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ANTIPERSPIRANT STICKS WITH IMPROVED LONG-TERM STABILITY

(57) Abstract [In English and German]

The present invention relates to water-free wax-based antiperspirant sticks that have improved long-term stability.

Water-free antiperspirant compositions that are manufactured as a wax-based stick generally contain, in addition to perspiration-reducing particulate active agents, at least one cosmetic oil as a carrier for the perspiration-reducing particulate active agent. Commercial sticks contain thickening agents such as aliphatic alcohols and/or waxes so that the antiperspirant active agent suspended in the oil does not precipitate during storage.

In commercial antiperspirant sticks, the antiperspirant active agent suspended in the water-free oil-containing carrier is covered with an oil layer. However, this oil layer delays the release of an antiperspirant active agent in the effective water-soluble form. In order to avoid this, water-free wax-based antiperspirant sticks usually contain an oil-in-water emulsifier, which promotes the release of the antiperspirant active agent from the wax matrix on the skin under the influence of skin moisture and sweat.

The basis for the present application was the observation that, in the case of such sticks from the prior art, the interaction between antiperspirant active agent, oil-in-water emulsifier and atmospheric humidity (during relatively long storage periods) or skin moisture and sweat (through contact with the skin during application) gives rise to adverse changes in the stick surface. The stick surface becomes hard, the product delivery when rubbed on the skin is reduced, and the cosmetic properties of the stick deteriorate. The perspiration-inhibiting effect of the product diminishes markedly after a period of regular use of as little as 2 to 3 weeks.

The object of the present invention was therefore to provide water-free wax-based antiperspirant sticks that do not exhibit any deterioration of the delivery properties even after many use cycles under the influence of moisture (air/skin/sweat), wherein delivery properties should be understood to mean, in particular, the melting behavior and gliding ability of the stick when applied to the skin, but also the release of the antiperspirant active agent and thus the antiperspirant performance.

Surprisingly, it was now found that the abovementioned disadvantages can be eliminated or at least significantly reduced, and the long-term stability of the delivery properties and the resistance to the influence of moisture can be significantly improved, for water-free wax-based antiperspirant sticks when the sticks contain, with respect to their total weight in each case,

1 – 4% by weight, preferably 2 – 3.5% by weight, especially preferably 2.5 – 3% by weight, of at least one oil-in-water emulsifier, selected from ethoxylates of C<sub>10</sub>-C<sub>22</sub> alkanols with 8 to 16, preferably 10 – 14, especially preferably with 12, ethylene oxide units in the molecule.

The subject matter of the present application is antiperspirant wax sticks, containing in total 3 – 27% by weight, with respect to the total weight of the anhydrous active substance (USP) in the total composition, of antiperspirant active agent(s), 0 to maximum 8% by weight of free water, in total 30 – 70% by weight of at least one cosmetic oil that is liquid under normal conditions, therein 10 – 50% by weight of at least one volatile oil that is selected from volatile cyclic silicones, volatile linear silicones and volatile aliphatic hydrocarbons, as well as mixtures thereof, and in addition to the at least one volatile oil in total 1 – 30% by weight of at least one nonvolatile oil, in total 15 – 25% by weight of at least one wax component that is solid under normal conditions, therein 12 – 22% by weight of at least one linear and saturated C<sub>14</sub>-C<sub>22</sub> alkanol, 0.5 – 5% by weight of at least one wax with a melting point from 65 – 150°C, 0.5 – 8% by weight of at least one wax with a melting point from 25 to < 50°C, 0.5 – 6% by weight of at least one water-insoluble particulate filler, 1 – 4% by weight, preferably 2 – 3.5% by weight, especially preferably 2.5 – 3% by weight, of at least one oil-in-water emulsifier, selected from ethoxylates of C<sub>10</sub>-C<sub>22</sub> alkanols with 8 to 16 ethylene oxide units in the molecule, wherein all specifications of % by weight relate to the total weight of the antiperspirant wax stick unless otherwise noted.

The subject matter of the present application is also antiperspirant wax sticks, containing in total 3 – 27% by weight, with respect to the total weight of the anhydrous active substance (USP) in the total composition, of antiperspirant active agent(s), 0 to maximum 8% by weight of free water, in total 30 – 70% by weight of at least one cosmetic oil that is liquid under normal conditions, therein 10 – 50% by weight of at least one volatile oil that is selected from volatile cyclic silicones, volatile linear silicones and volatile aliphatic hydrocarbons, as well as mixtures thereof, and in addition to the at least one volatile oil in total 1 – 30% by weight of at least one nonvolatile oil, in total 15 – 25% by weight of at least one wax component that is solid under normal conditions, therein

in total 12 – 22% by weight of at least one linear and saturated C<sub>14</sub>-C<sub>22</sub> alkanol,  
in total 0.5 – 5% by weight of at least one wax with a melting point from 65 – 150°C,  
in total 0.5 – 8% by weight of at least one wax with a melting point from 25 to < 50°C,  
furthermore in total 0.5 – 6% by weight of at least one water-insoluble particulate filler,  
in total 1 – 4% by weight, preferably 2 – 3.5% by weight, especially preferably 2.5 – 3% by  
weight, of at least one oil-in-water emulsifier, selected from ethoxylates of C<sub>10</sub>-C<sub>22</sub> alkanols with  
8 to 16 ethylene oxide units in the molecule,  
wherein all specifications of % by weight relate to the total weight of the antiperspirant wax stick  
unless otherwise noted.

Within the meaning of the present application, “normal conditions” are a temperature of 20°C  
and a pressure of 1013 hPa. Melting point specifications likewise relate to a pressure of 1013  
hPa.

The content of free water in the sticks according to the invention is 0 – 8% by weight, preferably  
0.1 – 6% by weight, especially preferably 0.2 – 4% by weight, extremely preferably 0.5 – 3% by  
weight, in each case with respect to the total weight of the antiperspirant wax stick.

Within the meaning of the present application, “free water” is water included in the antiperspirant  
composition that is not in the form of water of crystallization, water of hydration or similarly  
molecularly bound water. The content of water of crystallization, water of hydration or similarly  
molecularly bound water that is included in the constituents employed, in particular in the  
perspiration-inhibiting active agents, does not represent free water within the meaning of the  
present application. Free water is water that, for example, is added as a solvent, as a gel  
activator, or as a solvent constituent of other active agents, to the composition according to the  
invention.

In the case of cosmetic oils, a distinction is drawn between volatile and nonvolatile oils.  
Nonvolatile oils are understood according to the invention to be oils that have a vapor pressure  
of less than 2.66 Pa (0.02 mm Hg) at 20°C and an ambient pressure of 1013 hPa. Volatile oils  
are understood according to the invention to be oils that have a vapor pressure of 2.66 Pa –  
40000 Pa (0.02 mm – 300 mm Hg), preferably 10 Pa – 12000 Pa (0.1 mm – 90 mm Hg),  
especially preferably 13 Pa – 3000 Pa, extremely preferably 15 – 500 Pa, at 20°C and an  
ambient pressure of 1013 hPa.

The terms, “antiperspirant wax stick,” “antiperspirant stick,” “wax-based antiperspirant stick,” “stick composition” and “composition according to the invention” are used synonymously with respect to the subject matter of the present application.

The compositions according to the invention contain at least one perspiration-inhibiting active agent, which is also referred to as antiperspirant active agent, in a total amount of 3 – 27% by weight, preferably 5 – 22% by weight and especially preferably 10 – 20% by weight, in each case with respect to the total weight of the anhydrous active substance (USP) in the total composition.

Preferred antiperspirant active agents are selected from the water-soluble astringent inorganic and organic salts of aluminum, zirconium and zinc, or any desired mixtures of these salts.

According to the invention, water solubility is understood to be a solubility of at least 5% by weight at 20°C, which is to say that amounts of at least 5 g of the antiperspirant active agent are soluble in 95 g water at 20°C.

The perspiration-inhibiting active agents are present in undissolved, suspended form. For reasons of product stability, it is preferred that the active agent particles have a number average particle size of 0.1 – 200 µm, preferably 1 – 50 µm, especially preferably 3 – 20 µm and extremely preferably 5 – 10 µm.

Especially preferred antiperspirant active agents are selected from aluminum chlorohydrate, in particular aluminum chlorohydrate with the general formula  $[Al_2(OH)_5Cl \cdot 1-6 H_2O]_n$ , preferably  $[Al_2(OH)_5Cl \cdot 2-3 H_2O]_n$ , which can be present in nonactivated or in activated (depolymerized) form, as well as aluminum chlorohydrate with the general formula  $[Al_2(OH)_4Cl_2 \cdot 1-6 H_2O]_n$ , preferably  $[Al_2(OH)_4Cl_2 \cdot 2-3 H_2O]_n$ , which can be present in nonactivated or in activated (depolymerized) form.

The production of preferred antiperspirant active agents is disclosed in US 3,887,692, US 3,904,741, US 4,359,456, GB 2,048,229 and GB 1,347,950, for example.

Also preferred are aluminum sesquichlorohydrate, aluminum dichlorohydrate, aluminum chlorohydrate propylene glycol (PG) or aluminum chlorohydrate polyethylene glycol (PEG), aluminum or aluminum zirconium glycol complexes, e.g. aluminum or aluminum zirconium propylene glycol complexes, aluminum sesquichlorohydrate PG or aluminum sesquichlorohydrate PEG, aluminum PG dichlorohydrate or aluminum PEG dichlorohydrate, aluminum hydroxide, additionally selected from the aluminum zirconium chlorohydrates, such as aluminum zirconium trichlorohydrate, aluminum zirconium tetrachlorohydrate, aluminum zirconium

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