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(54) **Textile fabric impregnated with an antimicrobial and/or cleaning active ingredient preparation with a polyolefin fleece-based carrier**

(57) The invention relates to a textile fabric impregnated with an antimicrobial and/or cleaning active ingredient preparation. The carrier has a dry weight of 8 to 40g and comprises a bicomponent fibre fleece comprising a polyolefin, wherein the carrier has a substantially rectangular form with two short and two long sides, and wherein in the region of the two short sides there are means respectively for securing the carrier material to a

holder.

Furthermore, the invention relates to a kit consisting of a carrier based on a bicomponent fibre fleece comprising polyolefin and an active ingredient preparation for producing such a fabric.

In addition, the invention relates to a method for the disinfection and/or cleaning of inanimate surfaces with the impregnated textile fabric.

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**Description**

[0001] The invention relates to a textile fabric impregnated with an antimicrobial and/or cleaning acting ingredient preparation with a carrier which comprises a bicomponent fibre fleece comprising polyolefin. The fabric is particularly suitable for single use on inanimate hard surfaces, for example for the disinfection or cleaning of such surfaces. Furthermore, a kit consisting of a carrier and active ingredient preparation is provided. In addition, the invention relates to a method for the disinfection or cleaning of inanimate hard surfaces with the impregnated textile fabric.

**1. Prior art**

[0002] Impregnated textile fabrics for the disinfection or cleaning of inanimate surfaces, for example for surface disinfection, are known. The conventionally used impregnated fabrics (for example mops) have a comparatively high overall weight and are therefore disadvantageous. Thus a commercially available cotton mop in an impregnated state has a weight of almost 500 g.

[0003] In order to avoid spreading microorganisms, particularly for the disinfection or cleaning of larger areas in hygienically critical areas (for example in hospitals), mops also need to be changed at regular intervals (i.e. for example for each room). The total weight of the individual impregnated mop covers and the required repeat process of attaching a freshly impregnated mop can thus cause considerable and repeated stress to the musculoskeletal system of the cleaning staff during their daily work.

[0004] Means are also known which reduce this stress by way of a disposable system of low weight (for example the Swiffer® system). A disadvantage of the Swiffer system is that it is not widely applicable, as the wiping cloth cannot be attached to the holder by the user without making contact. For specific active ingredients in surface disinfectants contactless handling is desirable however. Furthermore, a special holder is needed for the Swiffer system.

[0005] According to the teaching of JP 2005/192624 a moist cleaning cloth is provided which is impregnated with a water-soluble cleaning agent. Said patent publication does not relate to disinfection or cleaning but to picking up dust.

[0006] US 2008/0098545 discloses a device for providing and impregnating cleaning mops without the user coming into contact with the impregnation solution. In this case the mop is soaked in a container with the impregnation solution. Apart from the fact that this involves an additional step, there is a risk that the mop will not be soaked evenly with the impregnating solution.

[0007] US 5,656,361 A discloses a moist cloth for repeated use, which is impregnated with an aqueous alcohol composition and releases the latter in a controlled manner. The fleece has a grammage of 17 to 100 g/m<sup>2</sup> and includes polypropylene meltblown fibres.

[0008] WO 2010/011192 discloses mops for cleaning, antisepsis, disinfection and for polishing floors. The mops comprise a piece of material which has a T-shaped metal or wooden structure in a central area. A structure of this kind is expensive and not suitable for one-off use.

[0009] US 2006/0053579 discloses a trolley for providing reusable moist cloths made of microfibres.

[0010] JP 2007-250939 discloses moist cloths with fibres made of polyethylene terephthalate (PET) or PET copolymers. The emphasis is on picking up hair from the cleaned floor. JP 2002-382284 also discloses PET-based fibres.

[0011] EP 1 250 413 A relates to a floor cleaning cloth. In the application according to the teaching of EP 1 250 413 A contactless handling is also not ensured.

[0012] EP 1 661 586 A1, which relates to the disinfection of hard surfaces, proposes using a carrier material made of plastic fibres, for example polyethylene terephthalate (PET) to prevent the adsorption of active ingredients. However, the carrier materials specifically proposed in EP 1 661 586 A1 are not suitable on different floor coverings owing to their lack of stability and lack of tearing resistance.

[0013] In WO 2004/000373 A1, which also relates to the disinfection of hard surfaces, the use of special additives is proposed, which lift up the fibres of the carrier materials in order to prevent the adsorption of active ingredients. The cleaning fabrics according to WO 2004/000373 A1 can be made of cotton or microfibres. As the additives special quaternary ammonium compounds, polydialkyldiallyl ammonium salts with acrylamide and/or acrylic acid and/or vinyl acetate and the derivatives thereof are proposed. The compulsory use of these special additives thus limits the option of formulating an active ingredient preparation with the lowest possible amount of quaternary ammonium compound.

[0014] It would be possible in principle to work with an excess amount of the active ingredient in the preparation during the production of moist cloths in order to overcome the disadvantage of the adsorption of active ingredients on the carrier material. However, this is problematic if the carrier materials impregnated with active ingredient preparations potentially come into contact with the skin of the user. Furthermore, it is not desirable to increase the content of active ingredients for reasons of toxicity and environmental concerns. In this case there are clear limits to increasing the concentration of the active ingredient.

[0015] WO 99/06523 A discloses moist cloths and also addresses the problem of releasing the disinfectant. Preferred substrates are made of paper.

[0016] Known moist cloths are thus not suitable for the optimized delivery of a cleaning and/or disinfectant active ingredient. Owing to technical problems such as the absorption of active ingredients and the unsuitable nature of the carrier materials, until now excessive amounts of cleaning and disinfectant solution have been used. This has been associated with the increased use of active ingredients and thus means additional stress on the staff using it with regard to exposure scenarios. Furthermore, the increased use of active ingredients means increased environmental pollution, higher procurement and disposal costs for the cleaning and disinfectant solutions and increased physical stress on the cleaning staff because of the excess weight of the impregnated moist cloths (i.e. including cleaning agents and disinfectants).

[0017] The underlying objective of the present invention is to provide a textile fabric for cleaning and/or disinfecting inanimate surfaces (in particular hard surfaces). The fabrics should be impregnated or be able to be impregnated with a preparation. In addition, it should be possible to formulate many different active ingredient preparations. Furthermore, the mandatory presence of such additives in the impregnation preparation which are only used for preventing adsorption should not be necessary, the presence of which offers no further advantages (as is the case with the additives of WO 2004/000373 A1). Lastly, it should be ensured according to the invention that no complex or expensive holding systems are required, but instead conventional holding systems should be able to be used which permit handling without making contact.

## 2. Brief description of the invention

[0018] It has been found surprisingly that said and further objectives are achieved by using a carrier based on polyolefin-bicomponent fibre fleece material with a dry weight of 8 to 40 g, wherein the carrier has a substantially rectangular form with two short and two long sides, and wherein in the region of the two short sides means are provided respectively for securing the carrier onto a holder.

[0019] Thus the invention relates in a first aspect and according to claim 1 to an impregnated textile fabric, which comprises

- a) a carrier with a dry weight of 8 to 40 g, which comprises a bicomponent fibre fleece comprising a polyolefin, wherein the carrier has a substantially rectangular form with two short and two long sides, and wherein in the region of the two short sides there are means respectively for fixing the carrier material to a holder, and
- b) an antimicrobial and/or cleaning active ingredient preparation, with which the carrier is impregnated.

[0020] The present invention thus relates to a textile fabric in particular for disinfecting and cleaning surfaces, which provides the user with optimal conditions with regard to occupational safety. The impregnated fabric is characterised by having a low weight and at the same time has good properties with regard to wetting with the disinfectant and/or cleaning preparation (hereinafter "antimicrobial and/or cleaning active ingredient preparation"), a coverage of about 18 to 23 m<sup>2</sup> (according to the average size of a typical two-bed patient room) and handling without making contact. According to the invention a plurality of conventionally used active ingredients can be used.

[0021] The term "substantially rectangular" means that the corners of the carrier can be rounded for example.

[0022] The invention is also based on the fact that it was found surprisingly that a carrier, which comprises a bicomponent fibre fleece comprising a polyolefin, as well as having low grammage has good impregnation and release properties with regard to the active ingredient preparation used. The carrier also shows good compatibility for example with quaternary ammonium compounds as active ingredients and is therefore highly suitable for use as a pre-impregnated mop cover for the disinfection and/or cleaning of surfaces. This could not have been predicted because the carrier material used according to the invention was previously used in the production of nappies, i.e. in applications for which it is not necessary to ensure good impregnability at the same as the effective release of an antimicrobial and/or cleaning active ingredient preparation.

[0023] A further important aspect of the present invention is the increase in safety of the cleaning and disinfection in daily use: by providing impregnated cloths insufficient disinfection and/or cleaning due to underdosing is avoided, as may occur when using self-impregnating systems or also according to the teaching of US 2008/0098545. Outbreaks of nosocomial infections which occur in practice because of user error, e.g. incorrect dosage or insufficient preparation of reusable wiping materials, are thus reduced considerably. By using an impregnated cloth system safety can also be maximised by providing a simple colour coding so that cleaning and disinfection cloths can be distinguished from one another reliably by means of said colour code.

[0024] It was thus found according to the invention that special carrier materials because of their nature (material composition, structure and external structure) are particularly advantageous for use in the disinfection and/or cleaning of a typical floor surface (for example about 20 m<sup>2</sup>) because all of the active ingredient preparation is released without any loss of active ingredient. In this way an optimal ratio of wiping surface to impregnated fabric is achieved. The amount

of antimicrobial and/or cleaning active ingredient preparation is thus determined by the saturation of the carrier.

### 3. Figures

#### 5 [0025]

Figure 1: release of liquid from carriers based on different fleece materials (Fig. 1a) and excess wiping surface with the use of carriers based on different fleece materials (Fig. 1b).

10 Figure 2: sketch showing the preferred wiping technique of the invention for narrow (Figure 2 top) and wide areas (Figure 2).

### 4. Detailed description of the invention

#### 15 a) Carrier

19 [0026] According to the invention a textile fabric is impregnated with an antimicrobial and/or cleaning active ingredient preparation. The fabric comprises a) a carrier with a dry weight of 8 to 40 g/piece, which comprises a bicomponent fibre fleece comprising a polyolefin, and b) an antimicrobial and/or cleaning active ingredient preparation.

20 [0027] The carrier thus comprises a bicomponent fibre fleece (preferably the carrier is made from the bicomponent fibre fleece), and the bicomponent fibre fleece comprises polyolefin.

25 [0028] Typical dry weights of the carrier used according to the invention are 10 to 30 g/piece, more preferably 12 to 18 g/piece, in particular about 14 g/piece.

29 [0029] The carrier used according to the invention comprises a bicomponent fibre fleece comprising a polyolefin. In principle all kinds of fleece are suitable. The term "bicomponent fibre" means that the fibre of the fleece comprises a core and a casing which are made from different materials.

30 [0030] In one embodiment the core is made of polyolefin. In a further embodiment the casing is made of polyolefin.

35 [0031] In all embodiments of the invention it is preferred that both the core and also the casing of the bicomponent fibre of the fleece are made of polyolefin. In a particularly preferred embodiment the polyolefin fleece consists of bicomponent fibres with a polypropylene core and a polyethylene casing. Furthermore, the carriers used according to the invention can comprise a plurality of layers of fleece or consist of these layers, preferably systems with 2 to 4 layers are preferred. In a preferred embodiment the fleece is produced by heat setting (through-air-bonding), as known to a person skilled in the art.

40 [0032] Properties of preferred fleeces are listed below:

Physical Properties	Units	Measuring method	General	Preferred	In particular
Base weight	g/m <sup>2</sup>	**	50-110	60-100	70-90
MD-tensile strength	N/5 cm	ERT 20.2.89*	20-100	30-90	40-80
MD-stretching	%	ERT 20.2.89*	10-80	15-60	20-50
CD-tensile strength	N/5 cm	ERT 20.2.89*	5-50	8-40	10-30
CD-stretching	%	ERT 20.2.89*	30-110	40-100	50-90
Thickness	mm	ERT 30.5.99	1.0-5.0	1.5-4.0	2.0-3.0

\*Test speed: 200 mm/min. Distance between jaws: 100 mm. \*\*The dry cloth weight is determined by weighing with scales calibrated to at least 2 places. The cloth or the mop is placed in a previously tared crystallising dish and the cloth weight is determined and documented.

50 [0033] Preferred polyolefins are homopolymers and copolymers of ethylene and propylene, wherein the polyolefins can contain typical plastic additives. In addition to the one polyolefin (or the two or more polyolefins) the fabric can also contain carrier materials based on a natural polymer (such as polylactide) or another synthetic polymer (such as polyethylene terephthalate, PET). However preferably the presence of PET homopolymers and copolymers is excluded.

55 [0034] In a preferred embodiment of the textile fabric according to the invention also the presence of a carrier material based on natural or other synthetic polymers (i.e. different from polyolefin) is excluded, i.e. the carrier is preferably made essentially completely of polyolefin.

[0035] Preferably, the presence of natural fibres is also excluded in the carrier used according to the invention (such

as plant fibres, fibres of animal origin and mineral fibres).

**[0036]** A typical base area of the carrier is in all embodiments of the invention 150 to 1,920 cm<sup>2</sup>, more preferably 240 to 1,080 cm<sup>2</sup>, in particular 350 to 700 cm<sup>2</sup>. Typical sizes of the carrier lie within the following ranges:

	Width [cm]	Length [cm]
Preferred	25-80	6-24
More preferred	30-60	8-18
In particular	35-50	10-14

**[0037]** The means for securing the carrier to a holder (securing means) are known and are preferably selected from loops and pockets, wherein pockets are preferred in all embodiments of the invention. The (preferably two) securing means (preferably pockets) are joined to the base area of the carrier. In one embodiment this connection is a seam.

15 Alternatively or additionally, the securing means can be adhered to the carrier material of the base area (possibly by the effect of heat and/or by adhesive).

**[0038]** A carrier is particularly preferred that is made completely of polyolefin, in which both the carrier material and the securing means of the carrier are made of polyolefin.

20 b) Active ingredient preparation

**[0039]** The textile fabrics impregnated according to the invention comprise in addition to the carrier a) the antimicrobial and/or cleaning active ingredient preparation b). Said active ingredient preparation is preferably a single-phase preparation. Active ingredient preparations are particularly preferred which are in the form of a solution or a gel.

**[0040]** If the textile fabrics used according to the invention are impregnated with the active ingredient preparation b), then the active ingredient preparation is present as an application preparation. In the embodiment according to claim 9, which comprises a kit made from a) textile fabric and b) antimicrobial and/or cleaning active ingredient preparation (separated), the antimicrobial and/or cleaning active ingredient preparation b) can be present as an application preparation or alternatively as a concentrate which is diluted with water to form an application preparation.

**[0041]** The antimicrobial and/or cleaning active ingredient preparation b) used according to the invention thus comprises b1) one or more antimicrobial and/or cleaning active ingredients. In addition to component b1) the active ingredient preparation used according to the invention comprises one or more of the following optional components in a preferred embodiment:

35 b2) one or more solvent and/or

b3) one or more adjuvant.

**[0042]** Examples of antimicrobial and/or cleaning active ingredients b1) are described in sections 39 to 62 of Wallhäußer's Praxis der Sterilisation, Disinfektion, Antiseptik und Konservierung (Publisher A. Kramer and O. Assidian, Georg Thieme-Verlag Stuttgart, New York, 2008). They include aliphatic alcohols, aldehydes (such as formaldehyde, glutardialdehyde and succindialdehyde) and aldehyde donor compounds, inorganic acids, the salts and anhydrides thereof, organic carboxylic acids (such as aliphatic or aromatic carboxylic acids, the esters thereof (such as parabens) and amides, oxidants (such as for example peroxides, in particular hydrogen peroxide and peracetic acid), phenol derivatives, surfactants (such as in particular quaternary ammonium salts and bispyridinium alkanes), guanidines and biguanides, alkyl amines, nitrogen heterocycles, urea derivatives, aromatic alcohols, acetals and aminals, benzamidines, isothiazolines (such as isothiazole-3-one), phthalimide derivatives, quinolinols, benzimidazoles, mercaptobenzothiazoles, nitriles, carbamates (such as 3-iodine-2-propinylbutylcarbamate, IPBC), metals and metal compounds. Thus component b1) can comprise a mixture of surfactants, as typically used for cleaning, or consists of such a mixture of surfactants.

**[0043]** If the active ingredient preparation used according to the invention comprises only cleaning active ingredients as component b1), for example a mixture of (non-ionic) surfactants, then typically and preferably one or more antimicrobial ingredients used as preservatives is/are contained in the active ingredient preparation.

**[0044]** Cationic, amphoteric and/or non-ionic surfactants can be provided as the surfactant active ingredient b1) in the active ingredient preparations according to the invention.

**[0045]** As the non-ionic surfactant all suitable non-ionic surfactants can be used, such as for example (i) (fatty)-alcohol ethoxylates, (ii) sorbitan esters, (iii) alkyl - glucosides (in particular alkyl polyglucosides), (iv) ethylene oxide/propylene

oxide block copolymers. Particularly preferred non-ionic surfactants are (iii) alkyl polyglucosides.

[0046] The (i) alcohol polyalkoxylates include fatty alcohol alkoxylates, e.g. isodecylethoxylates with different proportions of ethylene oxide, isotridecylethoxylates, polyethylene glycol ether of the stearyl, lauryl and cetyl and oleyl alcohol. In this case the alcohols can have been alkoxylated by ethylene oxide, propylene oxide or any mixtures of ethylene oxide and propylene oxide. Alcohol polyalkoxylates are known by the names Lutensol®, Marlipal®, Marlox®, Brij® and Plurafac®. Lauryl alcohol ethoxylates are particularly preferred as the non-ionic surfactant.

[0047] Furthermore, sorbitan esters are used as non-ionic surfactants (ii), which are mostly in the form of oleates, stearates, laurates and palmitates and which are referred to as polysorbates (e.g. Tween®).

[0048] Furthermore, the non-ionic surfactant can be (iii) alkyl glucoside, such as an alkyl glucoside (i.e. an alkyl glucoside of glucose), more preferably a C<sub>8</sub>- to C<sub>20</sub>-alkyl polyglucoside, in particular a C<sub>8</sub>- to C<sub>16</sub>-alkyl polyglucoside of a fatty alcohol, wherein a lauryl polyglucoside, a decyl polyglucoside or a mixture thereof is preferred. The C-chain length in the cocoyl polyglucoside contains 8 to 16 atoms, in the lauryl polyglucoside 12 to 16 C-atoms and in the decyl polyglucoside also 8 to 16 C-atoms.

[0049] Also amphoteric surfactants are suitable as the surfactant, for example betaines. Suitable betaines are described in EP 0 560 114 A. Cocamidopropyl betaine is particularly preferred.

[0050] In addition, cationic surfactants, such as quaternary ammonium salts are possible as the surfactant. In principle, according to the invention all suitable quaternary ammonium - compounds can be used. Preferably, the quaternary ammonium compound is a dialkyldimethyl ammonium salt.

[0051] According to the invention preferably used quaternary ammonium salts are produced by the formula [R<sup>1</sup>R<sup>2</sup>R<sup>3</sup>(CH<sub>3</sub>)N]<sup>+</sup>[X]<sup>-</sup>, wherein R<sup>1</sup> to R<sup>3</sup> can be identical or different and are selected from C<sub>1</sub> - to C<sub>30</sub>-alkyl, aralkyl, alkenyl and mixed groups, which can comprise one or more atoms selected from O, S, N and P, wherein R<sup>1</sup> to R<sup>3</sup> are for example C<sub>8</sub>- to C<sub>18</sub>-alkyl, benzyl or methyl, preferably C<sub>9</sub>- to C<sub>18</sub>-alkyl, benzyl or methyl, such as C<sub>16</sub>-alkyl, benzyl or methyl. X is an anion (an inorganic or organic acid). In this case both the anion and cation of the quaternary ammonium salts can be polyvalent ions, which produces a stoichiometry of [A<sup>(n+)</sup>]<sub>m</sub>[K<sup>(m+)</sup>]<sub>n</sub>.

[0052] According to the invention all of the quaternary ammonium salts of the above formula known from the prior art are suitable as the quaternary ammonium salts, as disclosed for example in WO 00/63337, which is referenced here. Preferably, however dialkyldimethyl ammonium salts are used, for example dialkyldimethyl ammonium chlorides, the alkyl chains of which are selected independently from one another from C<sub>8</sub>- to C<sub>18</sub>-alkyl, preferably C<sub>9</sub>- to C<sub>18</sub>-alkyl, such as C<sub>16</sub>-alkyl. Of the dialkyldimethyl ammonium salts one of the methyl groups can be an alkoxylated, for example ethoxylated, hydromethyl group.

[0053] According to the invention preferably used quaternary ammonium salts are compounds of the formula [R<sup>1</sup>N(CH<sub>3</sub>)<sub>3</sub>]<sup>+</sup>[X]<sup>-</sup>, [R<sup>1</sup>R<sup>2</sup>N(CH<sub>3</sub>)<sub>2</sub>]<sup>+</sup>[X]<sup>-</sup> and [R<sup>1</sup>R<sup>2</sup>R<sup>3</sup>(CH<sub>3</sub>)N]<sup>+</sup>[X]<sup>-</sup>, wherein R<sup>1</sup> to R<sup>3</sup> are selected independently of one another from C<sub>8</sub>- to C<sub>18</sub>-alkyl and -(CH<sub>2</sub>-CHR<sup>4</sup>O)<sub>n</sub>-R<sup>5</sup>, wherein n is an integer from 1 to 20, preferably 1 to 5, and R<sup>4</sup> and R<sup>5</sup> can be the same or different, H and/or C<sub>1</sub>- to C<sub>4</sub>-alkyl, preferably H.

[0054] Examples of anions and classes of anions of the quaternary ammonium salts used according to the invention are hydroxide, sulphate, hydrogen sulphate, methosulphate, ethosulphate, lauryl sulphate, lauryl ether sulphate, cellulose sulphate, sulfamate, halogenide (fluoride, chloride, bromide, iodide), nitrite, nitrate, carbonate, hydrogen carbonate, phosphate, alkyl phosphate, metaphosphate, polyphosphate, thiocyanate (rhodanide), carboxylic acid salt such as benzoate, lactate, acetate, propionate, citrate, succinate, glutarate, adipate, toluol sulfonate (tosylate) and salicylate. Particularly preferred anions are chloride and propionate.

[0055] Particularly preferably, the quaternary ammonium salts used are mecetronium ethyl sulphate (hexadecyl(ethyl)dimethyl ammonium-ethyl sulphate), benzalkonium chloride and didecyldimethyl ammonium chloride.

[0056] The active ingredients b1) preferred for a particularly strong disinfection include (list 1):

- 45 1) alcohols, such as aliphatic alcohols (for example ethanol and isopropanol) and aromatic alcohols (for example phenoxy ethanol),
- 2) guanidines (preferably biguanidines),
- 3) aldehydes (such as for example formaldehyde, glutardialdehyde and succindialdehyde),
- 4) formaldehyde donor compounds, which gradually release chemically bonded formaldehyde when in use,
- 5) active oxygen compounds such as peroxide compounds, peracetic acid and hydrogen peroxide,
- 6) alkyl amines and
- 7) amphotensides.

[0057] Active ingredients b1), for which the cleaning effect is foremost, are (list 2):

- 55 1) surfactants,
- 2) acids and acid splitters,
- 3) alkalis and alkali salts,

4) oxidants and  
5) reducing agents.

**[0058]** Active ingredients selected from the above lists 1 and 2 can also be included as preservative active ingredients.

**b2) Solvents**

**[0059]** Furthermore, the used active ingredient preparation contains optionally b2) solvents. Preferred solvents are glycols and water and mixtures thereof. A preferred component b2) is water.

**b3) Adjuvants**

**[0060]** Examples of adjuvants, which can be contained optionally in the active ingredient preparations according to the invention, are fragrances, scents, thickening agents, pH-regulators, humectants, dyes, complexing agents, solubility promoters, corrosion inhibitors and abrasive materials.

**[0061]** The aforementioned effect, namely that there is no adsorption of active ingredients with polyolefins as carrier materials, is provided at typical pH-values of active ingredient preparations which are possible according to the invention. Preferred pH-values of the active ingredient preparations used according to the invention are in the range of 1.0 to 12.0, more preferably 1.5 to 11.5, such as 2.0 to 11.0.

**[0062]** Furthermore, it is preferred that the carrier material a) is impregnated with the active ingredient preparation b) (namely as an application preparation), and with 500 to 4,000% of the dry weight of the bicomponent fibre fleece, preferably with 1,000 to 3,000% of the dry weight of the bicomponent fibre fleece, particularly preferably with 1,500 to 2,500% of the dry weight of the bicomponent fibre fleece, for example about 2,000% or about 2,100% of the dry weight of the bicomponent fibre fleece.

**[0063]** In a further preferred embodiment antimicrobial and/or cleaning active ingredient preparations b) according to the invention are produced by the dilution of concentrates.

**[0064]** Examples of concentrates with an antimicrobially effective component b1) are described in the following (concentrates 1 to 4).

**Concentrate 1**

**[0065]** A preferred concentrate 1 has the following composition (amounts in wt.%).

<b>Component</b>		<b>preferably</b>	<b>more preferably</b>	<b>in particular</b>
b1)	Quaternary ammonium salt (preferably benzalkonium chloride)	5.0-30	10-25	15-21
	Polyhexamethylene biguanide	0.5-5.0	0.7-2.0	1-1.5
	Non-ionic surfactant	1.0-15	2.0-10	3.0-7.0
	Alkanol (preferably isopropanol)	0.5-10	1.0-6.0	1.5-4.0
b2)	Water	Rest	Rest	Rest
b3)	Complexing agent	0.2-2.5	0.4-1.5	0.6-1.2
	Dye	0.5-50x10 <sup>-3</sup>	1.0-20x10 <sup>-3</sup>	2.0-10x10 <sup>-3</sup>
	Fragrance	0.02-1.0	0.05-0.5	0.1-0.3

**Concentrate 2**

**[0066]** A further preferred concentrate 2 is composed as follows (amounts in wt.%).

	Component	preferably	more preferably	in particular
5	b1) Quaternary ammonium salt (preferably benzalkonium chloride)	10-40	15-30	20-25
	Non-ionic surfactant	4.0-20	6.0-15	8.0-12
	Glycine derivatives	4.0-20	6.0-15	8.0-12
	Alkanol (preferably isopropanol)	1.0-20	2.0-12	3.0-8.0
	Aromatic alcohol (preferably phenoxy - ethanol)	5.0-40	10.0-30	15.0-20
10	b2) Water	Rest	Rest	Rest
	b3) Complexing agent	0.3-7.0	1.0-5.0	1.5-3.5
	Dye	0.5-50x10 <sup>-3</sup>	1.0-20x10 <sup>-3</sup>	2.0-10x10 <sup>-3</sup>
15	Fragrance	0.02-1.0	0.05-0.5	0.1-0.3

Concentrate 3

20 [0067] A further preferred concentrate 3 is composed as follows (amounts in wt.%)

	Component	preferably	more preferably	in particular
25	b1) Quaternary ammonium salt, preferably a mixture of two and in particular three quaternary ammonium salts	5.0-30	10.0-25	15.0-23
	Non-ionic surfactant preferably a mixture of two non-ionic surfactants	1.0-15	2.0-10	3.0-7.0
30	b2) Water	Rest	Rest	Rest
	b3) Complexing agent	0.2-2.5	0.4-1.5	0.6-1.2

Concentrate 4

35 [0068] A further preferred concentrate 4 is composed as follows (amounts in wt.%)

	Component	preferably	more preferably	in particular
40	b1) Quaternary ammonium salt (such as didecyldimethyl-ammonium chloride)	2.0-40	5.0-20	10-15
	Amphoteric surfactant (such as N-Cocoalkyl derivatives of N,N'''-1,3-propane-diylbisguanidine)	2.0-40	5.0-20	10-15
	Non-ionic surfactant (preferably mixture of two non-ionic surfactants)	0.5-15	1.0-7.0	2.0-4.0
	Alkylamine	0.2-6.0	0.5-4.0	1.0-2.0
45	b2) Water	Rest	Rest	Rest
	b3) Complexing agent (such as nitrilotriacetic acid -trisodium salt)	0.5-10	1.0-7.0	2.0-4.0
	Dye	0.1-3.0	0.3-2.0	0.6-1.0
	Fragrance	0.1-2.0	0.2-1.0	0.3-0.8

55 [0069] The components listed for the concentrates 1 to 4 are typically available components. Additional components can also be included in said concentrates.

[0070] In addition to concentrates 1 to 4 with an antimicrobially effective component b1), which are typically used for

disinfection, concentrates with a cleaning component b1) are also possible.

[0071] Typically a (1) volume of the concentrate is diluted with water to 50 to 1,000 times the volume to produce an antimicrobial and/or cleaning active ingredient preparation, wherein a dilution to 50 to 400 times the volume is preferred.

[0072] Alternatively, and particularly if active ingredient preparations are used on the basis of oxidants (such as peracetic acid) a second embodiment is preferred in which the active ingredient preparation is provided as an application preparation. A typical formulation for such an application preparation is specified in the following (amounts in wt.%).

Component		preferably	more preferably	in particular
b1)	Peracetic acid	0.02-1.0	0.05-0.5	0.07-0.2
	Hydrogen peroxide	1.0-12	2.0-10	4.0-8.0
	Surfactant	0.02-1.0	0.05-0.5	0.07-0.2
	Organic acid (such as acetic acid)	0.15-4.0	0.5-2.5	1.0-2.0
b2)	Water	Rest	Rest	Rest
b3)	Stabiliser (such as phosphonic acid)	0.02-1.0	0.05-0.5	0.1-0.3

[0073] The components specified for this application preparation are typically available components. Said application preparation can also contain additional components.

[0074] Alternatively, it is possible to provide the textile fabric consisting of a) the carrier and b) antimicrobial and/or cleaning active ingredient preparation as a kit, wherein the active ingredient preparation b) in this embodiment can also be in the form of a concentrate. Said embodiment according to claim 9 is preferred if the active ingredient preparation contains components which are not compatible on longer contact with the carrier a), as possible for example with peroxide active ingredients.

[0075] In addition, the invention relates to a method according to claim 10 for the disinfection and cleaning of inanimate surfaces (in particular hard surfaces) with the impregnated textile fabric or the kit. The textile fabric impregnated according to the invention and kit according to the invention have a much reduced weight, which produces a clear reduction in the physical stress on the cleaning staff. The construction of a carrier with side loops or pockets also enables contact-free handling and thereby improves safety at work.

[0076] Commercially available folding holders are used for the textile fabrics used according to the invention. For example commercially available folding holders can be used with a metal clip, during the use of which a foldable metal clip is fitted into the securing means (such as pockets) and secures the textile fabric. Alternatively, commercially available quick-change holders made of plastic can be used, which are also foldable and also fit into the fastening means (in particular pockets). Thus it is not necessary to use special devices for the textile fabrics used according to the invention.

[0077] According to the method, as shown in Figure 2, with textile fabrics impregnated according to the invention the areas to be treated are typically wiped with the fabric in overlapping loop-like/wavy wiping movements. In this way adherent dirt is soaked and removed and the surface is disinfected. In the case of single use the fabric is disposed of after treating the surface.

[0078] When using the impregnated textile fabrics according to the invention the following aspects of infection prevention are achieved:

The impregnated textile fabrics according to the invention are optimised surprisingly with regard to the absorption and delivery behaviour of the active ingredient preparation for an area of about 20 m<sup>2</sup>. Said area corresponds to an average hospital room and the usual room size of households, doctor's surgeries, tattoo studios, old people's homes/care homes, kitchens or the like. In this way by means of the optimised coverage of cleaning and disinfection processes the risk of spreading microorganisms is much reduced by the cleaning or disinfection process. Furthermore, it is possible, on the basis of different active ingredient preparations to provide different variants of the impregnated textile fabrics to avoid nosocomial infections. For example, an active ingredient preparation can be derived for cleaning accommodation. Further active ingredient preparations can be pathogen-specific according to their composition: thus an active ingredient preparation based on the concentrates 1 to 4 can be used for combatting multi-resistant *Staphylococcus aureus*, norovirus infections or ESBL (extended spectrum  $\beta$ -lactamase) pathogens. For controlling the endospores of *Clostridium difficile* and mycobacteria, such as *Mycobacterium tuberculosis*, for example formulations based on peracetic acid are suitable, particularly (but not only) in the case of an outbreak.

[0079] The advantage of using the impregnated textile fabrics according to the invention for preventing infection and combating infection is thus the fact that in addition to reducing the risk of spreading depending on the activity spectrum

of the active ingredient preparation a colour coding can ensure maximum safety and different escalation levels for infection prevention and combating infection.

[0080] Impregnated textile fabrics according to the invention are preferably stored as a stack in packaging. When opening the packaging the contents (i.e. stack of impregnated textile fabrics) do not need to be touched. After tearing open the packaging the fabrics according to the invention are tipped into a trough (i.e. the cloths can be transferred into the trough without being touched). The fabrics are then in a pre-impregnated form in the trough in a stack. By means of the holding device (in particular folding device) of the mop holder the fabric is secured (for example is slipped into the two pockets), and the mop holder is locked. The attachment (in particular sliding in) and locking do not require contact with the hand of the user. Thus the first (and each consecutive) mop cover is removed from the stack and the disinfection and cleaning process can be performed according to the invention. After using the fabric the lock is released (by foot) by means of a button on the mop holder, and the used fabric is disposed of by shaking into a bucket. Here too there is no need for handling.

[0081] By using this ready-for-use system (impregnated textile fabric or kit) the user is also no longer exposed to handling concentrated active ingredient preparations, which gives further protection and also prevents the possibility of insufficient disinfection from incorrect dosages.

[0082] Aspects resulting from the weight (and material-optimised) impregnated textile fabrics according to the invention are:

(1) Improvement of user friendliness:

- low weight of the charged mop system,
- simplification of the selection of a suitable system by the option of providing e.g. a coloured marking on the packaging,
- simplification of disposal, in that the used mop can be thrown away instead of taken for recycling.

(2) Improvement of safety aspects:

- reliable dosage (cloth uniformly covered by manufacturer),
- possibility of using a mop system independently of a recycling unit,
- possible for the manufacturer to define various different safety levels,
- bacteria is prevented from spreading by avoiding multiple use and destroying contaminated mops,
- the operating safety can be increased if a cleaning/disinfecting system is made available to staff which is easy to recognise, e.g. by colour coding.

(3) Cost reduction

- A recycling unit is no longer necessary.
- The recycling step and the associated staff costs are omitted.

(4) Extension of possible use

Also establishments which do not have professional treatment units or recycling systems can use mop systems with "defined effectiveness".

[0083] The advantages of the present invention are shown in particular in the following examples. In the examples and in the above description of the antimicrobial and/or cleaning active ingredient preparation all of the percentages relate to the total weight of the active ingredient preparation, unless otherwise indicated.

Examples

[0084] The coverage of a 0.5% aqueous dilution of concentrate 1 is tested with different carrier materials and wipers.

Example 1

[0085] Determining the coverage of different cloths with the standard wiper I (plastic, Table 1)

Product	Dimensions* [cm]	Area**[m <sup>2</sup> ]	Note
1) Swiffer disposable mop***	25.5 x 10	6.8	

(continued)

Product	Dimensions* [cm]	Area**[m <sup>2</sup> ]	Note
2) Meiko master mop light	42 x 15	32.4	65% cotton, 35% polyester
3) 3M 100% polyester	41 x 12	39.0	100% polyester
4) PPS King Mop Profi	40 x 12	51.0	polyester 50%, viscose 50%
5) Disposable mop according to the invention	40 x 12	24.0	PE/PP-2 component fibre

\*Dimensions of the unwashed mop covers \*\*Area which can be cleaned and disinfected by the respective mop.  
\*\*\*Test not with the 0.5% dilution and a conventional plastic holder, but with the commercially available impregnated Swiffer disposable mop and Swiffer holder.

[0086] From the data in Table 1 it can be seen that the textile fabrics according to the invention (disposable mops) are very suitable for cleaning and disinfecting an area of about 20 m<sup>2</sup>.

#### Example 2

[0087] Determining the coverage of different cloths with the standard wiper II (metal, Table 2)

Product	Dimensions* [cm]	Area** [m <sup>2</sup> ]	Note
1) Swiffer disposable mop***	25.5 x 10	6.8	
2) Meiko master mop light	42 x 15	33.8	65% cotton, 35% polyester
3) 3M 100% polyester	41 x 12	36.5	100% polyester
4) PPS King mop Profi	40 x 12	51.3	polyester 50%, viscose 50%
5) Disposable mop according to the invention	40 x 12	21.6	PE/PP-2 component fibre

\*of the unwashed mop covers, \*\*Area which can be cleaned and disinfected by the respective mop. \*\*\*Test not with the 0.5% dilution and a conventional plastic holder, but with the commercially available impregnated Swiffer disposable mop and Swiffer holder.

[0088] From the data in Table 2 it is also shown that textile fabrics according to the invention (disposable mops) are very suitable for cleaning and disinfecting an area of about 20 m<sup>2</sup>. The area covered by a folding holder with metal clip is slightly smaller than the area covered by a quick-change holder made of plastic (cf. Table 1).

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Table 3

Product	Wet weight [g]	Dry weight [g]	Weight after wiping [g]	Width of the test area [cm]	Achieved length [cm]	Coverage [m <sup>2</sup> ]	m <sup>2</sup> area/m <sup>2</sup> mop
1	66.9	8.7	43.6	135	500	6.8	<b>264.7</b>
2	529.4	138.1	330.4	135	2400	32.4	<b>514.3</b>
3	622.9	114.7	366.0	135	2900	39	<b>795.7</b>
4	589.0	154.7	342.7	135	3800	51	<b>1068.8</b>
5	293.0	14.0	71.5	135	1800	24	<b>506.3</b>

	Absorbed amount of liquid [g]	Dispensed amount of liquid [g]	Dispensed amount of liquid /m <sup>2</sup>	Excess m <sup>2</sup> (for a standard 20 m <sup>2</sup> room)	Absorbed/dispensed amount of liquid	Dispensed/absorbed amount of liquid
1	58.2	23.4	3.5	-13.3	2.5	0.4
2	391.3	199.1	6.1	12.4	2.0	0.5
3	508.2	256.9	6.6	19.2	2.0	0.5
4	434.3	246.4	4.8	31.3	1.8	0.6
5	279.0	221.4	9.1	4.3	1.3	0.8

Table 4

Product	Wet weight [g]	Dry weight [g]	Weight after wiping [g]	Width of the test area [cm]	Achieved length [cm]	Coverage [m <sup>2</sup> ]	m <sup>2</sup> area/m <sup>2</sup>
1	66.9	8.7	43.6	135.0	500.0	6.8	264.7
2	554.4	138.1	363.1	135.0	2500.0	33.8	535.7
3	691.8	114.7	434.3	135.0	2700.0	36.5	740.9
4	594.5	150.1	320.8	135.0	3800.0	51.3	1068.8
5	307.8	14.0	71.4	135.0	1600.0	21.6	450.0

	Absorbed amount of liquid [g]	Dispensed amount of liquid [g]	Dispensed amount of liquid [g]/[m <sup>2</sup> ]	Excess m <sup>2</sup> (for a standard 20 m <sup>2</sup> room)	Absorbed/dispensed amount of liquid	Dispensed/absorbed amount of liquid
1	58.2	23.4	3.5	-13.3	2.5	0.4
2	416.3	191.4	5.7	13.8	2.2	0.5
3	577.1	257.5	7.1	16.5	2.2	0.4
4	444.4	273.8	5.3	31.3	1.6	0.6
5	293.8	236.4	10.9	1.6	1.2	0.8

**[0089]** The data in Table 3 (with standard wiper I made of plastic, cf. Table 1) show that optimum results can be achieved with the textile fabric 5 according to the invention (cf. also Figure 1A and Figure 1B). The amount of liquid deposited per m<sup>2</sup> is greater than for all of the products of the prior art. Furthermore, relative to a standard room size of 20 m<sup>2</sup> the excess amount is the lowest and the ratio of absorbed to dispensed liquid is the lowest (i.e. the absorbed amount of liquid is re-dispersed the most effectively).

**[0090]** The values in Table 4 (with the standard wiper II made of metal, cf. Table 2) also show the advantages of the textile fabrics according to the invention, wherein the amount of liquid absorbed per m<sup>2</sup> is even greater than when using the standard wiper I made of plastic (cf. also Figure 1A and Figure 1B). Accordingly, the absorbed amount of liquid is dispensed even more completely, and in relation to a standard room size of 20 m<sup>2</sup> the excess amount contained in the cloth of antimicrobial and/or cleaning active ingredient preparation is the lowest (apart from the Swiffer disposable mop, which is only sufficient for cleaning about 7 m<sup>2</sup>).

## Claims

## 1. Impregnated textile fabric which comprises

5 a) a carrier with a dry weight of 8 to 40 g, which comprises a bicomponent fibre fleece comprising a polyolefin, wherein the carrier has a substantially rectangular form with two short and two long sides, and wherein in the region of the two short sides there are means respectively for securing the carrier to a holder, and  
 b) an antimicrobial and/or cleaning active ingredient preparation with which the carrier is impregnated.

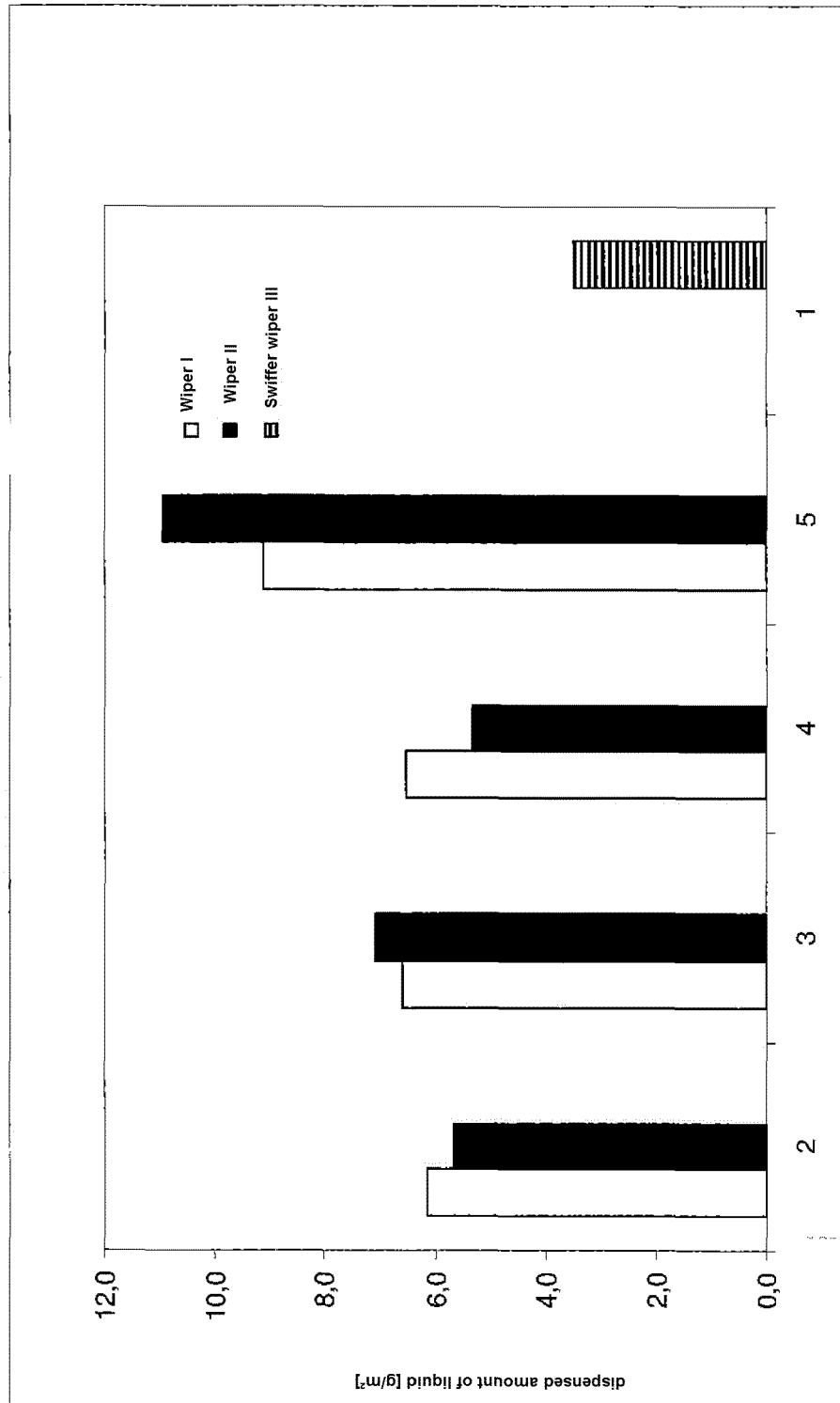
10 2. Fabric according to claim 1, **characterised in that** the carrier has a dry weight of 10 to 30 g, preferably 12 to 18 g.3. Fabric according to claim 1 or 2, **characterised in that** the core or casing of the bicomponent fibre consists of polyolefin, wherein preferably the core and casing are made of polyolefin.15 4. Fabric according to claim 3, **characterised in that** the polyolefin fleece comprises bicomponent fibres with a core of polypropylene and a casing of polyethylene and is preferably made from said bicomponent fibres.5. Fabric according to one of the preceding claims, **characterised in that** the active ingredient preparation is a single-phase preparation.20 6. Fabric according to one of the preceding claims, **characterised in that** the carrier is impregnated with the active ingredient preparation in an amount of 500 to 4,000% of the dry weight of the bicomponent fibre fleece, preferably 1,000 to 3,000% of the dry weights of the bicomponent fibre fleece, in particular 1,500 to 2,500% of the dry weight of the bicomponent fibre fleece.25 7. Fabric according to one of the preceding claims, **characterised in that** the active ingredient preparation comprises one or more active ingredients b1) selected from aliphatic alcohols, aldehydes and aldehyde donor compounds, inorganic acids, the salts and anhydrides thereof, organic carboxylic acid, the esters and amides thereof, oxidants, phenol derivatives, surfactants, guanidines and biguanides, alkylamines, nitrogen heterocycles, urea derivatives, aromatic alcohols, acetals and aminals, benzamidines, isothiazolines, phthalimide derivatives, quinolinols, benzimidazoles, mercapto benzothiazoles, nitriles, carbamates, metals and metal - compounds.30 8. Fabric according to one of the preceding claims, **characterised in that** the securing means are selected from loops and pockets.

## 35 9. Kit for the production of impregnated textile fabrics, which comprises

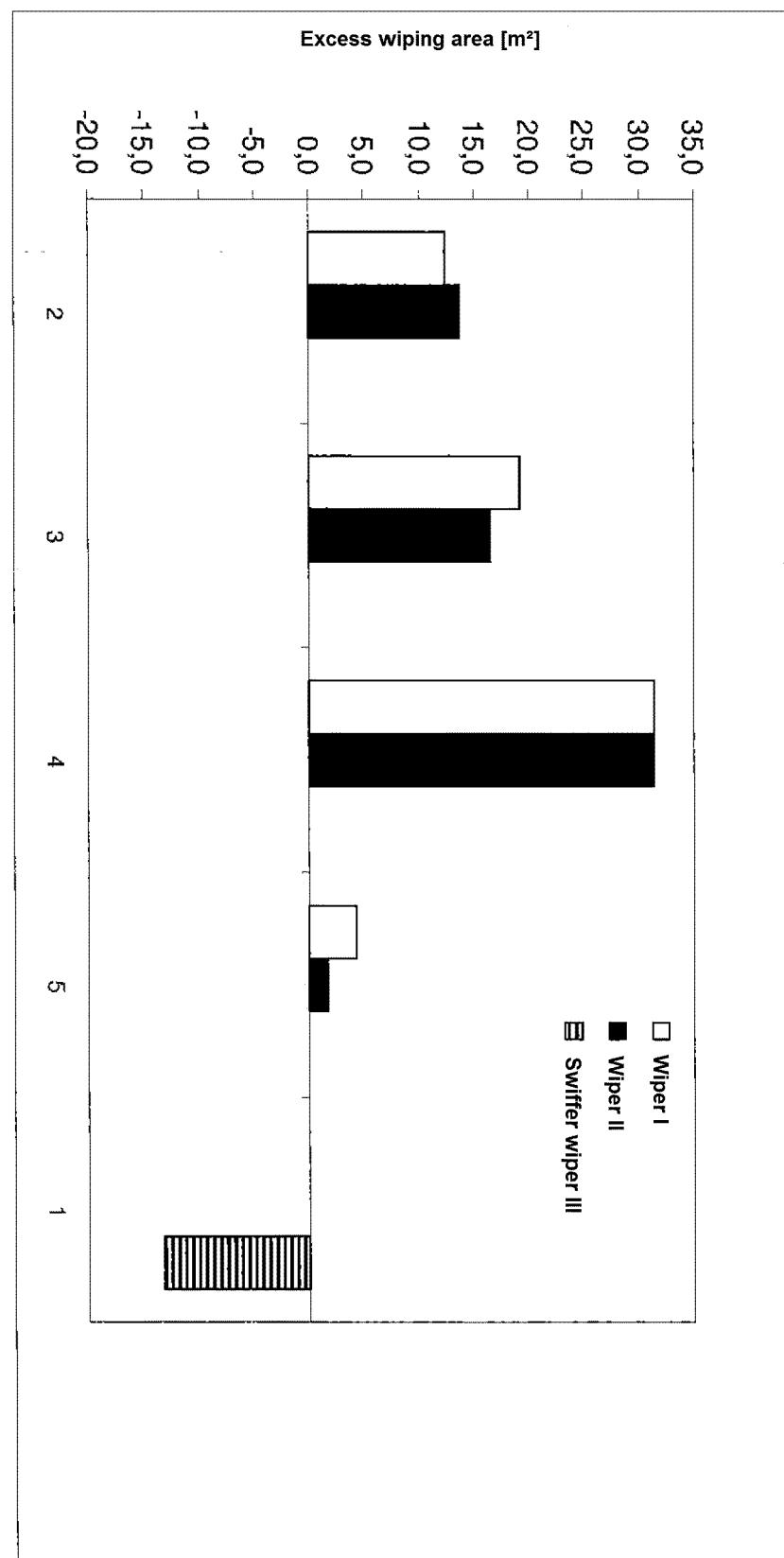
40 a) a carrier with a dry weight of 8 to 40 g, which comprises a bicomponent fibre fleece comprising a polyolefin, wherein the carrier has a substantially rectangular form with two short and two long sides, and wherein in the region of the two short sides there are means respectively for securing the carrier material to a holder, and  
 b) an antimicrobial and/or cleaning active ingredient preparation, preferably in the form of a concentrate or an application preparation.

## 45 10. Method for the disinfection and/or cleaning of inanimate surfaces, in which the surface is treated using the impregnated textile fabric according to one of claims 1 to 8 or the kit according to claim 9 and the fabric is discarded after single use, wherein the inanimate surface is preferably a hard inanimate surface.

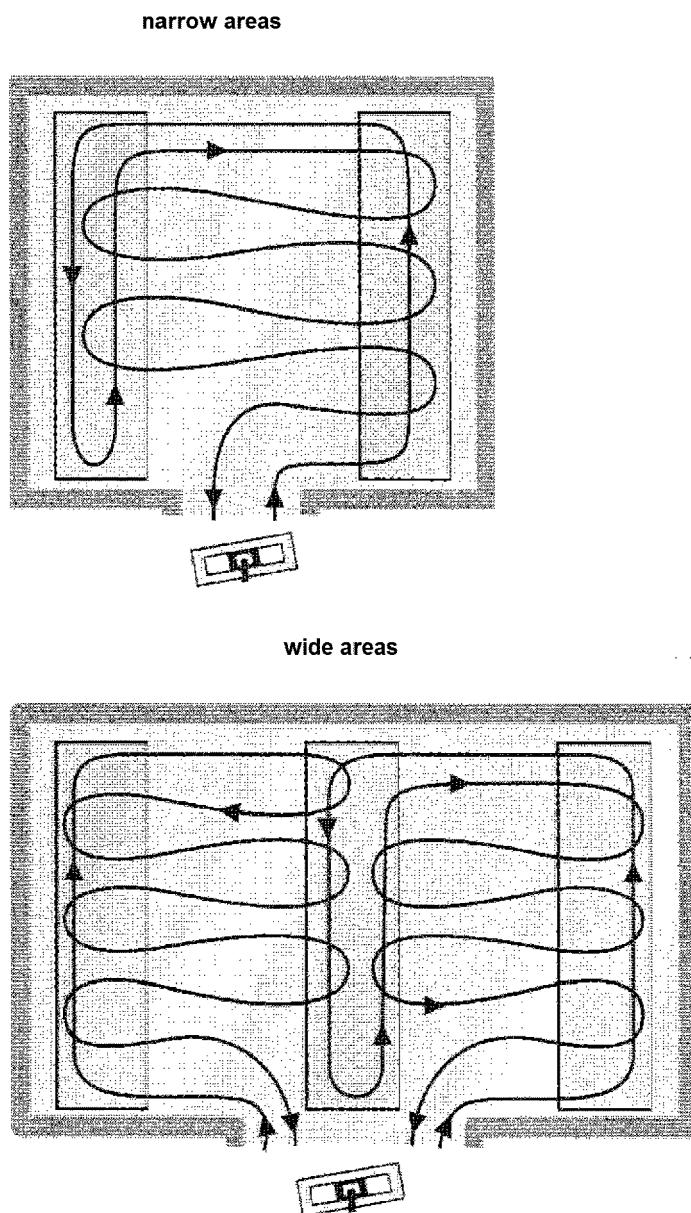
Figure 1 A. Determining the coverage of different mop covers with 0.5% of a disinfectant.  
Liquid release from mop covers made of different materials



**Figure 1B: Excess wiping surface of mop covers of different materials**



**Figure 2. Different procedures for narrow and wide areas**





## EUROPEAN SEARCH REPORT

Application Number

EP 14 19 7467

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