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(54) **Method for lubricating a conveyor belt**

Verfahren zur Schmierung eines Förderbands

Procédé pour lubrifier une bande transporteuse

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**Description****Field of the invention**

5 [0001] The present invention relates to a lubricant concentrate composition and more particularly to a lubricant composition obtainable on diluting such a concentrate, which compositions have biocidal activity.

**Background of the invention**

10 [0002] Slat conveyor systems such as used in industrial bottle washing systems, need to be lubricated in order to ensure smooth running.

Conveyor belt lubricants based on diamines are already known from for instance EP-A-372,628. Such lubricants use acetic acid to solubilise the diamines. However a problem here is that at low pH, lubrication is lost.

15 WO-A-92/13048 discloses antimicrobial conveyor belt lubricant compositions comprising a fatty acid, a quaternary ammonium compound, and optionally an amine. WO-95/26389 provides alkaline diamine track lubricants prepared from an admixture of an alkyl diamine and a water-soluble hydrotrope, said lubricants having a biocide incorporated therein. WO-92/13050 refers to antimicrobial conveyor lubricant compositions containing diamine acetate.

20 The inventors have found that on replacing acetic acid with a quaternary ammonium compound, and in particular didecyl dimethyl ammonium chloride, an effective lubricant is provided. It has further been found that in comparison to lubricants of the prior art, the level of diamine compounds in the lubricant composition can be reduced without substantially effecting activity, whereby a low-foaming lubricant, which can be easily washed away, is provided.

**Definition of the invention**

25 [0003] According to the invention, there is provided a method of lubricating a system such as a bottle washing or a conveyor belt system, according to claim 1, said method comprising the steps of diluting a lubricant concentrate composition as specified in claim 1 and passing the resulting diluted lubricant through the system. Preferably, the diluted lubricant composition is a 0.2 - 0.4% by weight aqueous solution of the lubricant concentrate composition of the invention.

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**Detailed description of the invention**

35 [0004] Since the need to add a relatively large amount of acid to solubilise the diamines is obviated in lubricant compositions according to the present invention, substantially all the diamine becomes available for lubrication. Since, in comparison with known lubricants, the lubricants according to the present invention are more alkaline, they therefore yield protection against acidic spillages.

40 [0005] A problem which may occur when using known lubricants in slat conveyor systems, is the occurrence of bio-films, which grow and colonize the systems, especially when such systems are shut down for example at the weekends. These bio-films, caused by water-born organisms, are the main cause of slimes, unpleasant smells and hygiene problems associated with these types of systems.

A further advantage of the lubricant compositions according to the present invention is that they overcome this problem of the formation of bio-films by providing an effective biocidal activity, whereby bio-organisms are prevented from growing in the system, and any such organisms already in the system are killed.

45 [0006] The lubricant concentrate composition used in the method of the invention preferably comprises from 1 to 5% by weight of each diamine compound present therein. More preferably, the concentration of each diamine compound is in the range of from 1 to 2% by weight.

The diamine compounds present in the lubricant composition of the invention are selected from the group consisting essentially of N-oleyl-1,3-diaminopropane and N-coco-1,3-diaminopropane, these giving effective results.

50 [0007] The concentration of the quaternary ammonium compound present in the lubricant concentrate composition is in the range from 4 to 10% by weight, preferably from 5 to 6% by weight.

The quaternary ammonium compound is didecyl dimethyl ammonium chloride. Didecyl dimethyl ammonium chloride offers the following advantages:

- 55 - the pH range over which both lubricity and disinfection (biocidal activity) are achieved when applying this quaternary ammonium compound in the composition of the invention, is wider than that achieved with known lubricants of the prior art -such as those disclosed by EP-A-372,628, the upper pH limit being about 10 according to the present invention;
- the sensitivity to anions in dilution water is substantially reduced with respect to known lubricants, in other words

the inventors have found a considerable improvement in the field of lubricants based on diamines, which are known to be susceptible to precipitation from use solutions containing high levels of anions, especially sulphates;

- The chemical oxygen demand and nitrogen levels of the compositions according to the present invention containing this type of quaternary ammonium compound are reduced whereby environmental loading and effluent treatment costs are reduced,
- The foam level with respect to known lubricants is substantially reduced, whereby the foam can be readily rinsed away and the lubricants compositions according to the present invention are cost effective.

**[0008]** The lubricant composition of the invention preferably further comprises an acid, desirably acetic acid. The concentration of said acid in the concentrate composition is effectively in the range of from 0.01 to 1% by weight.

**[0009]** In order to improve the detergency of the lubricant composition of the invention, said composition preferably further comprises a nonionic agent, the concentration of which being effectively in the range of from 0.1 to 5% by weight based on the concentrate composition. Said nonionic agent is preferably oleylamine ethoxylate.

**[0010]** A further optional and preferred component of the lubricant composition is a detergent builder, which is preferably triethanolamine. The concentration of said builder preferably lies in the range of from 0.1 to 5% by weight based on the concentrate composition.

**[0011]** The present invention is illustrated by way of the following example, in which % is by weight unless otherwise indicated.

**[0012]** A lubricant concentrate was formulated having the following composition:

	%wt
N-oleyl-1,3-diaminopropane	1.5
N-coco-1,3-diaminopropane	1.5
Acetic acid (60%) (other acids)	0.5
Didecyl dimethyl ammonium chloride (80%)	6.8
Water to	<u>100.0</u>

**[0013]** This concentrate composition was diluted with water to a 0.3 wt% dilute lubricant composition.

It will be realised that the extent of dilution required for obtaining a suitable dilute lubricant composition is dependent on the concentration of the diamines in the concentrate composition.

### Claims

1. Method of lubricating a system, such as a bottle washing or conveyor belt system, comprising the steps of
  - (a) diluting a lubricant concentrate composition comprising one or more diamine compounds selected from the group consisting essentially of N-oleyl-1,3-diaminopropane and N-coco-1,3-diaminopropane, and from 4 to 10% by weight of didecyl dimethyl ammonium chloride, and
  - (b) passing the resulting diluted lubricant through the system.
2. Method according to claim 1, wherein the composition comprises from 1 to 5% wt. of each diamine compound present therein.
3. Method according to claim 1 or 2, wherein the composition further comprises acetic acid.
4. Method according to claim 3, wherein the concentration of the acid lies in the range of from 0.01 to 1% by weight of the composition.
5. Method according to any of the preceding claims, wherein the composition further comprises a nonionic agent.
6. Method according to claim 5, wherein the non-ionic agent is oleylamine ethoxylate.
7. Method according to claim 5 or 6, wherein the concentration of the non-ionic agent lies in the range of from 0.1 to 5% by weight.

8. Method according to any of the preceding claims, wherein the composition further comprises a detergent builder.
9. Method according to claim 8, wherein the detergent builder is triethanolamine.
- 5 10. Method according to claim 8 or 9, wherein the concentration of the detergent builder lies in the range of from 0.1 to 5% by weight.

### Patentansprüche

- 10 1. Verfahren zum Schmierieren eines Systems, wie eines Flaschenwasch- oder Förderbandsystems, umfassend die Schritte:

15 (a) Verdünnen einer Schmiermittelkonzentratzusammensetzung, die eine oder mehrere Diaminverbindungen, ausgewählt aus der Gruppe, die im wesentlichen aus N-Oleyl-1,3-diaminopropan und N-Coco-1,3-diaminopropan besteht, und 4 bis 10 Gew.-% Didecyldimethylammoniumchlorid umfaßt, und

(b) Leiten des entstandenen verdünnten Schmiermittels durch das System.

- 20 2. Verfahren nach Anspruch 1, wobei die Zusammensetzung 1 bis 5 Gew.-% jeder darin vorhandenen Diaminverbindung umfaßt.

3. Verfahren nach Anspruch 1 oder 2, wobei die Zusammensetzung außerdem Essigsäure umfaßt.

- 25 4. Verfahren nach Anspruch 3, wobei die Konzentration der Säure im Bereich von 0,01 bis 1 Gew.-% der Zusammensetzung liegt.

5. Verfahren nach einem der vorstehenden Ansprüche, wobei die Zusammensetzung außerdem ein nichtionisches Mittel umfaßt.

- 30 6. Verfahren nach Anspruch 5, wobei das nichtionische Mittel Oleylaminethoxylat ist.

7. Verfahren nach Anspruch 5 oder 6, wobei die Konzentration des nichtionischen Mittels im Bereich von 0,1 bis 5 Gew.-% liegt.

- 35 8. Verfahren nach einem der vorstehenden Ansprüche, wobei die Zusammensetzung außerdem eine Gerüstsubstanz enthält.

9. Verfahren nach Anspruch 8, wobei die Gerüstsubstanz Triethanolamin ist.

- 40 10. Verfahren nach Anspruch 8 oder 9, wobei die Konzentration der Gerüstsubstanz im Bereich von 0,1 bis 5 Gew.-% liegt.

### 45 Revendications

1. Procédé de lubrification d'un système, tel qu'un lavage de bouteille ou un système de bande transporteuse, comprenant les étapes consistant:

50 (a) à diluer une composition de concentré lubrifiant comprenant un ou plusieurs composés diamine choisis dans le groupe formé essentiellement par le N-oléyl-1,3-diaminopropane et le N-coco-1,3-diaminopropane, et de 4 à 10% en poids de chlorure de didécyldiméthylammonium; et

(b) à faire passer le lubrifiant dilué résultant à travers le système.

- 55 2. Procédé selon la revendication 1, dans lequel la composition comprend de 1 à 5% en poids de chaque composé diamine présent dedans.

3. Procédé selon la revendication 1 ou 2, dans lequel la composition comprend de plus de l'acide acétique.

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4. Procédé selon la revendication 3, dans lequel la concentration de l'acide s'étend dans la gamme de 0,01 à 1% en poids de la composition.

5 5. Procédé selon l'une quelconque des revendications précédentes, dans lequel la composition comprend de plus un agent non ionique.

6. Procédé selon la revendication 5, dans lequel l'agent non ionique est l'éthoxylate d'oléylamine.

10 7. Procédé selon la revendication 5 ou 6, dans lequel la concentration de l'agent non ionique s'étend dans la gamme de 0,1 à 5% en poids.

8. Procédé selon l'une quelconque des revendications précédentes, dans lequel la composition comprend de plus un adjuvant de détergence.

15 9. Procédé selon la revendication 8, dans lequel l'adjuvant de détergence est la triéthanolamine.

10. Procédé selon la revendication 8 ou 9, dans lequel la concentration de l'adjuvant de détergence s'étend dans la gamme de 0,1 à 5% en poids.

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