 5 9. A composition according to any of claims 1 to 4, in which the deodorant other than a deodorant perfume is an antioxidant.
- 10 10. A composition according to claim 9, in which the antioxidant is butylated hydroxytoluene.
- 10 11. A composition according to any of claims 1 to 4, in which the deodorant other than a deodorant perfume is a citrate ester.
- 10 12. A composition according to claim 11, in which the citrate ester is acetyl tributyl citrate.
- 15 13. A composition according to any of claims 1 to 4, in which the deodorant other than a deodorant perfume is a diol.
- 15 14. A composition according to claim 13, in which the diol is 2-ethyl-1,3-hexane diol.
- 20 15. A composition according to any preceding claim, in which the detergent active compound forms from 5 to 95% by weight of the composition.
- 20 16. A composition according to any preceding claim, in which the deodorant perfume forms from 0.5 to 5% by weight of the composition.
- 20 17. A composition according to any preceding claim, in which the deodorant other than deodorant perfume forms from 0.5 to 3% by weight of the composition.
- 25 18. A composition according to any preceding claim and substantially as described in any of the Examples.
- 25 19. A process for preparing a deodorant detergent composition according to any preceding claim which process comprises mixing from 0.1 to 10% by weight of a deodorant perfume as herein defined and from 0.1 to 5% by weight of a deodorant other than a deodorant perfume as herein defined and from 1 to 99% by weight of a detergent active compound to provide a deodorant detergent composition having an odour reduction value within the range of from 0.50 to 3.5 as measured by the modified Whitehouse and Carter test.
- 30 20. A process for suppressing body malodour which comprises applying to the skin or hair an effective amount of a deodorant detergent composition according to any of claims 1 to 18.

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