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COSMETIC COMPOSITION CONTAINING LANOLIN AND HEXADECYL ALCOHOL

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This invention relates to a novel additive for cosmetic formulations. More particularly this invention relates to novel solubilizing agents for lanolin in cosmetic compositions. In a preferred embodiment this invention is concerned with the utilization of hexadecyl alcohol as an emollient and as a solubilizing agent for lanolin.

Lanolin has long been one of the most favored emollients and skin conditioners for a wide variety of cosmetic formulations. Thus, this material has been employed in varying amounts in such compositions as hair conditioners, baby oils and lotions, bath oils and lotions, suntan oils and lotions, shaving preparations, lipsticks and a variety of creams. The solubility of lanolin in the light, medium and heavy grade mineral oils with which it is commonly employed is less than 1 percent. Thus, the use of larger quantities of lanolin, which is desirable in many applications, results in formulations which are turbid due to precipitation. To avoid this turbidity and thereby improve the esthetic effect of the consumer products, the prior art formulations have employed lanolin derivatives, such as polyoxyethylated lanolin, isopropyl esters of lanolin and acetylated lanolin as solubilizing agents for lanolin. Although these derivatives possess some degree of emolliency, their utilization necessarily increases the expense of the cosmetic formulation. In addition to the use of lanolin derivatives, prior art formulations have also included such materials as isopropyl myristate and isopropyl palmitate, both of which possess emollient properties and will solubilize lanolin to the extent of 8 and 5 weight percent respectively.

It has now been discovered that certain liquid alcohols and relatively inexpensive group of solubilizing agents for lanolin.

A further object of this invention is to provide a novel solubilizing agent for lanolin which possesses effective emollient properties.

It has now been discovered that certain liquid alcohols are effective solubilizing agents for lanolin. Thus, C_6 to C_{20}, preferably C_{12} to C_{18}, both linear and branched chain saturated alcohols have been found to solubilize lanolin to the extent of approximately 5 weight percent. An even more surprising feature of this invention is the discovery that the combination of these alcohols with mineral oils results in the solubilization of greater quantities of lanolin than either the alcohol or the mineral oil alone can effectively solubilize. It therefore appears that the combination of an alcohol with mineral oil results in a synergistic solubilizing effect which was heretofore unobtainable when employing the lanolin derivatives and esters described above.

A further surprising feature of this invention is the discovery that hexadecyl alcohol not only acts as a solubilizing agent for lanolin but also possesses unique properties which make it useful as a non-greasy emollient in a wide variety of costmetic formulations. These properties include low volatility and an exceptionally low cloud point and freezing point (both below minus 60° F.) thereby reducing the tendency for forming turbid solutions. The saturated branched chain configuration of hexadecyl alcohol is a stable structure which is resistant to oxidative degradation and color formation. Unlike commonly used esters, hexadecyl alcohol is not subject

to hydrolysis. In addition, this alcohol has been found in preliminary tests to be no more irritating to human skin than commonly used isopropyl myristate or isopropyl palmitate. Thus, hexadecyl alcohol has been found to be equivalent or superior to the above-mentioned esters in a wide variety of cosmetic formulations.

The hexadecyl alcohol employed in these cosmetic formulations may be prepared by a combined carbonylation and dimerization reaction. Thus, a C_7 olefin is reacted at elevated temperatures and pressures with carbon monoxide and hydrogen in the presence of carbonylation and dimerization catalysts. The C_{16} aldehyde obtained from this reaction is thereafter hydrogenated by conventional means to yield hexadecyl alcohol. After careful processing to insure the high purity necessary for cosmetic formulations, the hexadecyl alcohol may typically have the following properties:

TABLE I

Typical physical properties of hexadecyl alcohol

Hydroxyl No., mg. KOH/g.	220
Carbonyl No., mg. KOH/g.	0.2
Specific gravity, 20/20° C.	0.842
Boiling range, ° C./50 mm.	195–205
Freezing point, °F.	—60
Iodine No., cg. I_2/g.	0.2
Water, weight percent	0.1
Color, (Pt-Co.)	5
Odor	Negligible

This invention contemplates the utilization of formulations containing a C_6 to C_{20} saturated alcohol with 0.1 to 5 weight percent, and preferably 2 to 5 weight percent, based on said alcohol, of lanolin dissolved therein and resulting in a clear homogeneous solution. In another embodiment, this invention contemplates the use of C_{12} to C_{20} saturated alcohols containging 0.1 to 5 weight percent, preferably 2 to 5 weight percent, lanolin dissolved therein. In yet another embodiment, this invention contemplates the use of formulations comprising C_6 to C_{20}, preferably C_{12} to C_{18} saturated alcohols, mineral oil and lanolin. In these latter formulations, the weight ratio of mineral oil to alcohol may be in the range of 1:100 to 100:1, preferably 1:4 to 4:1, e.g. 1:1. Lanolin will be dissolved therein in amounts ranging from 0.1 to 10 weight percent, based on the total mixture, so as to obtain a clear homogeneous solution.

In one preferred embodiment, this invention contemplates the preparation of cosmetic formulations comprising hexadecyl alcohol with about 0.1 to 6 weight percent, preferably 2 to 5 weight percent, of lanolin, based on the total solution, dissolved therein so as to obtain a clear homogeneous solution.

In another preferred embodiment, this invention contemplates the use of cosmetic formulations comprising hexadecyl alcohol, mineral oil and lanolin. In these formulations, the weight ratio of mineral oil to alcohol may be in the range of 1:100 to 100:1, preferably 1:4 to 4:1, e.g. 1:1. Lanolin will be dissolved in the alcohol-mineral oil mixture in amounts ranging from 0.1 to 16 weight percent, based on the total solution, so as to obtain a clear homogeneous solution.

It is to be understood that the above-described formulations may vary widely within the ranges specified and that in addition to the above-specified ingredients, the formulations may contain conventional amounts of other cosmetic ingredients, such as alcohols, waxes, esters, perfumes and coloring agents which are commonly employed in the manufacture of the various liquid and solid cosmetic formulations.

The invention will be further illustrated by the following examples:

Example 1

The alcohols and 1:1 weight ratio alcohol-mineral oil formulations listed below were tested to determine the solubility of lanolin therein. In each instance, the weight percent of lanolin, based on the total solution was added to the proposed solubilizing agent and allowed to stand for 96 hours at 77° F. The solutions were then examined and rated as either clear (C) or precipitated (P). The lanolin employed in the experiment was deodorized AAA grade Anhydrous Lanolin USP and the mineral oil was USP light mineral oil. The results are summarized below:

TABLE II

Solubilizing agent	Percent lanolin added		
	3	5	10
(Oxo) hexyl alcohol	C	P	P
(Oxo) hexyl alcohol/mineral oil 1:1	C	C	C
(Oxo) decyl alcohol	C	C	P
(Oxo) decyl alcohol/mineral oil 1:1	C	C	C
Branched dodecyl alcohol	C	C	P
Branched dodecyl alcohol/mineral oil 1:1	C	C	C
(Oxo) linear C_{10} alcohol	C	C	P
(Oxo) linear C_{10} alcohol/mineral oil 1:1	C	C	C
(Oxo) linear C_{14} alcohol	C	C	P
(Oxo) linear C_{14} alcohol/mineral oil 1:1	C	C	C

The results indicate that the combination of mineral oil and alcohol has a definite synergistic effect on the solubility of lanolin since as previously mentioned, mineral oil alone dissolves less than 1 weight percent of lanolin.

Example 2

In the following table (Table III), hexadecyl alcohol (HDA), hexadecyl stearate (HDS), isopropyl myristate (IPM), isopropyl palmitate (IPR), mineral oil (MO) and combinations of mineral oil with the above-mentioned compounds in specified weight ratios were tested as solubilizing agents for lanolin. The grades of mineral oil and lanolin were the same as specified in Example 1. In each test, the specified weight ratio of lanolin was admixed with the solubilizing agent and allowed to stand at a temperature of 77° F. for a period of 96 hours. The solutions were observed at the end of this period and were classified clear (C) or hazy (H).

Sun tan oil:

Hexadecyl alcohol	g.	98.0
2-ethyl hexyl salicylate	g.	1.5
Perfume	ml.	0.5

These results indicate the effectiveness of hexadecyl alcohol as a cosmetic ingredient, i.e. an emollient.

Example 4

A test lipstick having the following formulation was prepared. In this formulation, hexadecyl alcohol replaced castor oil which is a common ingredient in cosmetics of this type.

Test Lipstick

Ingredient	Grams
Lanolin	7.0
Petrolatum (alba-white)	12.0
Hexadecyl alcohol	46.0
Candelilla wax	11.5
Carnauba wax [1]	11.5
Stearic acid	5.0
Cetyl alcohol	1.5
Butyl stearate	2.0
Isopropyl palmitate	3.5
Antioxidant	0.02
Citric acid	0.006

[1] Combined with candelilla wax to impart more hardness to test batch.

The test lipstick proved to be a high quality lipstick that was more easily applied than a similar castor oil formulation, according to the test panel, and had minimum friction or drag with good staying power and no undesirable smearing or bleeding characteristics.

Having thus described the general nature and specific embodiments of the invention, the true scope will now be pointed out by the appended claims.

What is claimed is:

1. A composition of matter consisting essentially of a clean homogeneous solution of saturated branched hexadecyl alcohol having a freezing point of −60° F. and a boiling range at 50 millimeter pressure of 195° to 205° C. with 0.1 to 5 wt. percent of lanolin based on said alcohol dissolved therein.

TABLE III.—SOLUBILITY OF LANOLIN[1]

	Percent lanolin solubility																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Hexadecyl alcohol (HDA)	C	C	C	C	C	C	H	H	H	H					H			H
Hexadecyl stearate (HDS)	C	C	C	C	H	H	H	H	H	H								
Mineral oil (MO)[2]	H	H	H	H	H													
Isopropyl myristate (IPM)							C	C	H	H								
Isopropyl palmitate (IPP)				C	C	H	H	H	H	H								
MO/HDA (75:25)					C	C	C	C	C	C	C	C	C	C	H	H		
MO/HDA (50:50)					C	C	C	C	C	C	C	C	C	C	C	C	H	H
MO/HDA (25:75)					C	C	C	C	C	C	C	C	C	H	H			
MO/HDS (75:25)	C	C	H	H	H													
MO/HDS (50:50)	C	C	H	H	H													
MO/HDS (25:75)	C	C	H	H	H													
MO/IPM (75:25)	C	C	C	H	H													
MO/IPM (50:50)	C	C	C	C	C	H	H											
MO/IPM (25:75)					C	C	C	H	H									

[1] C—Clear, H—Haze; deodorized AAA grade, anhydrous lanolin USP, Robinson Wagner Company, Inc.
[2] USP light mineral oil.

The results indicate both the solubility of lanolin in hexadecyl alcohol and the synergistic effect on solubility of mineral oil alcohol mixtures.

Example 3

In the following cosmetic formulations, hexadecyl alcohol was substituted for isopropyl myristate and was found to be a satisfactory substitute by a test panel when tested against the control.

Bath oil:

Hexadecyl alcohol	g.	90
SDA 40 ethyl alcohol	g.	5
Perfume	ml.	4.5
Color (0.2% in mineral oil)	ml.	0.5

2. A composition of matter consisting essentially of a clear homogeneous solution of saturated branched hexadecyl alcohol having a freezing point of −60° F. and a boiling range at 50 millimeter pressure of 195° to 205° C., a mineral oil and lanolin, the weight ratio of said hexadecyl alcohol to said mineral oil being in the range of 1:100 to 100:1 and said lanolin being present in an amount ranging from about 0.1 to 10 wt. percent based on the total solution.

3. A composition in accordance with claim 2 wherein said weight ratio of said hexadecyl alcohol to mineral oil is in the range of 1:4 to 4:1.

4. A clear, homogeneous cosmetic composition consisting essentially of saturated branched hexadecyl alcohol

having a freezing point of −60° F. and a boiling range at 50 millimeter pressure of 195° to 205° C. with about 0.1 to 6 wt. percent of lanolin, based on the total solution, dissolved therein.

5. A cosmetic composition consisting essentially of a clear homogeneous solution of saturated branched hexadecyl alcohol having a freezing point of −60° F. and a boiling range at 50 millimeter pressure of 195° to 205° C., a mineral oil and lanolin, the weight ratio of said hexadecyl alcohol to said mineral oil being in the range of 1:100 to 100:1 and said lanolin being present in an amount ranging from 0.1 to 16 wt. percent based on the total solution.

6. The composition of claim 5 wherein said weight ratio of said hexadecyl alcohol to said mineral oil is in the range of 1:4 to 4:1.

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