Use of fatty acid ester for improving the antimicrobial efficacy of an alcoholic disinfectant

The invention relates to an alcoholic disinfectant and the disinfectant for use for hygienic and for surgical disinfection of the hands. The invention further relates to the use of fatty acid ester for improving the antimicrobial efficacy of an alcoholic disinfectant.

For hand hygiene and hand disinfection, for example ethanol-based disinfectants are recommended (including the product desderman® pure from Schülke & Mayr GmbH with a content (according to manufacturer's data) of 78.2 g ethanol (96%) and 0.1 g biphenyl-2-ol in 100 g). However, there are misgivings regarding disinfectants for the hygienic and surgical disinfection of the hands that contain high proportions of ethanol, because agents of this kind have a very strong defatting action.

When using ethanolic hand disinfectants, refatting of the skin thus plays an important role for user compliance. Glycerin is described in the literature as having skin-care qualities (Atrux-Tallau, N., Romagny, C., Padois, K., Denis, A., Haftek, M., Falson, F., Pirot, F., and Maibach, H. I. (2010). Arch Dermatol Res 302: 435-441). Glycerin is therefore a widely used substance as refatting agent in commercial formulations for alcoholic disinfection of the hands (cf. for example the commercial products Sterillium® classic and Sterillium® med from Bode Chemie GmbH, Hamburg, Federal Republic of Germany).

WO2014/032696 A1 discloses virucidal alcoholic hand disinfectants. In addition to C_2 to C_3 alcohol, the presence of glycerin is mandatory. However, agents with virucidal action are not necessarily effective against all microorganisms against which hand disinfectants must be effective. Moreover,

investigations with glycerin-containing formulations (WHO-I and WHO-II) have shown that the presence of glycerin inhibits the bactericidal properties of alcoholic hand disinfectants for surgical disinfection of the hands according to EN 12791 (Suchomel, M., Rotter, M. Weinlich, M., Kundi, M. (2013). J Hosp Infect 83: 284-7).

WO2006/122345 A1 describes agents for treating areas of skin before surgery. However, the glycerin-free gel as humectant, disclosed for example in WO 2006/122345 A1, contains relatively little ethanol (70 wt%). Moreover, it contains triclosan, which is assessed critically by the Federal Institute for Risk Assessment of the Federal Republic of Germany (FRG), cf. Opinion No. 30/2006 dated 8 May 2006, namely because bacteria such as *Salmonella enterica*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus* have mechanisms for developing resistance to triclosan.

WO 2009/088894 A2 discloses skin disinfectants containing C_2 to C_5 alcohol. They may also contain humectant esters. For example, the teaching includes esters of alkane diacids, especially the diisopropyl esters of adipic acid (hexane diacid) and sebacic acid (decane diacid). However, the efficacy of a disinfectant largely depends on the alcohol used and its concentration in the disinfectant (or the mixture of alcohols used and the concentration thereof).

The present invention is based on the problem of supplying refatting agents for ethanolic disinfectants, wherein the refatting agents in the disinfectant should not, in contrast to glycerin, have an inhibitory effect on the antimicrobial efficacy, especially when they are to be used at higher concentration.

It was found that this problem is solved according to the invention by using fatty acid ester of monovalent C_1 to C_6 alkyl alcohol. Thus, according to the invention it was found, surprisingly, that addition of a fatty acid ester as refatting agent to an alcoholic disinfectant leads, with increasing concentration, even to an improvement in efficacy in the quantitative suspension test according to DGHM, in contrast to addition of glycerin as refatting agent.

The invention therefore relates, in a first aspect, to an alcoholic disinfectant that comprises

a) at least 79.5 to 95 wt% ethanol, relative to the weight of the disinfectant, and
b) 0.3 to 2.0 wt% of isopropyl myristate;

with the disinfectant comprising

i. less than 0.1 wt% glycerin, relative to the weight of the disinfectant, and
ii. less than 5.0 wt% perfume, relative to the weight of the disinfectant.

The disinfectant according to the invention thus comprises less than 0.1 wt% glycerin, preferably less than 0.05 wt%, especially less than 0.03 wt%, for example less than 0.01 wt% glycerin, in each case relative to the weight of the disinfectant.

In another aspect of the disclosure, there is provided the use of isopropyl myristate for improving the antimicrobial efficacy of an alcoholic disinfectant wherein the alcoholic disinfectant comprises 81 to 93 wt% ethanol and from 0.02 to 5 wt% of isopropyl myristate, from 0.02 to

5 wt.% of myristyl alcohol; and less than 0.1 wt% glycerin relative to the weight of the disinfectant.

a) Ethanol

The alcoholic disinfectant according to the invention contains at least 78 wt% ethanol, preferably at least 78.5 wt%, preferably at most 98 wt%, more preferably at most 97 wt%, such as 79.0 to 96 wt%, especially 79.5 to 95 wt%, such as 80

to 94 wt%, for example 81 to 93 wt%, especially 81.5 to 92.5 wt% ethanol, in each case relative to the weight of the disinfectant.

The stated ethanol content thus refers to the pure substance (and does not include denaturing agent or water contained for example in ethanol of technical or medical purity).

b) Fatty acid ester of monovalent C_1 to C_6 alkyl alcohol

Disinfectants according to the invention contain b) one or more fatty acid esters of monovalent C_1 to C_6 alkyl alcohol.

Preferably, the alkyl alcohol of the fatty acid ester is selected from methanol, ethanol, n- and i-propanol. Especially preferably, the alkyl alcohol of the fatty acid ester is in particular i-propanol.

Moreover, it is preferable for the fatty acid of the fatty acid ester to be selected from C_{10} to C_{18} fatty acids, preferably C_{12} to C_{16} fatty acids, wherein the fatty acid is preferably myristic acid.

Therefore in all embodiments of the present invention it is preferred that component b) is isopropyl myristate.

Component b), preferably isopropyl myristate, is present in the disinfectant according to the invention preferably in an amount from 0.02 to 5 wt%, relative to the weight of the disinfectant, preferably 0.1 to 4 wt%, more preferably 0.2 to 3 wt%, especially 0.3 to 2.0 wt%, such as 0.5 to 1.8 wt%, for example 0.6 to 1.6 wt%, such as 0.75 or about 1.4 wt%.

Further constituents of the disinfectant

In addition to the mandatory components a) and b), disinfectants according to the invention may further optionally contain:

c) Fatty alcohol

The fatty alcohol is preferably selected from C_{10} to C_{18} fatty alcohols, preferably C_{12} to C_{16} fatty alcohols, wherein the fatty alcohol is preferably myristyl alcohol.

Component c), preferably myristyl alcohol, is present in the disinfectant according to the invention preferably in an amount from 0.02 to 5 wt%, relative to the weight of the disinfectant, more preferably 0.1 to 4 wt%, for example 0.5 to 1.5 wt%, such as 1.0 wt%.

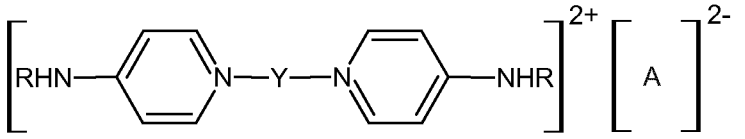
d) Diol

Preferred diols contained in the disinfectant according to the invention are propanediol-1,2 and propanediol-1,3.

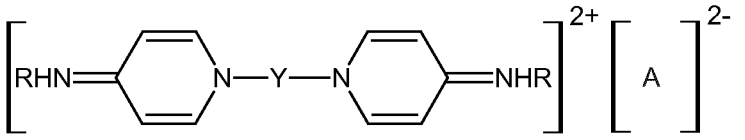
Component d) is present in the disinfectant according to the invention preferably in an amount from 0.01 to 2 wt%, relative to the weight of the disinfectant, more preferably 0.1 to 2 wt%, especially 0.2 to 1.5 wt%, such as 0.4 to 1.0 wt%, for example about 0.5 or about 0.8 wt%.

e) Bispyridinium alkane

Here, the term bispyridinium alkane comprises the bis-[4-(substituted-amino)-1-pyridinium]-alkanes of general formulae (I) or (II) disclosed in DE 27 08 331 C2



(I)



(II)

in which

Y is an alkylene group with 4 to 18 carbon atoms,

R denotes an alkyl group with 6 to 18 carbon atoms or a cycloalkyl group with 5 to 7 carbon atoms or the phenyl residue, which is substituted with a halogen atom, and

A is an anion or several anions.

The above definition for A applies strictly speaking to mono- and divalent anions, but A may of course also be a polyvalent anion, e.g. phosphate or orthosilicate. Furthermore, the term bispyridinium alkane comprises the various prototropes of the compounds of formula (I), as is disclosed for example in DE 196 47 692 A1.

In all embodiments of the invention it is preferred that the bispyridinium alkane is octenidine dihydrochloride (R = n-octyl, Y = n-decenyl; A = 2 x Cl, "octenidine"). Component e) is thus especially preferably octenidine.

Preferred amounts of component e) in the disinfectant according to the invention are 0.005 to 1.0 wt%, preferably 0.01 to 0.5 wt%, more preferably 0.03 to 0.3 wt%, even more preferably 0.04 to 0.2 wt%, such as 0.05 to 0.15 wt%, for

example about 0.1 wt%, in each case relative to the total weight of the disinfectant.

f) Chlorhexidine derivative

An example of a chlorhexidine derivative is chlorhexidine gluconate.

Component f) is present in the disinfectant according to the invention preferably in an amount from 0.01 to 2 wt%, relative to the weight of the disinfectant, more preferably 0.1 to 2 wt%, especially 0.2 to 1.5 wt%, such as 0.3 to 1.0 wt%, for example about 0.4 wt%.

g) Glycerin ether

An especially preferred glycerin ether is 1-(2-ethylhexyl)glycerin ether (Sensiva® SC 50).

The amount of glycerin ether (especially 1-(2-ethylhexyl)glycerin ether) is preferably 0.01 to 1 wt%, relative to the weight of the disinfectant, preferably 0.02 to 0.5 wt%, such as 0.05 to 0.3 wt%, for example about 0.2 wt%.

h) Fatty acid fatty alcohol ester

Disinfectants according to the invention preferably contain h) fatty acid fatty alcohol esters.

The fatty alcohol of the fatty acid fatty alcohol ester is preferably selected from C_{10} to C_{18} fatty acids, preferably C_{12} to C_{16} fatty acids, and is for example cetearyl alcohol.

The fatty acid of the fatty acid fatty alcohol ester is preferably selected from short-chain fatty acids, such as C_4 to C_{12} fatty acids, especially C_8 to C_{10} fatty acids, wherein the fatty acid is preferably octanoic acid.

Therefore in all embodiments of the present invention it is preferred that component h) is cetearyl octanoate.

Component h), preferably cetearyl octanoate, is present in the disinfectant according to the invention preferably in an amount from 0.01 to 2 wt%, relative to the weight of the disinfectant, more preferably 0.1 to 2 wt%, especially 0.2 to 1.5 wt%, such as 0.3 to 1.0 wt%, for example about 0.8 wt%.

i) Polyvinylpyrrolidone

An excipient preferably contained in the disinfectant according to the invention is polyvinylpyrrolidone, preferably povidone K, especially povidone K30.

Component i), i.e. polyvinylpyrrolidone, is present in the disinfectant according to the invention preferably in an amount from 0.01 to 2 wt%, relative to the weight of the disinfectant, more preferably 0.1 to 2 wt%, especially 0.2 to 1.5 wt%, such as 0.4 to 1.0 wt%, for example about 0.3 wt%.

j) Sugar alcohol

In an especially preferred embodiment, the disinfectant according to the invention contains j) sugar alcohol, for example sorbitol.

Component j) is present in the disinfectant according to the invention preferably in an amount from 0.01 to 2 wt%, relative to the weight of the disinfectant, more preferably 0.1 to 2 wt%, especially 0.2 to 1.5 wt%, such as 0.3 to 1.0 wt%, for example about 0.5 wt%.

k) Antioxidant

Preferably, disinfectants according to the invention contain k) one or more antioxidants. Examples of antioxidants are BHA,

BHT or vitamin E (or derivatives thereof), especially preferably vitamin E (or vitamin E-acetate).

The amount of antioxidant (especially tocopherol and/or tocopherol acetate) is preferably 0.001 to 0.1 wt%, relative to the weight of the disinfectant, preferably 0.002 to 0.05 wt%, such as 0.005 to 0.03 wt%, for example about 0.01 wt%.

l) Skin care agent

Skin care agents l) optionally present in the disinfectant according to the invention are preferably urea, dexpanthenol, hamamelis, bisabolol and/or allantoin.

The amount of component l) (especially dexpanthenol) is preferably 0.01 to 1 wt%, relative to the weight of the disinfectant, preferably 0.02 to 0.5 wt%, such as 0.05 to 0.3 wt%, for example about 0.1 or 0.2 wt%.

It is preferred that the disinfectant contains, apart from the mandatory components a) and b), only 0.05 to 5.0 wt%, preferably 1.0 to 4.0 wt% of further ingredients and water as the remainder.

Moreover, it is preferred that the disinfectant comprises less than 1.0 wt% of water-insoluble polymeric amines (as are described as mandatory component in DE 10 2009 040 089 A1 relating to deodorants). Preferably the disinfectant contains less than 0.5 wt% of water-insoluble polymeric amines, especially less than 0.2 wt%, such as for example less than 0.1 wt%, in each case relative to the weight of the disinfectant, wherein especially preferably the disinfectant is free from water-insoluble polymeric amines.

In particular, disinfectants according to the invention are preferred that comprise less than 1.0 wt% of amino-substituted polystyrenes (as are described as preferred water-insoluble polymeric amines in DE 10 2009 040 089 A1 relating to deodorants). Preferably the disinfectant contains less than 0.5 wt% of amino-substituted polystyrenes, especially less than 0.2 wt%, for example less than 0.1 wt%, in each case relative to the weight of the disinfectant, wherein especially preferably the disinfectant is free from amino-substituted polystyrenes.

In all embodiments of the present invention, it is preferred that the disinfectant comprises less than 10 wt% of C_3 alcohol, i.e. the total amount of 1-propanol and 2-propanol is preferably less than 10 wt%, more preferably less than 9.5 wt%, especially less than 9.0 wt%, for example less than 8.5 wt%, in each case relative to the weight of the disinfectant.

In all embodiments of the present invention, it is preferred that the disinfectant comprises less than 10 wt% DMSO, preferably less than 8.0 wt%, especially less than 5.0 wt%, for example less than 3.0 wt%, in each case relative to the weight of the disinfectant. Especially preferably, the disinfectant according to the invention contains less than 1.0 wt%, especially less than 0.5 wt%, for example less than 0.1 wt% DMSO, in each case relative to the weight of the disinfectant, wherein an especially preferred disinfectant according to the invention is free from DMSO.

Disinfectants according to the invention are preferably in the form of solution.

Alternatively, the disinfectants according to the invention may be in the form of aqueous-alcoholic gels (hydrogels).

Hydrogels are prized owing to their transparency and their non-greasy character. Lipophilic gels (oleogels) are also used owing to their aesthetic form and their consistency-imparting properties. Gels are mainly intended for external use and should be applied thinly.

A hydrogel is a generally translucent mass, which is produced using gelatin, tragacanth, Carbopol or similar swelling substances with addition of water.

In the embodiment according to the invention in which the disinfectant is in the form of gel, it preferably contains

a) 80 to 85 wt% ethanol,
b) 0.5 to 1.5 wt% fatty acid ester of monovalent C_1 to C_6 alkyl alcohol (preferably isopropyl myristate),
c) 0.8 to 1.5 wt% fatty alcohol (preferably myristyl alcohol),
m) 0.1 to 0.6 wt% thickener (preferably polyacrylic acid copolymer) and
n) 0.3 to 1.0 wt% complexing agent (preferably N,N,N',N'-tetrakis-(2-hydroxypropyl)-ethylenediamine).

Preferred gels according to the invention further contain

d) 0.2 to 3.0 wt% diol (preferably propylene glycol),
j) 0.2 to 0.5 wt% sugar alcohol (preferably sorbitol),
k) 0.005 to 0.2 wt% of antioxidant (preferably tocopherol and/or tocopherol acetate),
l) 0.01 to 0.1 wt% of skin care agent (preferably bisabolol, hamamelis and/or dexpanthenol), and
o) 0.02 to 0.05 wt% of UV-stabilizer.

In one embodiment, the invention relates to an alcoholic disinfectant that comprises a) at least 78 wt% ethanol, relative to the weight of the disinfectant, and b) one or more fatty acid esters of monovalent C_1 to C_6 alkyl alcohol, wherein the disinfectant comprises less than 0.1 wt% glycerin, relative to the weight of the disinfectant, for use for surgical and hygienic disinfection of the hands.

In another embodiment, the invention relates to the use of fatty acid ester of monovalent C_1 to C_6 alkyl alcohol for improving the antimicrobial efficacy of an alcoholic disinfectant, wherein the disinfectant comprises at least 78 wt% ethanol, relative to the weight of the disinfectant. Preferably this improvement in antimicrobial efficacy is an improvement in the quantitative suspension test according to DGHM (Method 9, Gebel et al. (2001): Standard methods of the DGHM for testing chemical methods of disinfection, mhp Verlag GmbH, as at 1 September 2001), determined at a concentration of 35% (v/v) of the disinfectant in the test (diluted with water of standardized hardness (WSH) on a concentration of 43.75% (v/v) (i.e. 1.25-fold) dirty conditions, *Escherichia coli* K12 ATCC 10538), with time of action of 30 s, 60 s, 90 s or 120 s (and preferably 60 s).

The advantages of the present invention can be seen in particular from the following examples. Unless stated otherwise, all percentages refer to weight.

Examples

Abbreviations used:
IPM = isopropyl myristate
EtOH = ethanol

I. Methods:

Method A - Antimicrobial efficacy

Quantitative suspension test according to DGHM, determined at a final concentration in the test of 35% (v/v) of the disinfectant (Gebel et al. (2001): Standard methods of the DGHM for testing chemical methods of disinfection, mhp Verlag GmbH, as at 1 September 2001). The individual test samples were prepared at a concentration of 43.75% (v/v) (i.e. 1.25-fold higher in water of standardized hardness (WSH, as described in Gebel et al. (2001): Standard methods of the DGHM for testing chemical methods of disinfection, mhp Verlag GmbH, as at 1 September 2001), diluted in order to reach the final concentration required in the test of 35% (v/v)) of the disinfectant, to allow testing in the dynamic range. *Escherichia coli* K12 ATCC 10538 was used as test organism. The tests were carried out in conditions of high organic loading (dirty conditions: 0.3% (g/100 ml) bovine serum albumin (fraction V) + 0.3% (g/100 ml) sheep erythrocytes) according to Method 9 (quantitative suspension test) Standard methods of the DGHM for testing chemical disinfectants (Gebel et al. (2001) with the stated test intervals (30, 60, 90, 120 seconds).

Evaluation:

The tests were evaluated according to Method 9, Quantitative suspension test, Standard methods of the DGHM for testing chemical disinfectants (Gebel et al. (2001)). The microbiological efficacy is stated as log RF (logarithmic reduction factor), which is calculated as follows: log RF = log (CFU Co1) - log (CFU D), with CFU Co1: number of colony forming units (CFU) per ml without action of the preparation (WSH-control (WSH = water of standardized hardness)) and CFU D: number of CFUs per ml after action of the preparation.

Method B - Haptic assessment

The proband test was conducted with blinded samples over a period of 6 weeks. Assessment by the probands (in each case 10) was based on the school grading system from 1 to 6.

Example 1

Antimicrobial efficacy of an ethanolic solution with addition of isopropyl myristate or glycerin

The following two basic formulations were tested in the quantitative suspension test (dirty conditions, *E. coli*):

- mixture of EtOH (72.6 g/100 g) with isopropanol (10 g/100 g), as comparative value without refatting agent and with the concentration of the respective refatting agent given in Fig. 1,
- EtOH (82.3 g/100 g), as comparative value without refatting agent and with the concentration of the respective refatting agent given in Fig. 2 (with IPM = according to the invention, with glycerin = comparison).

As can be seen from the examples, glycerin has an effect on the efficacy of alcoholic disinfectants in the quantitative suspension test, mainly in the range of amounts of 1 wt% or more that is of interest with respect to use as refatting agent. The effect whereby glycerin actually even lowers the efficacy in the quantitative suspension test in an amount of 1.5 wt%, is especially pronounced in the case of alcoholic disinfectants that contain over 80 wt% ethanol. In contrast, isopropyl myristate in an amount of 1.5 wt% increases the efficacy of an ethanolic disinfectant in the quantitative suspension test.

The data, especially in Fig. 2, thus show that, surprisingly, with increasing concentration of isopropyl myristate, the

efficacy increases (starting from a concentration of ≥ 1 wt% isopropyl myristate, already at 60 s there is a significant reduction of *Escherichia coli* (RF >1 log)). In contrast, addition of glycerin in corresponding concentration does not lead to any improvement in the efficacy of the ethanolic solution. Starting from a concentration of > 1 wt% glycerin, at any rate with a disinfectant without isopropanol, the efficacy is even impaired.

Example 2

Haptic assessment

The following products were assessed (Table 1):

A	90.00 parts by weight ethanol 96%, denatured with MEK, i.e. 83.7 wt% ethanol 1.40 parts by weight isopropyl myristate 6.80 parts by weight purified water 0.80 parts by weight propylene glycol 0.70 parts by weight cetearyl octanoate 0.30 parts by weight povidone K
B	Commercially available hand disinfectant, composition according to manufacturer's data: 100 g of solution contains 99% ethanol 85.0 g, other constituents: butan-2-one, 1-propanol (Ph. Eur.), tetradecan-1-ol, glycerin 85%, purified water
C	Commercially available hand disinfectant, composition according to manufacturer's data: ethanol 45 g, 1-propanol 18 g, other constituents: purified water, diisopropyl adipate, macrogol-6-glycerin caprylocaprate, dexpanthenol, (+/-)-alpha-bisabolol, odour substances (contain limonene and linalool), allantoin.
D	Commercially available hand disinfectant, composition according to manufacturer's data: 100 g of solution contains 99% ethanol 95.0 g, other constituents butan-2-one, glycerin, tetradecan-1-ol, benzine

Table 1: Composition of the agents undergoing haptic assessment

It was found, surprisingly, that a formulation that contains fatty acid ester (such as isopropyl myristate) instead of glycerin, is assessed in a blinded proband test as at least as pleasant as commercially obtainable glycerin-based products with high ethanol content (see Table 2).

	Number of assessments (scores)								
	1	2	3	4	5	6	Average score	n	Ranking
A	2	2	3	3			2.7	10	1
B	1	5	2		2		2.7	10	1
C		3	2	3	1	1	3.5	10	3
D		1	2	2	2	3	4.4	10	4

Table 2: Presentation of the assessment of various ethanolic formulations for disinfection of the hands

Patent claims

1. Use of isopropyl myristate for improving the antimicrobial efficacy of an alcoholic disinfectant, wherein the alcoholic disinfectant comprises 81 to 93 wt% ethanol, from 0.02 to 5 wt% of isopropyl myristate, from 0.02 to 5 wt.% of myristyl alcohol; and less than 0.1 wt% glycerin relative to the weight of the disinfectant.

2. Use according to Claim 1, characterized in that the improved antimicrobial efficacy is an improvement in the quantitative suspension test according to DGHM, Method 9, Gebel et al., i.e. Standard methods of the DGHM for testing chemical methods of disinfection, mhp Verlag GmbH, as at 1 September 2001, determined at a concentration of 35% v/v of the disinfectant in the test which is measured by diluting with water of standardized hardness to a concentration of 43.75% v/v , under dirty conditions, *Escherichia coli* K12 ATCC 10538, with time of action of 30 s, 60 s, 90 s or 120 s.

3. Use according to claim 2, characterized in that the time of action in the quantitative suspension test is 60s.

4. Use according to claim 1 or 2, characterized in that the alcoholic disinfectant

   i. comprises less than 5.0 wt% perfume, relative to the weight of the alcoholic disinfectant.

5. Use according to claim 1 or 2, characterized in that the alcoholic disinfectant comprises less than 0.05 wt% glycerin, relative to the weight of the alcoholic disinfectant.

6. Use according to claim 1 or 2, characterized in that the alcoholic disinfectant comprises from 0.02 to 5 wt% *isopropyl myristate*, relative to the weight of the disinfectant.

7. Use according to claim 1 or 2, characterized in that the alcoholic disinfectant comprises from 0.1 to 4 wt% *isopropyl myristate*, relative to the weight of the disinfectant.

8. Use according to claim 1 or 2, characterized in that the alcoholic disinfectant comprises from 0.5 to 1.8 wt% *isopropyl myristate*, relative to the weight of the disinfectant.

9. Use according to claim 1 or 2, characterized in that the alcoholic disinfectant comprises less than 1.0 wt% of

water-insoluble polymeric amines, relative to the weight of the alcoholic disinfectant.

10. Use according to claim 1 or 2, characterized in that the alcoholic disinfectant is free from water-insoluble polymeric amines.

11. Use according to claim 1 or 2, characterized in that the alcoholic disinfectant comprises less than 1.0 wt% of amino-substituted polystyrenes, relative to the weight of the alcoholic disinfectant.

12. Use according to claim 1 or 2, characterized in that the alcoholic disinfectant is free from amino-substituted polystyrenes.

13. Use according to claim 1 or 2, characterized in that the alcoholic disinfectant comprises less than 10 wt% of C3 alcohol, relative to the weight of the alcoholic disinfectant.

14. Use according to claim 1 or 2, characterized in that the alcoholic disinfectant comprises less than 9.0 wt% of C3 alcohol, relative to the weight of the alcoholic disinfectant.

15. Use according to claim 1 or 2, characterized in that the alcoholic disinfectant is an aqueous-alcoholic gel.

16. Use according to claim 1 or 2, characterized in that the alcoholic disinfectant further comprises
    c) 0.5 to 1.5 wt% myristyl alcohol and/or
    d) 0.4 to 1.0 wt% diol and/or
    e) 0.05 to 0.15 wt% bispyridinium alkane and/or

f) 0.3 to 1.0 wt% chlorhexidine derivative and/or
g) 0.05 to 0.3 wt% glycerin ether and/or
h) 0.3 to 1.0 wt% fatty acid fatty alcohol ester and/or
i) 0.4 to 1.0 wt% polyvinylpyrrolidone and/or
j) 0.3 to 1.0 wt% sugar alcohol and/or
k) 0.005 to 0.03 wt% of antioxidant and/or
l) 0.05 to 0.3 wt% of skin care agent.

17. Use according to claim 1 or 2, characterized in that the alcoholic disinfectant is a disinfectant for hygienic and for surgical disinfection of hands.