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(54) **Cleaning agent additives comprising oligogalacturonides**

(57) Cleaning compositions containing one or more oligogalacturonides in order to diminish the adherence of pathogens are claimed.

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Description

Field of application of the invention

[0001] The invention relates to cleaning agent additives which diminish the adherence of pathogens, said additives belonging to the oligogalacturonide group, and to cleaning agents containing said additives and to the application of these cleaning agents.

Background of the invention

[0002] Besides merely removing visible dirt, modern cleaning agents have a considerable number of other functions, depending on the field in which they are applied. Of these other functions, one of the most important is that of removing pathogenic micro-organisms and/or rendering their activity harmless. Without the use of such cleaning agents, life in an industrial society, given the density of its inherent population, would entail the frequent recurrence of epidemics. A number of channels are pursued in the elimination of pathogens. As an example, aggressive chemicals are used, extreme pH values established, pesticides added or long boiling procedures effected in the attempt to remove or destroy adherent germs. In sensitive fields, such as in personal hygiene or in the food sector, it is not possible to implement the strategies specified, or, if so, only to a limited extent. WO 95/12326, for example, describes how food and animal feed can be freed from dirt and residues under conditions which are moderate and toxicologically acceptable.

[0003] From the fields of medicine and pharmacy, a lot is known about the elimination of pathogenic micro-organisms. More recent research indicates that many pathogenic microorganisms first have to attach and adhere to certain cellular structures before they can unfold their pathogenic action. In the review of David Zopf and Stephen Roth, "Oligosaccharide anti-infective agents" (The Lancet, Vol. 347, April 13, 1996, p. 1017-1021), the point is made that certain oligosaccharides can, on the one hand, inhibit the attachment of certain pathogens while, on the other hand, these oligosaccharides are able to detach these already adhering pathogens again from body cells. Correspondingly, patent EP 0 716 605 describes the use of a pharmaceutical preparation which contains an oligogalacturonide as the active substance, said oligogalacturonide serving to block the attachment of germs to mammalian cells.

[0004] In many cases, it is impossible to create the marginal chemical and/or physical conditions that are required for a complete elimination of pathogenic micro organisms. The treatment of food with pesticides, for example, directly prior to consumption on the part of the end consumer is neither acceptable nor is it justifiable. Conservative cleaning using just tensides does not ensure the complete elimination of pathogens. In the food trade and in the food production sector, residues of the

disinfectant agents used can constitute a danger to the consumer; an example is the cleaning of drink cans. In the case of personal hygiene, common cleansing agents do not completely eliminate germs, a fact reflected in the slow healing process of rashes and minor skin inflammations, despite routine personal hygiene.

Therefore, it is an object of the present invention to overcome the problems posed by the prior cleansing agents.

[0005] It is a further object of the invention to provide a cleaning agent capable of at least partially detaching and eliminating certain causative pathogens (such as bacteria, viruses and/or fungi) from the surfaces to be cleansed, elimination meaning removal and/or rendering harmless to the consumer.

[0006] An additional object of the present invention is to provide a cleaning agent capable of at least partially preventing detached causative pathogens from reattaching and certain causative pathogens from attaching at all. In any case, the additive in the cleaning agent is not to entail any additional toxicological or ecological risk.

[0007] A further additional object of the cleaning agent of the present invention is to render certain causative pathogens, which might remain on the cleaned object as residues, harmless to consumers in that these pathogens cannot adhere to human cells.

Summary of the invention

[0008] The present invention provides a cleaning composition for increasing the effectiveness of cleaning activities wherein said cleaning composition comprises one or several oligogalacturonides.

[0009] The present invention further provides a cleaning composition wherein said cleaning composition is selected from the group of hard surface cleaning compositions, detergents, dish washing compositions, food cleaning compositions, cloth and fibre cleaning compositions, and disinfectants.

[0010] The present invention further provides a cleaning composition wherein said oligogalacturonides are comprised of 2 to 7 galacturonic acid units.

[0011] The present invention further provides a composition wherein said oligogalacturonides are at least partially esterified.

[0012] The present invention further provides a cleaning composition wherein said oligogalacturonides are comprised of galacturonides with at least partial α -1.4 glycosidic linkage.

[0013] The present invention further provides a cleaning composition wherein the pH value of said cleaning composition is below 7 during the course of application of said cleaning composition, preferably said pH value being adjusted between 3 and 6.

Detailed description of the invention

[0014] The term "cleaning agent" or "cleaning compo-

sition" as used herein refers to all compositions intended to be used in connection with and for increasing the effectiveness of cleaning activities. The term cleaning agent includes but is not limited to hard surface cleaning compositions (kitchen cleaning compositions, bathroom cleaning composition, floor cleaning compositions, general household cleaning composition, glass cleaning compositions), detergents, dish washing composition, food cleaning compositions, cloth and fibre cleaning compositions, disinfectants, and the like. The term "cleaning" as used herein refers to those activities which involve the removal of undesirable residues from surfaces and particularly includes activities such as chemical, mechanical, and thermal cleaning activities as well as combinations thereof. Chemical cleaning activities include for example the use of solvents for removing the residues from the surface, potentially further involving the use surface active substances to increase the compatibility between residue and solvent. Chemical cleaning activities further include chemical alteration of the residues to improve the ease of removal of the residue. Mechanical cleaning activities include the use of forces exerted onto the residues, potentially including the use of tools such as sponges, scrapers, and the like and/or potentially including other means to deliver the forces such as ultrasonic waves, a beam of solid particles, and the like. Thermal cleaning activities include changing the temperature of the residue to change the physical state of the residue such as lowering the temperature to render the residue brittle or raising the temperature to render the residue more viscous or even liquid.

[0015] In their effective forms, oligogalacturonides are comprised of 2 to 7 monomeric galacturonic acid units, preferably of α -1.4 glycosidic linkage. In microbiological tests, the digalacturonides proved to be the most effective in blocking adherence of certain bacteria to epithelial cells. Any pure substances such as α -1.4 digalacturonide, the appropriate tri-, tetra- etc. galacturonides as well as compounds thereof can be used in conjunction with the present invention. These oligogalacturonides can be of synthetic or natural origin or indeed can have been subjected to appropriate processing and cleaning procedures already. The galacturonic acid units can at least partially be esterified with preferably short chain alcohols (above all, methanol, ethanol).

[0016] In chemical terms, it is possible just to generate the described oligogalacturonides from precursors in the cleaning composition itself. It is likewise conceivable that the oligogalacturonides could be generated from corresponding precursors during application. Additives which contain such oligogalacturonide precursors may have a beneficial influence on the consistency of the cleaning agent and/or the action thereof. In particular, such precursors can be comprised of long chain oligogalacturonides or polygalacturonides. Given certain circumstances, natural substances, such as pectin, or plant extracts in general, can serve as oligogalacturonide precursors.

[0017] It is of benefit for the unfolding of the oligogalacturonide action in diminishing pathogenic adherence if the pH value is set at below 7. In this respect, a cleaning agent conforming to the present invention is preferably to be formulated to produce such a pH value during the cleaning procedure. In order to generate formulas which are permanently stable and guarantee good cleaning results with a high degree of skin tolerability, preference is given to cleaning agent formulas with pH values between 3 and 6. Preferably, the pH of the cleaning composition is buffered such that the pH is maintained during use of the agent.

[0018] Oligogalacturonides are carbohydrates. Therefore, no immune reactions in humans or animals are to be expected. It is safe to assume that oligogalacturonides are toxicologically safe. Further, it can be expected that the incorporation of oligogalacturonides does not have a negative impact on the human organism. Oligogalacturonides are thus ideally well suited for use as additives for cleaning agents, where on the one hand, pathogens are to be removed, yet on the other, there is the danger of absorption by human or animal.

[0019] Pathogens, the adherence of which to epithelial cells is inhibited by oligogalacturonides, are not likely to be resistant to this substance group during long-term applications or when applied frequently in a preventive capacity.

[0020] Oligogalacturonides are of neutral environmental impact. The quantities generally emitted by cleaning agents into the environment constitute no danger.

[0021] No extreme chemical and/or physical conditions are required for the oligogalacturonides to unfold their action as described by this invention. Only an adjustment of the pH value to a level lower than 7 reinforces the action of germ detachment.

[0022] Another advantage lies in the tremendous chemical stability of the oligogalacturonides. Practically unimpaired, they withstand even such conditions as are used for sterilization. Hence it is possible to sterilize products containing oligogalacturonides and equally to use oligogalacturonides under sterilizing conditions.

[0023] A cleaning agent conforming to the present invention may take any form that is suitable for the application intended and be applied by way of a suitable cleaning procedure.

[0024] Liquid cleaning agents can thus sometimes be treated as concentrates. The use of a cleaning agent conforming to the present invention is also possible in the form of creams, pastes, powders, pearls, tablets etc. Application as a solution, suspension, emulsion, spray, foam, on a moistened cloth etc. as well as the exact exterior presentation depends above all on the application intended.

[0025] Due to their germ-detaching action, oligogalacturonides are the optimum supplement for many hard surface cleaning compositions and other general household cleaning compositions. In addition to their

function of detaching causative pathogens from hard surfaces, they prevent the attachment of certain causative pathogens, not only to the object to be cleansed, but also to human and epithelial cells. In extreme circumstances, therefore, oligogalacturonides render washing possible with germ contaminated water. The re-attachment of detached pathogens is inhibited by the addition of oligogalacturonides to the cleaning agent, and even the attachment and adherence of germs in residue form to human or animal epithelial cells will be decreased reducing the respective health risks.

[0026] By way of their germ-detaching and attachment-inhibiting behaviour, oligogalacturonides may reinforce the action of ordinary disinfectants. These disinfectant agents are known to have a better effect when the pathogens are freely suspended in solution, than if they are bound to surfaces.

[0027] To reduce causative pathogens (e.g. certain bacteria and/or viruses) attaching to hard surfaces and to remove said pathogens from such surfaces, oligogalacturonides are added to hard surface cleaning compositions. In this context, the term hard surface cleaning composition denotes all products used for the purpose of cleaning of hard surfaces in particular those surfaces which come into contact with human skin or mucosa or which come into contact with article which in turn come into contact with human skin or mucosa.

[0028] Generally, hard surface cleaning compositions contain various substances which carry out a number of different functions, such as tensides for the mobilization and encasing of substances that are not soluble in water, softeners as chelating agents for alkaline earth ions, aromatic substances to heighten product appeal etc. The addition of oligogalacturonides to a number of hard surface cleaning compositions such as those well known in the art is conceivable and sensible, such hard surface cleaning compositions including but not being limited to kitchen cleaners, dish washing compositions, bathroom cleaners, medical cleaners, glass cleaners, polymeric material cleaners, wood cleaners, and floor cleaners.

[0029] The use of oligogalacturonides in hard surface cleaning compositions renders possible a combination never hitherto achieved of low impact/danger to human life and environment together with a highly effective action against certain pathogenic bacteria, viruses and fungi. It follows that hard surface cleaning compositions could be compiled which are toxicologically safe and still are able to remove pathogenic micro-organisms from sensitive surfaces.

[0030] Alternatively, to reduce causative pathogens (e.g. certain bacteria and/or viruses) attaching to food surfaces and to remove said pathogens from surfaces, oligogalacturonides are added to food cleaning compositions. A wide variety of food cleaning compositions is well known in the art and includes but is not being limited to compositions for washing fruits, salad, vegetables and the like.

[0031] The addition of oligogalacturonides to cleansing agents for food heightens the efficiency of such agents without evoking toxicologically hazardous side-effects. Any incorporation of residues from the cleaning agent additive which have not been fully removed is of no relevance to the individual. The safe, yet effective cleansing of food by the end consumer is becoming increasingly important to large sections of the population in many countries and is backed by the health authorities. The combination of impact, toxicological and ecological safety and the expected absence of immune reactions to the substance group makes oligogalacturonides the optimum adjuvant for washing meat, poultry, fish, vegetables, fruit and mushrooms.

[0032] In the same light, the use of oligogalacturonides is likewise recommended for cleaning agents for the food and drink industry. All surfaces which come into contact with food or food raw materials during their manufacture, have to be cleaned carefully. Oligogalacturonides are ideal for situations in which the complete removal of residues from cleaning agents cannot be guaranteed. Examples of such situations are when drink bottles and cans are rinsed prior to their filling or when tankers are cleaned before being loaded with raw food products. Not only here, oligogalacturonide additives to cleaning agents are also recommended for the sectors of food storage and the food trade itself. Even if it is possible to use disinfectants in these instances and others, and even if extreme sterilizing conditions can be generated, oligogalacturonides should still be used since they are able to mobilize certain pathogenic micro-organisms and hence facilitate the invasive impact of conservative disinfectants.

[0033] Given the context described and exceptional circumstances, contaminated waste water may also be used for cleaning purposes provided it is combined with a cleaning agent such as that constituted by this invention.

[0034] Another useful application of the cleaning agents is found in animal care. Domestic animals and livestock should be freed from pathogenic micro-organisms without endangering human health. With livestock, when using cleaning agents to which oligogalacturonides have been added, the focus is on improved hygienic conditions for the animals, factors which are reflected positively in terms of product quality and smooth, unimpeded production sequences. With domestic animals, cleansing of the animals with cleaning agents containing oligogalacturonides enables an uninhibited contact with the animal and the cleaning agent is safe to handle. Pathogenic micro-organisms that have been washed off the animals are unable to attach to cells of the person washing the animal.

[0035] Another advantage of the invention lies in the cleaning of living plants or their produce, using the cleaning agents as specified in the present invention. If oligogalacturonides are added to the cleaning agent pathogenic micro-organisms washed off ornamental

plants and agriculturally cultivated plants are not able to accumulate on the cells of the person washing them. Additionally, the intake of produce washed with these agents becomes safer since germs adhering to the produce will either be washed away in the cleaning process, or, in case the germs stay on the produce as residue, they will be unable to adhere to cells in the gastrointestinal area due to the attachment - inhibiting effect of the galacturonides.

[0036] The present invention also offers a wide scope of application for the cleaning of fibres and fabrics. This sector ranges from the cleaning of growing raw materials cultivated for the filling materials industry to the large-scale industrial removal of pesticides, dirt and pathogens from cotton and other fibres during processing through to the daily care taking of clothes, towels, linen, table cloths, carpets, curtains, and the like in the home such as washing with a fabric care composition. General compositions for the cleaning of fibres and fabrics as aforementioned are well known in the art. Here too, it is important to emphasize the advantages of this novel combination, namely its efficacy in detaching pathogenic micro-organisms, the resultant improved safety level for users and its extremely low ecological impact.

course of application of said cleaning composition.

7. A cleaning composition according to Claim 6 wherein said pH value is adjusted between 3 and 6.

Claims

1. A cleaning composition for increasing the effectiveness of cleaning activities **characterized in that** said cleaning composition comprises one or several oligogalacturonides. 30
2. A cleaning composition according to Claim 1 wherein said cleaning composition is selected from the group of hard surface cleaning compositions, detergents, dish washing compositions, food cleaning compositions, cloth and fibre cleaning compositions, and disinfectants. 35 40
3. A cleaning composition according to claim 1 or claim 2 **characterized in that** said oligogalacturonides are comprised of 2 to 7 galacturonic acid units. 45
4. A composition according to any of claims 1 to 3, **characterized in that** said oligogalacturonide are at least partially esterified. 50
5. A cleaning composition according to any of claims 1 to 4, **characterized in that** said oligogalacturonides are comprised of galacturonides with at least partial α -1.4 glycosidic linkage. 55
6. A cleaning composition according to any of the preceding claims **characterized in that** the pH value of said cleaning composition is below 7 during the



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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 3980

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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 03/92 (P4/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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