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(54) **Spray-dried detergent component comprising chelant**

Chelatbildner enthaltender sprühgetrockneter Waschmittelbestandteil

Composant de détergent séché par pulvérisation comprenant des agents de chelation

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EP 0 796 911 B2

Description

[0001] The present invention relates to a spray-dried component comprising a chelant, in particular diethylene triamine penta(methylene phosphonic acid) or its salts. Such components are useful in granular detergent products, and also as intermediate products in the manufacture of bar soap, detergent tablets and other detergent forms such as extrudates, and agglomerates.

[0002] US-A-4 259 200, issued on March 31, 1981, discloses phosphonates complexed with calcium, magnesium, zinc or aluminium ions, the molar ratio of metal ion to phosphonate being at least 1:1. It is disclosed that the magnesium and the phosphonate can be premixed in any suitable solvent, including water, optionally mixed with other detergent components and spray-dried. Improved storage stability in bleaching compositions is sought.

[0003] EP-A-0 225 309, published on June 10th, 1987, discloses the addition of salts of alkali or alkaline earth metals into particles comprising diethylene triamine penta (methylene phosphonic acid) for the purpose of improving free-flow and storage properties. The amount of sulphate is 60% to 200% of the dry weight of the chelant, corresponding to a weight ratio of metal ion salt to chelant of from 0.6:1 to 2:1. Preferred water content after spray-drying is less than 10% by weight of the particle.

[0004] The prior art does not suggest that spray-dried components may be prepared having a high chelant content (at least 50% by weight) and which still maintain good free-flowing properties.

[0005] The object of the present invention is to provide a spray-dried component which is in the form of a free-flowing particle with high chelant activity

Summary of the Invention

[0006] This object is achieved by a spray-dried component comprising:

- i) at least 50%, preferably at least 60%, by weight of a chelant;
- ii) from 1% to 25%, preferably from 5% to 10%, by weight of an alkali metal or alkaline earth metal sulphate; and
- iii) preferably less than 10% by weight free moisture

[0007] The chelant is a phosphonic or succinic acid, or salt of phosphonic or succinic acid, more preferably the chelant is selected from the group consisting of diethylene triamine penta(methylene phosphonic acid), ethylene diamine-N,N'-disuccinic acid, or mixtures, or salts thereof.

[0008] The alkaline earth metal is preferably magnesium.

Detailed Description of the invention

[0009] The spray-dried component of the present invention comprises a chelant. Chelants are used, for example in detergent compositions, for their ability to complex with metal ions, such as iron and/or manganese forming soluble chelates. Suitable chelants can be selected from amino phosphonates

[0010] Useful amino phosphonates include ethylenediaminetetrakis (methylenephosphonates), sold as DEQUEST®. Preferably these amino phosphonates do not contain alkyl or alkenyl groups with more than about 6 carbon atoms.

[0011] Particularly preferred chelants are diethylene triamine penta(methylene phosphonic acid) ("DTPMP") and ethylene diamine tetra(methylene phosphonic acid) (EDTMP).

[0012] A preferred biodegradable chelant for use herein is ethylene diamine-N,N'-disuccinate ("EDDS"), especially the [S,S] isomer as described in US-A-4 704 233, issued on November 3, 1987, to Hartman and Perkins.

[0013] Magnesium sulphates are preferred for use in the present invention. Epsom salts; MgSO₄ · 7H₂O, i.e. the hydrated, crystalline form of magnesium sulphate with seven moles of water is particularly preferred.

[0014] The chelants used in the present invention may be conveniently provided from commercially available sources in aqueous solution. Typical commercially available solutions have a chelant activity of from about 40% to about 60% by weight. The spray-dried component may be produced by mixing such an aqueous solution with the required amount of the sulphate, with the addition of more water if necessary to reduce total solids content, and then forming granules by spraying the solution into a conventional counter-current or co-current spray-drying tower. In the tower water is evaporated by hot gas, usually hot air, preferably to a level of less than 10% by weight of free moisture in the finished spray-dried component.

[0015] Optionally the spray-dried granules may pass through further drying and/or cooling steps in conventional process equipment, such as a fluid bed. Oversize and fines fractions are normally removed, for example, by passing the granules over vibrating screen

[0016] Further processing including additional granulation steps, agglomeration or compaction, as well as dry mixing with other components may be to provide finished products such as detergent powders, bar soaps and tablets.

Examples

[0017]

	Example 1	Example 2
DTPMP	80	84

(continued)

	Example 1	Example 2
MgSO ₄ · 7H ₂ O	10	5
Sodium chloride	5	6
Free moisture	5	5

[0018] DTPMP is hepta sodium salt of diethylene triamine penta(methylene phosphonic acid)
MgSO₄ · 7H₂O is Epsom salts All levels are % by weight unless otherwise specified

[0019] The spray-dried component produced in these examples have a bulk density of from 500 g/l to 700 g/l. The component absorbs very little moisture after manufacture (e.g. from atmospheric humidity) and hence flowability and caking problems are minimised or eliminated even in environments of high temperature and high humidity.

Claims

1. A spray-dried component comprising:

- i) chelant;
- ii) from 1% to 25% by weight of an alkali metal or alkaline earth metal sulphate; and
- iii) free moisture

characterised in that the spray dried component comprises at least 50% by weight of a chelant, wherein the chelant is a phosphonic or succinic acid, or salt of phosphonic or succinic acid, or mixtures thereof.

2. A spray-dried component according to claim 1 comprising:

- i) at least 60% by weight of chelant;
- ii) from 5% to 10% by weight of a alkali metal, or alkaline earth metal sulphate; and
- iii) less than 10% by weight free moisture.

3. A spray-dried component according to claim 1 wherein the chelant is selected from the group consisting of diethylene triamine penta(methylene phosphonic acid), ethylene diamine-N,N'-disuccinic acid, salts of diethylene triamine penta(methylene phosphonic acid), salts of ethylene diamine-N,N'-disuccinic acid, or mixtures thereof.

4. A spray-dried component according to any of the previous claims wherein the alkaline earth metal is magnesium.

5. A spray-dried component according to claim 4 wherein the alkaline earth metal sulphate is in the

hydrated, crystalline form of MgSO₄ · 7H₂O.

Patentansprüche

1. Sprühgetrocknete Komponente, umfassend:

- i) Komplexbildner;
- ii) 1 bis 25 Gew.-% eines Alkalimetall- oder Erdalkalimetallsulfats; und
- iii) freie Feuchtigkeit,

dadurch gekennzeichnet, daß die sprühgetrocknete Komponente mindestens 50 Gew.-% eines Komplexbildners umfaßt, wobei der Komplexbildner eine Phosphon- oder Bernsteinsäure oder ein Salz von Phosphon- oder Bernsteinsäure, oder Mischungen hiervon ist.

2. Sprühgetrocknete Komponente nach Anspruch 1, umfassend:

- i) mindestens 60 Gew.-% Komplexbildner;
- ii) 5 bis 10 Gew.-% eines Alkalimetall- oder Erdalkalimetallsulfats; und
- iii) weniger als 10 Gew.-% freie Feuchtigkeit.

3. Sprühgetrocknete Komponente nach Anspruch 1, wobei der Komplexbildner aus der Gruppe gewählt ist, bestehend aus Diethylentriaminpenta(methylenphosphonsäure), Ethylendiamin-N,N'-dibernsteinsäure, Salzen von Diethylentriaminpenta(methylenphosphonsäure), Salzen von Ethylendiamin-N,N'-dibernsteinsäure, oder Mischungen hiervon.

4. Sprühgetrocknete Komponente nach mindestens einem der vorangehenden Ansprüche, wobei das Erdalkalimetall Magnesium ist.

5. Sprühgetrocknete Komponente nach Anspruch 4, wobei das Erdalkalimetallsulfat in der hydratisierten, kristallinen Form von MgSO₄ · 7H₂O vorliegt.

Revendications

1. Composant séché par atomisation comprenant :

- i) un agent chélatant ;
- ii) 1% à 25% en poids d'un sulfate de métal alcalin ou de métal alcalino-terreux ; et
- iii) de l'humidité libre ;

Caractérisé en ce que le composant séché par atomisation comprend au moins 50% en poids d'agent chélatant.

2. Composant séché par atomisation selon la revendication 1 comprenant :

- i) Au moins 60% d'un agent chélatant ;
- ii) 5% à 10% en poids d'un sulfate de métal alcalin ou de métal alcalino-terreux ; et
- iii) moins de 10% en poids d'humidité libre ;

dans lequel l'agent chélatant est un acide phosphonique ou succinique, ou un sel d'acide phosphonique ou succinique, ou leurs mélanges.

3. Composant séché par atomisation selon la revendication 1, dans lequel l'agent chélatant est choisi dans le groupe constitué de l'acide diéthylènetriamine penta(méthylène phosphonique), de l'acide éthylènediamine-N,N'-disuccinique, des sels de l'acide diéthylènetriamine penta(méthylène phosphonique), des sels de l'acide éthylènediamine-N,N'-disuccinique, et de leurs mélanges.

4. Composant séché par atomisation selon l'une quelconque des revendications précédentes, dans lequel le métal alcalino-terreux est le magnésium.

5. Composant séché par atomisation selon la revendication 4, dans lequel le sulfate de métal alcalino-terreux se présente sous la forme cristalline, hydratée de $MgSO_4 \cdot 7H_2O$.