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(54) **COMPOSITION FOR PREVENTING BLOCKAGES IN A DRAINAGE PIPE**

(57) The present invention relates to a composition for preventing blockages in a drainage pipe, and to a method for producing such a composition. The present invention also relates to a particular embodiment of such a composition for preventing blockages in a drainage pipe, with the composition being designed as a stick.

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Description

[0001] The present invention relates to a composition for preventing blockages in a drainage pipe, and to a method for producing such a composition. The present invention also relates to a particular embodiment of such a composition for preventing blockages in a drainage pipe.

[0002] There is often stagnant water present in drainage pipes, such as for example with washbasins, kitchen worktops and shower floors. All kinds of processes can take place in this stagnant water which could have detrimental effects. Thus, in a kitchen environment, where leftover food and fats are being handled, it is not inconceivable for blockages to occur in the pipes. In the case of a shower floor, soap residues may cause blockages. In addition to the aforementioned blockages, the residues which remain behind may also cause unpleasant odours.

[0003] Various agents are commercially available which are intended to prevent such blockages or unpleasant odours. Examples of such agents which may be mentioned are chemical agents which may or may not be liquid and which may contain environmentally friendly acids and bases. Such agents may also damage the material of the pipes, as a result of which the service life and the appearance thereof will be adversely affected. In addition, care has to be taken with such agents to prevent them from coming into contact with other cleaning agents in order to avoid the formation of gases which are harmful to humans. Countless methods have been proposed to address the odour problem in drainage pipes, with many proposing to pour baking powder (sodium bicarbonate) down the drain. Although this method may offer a temporary solution to an odour problem in the drain, the baking powder is quickly washed away once water enters the drain. There are also so-called rubber plungers on sale but these only provide a solution once a blockage has already formed.

[0004] US patent application US 2009/110618 relates to a soluble scented bar which is placed in the drainage pipe of, for example, a sink in order to remove unpleasant odours. The compounds which are used to form the scented bar may be a deodorant, a disinfectant, an antimicrobial compound and an aromatic substance. Detailed data with regard to the specific chemical ingredients are missing. In addition, US patent application US 2009/110618 does not disclose any information about the method for producing such a scented bar, let alone which ingredients cause the scented bar to slowly dissolve in the drainage pipe of, for example, a sink, with a period of approximately thirty days being mentioned.

[0005] US patent US 11,021,682 relates to a water-soluble, hollow paper rod which is used to prevent blockages in drainage pipes. The paper rod contains a combination of chemical ingredients, i.e. a mixture of sodium hydroxide, aluminium powder, sodium hypochlorite and sodium nitrate. The action of the paper rod is based on heat which is generated by the exothermic reaction of the aluminium powder with the sodium hydroxide, as a result of which the material in the drainage pipe causing the blockage is unblocked.

[0006] Korean patent application KR20210113969A relates to a system for removing odours, for example odours which have spread from sewer and sewer pipes, with a perforated net being arranged in the pipe to which micro-organisms adhere and to which a complex enzyme is added, preventing the growth of damaging anaerobic bacteria and vermin.

[0007] Chinese patent application CN109715641 relates to an odour-removing device which is situated in a circuit in which gas or the aqueous liquid can be circulated, wherein the odour-removing element contains a polyoxometalate compound, which compound is provided as a surface layer in a network-like structure of the element.

[0008] US patent application US 2009/0105111 relates to a stable solid cleaning composition consisting of a wax-like solidifying agent, an ingredient selected from the group consisting of: a source of alkalinity, acidity regulator, stabilised microbial or enzyme composition, surfactant, sequestering agent and mixtures thereof, wherein the stable solid cleaning composition is obtained by means of a method comprising the following steps: providing liquid wax-like particles which comprise a solidifying agent and an ingredient selected from the aforementioned group, placing the liquid wax-like particles in a funnel or drawer of a concrete block-making machine and operating the concrete block-making machine in order to obtain the stable, solid cleaning composition.

[0009] It is an object of the present invention to provide a composition which is suitable for preventing blockages in a drainage pipe.

[0010] It is another object of the present invention to provide a composition which also reduces the undesirable odours which often occur in the case of blockages to a minimum.

[0011] Yet another object of the present invention is to provide a composition which can be inserted in a drainage pipe in a simple manner and is active for a certain period of time in situ to reduce blockages in the drainage pipe and the formation of undesirable odours to a minimum.

[0012] Yet another object of the present invention is to provide a composition which is suitable for preventing blockages, wherein the composition uses a biological process and is also biodegradable.

[0013] The invention thus relates to a composition for preventing blockages in a drainage pipe, which composition is designed as a stick and comprises the following ingredients:

a) wax, selected from the group of natural waxes, mineral waxes and derivatives thereof, or a combination thereof,
b) surfactant,
c) enzymes,

d) one or more additives, selected from the group of aromatic substances, fillers, binding agents, pH-regulating agents and stabilisers, emulsifiers, or a combination thereof, and
e) water.

[0014] On the basis of such a composition, one or more objects are achieved. The present inventors have found that the present composition in the form of a stick can be inserted in a drainage pipe in a simple manner, where the composition will perform its intended function. The wax present in the composition ensures that the enzymes are released according to a "slow release program", thus ensuring long-lasting action of the composition. In due course, the action of the composition preventing the blockage and neutralizing the odour will diminish, following which another stick has to be inserted in the drainage pipe. In this way, the problems of blockage and the formation of stale odours are solved in a natural way by means of the present composition in the form of a stick. The presence of wax in the present composition also ensures that the stick is readily bendable, which facilitates inserting it in a drainage pipe, which often comprises straight sections and bends, in which case the stick which has been inserted in this way is also slightly fixed in the drainage pipe, thus reducing the risk of the stick suddenly being flushed out to a minimum.

[0015] The present composition is biodegradable, based on renewable raw materials and free from microplastics. Microplastics are fragments of any type of plastic having a length of less than 5 mm, according to the U.S. National Oceanic and Atmospheric Administration (NOAA) and European Chemicals Agency.

[0016] In an example of the present composition, ingredient a) is present in an amount of at least 40% by weight, preferably at least 50% by weight and at most 80% by weight, preferably at most 70% by weight, based on the total weight of the composition.

[0017] In an example of the present composition, ingredient b) is present in an amount of at least 7% by weight, preferably at least 10% by weight and at most 25% by weight, preferably at most 20% by weight, based on the total weight of the composition.

[0018] In an example of the present composition, ingredient c) is present in an amount of at least 3% by weight, preferably at least 5% by weight and at most 20% by weight, preferably at most 15% by weight, based on the total weight of the composition.

[0019] In an example of the present composition, ingredient d) is present in an amount of at least 0.01% by weight, preferably at least 0.02% by weight and at most 5% by weight, preferably at most 4% by weight, based on the total weight of the composition.

[0020] In an example of the present composition, ingredient e) is present in an amount of at least 2% by weight, preferably at least 5% by weight and at most 25% by weight, preferably at most 20% by weight, based on the total weight of the composition.

[0021] The amounts of ingredients a) - e) are selected such that the sum of the ingredients is 100%, calculated on the basis of the total weight of the composition.

[0022] In an example of the present composition, ingredient a) has a melting point of at least 40°C, preferably at least 50°C, particularly preferably at least 60°C, measured in accordance with ASTM D87. Such a melting point is of particular importance in order to prevent a slow discharge of ingredient a), in particular when hot liquids come into contact with the stick, for example when hot pots and pans are being cleaned out with water in the sink or when, for example, the contents of a hot teapot are poured into a sink.

[0023] In an example of the present composition, ingredient a) has a hardness, at 25°C, of at most 15, determined in accordance with ASTM D1321. Such a hardness is desirable in order to prevent undesirable erosion of the composition, in particular when the stick comes into contact with sharp objects. In addition, a combination of hardness and melting point ensures that the active ingredients of the present composition are released in accordance with a "slow release profile", thus ensuring that the action of the stick is guaranteed for a long time.

[0024] Examples of ingredient b) anionic surfactants, such as for example sodium lauryl sulphate, sodium alkyl ether sulphate, anionic surfactants, such as for example alkyl benzene sulphonates, non-ionic surfactants, such as for example alcohol ethoxylates, amphoteric surfactants, such as for example cocamidopropyl betaine, ethanolamines and sorbitan esters, with the two last-mentioned groups also being regarded as emulsifiers to stabilise mixtures of oil and water.

[0025] In an example of the present composition, the sodium salt of palm acid is used as ingredient a).

[0026] In an example of the present composition, the sodium salt of palm kernel acid is used as ingredient b).

[0027] In an example of the present composition, one or more of proteases, amylases, lipases, hyaluronidase and peroxidase are used as ingredient c).

[0028] An example of a composition according to the present invention comprises the following ingredients, with the amounts in weight also being indicated: sodium palmate (55-65%), sodium palmpitate (12.5-17.5%), water (10-15%), enzymes (7.5-12.5%), glycerine (2.5-4.5%), aromatic substance (0.2-0.5%), sodium chloride (0.25-0.5%), lemon fragrance (0.25-0.5%) and citral (0.02-0.07%). The amounts of the aforementioned ingredients are selected in such a way that the sum of the ingredients is 100%, calculated on the basis of the total weight of the composition.

[0029] The present invention also relates to a method for producing a composition for preventing blockages in a drainage pipe as described above, in which the ingredients a) - e) are mixed, after which the mixture obtained in this way is then heated to a temperature above the melting point or melting range of ingredient a), following which the mixture which has been heated in this way is shaped to form a stick, the aforementioned stick being

obtained after cooling.

[0030] The present invention also relates to a stick based on a composition for preventing blockages in a drainage pipe as described above or obtained according to a method as described above, with the stick having a length, in one example, of at least 6 cm, preferably at least 8 cm, and having a diameter of at least 1 cm, preferably at least 2 cm.

[0031] The present invention also relates to a method for preventing blockages in a drainage pipe, comprising inserting a stick based on a composition as described above, or a stick as described above, or a stick obtained according to a method as described above, in a drainage pipe.

[0032] The present invention also relates to the use of a stick based on a composition as described above for preventing blockages in a drainage pipe and reducing the formation of undesirable odours.

[0033] The present invention will be explained below in more detail with reference to an example, but it should be noted that the invention is not limited thereto.

Example

[0034] A mixture of 60% by weight of sodium palmate, 15% by weight of sodium palmpitate, 10% by weight of enzymes (combination of proteases, amylases and lipases), 3% by weight of glycerine, 1% by weight of aromatic substance (lemon fragrance), 0.3% by weight of sodium chloride (0.25-0.5%) and a remaining amount of water were mixed while being heated at a temperature of 70°C to form a homogenous mass. The slightly liquid mass was transferred to a mould in order to form an elongate stick having a length of 7 cm and a diameter of 2 cm. After cooling, the stick shaped in this way was removed from the mould and manually inserted in a drainage pipe of a sink for domestic use. The drainage pipe did not have any blockages for a period of six months and did not suffer from any formation of disagreeable odours. Upon inspection, it was found that the stick had completely dissolved. Subsequently, a similar stick was again inserted in the drainage pipe and the same favourable effects were noted for an identical period of time.

Claims

1. Composition for preventing blockages in a drainage pipe, **characterized in that** the composition is designed as a stick and comprises the following ingredients:

   a) wax, selected from the group of natural waxes, mineral waxes and derivatives thereof, or a combination thereof,
   b) surfactant,
   c) enzymes,
   d) one or more additives, selected from the group of aromatic substances, fillers, binding agents, pH-regulating agents and stabilisers, emulsifiers, or a combination thereof, and
   e) water.

2. Composition according to Claim 1, **characterized in that** ingredient a) is present in an amount of at least 40% by weight, preferably at least 50% by weight and at most 80% by weight, preferably at most 70% by weight, based on the total weight of the composition.

3. Composition according to one or more of Claims 1-2, **characterized in that** ingredient b) is present in an amount of at least 7% by weight, preferably at least 10% by weight and at most 25% by weight, preferably at most 20% by weight, based on the total weight of the composition.

4. Composition according to one or more of Claims 1-3, **characterized in that** ingredient c) is present in an amount of at least 3% by weight, preferably at least 5% by weight and at most 20% by weight, preferably at most 15% by weight, based on the total weight of the composition.

5. Composition according to one or more of Claims 1-4, **characterized in that** ingredient d) is present in an amount of at least 0.01% by weight, preferably at least 0.02% by weight and at most 5% by weight, preferably at most 4% by weight, based on the total weight of the composition.

6. Composition according to one or more of Claims 1-5, **characterized in that** ingredient e) is present in an amount of at least 2% by weight, preferably at least 5% by weight and at most 25% by weight, preferably at most 20% by weight, based on the total weight of the composition.

7. Composition according to one or more of Claims 1-6, **characterized in that** ingredient a) has a melting point of at least 40°C, preferably at least 50°C, particularly preferably at least 60°C, determined in accordance with ASTM D87.

8. Composition according to one or more of Claims 1-7, **characterized in that** ingredient a) has a hardness at 25°C of at most 15, determined in accordance with ASTM D1321.

9. Composition according to one or more of Claims 1-8, **characterized in that** the composition comprises the following ingredients: sodium palmate (55-65% by weight), sodium palmpitate (12.5-17.5% by weight), water (10-15% by weight), enzymes (7.5-12.5% by weight), glycerine (2.5-4.5% by weight), aromatic substance (0.2-0.5% by weight),

sodium chloride (0,25-0,5% by weight), lemon fragrance (0.25-0.5% by weight) and citral (0.02-0.07% by weight), wherein said amounts of the aforementioned ingredients have been selected in such a way that the sum of the ingredients is 100%, calculated on the basis of the total weight of the composition.

10. Composition according to one or more of Claims 1-9, **characterized in that** the composition is free from microplastics.

11. Method for producing a composition for preventing blockages in a drainage pipe according to one or more of the preceding claims, wherein the ingredients a) - e) are mixed , after which the mixture obtained in this way is then heated to a temperature above the melting point or melting range of ingredient a), following which the mixture which has been heated in this way is shaped to form a stick, the aforementioned stick being obtained after cooling.

12. Stick based on a composition for preventing blockages in a drainage pipe according to one or more of Claims 1-10, or obtained according to a method according to Claim 11, **characterized in that** the stick has a length of at least 6 cm, preferably at least 8 cm, and a diameter of at least 1 cm, preferably at least 2 cm.

13. Method for preventing blockages in a drainage pipe, comprising inserting a stick based on a composition according to one or more of Claims 1-10 or a stick according to Claim 12 or a stick obtained according to a method according to Claim 11 in a drainage pipe.

14. Use of a stick based on a composition according to one or more of Claims 1-10, a stick according to Claim 12 or a stick obtained according to a method according to Claim 11, for preventing blockages in a drainage pipe and reducing the formation of undesirable odours.

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EUROPEAN SEARCH REPORT

Application Number
EP 23 21 9913

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 April 2024	Neys, Patricia

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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