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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: LAUNDRY DETERGENT COMPOSITION WITH LAMELLAR BODY ADDITIVES

(57) Abstract: A laundry detergent composition with 0.01 to 1 wt% lamellar body additives characterised in that the additives have a solubility which leaves less than 10% residues as measured by the percentage insolubles test.

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LAUNDRY DETERGENT COMPOSITION WITH LAMELLAR BODY ADDITIVES

This invention relates to laundry detergent compositions, especially powder compositions, with lamellar body additives.

It is well known to include visually contrasting particles, for example, coloured speckles or noodles, in laundry detergent compositions. These may be added as a visual cue to the user, to indicate the presence of a specific ingredient in a powder. Alternatively, their inclusion may simply be to give the powder an attractive appearance.

In GB 2 358 403A (C3993) there is described the use of bodies of high visual contrast. These bodies may provide a visual cue for the presence of a beneficial ingredient. The bodies are in the form of lamellae and it is essential that the bodies are significantly larger, in at least one dimension, than the bulk of the particles constituting the detergent composition. It is preferred that the bodies are regular in shape and uniform in size. It is also preferred that they are brightly coloured and advantageously they are shiny. They may be formed of coloured water-soluble plastic-film. Klucel® GFF (or GF3), a hydroxypropyl cellulose from Aqualon, is used in all of the examples. The bodies are taught to be present at very low concentrations, for example, 0.02 to 1 wt%, preferably 0.05 to 0.5 wt%.

Laundry detergent powders having an effervescent action on contact with water are of interest. Typically, this effervescence is caused by the reaction of a particle of an

acid, such as citric acid, with a particle of a base, such as sodium carbonate. In theory, particles could be coloured in order to give the powder containing effervescent particles a distinct appearance. In practice, they would not be very visible at the concentration levels used. Furthermore, a coloured granule like this is already associated in the user's mind with other functional ingredients such as enzymes or bleach.

As disclosed in GB 2 358 403A, use of coloured lamellar additive provides a much greater visual impact at a much lower weight of the additive. However, we have determined the type of additive preferred in that disclosure to be unsuitable for a number of reasons.

Firstly, we have found that regularly shaped additives are not a good visual cue for a powder that is effervescent. Secondly we have found that totally flat additives do not reflect light and stand out as well as those having a slight curvature; and thirdly we have found that additives made from certain polymers, such as polyvinyl alcohol, have a tendency to stick to the plastic drawer of the washing machine dispenser and then do not dissolve fast enough. This leaves a residue of the additive in the drawer and may give rise to complaints of poor dispensing of the powder.

According to the present invention there is provided a laundry detergent composition with 0.01 to 1 wt% lamellar body additives characterised in that the additives have a solubility which leaves less than 10% residues as measured by the percentage insolubles test described below.

Preferably the level of residues is less than 8% and more preferably less than 5% or even substantially zero. Such additives are not likely to cause residue problems in the dispenser. Preferably the level of additives is 0.02 to 0.5%, more preferably 0.05 to 0.2% and most preferably about 0.1% by weight. Advantageously the laundry detergent composition is a powder formed from granules. The additives may be added to any laundry detergent powder, for example standard low bulk density powder, compact powder or powder compacted into tablets. The additives according to the invention are particularly useful for granular powder compositions containing a special functional ingredient or ingredients, for example an effervescent system, or a fabric care additive, such as aloe vera.

The additive will often be used purely as a visual cue for an "invisible" powder benefit that may be an ingredient in the powder or a certain property or behaviour of the powder. However, it is within the scope of this invention to include one or more functional ingredients within the additive. Among such functional ingredients, there may be cited: surface active agents, perfume, antioxidant, antifoam, etc.

The lamellar body additives are preferably formed of material selected from gum Arabic, hydroxypropyl methylcellulose and sodium caseinate. These materials have excellent dissolution rates. The additives are most preferably formed of gum Arabic.

Advantageously the additives have a slight curvature with a radius of curvature of from 0.5 m to 2 m. This may assist in

prevention of sticking and enhances the visual impact of the additives, especially if they are shiny and reflect light. Desirably the additives are produced by fragmenting a large film of the appropriate material. When suitable film material is broken in this way, it forms random shapes with sharp angles. This sharpness of angle may also assist in the dispensing. It also gives each additive particle a large visual impact due to the generally triangular nature of many of the fragments. This effectively reduces the amount of additive material required to produce a given visual impact. The 'spikey' nature of the additives may also cause a beneficial association with the idea that the powder will generate effervescence when mixed with water.

To give a high level of visibility and to reduce segregation the additives should generally have at least one dimension not smaller than the mean diameter of the laundry powder granules. Preferably, the additives have a maximum dimension which varies across the range of from about one to about three times the mean diameter of the granules. For example if the mean diameter of the granules is about 550 μm then the additives could be chosen to pass a 1400 μm sieve, but not a 500 μm sieve.

The thickness of the additives should be in the range 10-200 μm preferably 30-100 μm and most preferably about 50 μm.

The percentage insolubles test is carried out as follows.

500ml tap water of approximately 15 FH and at about 20°C is added to a 1L beaker and stirred with a magnetic stirring device to give a 4 cm-deep vortex. 0.5g of the material to be tested is added, in lamellar form, to the vortex. The thickness of the material added is preferably about 50 µm. Two minutes after the addition of the material, the contents of the beaker are vacuum filtered and the filter paper is dried for four hours at a temperature of 80°C. The dry mass of the undissolved material on the filter paper is weighed.

The percentage insolubles residue value is then calculated as follows:

percentage insolubles = 100% * dry mass of undissolved material /

mass starting material

To determine which materials may have the desired low percentage insolubles value several potential lamellar additive materials were formed into lamellae and tested using the above test. The results are given in table 1 below.

Table 1 - Results of percentage insolubles test

Additive material	lamellae thickness µm	% insolubles
gum Arabic	50	0
Casein[1]	~50	4
HPMC[2]	75	6
SCMC[3]	~50	7
HPC[4]	50	16
PVOH (PVA)[5]	60	20

[1] Casein sodium salt from bovine milk

[2] hydroxypropyl methyl cellulose

[3] sodium carboxymethyl cellulose

[4] hydroxypropyl cellulose

[5] polyvinyl alcohol

The invention will now be further described, by way of reference to the following non-limiting examples.

Example 1 and Comparative Example A

A LAS/nonionic zeolite built laundry powder was used for these examples. It contained 4.25% post-dosed sodium carbonate and 1.5% post dosed citric acid in granular form. These ingredients create an effervescent system, which is generally considered to aid dispensing of the powder from a drawer.

To one batch of powder was added 0.1 wt% of polyvinyl alcohol lamellae to make Comparative Powder A.

To another identical batch of powder was added 0.1% of gum Arabic lamellae to make Powder 1.

The gum Arabic used had been produced by a film making technique in which it is cast and subsequently dried to produce a film. This is then broken into fragments having very sharp corners. The size of the fragments used was a 500-1400 micron sieved fraction, the same fraction as was taken for the polyvinyl alcohol lamellae.

The powders were added to the dispensing drawer of a washing machine and the residue of powder examined to see how many lamellae remained after dispensing with water. Five consecutive additions and dispensings of each powder were made to the drawer in each of example 1 and comparative example A. Powder 1 was used for Example 1 and Comparative Powder A was used for Comparative Example A. The results of the number of lamellae additives observed in the drawer in each case are given in Table 2.

Table 2 - Number of undispensed additives

Number of dispensings	1	2	3	4	5
Comparative Example A	3	15	25	30	30
Example 1	4	4	7	10	12

It can be seen from this build-up test that the lamellar additives according to the invention are much less prone to remaining in the drawer after dispensing. This confirms that the percentage insolubles test is a good indication of the dispensing properties of the lamellar additives. This

is because the lamellae tend to stick to the drawer due to their shape and then dissolve away. A faster dissolution together with the other beneficial features of the additives will prevent their numbers building up in this repeated testing.

CLAIMS

1. A laundry detergent composition with 0.01 to 1 wt% lamellar body additives characterised in that the additives have a solubility which leaves less than 10% residues as measured by the percentage insolubles test defined herein.

2. A laundry detergent powder composition according to claim 1 in which the additive has a percentage insolubles residues value of less than 8%.

3. A laundry detergent powder according to claim 1 or claim 2 in which the additives are formed of material selected from sodium carboxymethyl cellulose, gum Arabic, hydroxypropyl methylcellulose and sodium caseinate.

4. A laundry detergent powder according to claim 2 in which the additive has a percentage insolubles residue value of less than 5%.

5. A laundry detergent powder according to claim 4 in which the additives are formed of material selected from gum Arabic, hydroxypropyl methylcellulose and sodium caseinate.

6. A laundry detergent powder according to claim 4 in which the additive has a percentage insolubles residue value of substantially zero.

7. A laundry detergent powder according to claim 6 in which the additives are formed of gum Arabic.

8. A laundry detergent powder according to any one of claims 2 to 7 in which the additives have a slight curvature.

9. A laundry detergent powder according to any one of claims 2 to 8 in which the additives are comprised of irregular random shapes with sharp angles.

10. A laundry detergent powder according any one of claims 2 to 9 which further comprises an effervescent system, or a fabric care additive, such as aloe vera.

11. A laundry detergent powder according to any one of claims 2 to 10 in which a substantial part of the additives have at least one dimension greater than the mean diameter of the laundry powder granules.

12. A laundry detergent composition according to claim 1 in which the additives have a thickness in the range 10-200 μm.

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
C11D17/06 C11D3/22 C11D3/384 C11D3/00

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)
C11D

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)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 358 403 A (* UNILEVER PLC) 25 July 2001 (2001-07-25) cited in the application claims 1,2,8-10; examples 8,9	1-5,8,11

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"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.

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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
GB 2358403 A	25-07-2001	BR 0100148 A	28-08-2001
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