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<p>(21) International Application Number: PCT/US97/04220</p> <p>(22) International Filing Date: 18 March 1997 (18.03.97)</p> <p>(30) Priority Data:</p> <table border="0"> <tr> <td>60/013,727</td> <td>20 March 1996 (20.03.96)</td> <td>US</td> </tr> <tr> <td>08/818,486</td> <td>14 March 1997 (14.03.97)</td> <td>US</td> </tr> </table> <p>(71) Applicant: COLGATE-PALMOLIVE COMPANY [US/US]; 300 Park Avenue, New York, NY 10022 (US).</p> <p>(72) Inventors: KASAT, Radhakrishna, B.; 65 Oxford Place, Belle Mead, NJ 08502 (US). DE LA ROSA, Consuelo, P.; 12 Kenzel Avenue, Nutley, NJ 07110 (US). LINN, Elizabeth; 621 Fifth Avenue, Lyndhurst, NJ 07071 (US).</p> <p>(74) Agent: MIANO, Rosemary; Colgate-Palmolive Company, 909 River Road, Piscataway, NJ 08855-1343 (US).</p>	60/013,727	20 March 1996 (20.03.96)	US	08/818,486	14 March 1997 (14.03.97)	US	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b> <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>
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<p>(54) Title: LOW RESIDUE ANTIPERSPIRANT STICK COMPOSITION</p>							
<p>(57) Abstract</p> <p>Disclosed are antiperspirant stick compositions that exhibit substantially no visible residue (whitening) upon application to the skin or after drying. The compositions include both emollients that are silicone materials and emollients that are not silicone materials, these materials having a refractive index of at least 1.4460, in addition to including a vehicle (for example, cyclomethicone), a gelling agent (for example, stearyl alcohol and hydrogenated castor oil) and the active antiperspirant material (for example, particulate antiperspirant metal salts). These compositions reduce the necessity of using expensive silicone materials, while still achieving antiperspirant compositions with substantially no visible residue.</p>							

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## LOW RESIDUE ANTIPERSPIRANT STICK COMPOSITION

10 BACKGROUND OF THE INVENTION

15 The present invention is directed to an antiperspirant stick composition. In particular, the present invention is directed to an antiperspirant stick composition (for example, a solid stick composition) which reduces or eliminates the residue left on the skin after application. Preferably the compositions of this invention leave substantially no visible (for example, white) residue on skin after application or after drying, and have superior cosmetic properties.

20 Wax-based stick compositions, which contain a wax-type solidifying agent, are known. It is also known to incorporate an antiperspirant active material, such as aluminum-zirconium-glycine complexes, in such wax-based stick compositions, to provide an antiperspirant stick. However, application of such wax-based antiperspirant stick to the skin frequently results in objectionable aesthetic characteristics (such as unsatisfactory glide on the skin); moreover, such products leave undesirable visible residue (white residue) on the skin after application and after drying.

30 U.S. Patent No. 4,919,934 to Deckner, et al. discloses wax-based cosmetic stick compositions containing specific amounts of a wax-type solidifying agent and a polyalphaolefin, and preferably an active component such as a sunscreen agent, analgesic, antiperspirant or deodorant active. This patent

5 discloses that the stick composition preferably also includes  
at least one emollient, selected from volatile and non-  
volatile silicone oils and non-polar fatty acid and fatty  
alcohol esters; these compositions which contain an  
antiperspirant active and/or deodorant active also preferably  
10 include at least one emulsifier. The contents of U.S. Patent  
No. 4,919,934 are incorporated herein by reference in their  
entirety.

There have been attempts to provide low-residue  
antiperspirant solid sticks. See, for example, U.S. Patent  
15 No. 4,822,603 to Farris, et al.; U.S. Patent No. 5,254,332 to  
Greczyn, et al.; and U.S. Patent No. 5,302,381 to Greczyn, et  
al. Each of U.S. Patent No. 4,985,238 to Tanner and U.S.  
Patent No. 5,169,626 to Tanner discloses low residue  
antiperspirant sticks containing specific amounts of a  
20 volatile silicone material; a particulate antiperspirant  
active; a low melting point wax; and a non-volatile paraffinic  
hydrocarbon fluid selected from mineral oils, branched-chain  
hydrocarbons containing an average of from about 16 to about  
68 carbon atoms, and mixtures thereof. Non-essential  
25 components which can also be incorporated in the sticks  
include, for example, emollients, colorants, perfumes and  
emulsifiers.

U.S. Patent No. 5,225,188 to Abrutyn, et al. discloses  
underarm formulations which contain volatile and/or non-  
30 volatile alkylmethylsiloxanes having a specific structure,

5 which formulations may contain other components such as  
astringent antiperspirant compounds, suspending agents,  
conventional waxes, emollients, perfumes, coloring agents and  
other ingredients normally used in making underarm products.  
Incorporation of the alkylmethylsiloxanes in underarm  
10 formulations provide characteristics such as modified  
hardness, reduced whitening, improved feel, compatibility of  
ingredients, and control of vapor pressure.

It has also been proposed to incorporate  
phenyltrimethicone in antiperspirant formulations containing  
15 cyclomethicone as a vehicle, stearyl alcohol and hydrogenated  
castor oil as gelling agents, PEG-8 distearate, and aluminum-  
zirconium-tetrachlorohydroxide-Gly, the phenyltrimethicone acting  
as a masking ingredient for the antiperspirant active  
ingredient to avoid a visible residue of the antiperspirant  
20 active on the skin.

U.S. Patent No. 5,449,511 to Coe, the contents of which  
are incorporated herein by reference in their entirety,  
discloses a non-aqueous antiperspirant product that includes a  
non-aqueous carrier vehicle; an antiperspirant active salt  
25 suspended in particle form in the carrier vehicle; and a non-  
volatile, water-soluble, liquid (at 25°C) masking agent that  
interacts with the antiperspirant active to essentially  
eliminate discernible whitening without substantially  
inhibiting the antiperspirant activity of the salt when the  
30 product is applied to the skin. The masking agent can be

5 selected from non-volatile aliphatic compounds (such as  
alcohols, ethers, silanols, silyl ethers, siloxanes and  
silicones) which contains disubstituted oxygen  
functionalities. This patent discloses that the masking agent  
preferably is a water-soluble, liquid, non-volatile emollient  
10 material, which reduces whitening by interacting with the  
particulates to produce an optical effect that tends to reduce  
light scattering and apparent whiteness. Illustrative masking  
agents disclosed in U.S. Patent No. 5,449,511 include PPG-10  
butanediol and dimethicone copolyols. This patent discloses  
15 that, in addition, for solid products, gelling agents may be  
included, examples of suitable gelling agents including  
hydrogenated castor oil, and fatty alcohols such as stearyl  
alcohol, among others, as well as blends and combinations.

Thus, it is an object of the invention to provide an  
20 antiperspirant stick composition that exhibits reduced and  
preferably no whitening (residue) upon application to the skin  
or after drying thereon, which has desired cosmetic properties  
and antiperspirant efficacy, and which can be formed at  
reduced cost.

25 It is also an object of the invention to provide  
antiperspirant stick compositions with reduced visible residue  
on the skin after application and after drying, which have  
good cosmetic characteristics.

It is a further object of the invention to provide an  
30 antiperspirant stick composition having reduced or

5 substantially no visible (white) residue on the skin after application and after drying, which includes a method of making and of using such antiperspirant stick composition.

It is another object of the present invention to provide an antiperspirant stick composition which exhibits  
10 substantially little or no visible residue on the skin after application and after drying, and which has good cosmetic properties (including good glide on the skin and good emolliency).

15 SUMMARY OF THE INVENTION

The foregoing objects are achieved by an antiperspirant stick composition comprising:

(1) an antiperspirant active material;  
(2) a gelling agent, in an amount so as to form a stick  
20 (especially a solid stick) product;

(3) a vehicle for the gelling agent, in an amount such that the gelling agent can dissolve therein and can gel therefrom; and

(4) an emollient, including both at least one non-  
25 volatile silicone material and at least one non-volatile emollient material that is not a silicone material, wherein

(a) both the at least one non-volatile silicone material and the at least one emollient material that is not a silicone material have a refractive index of at least 1.4460;  
30 and

5 (b) these emollient materials, as a whole, are included in an amount so as to reduce or eliminate the whitening effect of an antiperspirant active ingredient on the skin.

10 DETAILED DESCRIPTION OF THE INVENTION

The present invention contemplates an antiperspirant stick composition that leaves substantially little or no visible residue (whitening) either upon application to the skin or after drying on the skin. The nonaqueous composition includes, in addition to an antiperspirant active material (for example, a particulate antiperspirant metal salt), a gelling agent, a vehicle for the gelling agent (the vehicle being a material in which the gelling agent can dissolve and from which the gelling agent can form a gel (for example, upon cooling)), and an emollient, the emollient including at least one non-volatile silicone material and at least one non-volatile emollient material that is not a silicone material, the various emollient materials having a refractive index of at least 1.4460, with the emollient materials being included in an amount so as to mask a whitening effect of the antiperspirant active ingredient (and any other whitening powder ingredient, such as talc) on the skin.

By incorporating the emollient material that is not a silicone material, such emollient material having the specified refractive index, especially in combination with the



5 non-volatile silicone material, a relatively low-cost component can be included to mask any whitening effect, while also providing improved cosmetic properties due to its emolliency effects.

The antiperspirant active materials used in this  
10 invention can be any conventional antiperspirant material, including (but not limited to) antiperspirant active metal salts. These antiperspirant active metal salts generally have a refractive index of at least 1.500, and include, but are not limited to, aluminum-zirconium tri-, tetra- and penta-  
15 chlorohydrate glycine complexes, which are coordination complexes of aluminum-zirconium tri-, tetra- or penta-chlorohydrate and glycine in which some of the water molecules normally coordinated to the metal have been displaced by the glycine. Illustrative antiperspirant active metal salts  
20 include aluminum-zirconium tetrachlorohydrate gly (for example, Reach AZP-908 and Reach 908-0, each manufactured by Reheis Inc., Berkeley Heights, New Jersey, which are coordination complexes of aluminum-zirconium tetrachlorohydrate and glycine in which some of the water molecules normally coordinated to  
25 the metal have been displaced by the glycine. The present invention is not limited to use of aluminum-zirconium tetrachlorohydrate gly, and other antiperspirant active metal salts (such as aluminum chlorohydrate), and/or other antiperspirant active materials, can be utilized in the stick  
30 composition of the present invention.

5           Illustratively, antiperspirant solid stick compositions  
according to the present invention contain the antiperspirant  
active material in an amount of 10-30% by weight, of the total  
weight of the composition. Moreover, the preferred  
antiperspirant material particulate (for example,  
10 antiperspirant metal salt particulate) has a median particle  
size of less than 100 microns, a bulk density of 20-40  
pounds/cubic foot and a spherical particle shape. Most  
preferred is a median particulate size of 5-40 microns,  
preferably 5-10 microns.

15           The gelling agent used in the composition of the present  
invention are those commonly known in the art. Examples  
include various waxes, including (but not limited to)  
hydrogenated castor oil, fatty alcohols such as stearyl  
alcohol, polyethylene, etc. For various gelling agents,  
20 attention is directed to the solidifying agents described in  
U.S. Patent No. 4,919,934 to Deckner, et al., the contents of  
which have been incorporated herein by reference in their  
entirety. Various combinations, blends and mixtures of  
different materials can be utilized as the gelling agent  
25 according to the present invention. Illustratively, the  
gelling agent is included in an amount of 17%-40% by weight,  
of the total weight of the composition.

A preferred gelling agent for the present invention is a  
mixture of high melting point wax and low melting point wax,  
30 such as hydrogenated castor oil and stearyl alcohol, which

5 respectively have refractive indices in the ranges of 1.570-  
1.585 and of 1.50-1.52. Any whitening effect due to the  
gelling agent can be avoided according to the present  
invention, utilizing emollient material having refractive  
indices of at least 1.4460.

10 Illustratively (and not limiting of the present  
invention), where the gelling agent includes both high and low  
melting point waxes, the low melting point wax is included in  
the composition in an amount of 10%-25% by weight, and the  
high melting point wax is included in the composition in an  
15 amount of 2%-17% by weight, each of the total weight of the  
composition.

Of course, the gelling agent must be soluble in the  
vehicle, and must be able to be gelled therefrom, for example,  
upon cooling of the composition after the composition has been  
20 heated in order to dissolve the gelling agent in the vehicle.

The gelling agents suitable for use with this invention  
include microcrystalline waxes, stearyl alcohol, hydrogenated  
castor oil, cetyl stearate, stearyl stearate, cetyl myristate,  
cetyl palmitate, and stearoxydimethionine.

25 Compositions according to the present invention include a  
non-aqueous carrier vehicle; in preferred embodiments, a  
volatile silicone such as cyclomethicone is utilized as the  
vehicle. An illustratively cyclomethicone which can be used  
as the vehicle is DC-345 silicone fluid, from Dow Corning  
30 Corp. However, the vehicle is not limited to cyclomethicone,

5 and other known vehicles, such as aliphatic hydrocarbons, can also be utilized as the vehicle. Illustratively, and not limiting of the present invention, the vehicle is included in the composition in an amount of 30%-50% by weight, of the total weight of the composition.

10 Suitable vehicles include cyclomethicone, hydrogenated polyisobutene, isodecane, isohexane, and isoeicosane.

Emollients are a known class of materials in this art, imparting a soothing effect to the skin. According to the present invention, the emollient (for example, non-volatile  
15 emollient) incorporated in the composition both reduces or eliminates visible residue and imparts emollient effects to the skin. Suitable non-volatile emollients include silicone and non-silicone materials. Such silicone materials include silicone compounds such as phenyltrimethicone and dimethicone  
20 copolyol.

The non-volatile emollient materials (both the non-volatile silicone materials and the non-volatile emollient material that is not a silicone material) each can include a mixture. The emollient materials cannot all be silicone  
25 materials. It is preferred that each of the emollient materials of the mixture has a refractive index of at least 1.4460. Preferably, the emollient materials have a high refractive index, close to the refractive index of the antiperspirant active material.

5 By incorporating the emollient materials (including the  
emollient material that is not a silicone material) having a  
refractive index of at least 1.4460, in the composition, both  
improved cosmetic properties and reduced whitening effects are  
achieved. That is, by utilizing the emollient materials  
10 having the refractive index of at least 1.4460, whitening  
effects of the active salt complex (and any other whitening  
powder ingredient in the composition for example, talc) can be  
avoided. Moreover, the compositions, containing the at least  
one non-volatile emollient material that is not a silicone  
15 material, can include relatively inexpensive emollients.

Accordingly, through use of the present invention,  
incorporating at least the non-silicone, non-volatile  
emollient material having a refractive index of at least  
1.4460 in the composition, in combination with the non-  
20 volatile silicone, an antiperspirant stick composition is  
achieved which exhibits no residue (whitening) upon  
application to the skin or after drying, which composition  
includes relatively low-cost materials, and which composition  
has good cosmetic properties.

25 The composition according to the present invention  
desirably includes, in addition to the foregoing components,  
inert fillers and/or other materials such as, for example,  
fragrances, bacteriostats and/or bactericides, colorants,  
etc., known in the art as components of antiperspirant stick  
30 compositions.

5 As mentioned previously, various known components of antiperspirant solid sticks can also be incorporated in the solid stick compositions according to the present invention, such known components including fragrances, bacteriostats, etc. Known bacteriostats include bacteriostatic quaternary  
10 ammonium compounds such as 2-amino-2-methyl-1-propanol (AMP), cetyl-trimethylammonium bromide, cetyl pyridinium chloride, 2, 4, 4N-trichloro-2N-hydroxydiphenylether (Triclosan), etc., and various zinc salts. The bacteriostat can, illustratively, be included in the composition in an amount of 0.2-1.0% by  
15 weight, of the total weight of the composition.

Various fragrances known in the art can also be incorporated in the antiperspirant solid stick composition of the present invention. These fragrances can be incorporated in amounts known in the art, e.g., 0.5-3.0% by weight, of the  
20 total weight of the composition.

Inert fillers can be incorporated in the antiperspirant stick compositions of the present invention. Illustratively, the inert filler can be corn starch, talc, fumed silica and/or inorganic clays, polyethylene, or mixtures of these inert  
25 particulate materials. Preferably, the inert filler, in particulate form, should have physical properties (for example, size, shape, etc.) that are similar to those of the antiperspirant active material (for example, particulate antiperspirant active metal salt).

5           Where the inert filler contributes to the whitening  
(visible residue) effect of the stick composition, the  
whitening effect can be reduced through use of the emollient  
having the refractive index in the present invention.

10           While the invention will be described in connection with  
specific and preferred embodiments, it will be understood that  
it is not intended to limit the invention to those  
embodiments. To the contrary, it is intended to cover all  
alterations, modifications and equivalents as may be included  
within the spirit and scope of the invention as defined by the  
15           appended claims.

          Throughout the present disclosure, where compositions are  
described as including or comprising specific components, or  
where processes are described as including or comprising  
specific processing steps, it is contemplated that  
20           compositions of the present invention also consist essentially  
of, or consist of, the recited components, and that the  
processes of the present invention also consist essentially  
of, or consist of, the recited processing steps.

          In the following Table are set forth various illustrative  
25           non-volatile, non-silicone emollient materials that can be  
utilized, in combination with the non-volatile silicone  
emollient material, as part of the present invention, both to  
reduce the whitening effect of the antiperspirant active  
ingredient and to provide emollient properties to the  
30           antiperspirant stick compositions. Listed in the following

- 5 Table are the CTFA name (as set forth in the CTFA International Cosmetic Ingredient Dictionary (4th Ed. 1991)), a trade name for the material (where appropriate), and the refractive index of such material.

TABLE

CTFA Name	Tradename	Refractive Index
Isostearyl isostearate	SCHERCEMOL 1818	1.4612
Glycereth-7-benzoate	PELEMOL G7B	1.4953
C12-C15 alkyl benzoate	FINSOLV TN	1.4820
Octyldodecyl benzoate	FINSOLV BOD	1.4833
Isostearyl lactate	PELEMOL ISL	1.4519
Isostearyl palmitate	DERMOL ISP	1.4546
Benzyl laurate	MAZON EE-1	1.4811
Laureth 4	MACOL LA 4	1.4514
Laureth 7	MACOL LA 790	1.4547
Oleth 2	BRIJ 93	1.4612
PEG 4	CARBOWAX 200	1.4594
PEG 12	CARBOWAX 600	1.4664
PPG 2 cetareth 9	EUMULGIN L	1.4611
PPG 2 isodeceth 12	SANDOXYLATE SX 424	1.4591
PPG 5 buteth 7	UCON 50 HB 170	1.4526
PPG 14 butyl ether	FLUID AP	1.4474
PPG 15 butyl ether	UCON LB 285	1.4479
PPG 53 butyl ether	UCON LB 3000	1.4512
Octyldodecanol	EUTANOL G	1.4530



Polydecene	ETHYLFLO 364	1.4535
Polydecene	ETHYLFLO 366	1.4569

5

Of course, combinations (for example, mixtures) of at least two of the above-listed emollient materials can be incorporated in compositions of the present invention.

10 Illustratively, the non-volatile emollient material that is not a silicone can be incorporated in the composition in an amount of 10%-27% by weight, of the total weight of the composition. This range is not limiting of the present invention.

15 Furthermore, compositions according to the present invention include non-volatile silicone emollient materials, for example, those having relatively high refractive indices (such as phenyltrimethicone, having a refractive index of 1.4600). Phenyltrimethicone is an illustrative non-volatile emollient silicone material, and is not limiting of the present invention. 20 Illustratively (and not limiting), the non-volatile emollient silicone material is included in the composition in an amount of 5%-20% by weight, of the total weight of the composition. Combinations (such as mixtures) of at least two non-volatile emollient silicone materials can be 25 incorporated in compositions of the present invention; thus, combinations both of non-volatile emollient materials and of non-volatile silicone emollient materials can be included in compositions of the present invention. Other emollient

5 materials which can be incorporated in the compositions of the present invention include, illustratively (but not limiting), dimethicone copolyol (DC 190), having a refractive index of 1.4480; and dimethicone copolyol (DC 193), having a refractive index of 1.4540. Where relatively large amounts of the  
10 relatively expensive phenyltrimethicone, and where relatively large amounts of the dimethicone copolyols, are utilized, advantages of using the non-silicone material (for example, low-cost component) are somewhat limited.

The antiperspirant sticks of the present invention may be  
15 manufactured using methods known in the art. Typically, the ingredients are combined and heated to melt components (for example, other than the antiperspirant material particulate and particulate inert filler), and the melted and particulate components are mixed. Desirably, volatile materials, such as  
20 the fragrance material, are incorporated in the composition in the latter stages of the mixing cycle, in order to avoid volatilization thereof. After mixing, the molded composition can be poured into stick-form molds (for example dispensing containers), as conventional in the art, after which the  
25 compositions harden into a solid.

The compositions according to the present invention can be utilized by the consumer, to reduce perspiration, as conventional antiperspirant solid stick compositions are used. An end of the molded compositions, hardened in the dispensing  
30 container, can be elevated out of the dispensing container, so

5 as to protrude out of the dispensing container, and rubbed  
 against the skin in the axillary region, for example, so as to  
 deposit antiperspirant active material in the axillary region,  
 which prevents (or at least reduces) perspiration from the  
 axillary region. Thus, by rubbing the composition of the  
 10 present invention against the skin in regions of the body  
 particularly prone to perspiration (for example, the axillary  
 region), perspiration wetness in such regions can be  
 controlled.

The following sets forth an example of the present  
 15 invention. This example is illustrative, and not limiting, of  
 the present invention. In this Example A, the amounts are in  
 percent by weight, of the total weight of the composition.  
 Where appropriate, the refractive indices of the various  
 materials are set forth.

20

EXAMPLE A

<u>Ingredients</u>	<u>%w/w</u>	<u>Refractive Index</u>
Cyclomethicone	37.0	1.3980
PPG 14 Butyl Ether	13.1	1.4474
25 Phenyltrimethicone	5.0	1.4600
Aluminum Zirconium Tetrachlorohydrate Gly Complex	20.0	1.5360
PEG 8 Distearate	2.0	
Fragrance/Starch	1.9	
30 Hydrogenated Castor Oil	4.0	1.570-1.585
Stearyl alcohol	<u>17.0</u>	1.50-1.52
	100.0%	

In the foregoing Example A, PPG-14 butyl ether and  
 35 phenyltrimethicone are used as emollient materials reducing  
 the whitening effect of the whitening powder ingredients (for  
 example, the antiperspirant active material) on the skin. It

5 is preferred that emollients having relatively high refractive indices close to that of, for example, the antiperspirant active ingredient, be utilized, in order to avoid visible residue (whitening) on the skin.

EXAMPLE B

10	<u>Ingredients</u>	<u>%w/w</u>	<u>Refractive Index</u>
	Cyclomethicone	35.1	1.3980
	Phenyltrimethicone	10.0	1.4600
	Aluminum Zirconium		
15	Tetrachlorohydrax Gly Complex	20.0	1.5360
	PEG 8 Distearate	2.0	
	Fragrance/Starch	1.9	
	Hydrogenated Castor Oil	4.0	1.570-1.585
	Stearyl alcohol	17.0	1.50-1.52
20	Isostearyl isostearate	<u>10.0</u>	1.4612
		100.0%	

Accordingly, by the present invention, an antiperspirant  
 25 solid stick composition having substantially no visible (white) residue on the skin after application and after drying, and which has good cosmetic properties, yet which is relatively inexpensive in cost of the materials utilized to form the composition, is achieved.

30 Studies were done to illustrate the performance of compositions made in accordance with this invention. In the first study, a composition was made according to Example A and evaluated for visual white residue when applied to the underarm. Four commercial, white, opaque antiperspirant  
 35 sticks and one antiperspirant gel product were also evaluated for comparison. There were five cells (each commercial product versus the Example A product; 14 female panelists

5 participated in each cell. The evaluator applied 0.3 grams  $\pm$   
 10 percent of product in a circular motion into the armpit of  
 the panelist. The panelist held her arms up for 30 minutes.  
 Then the evaluator standing 1.83 meters (6 feet) away from the  
 panelist, ranked the intensity of whiteness seen in the  
 10 underarm area on a scale of 0 - 8 (0 being no whiteness and 8  
 being extreme whiteness). The evaluators were given  
 photographs as standards for the scale. The results are  
 listed below. In these tables, axillary vault area means a  
 10.16 cm X 15.24 cm (4 X 6 inch) underarm area; n means the  
 15 number of evaluations (for all the following tests n=14);  
 p-value means the probability of observing a test statistic  
 value which can be considered as extreme as, or more extreme  
 than, the observed value. The term "p-value" is recognized by  
 those dealing with statistics. Usually p-value is interpreted  
 20 as a measure (on a scale from 0-1) of how well the data  
 support or discredit the null hypothesis; the smaller the p-  
 value, the greater the evidence against the null-hypothesis.  
 The "\*" mark indicates a statistically significant difference  
 favoring the product made by Example A.

25

Example A versus Commercial Sample B

Test Article	Mean	Difference (A vs. B)	p-value (A vs. B)
Example A	0.43	0.86	0.001
Sample B	1.29		

5

Example A versus Commercial Sample C

Test Article	Mean	Difference (A vs. C)	p-value (A vs. C)
Example A	0.29	0.39	0.010
Sample C	0.68		

Example A versus Commercial Sample D

Test Article	Mean	Difference (A vs. D)	p-value (A vs. D)
Example A	0.39	2.54	< 0.001
Sample D	2.93		

10

Example A versus Commercial Sample E

Test Article	Mean	Difference (A vs. E)	p-value (A vs. E)
Example A	0.43	0.54	0.029
Sample E	0.96		

Example A versus Commercial Sample F

Test Article	Mean	Difference (A vs. F)	p-value (A vs. F)
Example A	0.29	2.29	< 0.001
Sample F	2.57		

15 In a second study, only the product of Example A was evaluated and similarly applied under both arms of 30 female panelists. This time the panelists held their arms at their sides for 30 minutes. Using the previously described 0 - 8

5 scale, the evaluator ranked the appearance of the underarm  
area. The average result was a value of 0.13, indicating very  
little visible white residue.

Although we have shown and described several embodiments  
in accordance with the present invention, it is understood  
10 that the same is not limited thereto, but is susceptible to  
numerous changes and modifications as known to one having  
ordinary skill in the art, and we therefore do not wish to be  
limited to the details shown and described herein, but intend  
to cover all such modifications as are encompassed by the  
15 scope of the appended claims.

WHAT IS CLAIMED IS:

1. Antiperspirant stick composition exhibiting reduced or no visible residue after application to human skin, comprising:

(a) an antiperspirant active ingredient, in an amount sufficient to provide an antiperspirant active effect when applied to the human skin;

(b) a gelling agent, in an amount sufficient to provide the composition as a stick composition;

(c) a vehicle for the gelling agent, in an amount such that the gelling agent can dissolve therein and can gel therefrom; and

(d) an emollient, the emollient comprising both at least one non-volatile silicone material and at least one non-volatile emollient material that is not a silicone material, wherein (i) both the at least one non-volatile silicone material and the at least one non-volatile emollient material have refractive indices of at least 1.4460, and (ii) the emollient is included in an amount so as to reduce or eliminate a whitening effect of the antiperspirant active ingredient on the skin.

2. The antiperspirant stick composition according to claim 1, wherein the at least one non-volatile emollient material is selected from the group consisting of isostearyl isostearate; glycereth-7-benzoate; C<sub>12</sub>-C<sub>15</sub> alkyl benzoate;



octyldodecyl benzoate; isostearyl lactate; isostearyl palmitate; benzyl laurate; laureth-4; laureth-7; oleth-2; PEG 4; PEG-12; PPG-2 Cetareth-9; PPG-2 Isodeceth-12; PPG-5 buteth-7; PPG 14 butyl ether; PPG-15 butyl ether; PPG-53 butyl ether; octyldodecanol; and polydecene.

3. The antiperspirant stick composition according to claim 2, wherein the antiperspirant active ingredient is an antiperspirant metal salt, in particulate form.

4. The antiperspirant stick composition according to claim 3, wherein the antiperspirant active ingredient has a refractive index of at least 1.500.

5. The antiperspirant stick composition according to claim 4, wherein the antiperspirant active ingredient is aluminum-zirconium tetrachlorohydrate gly complex, having a refractive index of 1.5360.

6. The antiperspirant stick composition according to claim 4, wherein the non-volatile silicone material includes phenyltrimethicone.

7. The antiperspirant stick composition according to claim 6, wherein the composition also includes an additional whitening powder ingredient, the silicone material and the

emollient material being included in an amount sufficient to reduce a whitening effect of the additional whitening powder ingredient and of the antiperspirant active ingredient on the skin.

8. The antiperspirant stick composition according to claim 6, wherein the gelling agent includes both stearyl alcohol and hydrogenated castor oil.

9. The antiperspirant stick composition according to claim 8, wherein the vehicle for the gelling agent includes cyclomethicone.

10. The antiperspirant stick composition according to claim 9, wherein the composition includes, in percent by weight of the total weight of the composition, 30%-50% of the vehicle, 2%-17% hydrogenated castor oil, 10%-25% stearyl alcohol, 10%-30% antiperspirant metal salt, 5%-20% non-volatile silicone material, and 10%-27% non-volatile emollient material.

11. The antiperspirant stick composition according to claim 1, wherein the antiperspirant active ingredient is an antiperspirant metal salt, in particulate form.

12. The antiperspirant stick composition according to claim 11, wherein the non-volatile silicone material includes phenyltrimethicone.

13. The antiperspirant stick composition according to claim 11, wherein the non-volatile silicone material includes dimethicone copolyol.

14. The antiperspirant stick composition according to claim 1, wherein the composition includes, in % by weight of the total weight of the composition, 5%-20% non-volatile silicone material and 10%-27% emollient material.

15. The antiperspirant stick composition according to claim 14, wherein the vehicle is included in an amount of 30%-50% by weight, the gelling agent is included in an amount of 17%-40% by weight, and the antiperspirant active ingredient is included in an amount of 10%-30% by weight, each of the total weight of the composition.

16. The antiperspirant stick composition according to claim 15, wherein the antiperspirant active ingredient is an antiperspirant metal salt, in particulate form.

17. A method for controlling perspiration wetness, comprising applying the antiperspirant stick composition of claim 16 to axillary regions of a human.
18. A method for controlling perspiration wetness, comprising applying the antiperspirant stick composition of claim 11 to axillary regions of a human.
19. A method for controlling perspiration wetness, comprising applying the antiperspirant stick composition of claim 10 to axillary regions of a human.
20. A method for controlling perspiration wetness, comprising applying the antiperspirant stick composition of claim 3 to axillary regions of a human.
21. A method for controlling perspiration wetness, comprising applying the antiperspirant stick composition of claim 1 to axillary regions of a human.
22. A method of reducing visible residue resulting from application of an antiperspirant stick composition to human skin, comprising incorporating an emollient in a composition also containing an antiperspirant active ingredient, a gelling agent and a vehicle for the gelling agent, wherein the emollient includes both at least one non-volatile silicone

material and at least one non-volatile emollient material that is not a silicone material, the at least one non-volatile silicone material and the at least one non-volatile emollient material having refractive indices of at least 1.4460, wherein the emollient is incorporated in an amount so as to reduce a whitening effect of the antiperspirant active ingredient on the skin.

23. An antiperspirant stick composition made by combining:

(a) an antiperspirant active ingredient, in an amount sufficient to provide an antiperspirant active effect when applied to the human skin;

(b) a gelling agent, in an amount sufficient to provide the composition as a stick composition;

(c) a vehicle for the gelling agent, in an amount such that the gelling agent can dissolve therein and can gel therefrom; and

(d) an emollient, the emollient comprising both at least one non-volatile silicone material and at least one non-volatile emollient material that is not a silicone material, wherein (i) both the at least one non-volatile silicone material and the at least one non-volatile emollient material have refractive indices of at least 1.4460, and (ii) the

emollient is included in an amount so as to reduce or eliminate a whitening effect of the antiperspirant active ingredient on the skin.

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 97/04220

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 A61K7/32

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**  
Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	US 5 531 986 A (M. SHEVADE ET AL.) 2 July 1996 see the whole document & CA 2 152 752 A (MENNEN CO. ) 2 January 1996	1-23
X	--- CA 1 266 003 A (PROCTER & GAMBLE) 20 February 1990 see the whole document -----	1-23

Further documents are listed in the continuation of box C.       Patent family members are listed in annex.

\* Special categories of cited documents :

<p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p>	<p>*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>*&amp;* document member of the same patent family</p>
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Date of the actual completion of the international search  <b>17 July 1997</b>	Date of mailing of the international search report  <b>31.07.97</b>
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Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+ 31-70) 340-3016	Authorized officer  <b>Willekens, G</b>
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# INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/US 97/04220

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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CA 1266003 A	20-02-90	NONE	
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