surface, and leaves a residual coating which renders the surface bacteriostatic for extended periods of time, which can typically be measured in weeks. The specified compositions in that case consisted essentially of a biostatic complex formed between a polyvinyl alcohol (hereinafter also referred to as "PVOH") and a C12-C18 straight chain alkyl benzalkonium quaternary compound. Those compositions contained from 1.2% to 8% w/w of PVOH and up to 8% w/w of the quaternary ammonium compound**.** Although such compositions provide major benefits and have met with commercial success, they were understood to suffer from the disadvantage that, because of the highly cationic nature of the composition, it could not be sold impregnated onto a cellulosic substrate, but rather need to be supplied in a container. The user was required to locate an applicator such as a nonwoven or fabric or paper wipe with which to wipe the surface immediately after application of the composition.

It is an object of the present disclosure to overcome or ameliorate one of the abovementioned disadvantages, or at least provide a commercial alternative.

Brief Statement

According to a first example the present disclosure provides an applicator for providing an active composition to a surface, the applicator comprising a cellulosic substrate having anionic sites and an impregnated or coated composition, the impregnated composition comprising a bioactive cationic component in an amount sufficient in use to deactivate the anionic sites in the cellulosic substrate and to provide a desired effect.

In one example, the desired effect is a biocidal effect. In other examples, the desired effect is enhanced skin feel or skin health. In yet other examples, the effect is fabric softening.

Preferably, the applicator in the form of a sheet wipe. The sheet wipe may comprise a single layer of cellulosic substrate or it may comprise multiple layers (for instance, two, three, four, five or more layers, e.g. two or three layers) of cellulosic substrate.

The applicator may be wet or dry. In some examples, it is preferable if the applicator is substantially dry.

Preferably, the cationic component is selected from the group consisting of a quaternary ammonium compound, or a skin compatible cationic selected from benzalkonium chloride, benzethonium chloride, alkylammonium chloride, chlorhexidine gluconate, octenidine hydrochloride, tallow quaternary compounds or silicone-based quaternary compounds.

The cellulosic substrate may be selected from the group consisting of paper, paper laminates, cardboard, plant fabrics or the like. The plant fabric may be a wood pulp, cotton material,

bamboo material, hemp material or the like. The cellulosic substrate may be woven or non-woven.

According to a second example the disclosure provides an applicator for providing an active composition to a surface, the applicator comprising at least two layers of cellulosic substrate having anionic sites; said layers being adhered to each other by an adhesive composition, the adhesive composition comprising a cationic component in an amount sufficient in use to deactivate the anionic sites in the cellulosic substrate and to provide a desired effect.

In an aspect, there is provided an applicator for providing an active composition to a surface, the applicator comprising at least two layers of cellulosic substrate having anionic sites; said layers being adhered to each other by an adhesive composition, the adhesive composition comprising a water-soluble or water-dispersible adhesive polymer is selected from one or more of PVOH, polyvinyl pyrrolidone or copolymers of polyvinyl pyrrolidone with vinyl acetate, non-ionic polyvinyl acetate emulsions or vinyl ether/maleic anhydride copolymer and a cationic component in an amount sufficient in use to deactivate the anionic sites in the cellulosic substrate and to provide a biocidal effect and at least one other desired effect.

In one example, the desired effect is a biocidal effect. In other examples, the desired effect is enhanced skin feel or skin health. In yet other examples, the effect is fabric softening.

Preferably, the adhesive composition also comprises a water-soluble or water-dispersible adhesive polymer. Any suitable water-soluble or water-dispersible adhesive polymer may be used, for preference, it is selected from one or more of PVOH, polyvinyl pyrrolidone or copolymers of polyvinyl pyrrolidone with vinyl acetate, non-ionic polyvinyl acetate emulsions or vinyl ether/maleic anhydride copolymer.

The impregnation or coating of the present disclosure preferably takes place without the need for thermal modification, i.e. there is no thermoplastic adhesion between the substrate and the cationic compound.

More specifically according to one example the disclosure provides an applicator for providing an active composition to a surface, the applicator comprising at least two layers of cellulosic substrate having anionic sites; said layers being adhered to each other by an adhesive composition, the adhesive composition comprising a cationic component in an amount sufficient in use to deactivate the anionic sites in the cellulosic substrate and to provide a desired effect, and polyvinyl alcohol.

In one example, the desired effect is a biocidal effect. In other examples, the desired effect is enhanced skin feel or skin health. In yet other examples, the effect is fabric softening.

The applicator may be wet or dry. In some examples, it is preferable if the substantially dry.

Preferably, the cationic component is selected from the group consisting of a quaternary ammonium compound, or a skin compatible cationic selected from benzalkonium chloride, benzethonium chloride, alkylammonium chloride, chlorhexidine gluconate, octenidine hydrochloride, tallow quaternary compounds or silicone based quaternaries.

In one example, each one of said at least two layers are the same. In another example, each one of said at least two layers are different. In some examples, the applicator comprises multiple layers of cellulosic substrate adhered to each other by an adhesive composition.

The cellulosic substrate may be selected from the group consisting of paper, paper laminates, cardboard, plant fabrics or the like. The plant fabric may be a wood pulp, cotton material, bamboo material, hemp material or the like. The cellulosic substrate may be woven or non-woven.

According to a third example the disclosure provides a method of preparing an applicator according to preceding examples comprising:

- selecting a cellulosic substrate and a cationic component,
- determining a base loading of the cationic component on the cellulosic substrate at which and anionic sites on the cellulosic substrate are inactive, and
- selecting an amount of cationic component for application to the cellulosic substrate such that cationic component will exhibit an effect in use.

In another aspect, there is provided a method of preparing an applicator as defined above, the method comprising

- selecting a cellulosic substrate and a cationic component,
- determining a base loading of the cationic component on the cellulosic substrate at which and anionic sites on the cellulosic substrate are inactive, and
- selecting an amount of cationic component for application to the cellulosic substrate such that the applicator will exhibit a biocidal effect and at least one other desired effect in use.

The amount of cationic component comprises the base loading and an amount sufficient to provide a desired or predetermined effect.

In one example, the desired effect is a biocidal effect. In other examples, the desired effect is enhanced skin feel or skin health. In yet other examples, the effect is fabric softening.

The cationic component may be selected from the group consisting of a quaternary ammonium compound, or a skin compatible cationic selected from benzalkonium chloride, benzethonium chloride, alkylammonium chloride, chlorhexidine gluconate, octenidine hydrochloride, tallow quaternary compounds or silicone based quaternaries.

The cellulosic substrate may be selected from the group consisting of paper, paper laminates, cardboard, plant fabrics or the like. The plant fabric may be a wood pulp, cotton material,

bamboo material, hemp material or the like. The cellulosic substrate may be woven or non-woven.

According to a fourth example the disclosure provides a method of making an applicator comprising:

- contacting the surface of a first ply of cellulosic material with an adhesive composition comprising a cationic component and
- applying to the adhesive composition a further ply of cellulosic material, and

wherein the cationic component is present in an amount sufficient in use to deactivate the anionic sites in the cellulosic substrate and to provide a desired effect.

In another aspect, there is provided a method of making an applicator, the method comprising:

- contacting the surface of a first ply of cellulosic material with an adhesive composition comprising a water-soluble or water-dispersible adhesive polymer is selected from one or more of PVOH, polyvinyl pyrrolidone or copolymers of polyvinyl pyrrolidone with vinyl acetate, non-ionic polyvinyl acetate emulsions or vinyl ether/maleic anhydride copolymer and a cationic component and
- applying to the adhesive composition a further ply of cellulosic material to produce a cellulosic substrate having anionic sites, and

wherein the cationic component is present in an amount sufficient in use to deactivate the anionic sites in the cellulosic substrate and to provide a biocidal effect and at least one other desired effect.

In yet another aspect, there is provided a method of disinfecting an inanimate surface comprising moistening the surface and then wiping the surface using an applicator as defined above.

In yet another aspect, there is provided a method of disinfecting an inanimate surface comprising moistening an applicator as defined above and then wiping the surface with the moistened paper or fabric whereby to apply a bioactive cationic species to the surface.

In yet another aspect, there is provided a method of disinfecting skin comprising moistening the surface and then wiping the skin using an applicator as defined above.

In yet another aspect, there is provided a method of disinfecting skin surface comprising moistening an applicator as defined above and then wiping the surface with the moistened paper or fabric whereby to apply a bioactive cationic species to the skin.

In one example, the desired effect is a biocidal effect. In other examples, the desired effect is enhanced skin feel or skin health. In yet other examples, the effect is fabric softening. In the case of a biocidal effect the biocidal efficacy of the treatment is measured using the same standardised methodology as has for decades been used with wet wipes. In the case of wet wipes the liquid is squeezed from the wipe and the biocidal efficacy of this liquid then tested against microorganisms according to standard methods.

In the case of the dry wipes as described herein, where the dry wipe is composed of 2 paper plys each of 20gms/sq.m. The first ply by applying via transfer roller a solution of

benzalkonium chloride and polyvinyl alcohol to the surface of this first ply which is then brought into contact and squeezed between rollers to contact the second ply. The quantity of treatment applied to the surface is insufficient to saturate the substrate even after squeezing between rollers so that the now composite structure can be immediately rolled up without the adjacent layers of the 2 ply material bonding to each other.

When this treated substrate has been formulated and manufactured so as to satisfy the requirements of hospital grade hard surface disinfection the antimicrobial efficacy is assessed as follows:

For each 20 x 23 sq.cm section of treated substrate 4 mls of water is added. Soon after this addition the wetted paper is squeezed and the exuded solution collected. This solution is then subjected to standardised microbiocidal efficacy testing as described in the4 Australian Health Therapeutic Goods Administration Option A test. For compliance to this test the solution must achieve an over 5 log reduction in a Staph aureus suspension and also an over 5 log reduction in an E coli suspension.

In the case of a substrate intended for skin antisepsis similar methodology is used whereby a predetermined area of treated substrate is wetted with water, subsequently squeezed and the liquid collected and its antimicrobial efficacy tested by standardised test methods.

The Australian Health Department's Therapeutic Goods Administration has approved this test methodology for the assessment of efficacy of active, dry substrates which are to be activated by water contact.

Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise", "comprising", and the like are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to".

CLAIMS

1. An applicator for providing an active composition to a surface, the applicator comprising at least two layers of cellulosic substrate having anionic sites;
   said layers being adhered to each other by an adhesive composition, the adhesive composition comprising a water-soluble or water-dispersible adhesive polymer is selected from one or more of PVOH, polyvinyl pyrrolidone or copolymers of polyvinyl pyrrolidone with vinyl acetate, non-ionic polyvinyl acetate emulsions or vinyl ether/maleic anhydride copolymer and a cationic component in an amount sufficient in use to deactivate the anionic sites in the cellulosic substrate and to provide a biocidal effect and at least one other desired effect.

2. An applicator according to claim 1 wherein the at least one other desired effect is selected from one or more of an enhanced skin feel, enhanced skin health and fabric softening.

3. An applicator according to claim 1 or 2 wherein each one of said at least two layers are the same.

4. An applicator according to any one of claims 1 to 3 wherein each one of said at least two layers are different.

5. An applicator according to any one of claims 1 to 4 comprising multiple layers of cellulosic substrate adhered to each other by an adhesive composition.

6. An applicator according to any one of claims 1 to 5 wherein the cellulosic substrate is selected from the group paper, paper laminates, cardboard, plant fabrics or the like.

7. An applicator according to claim 6 wherein the plant fabric is a wood pulp or cotton material.

8. An applicator according to any one of claims 1 to 7 wherein the cellulosic substrate is woven.

9. An applicator according to any one of claims 1 to 7 wherein the cellulosic substrate is non-woven.

10. A method of preparing an applicator according to any one of the preceding claims, the method comprising
    - selecting a cellulosic substrate and a cationic component,
    - determining a base loading of the cationic component on the cellulosic substrate at which anionic sites on the cellulosic substrate are inactive, and
    - selecting an amount of cationic component for application to the cellulosic substrate such that the applicator will exhibit a biocidal effect and at least one other desired effect in use.

11. A method according to claim 10 wherein the at least one other desired effect is selected from one or more of an enhanced skin feel, enhanced skin health and fabric softening.

12. A method according to claim 10 or 11 wherein the cationic component is selected from the group consisting of a quaternary ammonium compound, or a skin compatible cationic selected from benzalkonium chloride, benzethonium chloride, alkylammonium chloride, chlorhexidine gluconate, octenidine hydrochloride, tallow quaternary compounds or silicone based quaternaries.

13. A method according to any one of claims 10 to 12 wherein the cellulosic substrate is selected from the group consisting of paper, paper laminates, cardboard, plant fabrics or the like.

14. A method of making an applicator, the method comprising:
    - contacting the surface of a first ply of cellulosic material with an adhesive composition comprising a water-soluble or water-dispersible adhesive polymer is selected from one or more of PVOH, polyvinyl pyrrolidone or copolymers of polyvinyl pyrrolidone with vinyl acetate, non-ionic polyvinyl acetate emulsions or vinyl ether/maleic anhydride copolymer and a cationic component and
    - applying to the adhesive composition a further ply of cellulosic material to produce a cellulosic substrate having anionic sites, and

    wherein the cationic component is present in an amount sufficient in use to deactivate the anionic sites in the cellulosic substrate and to provide a biocidal effect and at least one other desired effect.

15. A method according to claim 14 wherein the at least one other desired effect is selected from one or more of an enhanced skin feel, enhanced skin health and fabric softening.

16. A method according to claim 14 or 15 wherein subsequent layers of adhesive and ply are applied to make a multi-ply applicator, and wherein the cationic component is present in an amount sufficient in use to deactivate the anionic sites in the cellulosic substrate and to provide a desired effect.

17. A method of disinfecting an inanimate surface comprising moistening the surface and then wiping the surface using an applicator according to any one of claims 1 to9.

18. A method of disinfecting an inanimate surface comprising moistening an applicator according to any one of claims 1 to 9 and then wiping the surface with the moistened paper or fabric whereby to apply a bioactive cationic species to the surface.

19. A method of disinfecting skin comprising moistening the surface and then wiping the skin using an applicator according to any one of claims 1 to 9.

20. A method of disinfecting skin surface comprising moistening an applicator according to any one of claims 1 to 9 and then wiping the surface with the moistened paper or fabric whereby to apply a bioactive cationic species to the skin.