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(54) Title: A DEPILATORY COMPOSITION WITH IMPROVED RINSING PROPERTIES		
<p>(57) Abstract</p> <p>A depilatory composition has improved rinsing properties by the inclusion of a thixotropic agent. Preferred thixotropic agents are smectite clays, in particular Laponite.</p>		

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## A DEPILATORY COMPOSITION WITH IMPROVED RINSING PROPERTIES

The present invention relates to compositions for the treatment of hair and, in particular, to hair treatment compositions having improved rinsing properties. The invention relates especially to depilatory compositions, but will also find application in perming compositions.

10 Depilatory compositions are conventionally applied to the skin in the form of a cream, lotion, gel or mousse. After a period of time, the depilatory composition is removed by suitable means, such as by the use of a spatula. The active depilatory  
15 ingredient of the composition is conventionally an alkali metal salt or alkaline earth metal salt of an alpha or beta mercapto-carboxylic acid, such as potassium or calcium thioglycolate. These materials act by penetrating the hair and destroying the cystine  
20 bonds between the hair molecules. This weakens the hair to such an extent that the action of scraping and wiping away the depilatory composition causes the hair to break off at skin level, so that the hair may be removed.

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A particular problem with compositions of this type is that the composition is difficult to remove completely from the skin and cannot be removed easily by simply rinsing away the composition. A heavy or  
30 vigorous mechanical scrubbing or scraping action is

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required, for example with a spatula, which can be a  
cause of considerable discomfort and inconvenience.  
Accordingly, the present invention seeks to provide  
hair treatment compositions, in particular depilatory  
5 compositions, having improved rinsing properties.

For conventional depilatory compositions in the  
form of a cream, lotion, gel or mousse, the emulsion  
is normally stabilised by including a relatively high  
10 amount of thickener in the composition. For example,  
conventional thickeners, which will be well known to  
those skilled in the art, are generally present at  
levels of up to 30% w/w. Alternatively, depilatory  
creams, lotions and gels can be formulated to give a  
15 stable emulsion by including high levels of fatty  
materials in the depilatory composition. In such  
compositions, either no thickener is present, or a  
small amount of thickener may be present.

20 In both cases, however, good rinsability of the  
depilatory composition from the skin will not be  
achieved. In the case where a high level of thickener  
is present, there will be such strong steric  
interactions between the polymeric materials in the  
25 emulsion that it is not possible to remove the  
depilatory composition quickly and easily from the  
skin by the mechanical action of water together with a  
light rubbing action. Where high levels of fatty  
materials are present, the texture or "body" of the  
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depilatory composition will be too strong to allow the composition to be rinsed simply from the skin.

For example, International Patent Application No. 5 PCT/EP92/02494; WO 93/08791 (The Boots Company PLC) describes depilatory formulations including, *inter alia*, smectite or kaolin clays such as bentonite. The clays are said to improve the feel of the depilatory composition on the skin and to reduce the unpleasant 10 smell associated with the depilatory agent. However, the compositions described in WO 93/08791 would not have the improved rinsability of the depilatory compositions of the present invention. That is, the compositions described in WO 93/08791, containing the 15 levels of thickeners and fatty materials as specified, would not be able to be rinsed simply from the skin by the mechanical action of water together with a light rubbing action.

20 However, in accordance with the present invention, we have found that it is possible to formulate a depilatory composition which is sufficiently stable to provide a good depilatory product, but which has weak enough steric interactions between the polymeric 25 materials in the composition to provide improved rinsing properties.

It has now been found surprisingly that the incorporation in a hair treatment composition of a 30 viscosity enhancer which imparts a shear sensitive

structure to the composition (hereinafter called a thixotropic agent) provides such improved rinsing properties. The incorporation of a thixotropic agent in a depilatory composition allows the composition to  
5 be rinsed off the skin simply, for example, by the mechanical action of water from a shower together with a light rubbing action. The need for heavy scrubbing or scraping with a spatula or the like is thus avoided. The sensitivity of the composition to shear  
10 forces can be made so acute that the mere mechanical action on the skin of water from the shower is sufficient for effective removal of the composition, but such a degree of shear sensitivity may adversely affect other properties of the composition.

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Accordingly, the first aspect of the present invention provides a depilatory composition including a functional amount of a thixotropic agent, which composition has a shear sensitive structure.

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By this we mean that the sensitivity of the depilatory composition of the present invention to shear forces is such that the mechanical action on the skin of water alone, or the mechanical action on the  
25 skin of water together with a light rubbing action, is sufficient to remove the composition from the skin.

In accordance with a second aspect of the present invention there is provided the use, in a depilatory  
30 composition, of a functional amount of a thixotropic

agent effective to impart a shear sensitive structure to the composition.

The compositions of the invention may include any  
5 suitable mineral or organic thixotropic agent, but particularly preferred thixotropic agents include smectite clays, synthetic hectorite clays such as Laponite LS from Laporte, colloidal montmorillonites  
10 from Southern Clay Products Inc, USA and Laporte, silicoaluminate clays such as the colloidal magnesium aluminium silicate derived from natural smectic clay obtainable as Veegum from Vanderbilt Products (USA) and xanthan gums such as Keltrol T from Kelco.

15

The thixotropic agent is preferably present in an amount of 0.25% to 6% w/w, most preferably 0.25% to 2% w/w, and especially 0.25% to 1% w/w.

20 The compositions of the invention preferably include 1.5% to 8% w/w (most preferably 2.5% to 5% w/w) of an active depilatory agent. In the compositions of the invention, the depilatory agent will preferably act by reducing disulfide bonds in the hair and in principle  
25 any suitable reducing agent may be used. Suitable examples include mercaptans and sulfides such as organic sulfides, especially alkyl sulfides. Preferred depilatory agents are alkaline salts of thioglycolic acid such as the lithium, sodium,  
30 potassium or calcium salts. The potassium and calcium

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salts, alone or in mixture, are particularly preferred. Other suitable depilatory agents include thioglycerol, mercapto propionic acid and dithioerythritol.

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Optionally, the compositions of the invention may further include an accelerator to facilitate the action of the depilatory agent, preferably in an amount of 3% to 10% w/w and particularly preferably not less than 5% w/w. A preferred accelerator is urea.

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Additional polymeric thickening agents may be included in the compositions of the invention in amounts of 0 to 2% w/w, preferably 0 to 0.5% w/w, especially 0.1% w/w. Appropriate thickening agents can also contribute to the stability of the composition.

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The compositions of the invention will preferably have a pH of at least 10.5, particularly preferably 11.5 to 12.7 (whilst the pH could be higher than 12.7, the latter value is the highest permitted in Europe). Suitable materials for achieving the desired pH include calcium hydroxide (at a concentration of 2% to 4% w/w) or alkaline silicates such as meta- or trisilicates.

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The compositions of the invention will also desirably include texturising agents to provide the composition with a desired texture or "body" whereby

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the depilatory composition can be maintained on the skin in contact with the hair and in the correct quantity to achieve a satisfactory degree of hair digestion in a suitable time. Suitable materials for this purpose are generally known in the art and include, for example, fatty materials such as fatty alcohols (for example cetostearyl alcohol) alone or in combination with paraffin oils. These materials may be present in amounts of, for example, 5% to 20% w/w, preferably 8% to 15% w/w. An appropriate emulsifier such as a non-ionic ethoxylated fatty alcohol may also be included, suitably in an amount of 1% to 5% w/w. An example of a suitable emulsifier is cetareth 20, supplied by Henkel. The compositions of the invention may further include buffering agents (such as calcium hydroxide) (2% to 6% w/w), cosmetic ingredients such as moisturising agents (for example Aloe Vera extracts) and skin smoothing agents (for example, almond oil, shea butter, lanolin and allantoin), colouring agents (0.4% to 0.6% w/w) and perfumes (0.55% to 0.7% w/w), with the balance being water.

Most preferably, the amount of thixotropic agent and the amount of fatty materials present in the compositions of the invention will be adjusted to provide the best rinsing properties.

According to a further aspect of the present invention there is provided a depilatory composition

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having a shear sensitive structure, which composition contains 0.25% to 6% w/w of a thixotropic agent and 5% to 15% w/w fatty materials. Most preferably, the composition contains 0.25% to 2% w/w (especially 0.25% to 1% w/w) of a thixotropic agent and 8% to 10.5% w/w fatty materials.

By "fatty materials" we mean any materials commonly found in the oil phase of a cosmetic emulsion, especially materials having a hydrocarbon chain of at least six carbons of very poor water solubility, for example paraffin oil, fatty alcohols and fatty esters, and any emulsifying agents soluble in the above-mentioned materials, for example fatty alcohol ethoxylates, fatty amide ethoxylates and soaps.

#### Examples

The following depilatory compositions were prepared:

20

#### Composition A (Reference composition)

	Cetostearyl alcohol (C <sub>16</sub> 80%, C <sub>18</sub> 20%)	8%
25	Ceteareth 20	2%
	Urea	10%
	KOH	2.7%
	Thioglycolic acid	4.5%
	Calcium hydroxide	2.9%*
30	Dye	0.5%

Balance, water

\*Calcium hydroxide is added in an amount to achieve the desired pH - preferably pH 12.5

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Composition B

The following pre-mixes were first prepared:

10	1.	Laponite XLG	1%
		Water	2.0%
	2.	Calcium Hydroxide	2.9%
		Water	15.0%
15	3.	Cetostearyl alcohol	8%
		Polyethyleneglycol fatty alcohol	1.25%
		Almond oil	0.5%
20	4.	Urea (technical grade)	8%
		Water	10%

These premixes may be heated as known in the art to achieve dispersion/dissolution.

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The final mixture was then prepared in the following sequence:

1. Premix 1
- 30 2. Dye (0.69%)

- 10 -

3. Premix 2
4. Premix 3
5. Water (12.5%)
6. Premix 4
- 5 7. Perfume (0.55%)
8. 30% Potassium thioglycolate (10.0%)
9. Water to 100%

Composition C

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Composition B further including

0.5% Viscose fibres, length 1mm and

5.0% Low density polyethylene microparticles (230 $\mu$ m).

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Composition D

The following pre-mixes were first prepared:

20	1. Calcium hydroxide	2.9%
	Water	20%
	2. Cetostearyl alcohol	8%
	Polyethyleneglycol fatty alcohol	2.5%
25	Almond oil	0.5%
	3. Laponite XLG	1%
	Urea (technical grade)	8%
	30% Potassium thioglycolate	10%
30	Water	balance

The final mixture was then prepared in the following sequence.

- 5 1. Premix 1
2. Dye (0.69%)
3. Premix 2
4. Premix 3
5. Perfume (0.55%)

10

Compositon A was prepared by mixing at a suitable temperature, e.g. 70°C, the emulsifier, the fatty ingredients and part of the water to form a primary emulsion. After cooling to below 40°C, the remaining  
15 ingredients were added.

In the compositions of the invention, the thioxotropic agent is preferably added as a gel to the primary emulsion (e.g. premixes 1, 2 and dye in  
20 composition D).

The rinsing properties of depilatory compositions A, B and C were tested in vitro using the following protocol:  
25

17g of the composition was applied evenly to a "Velcro" (TM) strip (5cm x 20cm) mounted on a support. The composition was then rinsed using a warm water shower with a water output of 0.16 l/s, with the  
30 shower head maintained perpendicular to the coated

"Velcro" (TM) strip at a distance of 5 to 10cm. The time taken to remove the compositions from the "Velcro" (TM) strip was measured. The results are indicated in Table 1.

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Table 1

Composition	Rinsing time (s)
A	41.3
10 B	13.0
C	12.3
D	13.0

From the above it can be appreciated that the inclusion of a thixotropic agent significantly improves the rinsability of the compositions.

Comparative tests were also conducted in vivo on 22 volunteers at the applicant's premises. The tested formulations were Composition C and, as the comparative formulation, Composition A. The results of these tests are set out below.

The volunteers were asked to compare the two compositions, by giving a rating for each composition between 1 and 10 having used the preparations, with 1 indicating very poor results and 10 indicating very good results.

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Test	Rating for Composition A	Rating for Composition B
Easy to Remove	6.5	8.0
5 Provides soft skin	7.0	8.0
Easy to rinse	6.0	7.5
No greasy skin feel	7.0	8.5
Texture	7.0	6.0
10 Colour	7.5	6.0

It is apparent that Composition C was perceived by the volunteers to be superior in all respects with the exception of the colour (attributable to the particular fibres used) and texture (attributable to the fibres and the microparticles).

A further test on three volunteers known to be sensitive to depilatory compositions showed no difference in skin irritancy between Composition C and Composition A.

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Claims

1. A depilatory composition including a functional amount of a thixotropic agent, which composition has a  
5 shear sensitive structure.
2. A composition as claimed in claim 1 wherein the thixotropic agent is a smectite clay.
- 10 3. A composition as claimed in claim 1 or 2 wherein the thixotropic agent is a sodium magnesium silicate clay.
4. A composition as claimed in claim 1 wherein the  
15 thixotropic agent is a silicoaluminate clay.
5. A composition as claimed in any preceding claim wherein the thixotropic agent is present in an amount of 0.25% to 6% w/w.  
20
6. A composition as claimed in claim 5 wherein the thixotropic agent is present in an amount of 0.25% to 2% w/w.
- 25 7. A composition as claimed in claim 5 or 6 which includes 5% to 15% w/w fatty materials.
8. A composition as herein described with reference to the Examples.



9. The use, in a depilatory composition, of a functional amount of a thixotropic agent effective to impart a shear sensitive structure to the composition.

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# INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 A61K7/155

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.
A	WO,A,93 08791 (BOOTS CO PLC) 13 May 1993 cited in the application see the whole document ---	1-9
A	EP,A,0 307 129 (THE BOOTS COMPANY PLC) 15 March 1989 see example 1 ---	1-9
A	PATENT ABSTRACTS OF JAPAN vol. 016, no. 473 (C-0991), 2 October 1992 & JP,A,04 173725 (SHISEIDO CO LTD), 22 June 1992, see abstract -----	1,2,9

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A-9308791	13-05-93	AU-A- 2876892	07-06-93
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