

COMPOSITION AND METHOD FOR URIC ACID REMOVAL

5 [001] This invention relates to a composition useful in the removal of uric acid from urinal waste pipes, as well as a method of using such a composition.

[002] Background

10 [003] The provision of cleaning services to public buildings, offices and the like is a highly competitive industry. Cost savings are therefore continuously sought. One way in which costs, and water consumption, have been reduced is the replacement of conventional urinals in men's washrooms with either low-flush or waterless urinals.

15 [004] A problem with low-flush and waterless urinals is that the reduced amount of water used results in the build-up of uric acid in urinal waste pipes. This can then cause undesirable odours and blockages in the waste pipes. Figures 1 and 2 show two examples of uric acid build-up in urinal waste pipes.

20 [005] The blockages in urinal waste pipes generally comprise two main components:

- (i) an organic component (around 30 wt%) comprising human uric acid waste which has been passed through the body, and
- (ii) an inorganic component (around 70 wt%) comprising mineral scale, the scale mainly comprising struvite, calcium carbonate and apatite.

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[006] To deal with this problem, cleaning services companies use increasingly corrosive chemicals to remove any blockages. However, the use of such chemicals is undesirable both from an environmental and a social responsibility perspective.

30 [007] Improved compositions and methods for deal with uric acid blockages have been sought.

[008] Statement of invention

35 [009] This invention relates to a composition comprising:

- (a) 10-20 wt% acidifying bacteria,
- (b) 30-40 wt% of an oxidising agent,
- (c) 5-15 wt% of an organic acid, and
- (d) 1-10 wt% of a chelating agent.

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[0010] It has been surprisingly found by the inventors that acidifying bacteria can digest organic waste because it is a food source for the bacteria. This digestion will take place as long as the environment is optimised for bacterial incubation, germination, replication and digestion. This can be achieved in the present invention with the introduction of oxygen within the composition via the inclusion of an oxidising agent. The inorganic component can be removed by inclusion of an organic acid and a chelating agent. In this way, the invention seeks to provide an effective product which also uses non-toxic chemicals and is therefore eco-friendly.

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[0011] The composition of the invention seeks to provide two benefits:

- (i) Digestion – the composition can digest legacy uric acid build up existing with the urinal waste pipe
- (ii) Prevention – the composition can digest and soften the uric acid within urine as it enters the urinal

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[0012] In particular, the composition may be a solid, more particularly a powder or granules.

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[0013] More particularly, the acidifying bacteria may be non-pathogenic. In particular, the acidifying bacteria may be at least partially dehydrated. For example, the acidifying bacteria may be lyophilised. More particularly, the acidifying bacteria may comprise *bacillus* bacteria or *lactobacillus* bacteria. In particular, the *bacillus* bacteria or *lactobacillus* bacteria may comprise *Lactobacillus plantarum*, *Lactobacillus acidophilus*, *Lactobacillus lactis*, and/or *Bacillus subtilis*. More particularly, the bacteria may comprise *Lactobacillus plantarum*. More particularly, the acidifying bacteria may be present in an amount of 10-20 wt%, even more particularly 13-17 wt%, more particularly about 15 wt%.

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[0014] More particularly, the composition may comprise lactose. In particular, the composition may comprise lactose in an amount of 10-20 wt%, more particularly 13-17 wt%, even more particularly about 15 wt%.

- 5 [0015] In particular, the composition may comprise glucose and/or dextrose. More particularly, the composition may comprise glucose and/or dextrose in an amount of 10-20 wt%, even more particularly 13-17 wt%, even more particularly about 15 wt%.

- 10 [0016] More particularly, the composition may comprise an organic acid in an amount of 8-12 wt%, even more particularly about 10 wt%. In particular, the organic acid may be citric acid and/or lactic acid.

- 15 [0017] More particularly, the composition may comprise an oxidising agent in an amount of 33-37 wt%, even more particularly about 35 wt%. In particular, the oxidising agent comprises sodium carbonate and/or sodium percarbonate. More particularly the oxidising agent may be a combination of 10-20 wt% sodium carbonate and 15-25 wt% sodium percarbonate, even more particularly 13-17 wt% sodium carbonate and 18-22 wt% sodium percarbonate, more particularly about 15 wt% sodium carbonate and about 20 wt% sodium percarbonate.

- 20 [0018] More particularly, the composition may comprise a chelating agent. In particular, the composition may comprise a chelating agent in an amount of 3-7 wt%, more particularly about 5 wt%. In particular, the chelating agent may be EDTA, trisodium dicarboxymethyl alaninate, polyaspartic acid and/or L-Glutamic acid N,N-diacetic acid. More particularly, the chelating agent may be L-Glutamic acid N,N-diacetic acid.

- 30 [0019] In particular, the composition may comprise a biodegradable dye. More particularly, the composition may comprise a biodegradable dye in an amount of 1-5 wt%, even more particularly about 3 wt%. More particularly, the composition may comprise a fragrance, even more particularly in an amount of 2 wt% or less.

- 35 [0020] The non-bacterial components of the composition are understood to help to break down the inorganic component of any blockage and release trapped nutrients for the acidifying bacteria.

[0021] This invention also relates to a method of removing uric acid from a waste pipe, more particularly a urinal waste pipe, comprising the step of inserting the composition as described above into the waste pipe.

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[0022] This invention will be further described by reference to the following Figures which are not intended to limit the scope of the invention claimed, in which:

Figure 1 shows a first example of uric acid build-up in a urinal waste pipe,

Figure 2 shows a second example of uric acid build-up in a urinal waste pipe,

10 **Figure 3** shows a bar chart of uric acid blockage degradation of a composition according to the invention compared with a control sample,

Figure 4 shows an experimental set-up used to test the breakdown in uric acid that would occur once the hydraulic action of urination is accounted for.

15 **Figure 5** shows a bar chart of uric acid blockage degradation of a composition according to the invention compared with a control sample utilising the set-up of Figure 4.

[0023] Examples

20 [0024] Example 1

[0025] A composition according to the invention was prepared by blending the following components in the amounts mentioned below:

25 15 wt% *Lactobacillus plantarum*
15 wt% Lactose
15 wt% glucose
15 wt% sodium carbonate
20 wt% sodium percarbonate
10 wt% citric acid,
30 5 wt% L-Glutamic acid N,N-diacetic acid
3 wt% biodegradable dye
2 wt% fragrance

35 [0026] Samples of uric acid blockage were weighed and dried overnight (30 °C) in a 30 ml disposable urine sample pot. 1 gram of the composition according to the

invention was added, along with 10 ml of water. Control samples were also prepared, which involved adding 10 ml of water with no product. There were 3 x repeats of each treatment (the invention or control). Treatment was left overnight, and the next day water was drained through a fine mesh that blocked the passage of solid uric acid scale. After the experiment, samples were dried overnight (30 °C), and then weighed.

[0027] Figure 3 shows the percentage weight loss in the uric acid samples after treatment, compared to the starting weight. The invention showed efficiency in breaking down uric acid (the samples labelled "ABS", 35 wt%-52 wt%) while the addition of water (i.e. the control samples) only broke down 5 wt%-12 wt%.

[0028] Example 2

[0029] Samples of uric acid blockage were weighed and dried for 8 hours (60 °C) in a 60 ml disposable plastic pot. The samples were then placed in a laboratory set-up designed to emulate pipework in men's urinals (see Figure 4). 1 gram of the composition of Example 1 was added, and 50 ml water was dripped onto the combined uric acid blockage and the inventive composition to provide moisture. This was left overnight. Control samples involved dripping water onto the uric acid blockage with no product added. The next day a urination simulation machine was run 60 times to emulate the hydraulic force that the blockage would experience in a real life setting. The experiment was run daily for 3 days. After the experiment, samples were dried for 8 hours (60°C), and then weighed.

[0030] Figure 5 shows the percentage weight loss in the uric acid samples after treatment, compared to the starting weight. The invention showed efficiency in breaking down uric acid (the samples labelled "ABS", 15 wt%-30 wt%) while the addition of water (i.e. the control samples) only broke down 7 wt%-12 wt%.