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(54) Title: CONVEYOR LUBRICANT COMPOSITION

(57) Abstract: The subject of this invention is a lubricant composition with a disinfectant and washing properties, based on the diamines, derivatives of glycerin and an acidified sodium chlorite (ASC) as antimicrobial active agent. The composition gives very good glide properties, and it keeps at the conveyor surface a homogenous coat. It doesn't cause the sediments with the supplied water, it also effectively protects before contaminates of microorganisms.

Conveyor lubricant composition

FIELD OF THE INVENTION

The present invention relates to the lubricant composition, to use in the spray system, for the lubrication, sanitization and cleaning of the belt chain for the transport of glass, PET, aluminium and similar containers in the plant of food industry.

BACKGROUND

The requirements of the lubricant composition for the chain lubrication are very high and relate to:

- Mechanical needs: to reduce the mechanical friction between the containers and loaded surface of the conveyor while the distribution from an entrance to an exit on the plain, with bottles or containers in a changeable weight, and to give a constantly wet surface with a good lubrication.

-Cleaning condition: to keep a clean condition of the transporters' surface without any dirt, deposits and microbiologic contamination, dangerous for the beverages or packed food in open containers.

- Resistant for water quality: the lubricant composition doesn't make with water ions the sediment, which could plug nozzles and give a disturbance of the lubrication.

The chemical lubricants compositions are in the main three groups:

1) Lubricants based on the soap;
2) Lubricant based on the fatty amines or diamines;
3) Lubricant based on phosphoric esters.

In this invention the focus is on the lubricant based on the diamines, because this kind of the lubricant has a very good basis for lubrication having a small concentration of active components and it also has a favourable characteristic.

Composition with diamines is free of:

Complexing agent (necessary in soap based lubricant, mainly there is used EDTA, which is not readily biodegradable, and ecological disadvantageous);

Phosphate agent, (lubricant based on the phosphoric esters, which is a source of phosphate dangerous for environment because of eutrofization of water reservoir, so the concentration of phosphor is determined in waste water according to the current regulation).

The negative features of the composition based on the diamines are:

The tendency to precipitate reaction with polyvalent anions such as carbonates, sulphates and phosphates presents in hard water, or water half- deionizated by kationite cause clogging of nozzles for spraying lubricant solutions;

Not sufficient microbiologic action in the lubrication system;

Not sufficient wetting action on the loaded conveyor, to break lubricant film.

The main problem is to make the composition, which have only good or sufficient properties to use for the lubrication process without the described above disadvantages.

WO2006101609 –consists of the low foaming lubricant composition containing:

a) Alkyl alkoxylated phosphate ester 1 to about 20% wt;

b) Diamine acetale salt in present from 1 to about 25% wt;

c) Alkil polyglucoside surfactant from 0,5-10% wt.

This composition has the addition of other functional ingredients to give a broad spectrum of lubrication properties.

US 5935914 consist of the lubricant concentrate with low concentration of an active agent containing:

Amine, diamine 0,5-6% more suitable 2-2,5%

Ether carboxylic acid compound with the general formula I concentration 1-6% more suitable 2-2,5%

R@1- (O(CH)2)m)n-OCH2COO@-M@+1

R@ is selected from the group consisting of saturated linear or branched C1-C22 alkyl Rest , a mono or polyunsaturated, linear or branched alkenyl or alkinyl rest with 2 to 22 carbon atoms and the mono or poly C1-C22 alkyl or C1-C22 alkenyl or alkinyl substituted acryl rest

polyethyleneglycol with formula II

H-(OCH2H4)n-OH

Where is positive number between 5 and less than 100,00

Composition is resistant for hard water without having the tendency to precipitate with polyvalent anions such as carbonates, sulphates and phosphates. Aqueous use lubrication solution has cleaning and disinfection properties as well.

The alkil ether carboxylic acid compound has been used in this formula as the most popular agent for inhibiting the precipitation and increase of the lubrication.

US2004097383 describes lubricant concentrate based on: more then 20% of glycerol with:

a) One nitrogen compound:

R1 R2 R3 N

Wherein:

R1, R2,R3 independently of one another denote H or – (CH2)n-OH where may be 1 or2 , wherein not all radicals R1,R2,R3 may simultaneously be H, and

b) At last one organic acid with 1 to 10 C atoms in the molecule.

Antimicrobial active constituents are added separately.

SUMMARY OF THE INVENTION

The present invention contains all favourable features for the lubrication in the foodstuff industry. Low concentration of the active agent, good cleaning and disinfection properties and very good moistening and covering properties of the chains surface without plugging nozzles and making deposits with a good glide action and the low costs of agents.

The disinfecting agent in this invention there is an Acidified Sodium Chlorite (ASC), which is characteristic of slow emission of chlorine dioxide, thanks to that the disinfection is effective in the whole lubrication system, thereby this agent is better then chlorine dioxide, which in this conditions very quickly gets decomposed.

All the agent are very safe for factories equipment, staff, and the environment.

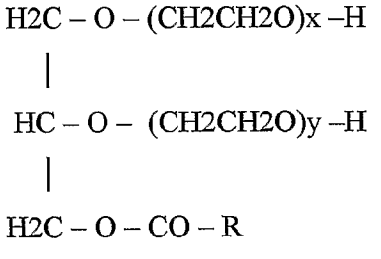
This composition contains:

i) Alkilo propylene diamine 3-6 % wt

R NH(CH2)3 NH2

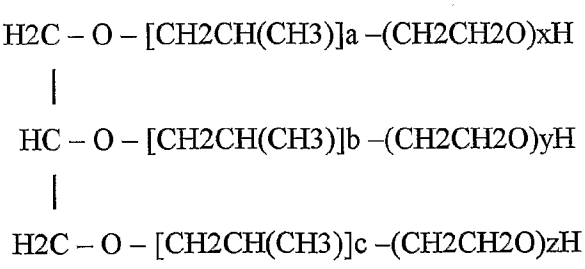
R= linear or branched saturated or unsaturated C12-C22

(ii) glycerin partial estryfication 0,1- 3% wt



for X + Y > 5 and R= Alkil C8 – C22

(iii) Polioksyalkilenotriol 0,1-5% wt



For a+b+c ≈ 50 and x+y+z ≈ 70

(iv) Alkilopolioksyetylenoglikol 0,1-2%

R-(OC2H4)n-OH n= 5-12

R= Alkil C12-C15

(v) acetic acid to pH 5-7 1-3 %

According to the invention it is preferred that the lubricant composition consists of:

3-6 % diamine

0,1-3% glycerin partial estryfication

0,1-5% polioksyalkilenotriol

0,1-2% alkilopolioksyetylenoglikol

1-3 % Acetic acid

According to the invention it is preferred that in aqueous lubricant composition the diamina of formula (i) is oleyl(vegetable)propylene diamina.

Lubricant composition are usually applied in dilute from 0,1 to 1,5% by weight.

The conveyor system lubrication according to the invention can be a system for glass bottles, glass containers, PET , drums and cans.

EXAMPLES

Example 1. Lubrication properties:

Comparing lubrication properties of the lubricant according to the invention with the lubricant based on diamines, with alkiloether carboxylic acid as patented in US5935914.

Test measuring the friction resistance were performed on a short lab conveyor belt tester. The friction coefficient is defined as the coefficient between the force measured for a bottle and the weight of this bottle expressed in grams.

For test were used brewery bottles 0,5l, filled with water. After all series of the tests the conveyor surface was cleaned by the water and isopropyl alcohol.

The values are collected in table nr 1.

Table 1

EXAMPLE	1.	2.	3.	4.	5.	6.	8.*
Diamine	5	5	5	5	5	5	5
Glycerine partial ester	0	3	3	2	2	0	0
Polialkilenotriol	0	0	1	2	3	3	0
Alkilopolioksyetylenoglikol	2	2	2	2	2	2	2
Ether carboxylic acid	0	0	0	0	0	0	2
Polioksyetylenoglikol 300	0	0	0	0	0	0	3
Friction	0,115	0,106	0,104	0,103	0,109	0,108	0,109

* formula according patent

Example 2.The clear water solubility:

The properties of clear water solubility were tested using tap water 17dH,

Tested 0,3% by weight solutions in 100ml of measuring cylinder .Noticed of the appearance of the solution after 0,5 h, and 24 h.

Test clear solubility is expressed in units:

full clear

very week opalesce

week opalisation

opalisation

Summary of the test are in table nr 2.

Table 2

EXAMPLE	1.	2.	3.	4.	5.	6.	8.
Diamine	5.	5	5	5	5	5	5
Glycerine partial ester	0	3	3	2	2	0	0
Polialkilenotriol	0	0	1	2	3	5	0
Alkilopolioksyetylenoglikol	2	2	2	2	2	2	2
Ether carboxylic acid	0	0	0	0	0	0	2
Polioksyetylenoglikol 300	0	0	0	0	0	2	3
Clear water after 0,5h	2	0	0	0	1	2	0
Clear water after 24 h	3	0	0	0	1	3	0

Example 2 confirms that the formulas of a lubrication agent with the lowest coefficient friction have a durably clear water solutions.

Example 3.

Disinfection action:

The 0,3% solution of the tested lubricant was soiled by the microbiology sediment from conveyour and after 30 min tested by the Mikrocount combi test of Schulke and Mayr.

Solution of the patented lubricant was pure.

Solution containing water soiled by microbiology sediment had 105 total bacterial.

CLAIMS

1. The lubricant composition concentrate for cleaning and disinfection of conveyance installation in the food industry having the form of water solution comprising diamine, derivative of glycerine and disinfection agent.

2. The lubricant composition according to claim 1, comprising:

i) 3-6 % wt of alkilo propylene diamine having general formula: R NH(CH2)3 NH2, wherein R = linear or branched saturated or unsaturated C12-C22 alkil,

(ii) 0,1- 3% wt of glycerin partiale estryfication having general formula:

H2C – O – (CH2CH2O)x –H
|
HC – O – (CH2CH2O)y –H
|
H2C – O – CO – R,

wherein X + Y > 5 and R= Alkil C8 – C22,

(iii) 0,1-5% wt of polioksyalkilenotriol having general formula:

H2C – O – [CH2CH(CH3)]a –(CH2CH2O)xH
|
HC – O – [CH2CH(CH3)]b –(CH2CH2O)yH
|
H2C – O – [CH2CH(CH3)]c –(CH2CH2O)zH,

wherein a+b+c ≈ 50 and x+y+z ≈ 70,

(iv) 0,1-2% wt of alkilopolioksyetylenoglikol having general formula:

R-(OC2H4)n-OH, wherein n= 5-12, R= Alkil C12-C15

(v) 1-3% wt of acetic acid to pH 5-7.

3. The lubricant composition according to claim 1, comprising: 3-6 % wt of diamine, 0,1-3% wt of glycerin partiale estryfication, 0,1-5% wt of polioksyalkilenotriol, 0,1-2% wt of alkilopolioksyetylenoglikol, and 1- 3% wt of acetic acid to pH 7.

4. The lubricant composition according to claim 1, wherein said diamine of formula (i) is oleyl(vegetable)propylene diamine.

5. The lubricant composition according to claim 1, wherein said disinfection agent is acidified sodium chlorite (ASC).

6. The lubricant composition according to claim 1 or 5, wherein said disinfection agent is comprised in the concentrated composition or it is added separately to the lubricating

conveyance.

7. The lubricant composition according to claim 5 or 6, wherein acidified sodium chlorite (ASC) is used in the concentration 1-100ppm.

8. The concentrated lubricant composition according to claim 1, characterized in that it is applied in dilute from 0,1 to 2% by weight.

10. The concentrated lubricant composition according to claim 1, characterized in that said conveyor system lubrication is system selected among of systems for glass bottles, glass containers, PET , drums or cans.

INTERNATIONAL SEARCH REPORT

International application No
PCT/PL2007/000072

A. CLASSIFICATION OF SUBJECT MATTER
INV. C10M173/02
ADD. C10N30/16

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)
C10M

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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	page 22, line 26 - page 23, line 1; claims 1,4,6-9,15,17-21,28,29; table 2 page 29, line 3 - line 9 page 22, line 10 - line 14 page 26, line 4 - line 7 page 15, line 1 - page 16, line 17	5-7
X	US 5 182 035 A (SCHMIDT BRUCE E [US] ET AL) 26 January 1993 (1993-01-26) column 5, line 10 - line 17; claim 7	1

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[X] Further documents are listed in the continuation of Box C.

[X] 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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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"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.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
4 July 2008	14/07/2008

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Pöllmann, Klaus

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INTERNATIONAL SEARCH REPORT

International application No
PCT/PL2007/000072

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 244 589 A (LIU CHUNG-TSING [US] ET AL) 14 September 1993 (1993-09-14) column 4, line 31 - column 6, line 26 column 7, line 5 - line 20 column 8, line 10 - line 19; claims 1,8,24	1
Y	WO 03/078557 A (ECOLAB INC [US]) 25 September 2003 (2003-09-25) paragraphs [0037], [0041]	5-7

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/PL2007/000072

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