



(11) **EP 2 915 874 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
09.09.2015 Bulletin 2015/37

(51) Int Cl.:
C11D 3/395 (2006.01) **C11D 3/04** (2006.01)
C11D 3/08 (2006.01) **C11D 3/12** (2006.01)

(21) Application number: **14157434.3**

(22) Date of filing: **03.03.2014**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME

(71) Applicant: **I.C.F. S.r.l.**
26020 Palazzo Pignano (CR) (IT)

(72) Inventors:
• **Gelmi, Fabio**
26100 Cremona (IT)
• **Venturini, Maurizio**
26100 Cremona (IT)

(74) Representative: **Villa, Livia et al**
ADV IP S.r.l.
Via Conservatorio, 22
20122 Milano (IT)

(54) **Composition for washing and sanitizing food production plants**

(57) A composition for washing and sanitizing food production plants, in particular milking and milk processing plants, is described. In particular, said composition is capable of cleansing equipment used in the dairy industry in a deep and effective manner, preventing milk-

stone deposition, thus reducing the use of acid detergent, removing all the microorganisms that can contaminate the milk, and providing solubilisation in water and immediate efficacy.

EP 2 915 874 A1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a composition for washing and sanitizing food production plants, in particular milking and milk processing plants.

BACKGROUND OF THE INVENTION

[0002] The qualities of the milk and dairy products begin at the dairy farm and, in particular, in the milking room. The behaviour adopted in the milking room, the techniques, the cleaning and disinfecting methods, such as the milking routine, can change the characteristics of the milk.

[0003] The signs of a lack of cleanliness are highlighted by residues called sediments. These sediments present in the milking plant components, in the milking facilities and in adjacent areas can be classified into organic and inorganic sediments.

[0004] Mineral deposits such as iron, calcium or magnesium in water, milk or chemicals cleaning products are called inorganic sediments. In time, an accumulation forms on the surfaces of milking plant components and the sediment becomes clearly visible. The term used to identify said sediments is "milk-stone".

[0005] Said sediment promotes the growth of bacteria and provide them with protection against the cleaning and disinfecting chemical agents.

[0006] Quality milk, both for direct consumption and for processing into cheese, must be produced from healthy animals, without udder infections and in a good state of health with low cell and bacterial counts. The quality of the milk cannot be improved post-milking, therefore milking operations, cleaning and disinfection of the premises, of the milking and milk storage equipment, if performed incorrectly, markedly degrade the characteristics of the milk, besides causing a greater incidence of cases of mastitis.

[0007] Cleaning and disinfection of the milking plant are thus the most important operations for complete elimination of all traces of dirt or milk residue in the milking plant components.

[0008] The milking plant is formed by different materials, such as glass, plastic, rubber, steel or aluminium. Said materials require different cleaning and disinfecting or sanitizing methods, thus the products to be used must be capable of adequately cleaning and disinfecting said materials, without corroding them.

[0009] The object of the present invention is to find an effective product for washing and sanitizing the equipment that comes into contact with the food during the production, manufacture and distribution, and in particular, the equipment used in the dairy industry, that is at the same time easy to use and quick acting.

SUMMARY OF THE INVENTION

[0010] The above object has been achieved by a solid composition consisting of chlorinated isocyanuric acid or its salt, sodium hydroxide, silica and a sequestering agent selected from alkaline tripolyphosphate, tetra-alkaline pyrophosphate and mixtures thereof, wherein said chlorinated isocyanuric acid or its salt is at least 20 wt% on the weight of the composition.

[0011] With the term "chlorinated isocyanuric acid or its salt" is meant dichloroisocyanuric acid, trichloroisocyanuric acid, their sodium or potassium salts, anhydrous or hydrate, and mixtures thereof.

[0012] In another aspect, the present invention concerns the use of a solid composition comprising chlorinated isocyanuric acid or its salt, sodium hydroxide, silica and a sequestering agent selected from alkaline tripolyphosphate, tetra-alkaline pyrophosphate and mixtures thereof, wherein said chlorinated isocyanuric acid or its salt is at least 20 wt% on the weight of the composition, for washing and sanitizing the equipment used in the dairy industry.

[0013] The characteristics and advantages of the present invention will be evident from the detailed description given below, and from the illustrative non-limiting working examples.

DETAILED DESCRIPTION OF THE INVENTION

[0014] The subject of the invention is thus a solid composition consisting of chlorinated isocyanuric acid or its salt, sodium hydroxide, silica and a sequestering agent selected from alkaline tripolyphosphate, tetra-alkaline pyrophosphate and mixtures thereof, wherein said chlorinated isocyanuric acid or its salt is at least 20 wt% on the weight of the composition.

[0015] It has been surprisingly found that said solid composition is capable of cleansing equipment used in the dairy industry, such as the milking plant, in a deep and effective manner, preventing milk-stone deposition, thus reducing the use of acid detergent typically used after washing with alkaline detergents, removing all the microorganisms that can contaminate the milk, and providing solubilisation in water and immediate efficacy.

[0016] In addition, the fact that it is in solid form advantageously allows reduction of the storage areas required, and reduction of the transport and disposal costs. Indeed, since the composition is particularly active at even very low concentrations and since the volume occupied compared to known products in liquid form is significantly reduced, the solid composition of the invention advantageously requires minimal spaces both during storage and during transport, with clear economic and ecological advantages.

[0017] In addition, a further advantage of the use of a solid composition is the high stability of said chlorinated isocyanuric acid or its salt compared to the stability of the chlorinated compounds in aqueous solution. This

means that the storage times of said composition are extremely and significantly increased, not only with respect to the corresponding aqueous solutions, but also with respect to the known products.

[0018] Furthermore, the composition of the invention does not require surfactants of any type and this is a further advantage, not only from an ecological point of view, but also from the point of view of food safety, since it is intended for equipment used in the processing of food, such as milk.

[0019] Preferably, said chlorinated isocyanuric acid or its salt is selected from the group consisting of dichloroisocyanuric acid, trichloroisocyanuric acid, sodium dichloroisocyanurate, potassium dichloroisocyanurate, sodium dichloroisocyanurate dihydrate, and mixtures thereof.

[0020] In preferred embodiments, said chlorinated isocyanuric acid or its salt is sodium dichloroisocyanurate.

[0021] It has been observed that said chlorinated isocyanuric acid or its salt, particularly sodium dichloroisocyanurate, allows the proliferation of microorganisms, such as bacteria, to be advantageously and effectively counteracted for periods of time much longer, especially with respect to other known chlorinated compounds.

[0022] For the purposes of the present invention, the term 'solid composition' means a mixture in powder, granule, micro-granule, pellet, multiparticulate, micronized particulate form or a combination thereof. The composition of the invention is preferably in the form of microgranules.

[0023] Preferably, in said composition, said chlorinated isocyanuric acid or its salt is in an amount of 25-40 wt% on the weight of the composition; more preferably, it is in an amount of 27-35 wt% on the weight of the composition. A chlorinated isocyanuric acid or its salt in said amounts is more effective in removing that which may contaminate the milk and in synergising the detergent action of the sodium hydroxide.

[0024] Preferably, in said composition, the sodium hydroxide is at least 40 wt% on the weight of the composition. Indeed, in this amount it has been observed that the sodium hydroxide has an improved detergent effect. More preferably, the sodium hydroxide is in an amount of 45-60 wt% on the weight of the composition. Preferably, the sequestering agent is in an amount of 10-30 wt% on the weight of the composition; more preferably, it is in an amount of 12-25 wt% on the weight of the composition. In fact, many minerals are present in the milk, including calcium, iron and phosphate, which deposit inside the milking plant forming the so-called "milk-stone". The sequestering agent, present in high quantities in the composition, has the ability to form complexes with said ions bringing them in solution; there is therefore an advantageous reduction in the use of acid detergent.

[0025] Suitable sequestering agent is one or more compounds selected from:

- inorganic polyphosphates such as sodium hexameta

phosphate (SHMP), sodium polyphosphate, sodium tripolyphosphate, sodium trimeta phosphate, sodium pyrophosphates, and

- phosphonated aminopolycarboxylates such as ethylenediaminetetramethyl phosphonic acid (EDTMP), Diethylenetriaminepentamethyl phosphonic Acid (DETMP), aminotrimethylphosphonic acid (ATMP), 1-hydroxy-ethylidene-1,1-diphosphonic Acid (HEDP), diethylenetriamine penta(methylene phosphonic acid) (DTPMP).

[0026] Inorganic phosphates work under specific conditions and work as sequestering agents by converting troublesome metal ions into water soluble complex by a process of ion exchange.

[0027] Phosphates of aminopolycarboxylic acids or phosphonates are derivatives of phosphorous acid and are characterised by a C-P bond, which has stronger hydrolytic stability than the P-O-P bond of polyphosphates. This type of sequestering agents possess more features than mere chelation. These characteristics are: Threshold effect, i.e. inhibition of precipitation of CaCO_3 , CaSO_4 with sub-stoichiometric quantities of inhibitor; Corrosion inhibition; Resistance to hydrolysis; Deflocculation i.e. stability effect on colloidal suspensions.

[0028] Compared to popular amino polycarboxylic acid based sequestering agents, these phosphonates based sequestering agents have a high chelation ratio. Apart from better chelation value or better chelation ratio, these phosphonates also have better iron chelation than EDTA and NTA.

[0029] According to a preferred embodiment, the sequestering agent is sodium tripolyphosphate, as it offers a greater solubilisation rate in contact with water. Preferably, the composition of the invention consists of chlorinated isocyanuric acid or its salt, sodium hydroxide, silica and a sequestering agent selected from alkaline tripolyphosphate, tetra-alkaline pyrophosphate and mixtures thereof, wherein said chlorinated isocyanuric acid or its salt is at least 20 wt%, the sodium hydroxide is at least 40 wt%, and the sequestering agent is in an amount of 10-30 wt% on the weight of the composition

[0030] According to a preferred embodiment, the composition of the invention consists of 28-32 wt% of chlorinated isocyanuric acid or its salt, 48-55 wt% of sodium hydroxide, 15-20 wt% of sequestering agent and 0.1-2 wt% of silica.

[0031] According to an even more preferred embodiment, the composition of the invention consists of 29-31 wt% of chlorinated isocyanuric acid or its salt, 49-51 wt% of sodium hydroxide, 19-20 wt% of sequestering agent and 0.3-1 wt% of silica. In another aspect, the invention concerns a unit dose of the above-described solid composition consisting of

- 28-32 g of chlorinated isocyanuric acid or its salt,
- 48-55 g of sodium hydroxide.
- 15-20 g of sequestering agent, and

- 0.1-2 g of silica.

[0032] Said unit dose is particularly advantageous in that it allows dosing errors and wastage to be prevented, ensures a solid product at constant composition, allows economy of warehouse space and transport costs, and prevents the problem of the storage and disposal of empty cans, which the liquid products of the prior art disadvantageously present.

[0033] Said unit dose preferably consists of:

- 29-31 g of sodium dichloroisocyanurate,
- 49-51 g of sodium hydroxide.
- 19-20 g of sodium tripolyphosphate, and
- 0.3-1 g of silica.

[0034] According to a preferred embodiment, said unit dose comprises 100 g of the powder composition of the invention.

[0035] The composition and the unit dose of the present invention are prepared by mixing the solid compounds in the weight ratios as defined above.

[0036] In a further aspect, the invention relates to the use of a solid composition comprising chlorinated isocyanuric acid or its salt, sodium hydroxide, silica and a sequestering agent selected from alkaline tripolyphosphate, tetra-alkaline pyrophosphate and mixtures thereof, wherein said chlorinated isocyanuric acid or its salt is at least 20 wt% on the basis of the weight of the composition, an industrial food field, since significantly satisfactory results have been achieved in the washing and sanitizing of the equipment used, particularly in the dairy industry. In the dairy industries, said equipment is specifically milking pails, drums, filters, milking machines, reservoirs, pipes, filling machines, glass items, cream separators, tanks, boilers, tubs, vats and cold storage tanks, milk processing lines, surfaces and floors.

[0037] It has been observed that said chlorinated isocyanuric acid or its salt, particularly sodium dichloroisocyanurate, allows the proliferation of microorganisms, such as bacteria, to be advantageously and effectively counteracted for periods of time much longer, especially with respect to other known chlorinated compounds. This is particularly important in food industry, and especially in the dairy industry, where the equipments are washed and sanitized every day, and notwithstanding this, microorganisms, such as bacteria, sometime resist and proliferate.

[0038] Preferably, a solid composition consisting of chlorinated isocyanuric acid or its salt, sodium hydroxide, silica and a sequestering agent selected from alkaline tripolyphosphate, tetra-alkaline pyrophosphate and mixtures thereof, wherein said chlorinated isocyanuric acid or its salt is at least 20 wt% on the weight of the composition, is used for washing and sanitizing of the equipment in the dairy industry.

[0039] In particular, the solid composition or unit dose are poured directly into said equipment in which water is

present. Once the washing operations are concluded, the equipment is rinsed with water.

[0040] The composition of the invention acts in an effective and safe manner, in that even in the event of incomplete rinsing, that is where traces thereof remain, no negative effect on the milk flora was observed.

[0041] Furthermore, it has been surprisingly found that the suitable combination of components in the composition of the invention, including said chlorinated isocyanuric acid or its salt, allows the advantageous use of chlorine at low doses. It is in fact sufficient to pour the solid composition or unit dose into water in suitable quantities to reach a concentration of 0.5-2 g/l, preferably about 1 g/l. Indeed, a 100 g dose of composition is sufficient for 100 litres of water.

[0042] The composition of the invention is therefore particularly practical since it does not require pre-dilution, but can be poured directly into the plant, being also particularly soluble.

[0043] In a further aspect, the present invention concerns a product for washing and sanitizing of the equipment used, particularly in the dairy industry, comprising the composition above described. Said product can be in a solid, liquid, emulsion, suspension or gel form.

[0044] It is to be understood that all aspects identified as preferred and advantageous for the composition of the invention, are to be deemed analogously preferred and advantageous also for the unit dose and the uses of said composition, as well as for the product comprising the same.

[0045] Working examples of the present invention provided for illustrative purposes are reported herein below.

EXAMPLES

Example 1

[0046] 100 g of a solid composition were prepared in accordance with the present invention by mixing:

- 30 g of sodium dichloroisocyanurate,
- 50 g of sodium hydroxide,
- 19.5 g of sodium tripolyphosphate, and
- 0.5 g of silica.

Example 2

[0047] 100 g of a solid composition were prepared in accordance with the present invention by mixing:

- 28 g of sodium dichloroisocyanurate,
- 56 g of sodium hydroxide,
- 15.8 g of sodium tripolyphosphate, and
- 0.2 g of silica.

Example 3

[0048] 100 g of a solid composition were prepared in

accordance with the present invention by mixing:

- 32 g of potassium dichloroisocyanurate,
- 45 g of sodium hydroxide,
- 22 g of sodium tripolyphosphate, and
- 1 g of silica.

Example 4

[0049] 100 g of a solid composition were prepared in accordance with the present invention by mixing:

- 40 g of sodium dichloroisocyanurate dihydrate,
- 40 g of sodium hydroxide,
- 19 g of sodium tripolyphosphate, and
- 1 g of silica.

Example 5

[0050] 100 g of a solid composition were prepared in accordance with the present invention by mixing:

- 22 g of sodium dichloroisocyanurate dihydrate,
- 60 g of sodium hydroxide,
- 16 g of EDTMP, and
- 2 g of silica.

Example 6

[0051] 100 g of a solid composition were prepared in accordance with the present invention by mixing:

- 50 g of trichloroisocyanuric acid,
- 35 g of sodium hydroxide,
- 12 g of ATMP, and
- 3 g of silica.

Claims

1. Solid composition consisting of chlorinated isocyanuric acid or its salt, sodium hydroxide, silica and a sequestering agent selected from alkali tripolyphosphate, tetra-alkali pyrophosphate and mixtures thereof, wherein said chlorinated isocyanuric acid or its salt is at least 20 wt% on weight of the composition.
2. The solid composition of claim 1, wherein said chlorinated isocyanuric acid or its salt is in an amount of 25-40 wt% on the weight of the composition.
3. The solid composition of claim 2, wherein said chlorinated isocyanuric acid or its salt is in an amount of 27-35 wt% on the weight of the composition.
4. The solid composition of any one of claims 1-3, wherein said chlorinated isocyanuric acid or its salt

is selected from the group consisting of dichloroisocyanuric acid, trichloroisocyanuric acid, sodium dichloroisocyanurate, potassium dichloroisocyanurate, sodium dichloroisocyanurate dihydrate, and mixtures thereof.

5. The solid composition of claim 4, wherein said chlorinated isocyanuric acid or its salt is sodium dichloroisocyanurate.

6. The solid composition of any one of claims 1-5, wherein sodium hydroxide is at least 40 wt% on the weight of the composition.

7. The solid composition of any one of claims 1-6, wherein said sequestering agent is in an amount of 10-30 wt% on the weight of the composition.

8. The solid composition of any one of claims 1-7, in the form of powder, granule, micro-granule, pellet, multiparticulate, micronized particulate, or a combination thereof.

9. The solid composition of any one of claims 1-8, consisting of 28-32 wt% of chlorinated isocyanuric acid or its salt, 48-55 wt% of sodium hydroxide, 15-20 wt% of sequestering agent and 0.1-2 wt% of silica.

10. The solid composition of claim 9, consisting of 29-31 wt% of chlorinated isocyanuric acid or its salt, 49-51 wt% of sodium hydroxide, 19-20 wt% of sequestering agent and 0.3-1 wt% of silica.

11. Unit dose of the solid composition of claim 1, consisting of:

- 28-32 g of chlorinated isocyanuric acid or its salt,
- 48-55 g of sodium hydroxide.
- 15-20 g of sequestering agent, and
- 0.1-2 g of silica.

12. The unit dose of claim 11, consisting of:

- 29-31 g of sodium dichloroisocyanurate,
- 49-51 g of sodium hydroxide.
- 19-20 g of sequestering agent, and
- 0.3-1 g of silica.

13. Use of a solid composition comprising chlorinated isocyanuric acid or its salt, sodium hydroxide, silica and a sequestering agent selected from alkali tripolyphosphate, tetra-alkali pyrophosphate and mixtures thereof, wherein said chlorinated isocyanuric acid or its salt is at least 20 wt% on the weight of the composition, for washing and sanitizing equipment used in the dairy industry.

14. The use of claim 13, wherein the solid composition is poured directly into said equipment, in which water is present, so as to reach a concentration of 0.5-2 g/l in water.

5

15. A product for washing and sanitizing of the equipment used in the dairy industry, comprising the solid composition of any one of claims 1-10 or the unit dose of any one of claims 11-12.

10

15

20

25

30

35

40

45

50

55



EUROPEAN SEARCH REPORT

 Application Number
 EP 14 15 7434

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 1 063 101 A (ECONOMICS LAB) 30 March 1967 (1967-03-30) * example 7 *	1-15	INV. C11D3/395 C11D3/04 C11D3/08 C11D3/12
A	US 3 336 228 A (FUCHS ROBERT JOSEPH [US] ET AL) 15 August 1967 (1967-08-15) * example XXV *	1-15	
A	EP 2 378 524 A1 (CRISTANINI SPA [IT]) 19 October 2011 (2011-10-19) * examples S1,S6 *	1-15	
A	GB 1 047 256 A (DIVERSEY (UK) LIMITED) 2 November 1966 (1966-11-02) * example 5 *	1-15	
A	US 3 352 785 A (CORLISS DUNCAN S ET AL) 14 November 1967 (1967-11-14) * example G *	1-15	
A	US 3 354 090 A (KEAST RUSSELL R) 21 November 1967 (1967-11-21) * claims 1-12 *	1-15	TECHNICAL FIELDS SEARCHED (IPC)
A	US 3 491 028 A (CROTTY HOMER E ET AL) 20 January 1970 (1970-01-20) * claims 1-8 *	1-15	C11D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 26 August 2014	Examiner Richards, Michael
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 14 15 7434

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

26-08-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 1063101 A	30-03-1967	NONE	
US 3336228 A	15-08-1967	NONE	
EP 2378524 A1	19-10-2011	NONE	
GB 1047256 A	02-11-1966	BE 634397 A CH 443842 A GB 1047256 A	26-08-2014 15-09-1967 26-08-2014
US 3352785 A	14-11-1967	DE 1617095 A1 FR 1539517 A GB 1144728 A US 3352785 A	18-02-1971 13-09-1968 05-03-1969 14-11-1967
US 3354090 A	21-11-1967	BE 681595 A DE 1670697 A1 GB 1142892 A JP S5115038 B1 NL 6607260 A US 3354090 A	31-10-1966 17-12-1970 12-02-1969 13-05-1976 02-12-1966 21-11-1967
US 3491028 A	20-01-1970	US 3491028 A ZA 7000687 A	20-01-1970 27-01-1971

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82