

CLAIMS

1. An antimicrobial composition comprising at least two quaternary ammonium
 5 compounds selected from:

(i) a quaternary ammonium compound having the formula:



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and

(ii) a quaternary ammonium compound having the formula:

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wherein in each of the at least two quaternary ammonium compounds A, R, R¹, a, Z
 and n are independently selected, and:

A is a member selected from the group consisting of alkoxy radicals, alkylether
 20 alkoxy radicals, and alkyl radicals;

R is a divalent hydrocarbon radical;

each R¹ is independently a member selected from the group consisting of benzyl,
 alkyl radicals, alkyl ether hydrocarbon radicals, hydroxyl-containing alkyl radicals, and
 nitrogen-containing hydrocarbon radicals;

25 Z is a member selected from the group consisting of chloride, bromide, iodide,
 tosylate, hydroxide, sulfate and phosphate;

a is 0, 1 or 2, b is 1, 2 or 3, and the sum of a and b is 3;

c is 0, 1, 2 or 3, d is 1, 2, 3 or 4, and the sum of c and d is 4; and

n is 1, 2 or 3; and

30 wherein the composition comprises at least two quaternary ammonium compounds
 of formula (i).

2. The composition according to Claim 1 wherein;

A is a member selected from the group consisting of alkoxy radicals of 1 to 10 carbon
 35 atoms, alkylether alkoxy radicals of 2 to 10 carbon atoms, and alkyl radicals with 1 to 10
 carbon atoms; and/or

R is a divalent hydrocarbon radical with 1 to 10 carbon atoms; and/or

each R¹ is independently a member selected from the group consisting of benzyl, alkyl radicals with 1 to 30 carbon atoms, alkyl ether hydrocarbon radicals of 2 to 30 carbon atoms, hydroxyl-containing alkyl radicals of 1 to 30 carbon atoms, and nitrogen-containing hydrocarbon radicals of 1 to 30 carbon atoms.

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3. The composition according to claim 1 or 2 which comprises two quaternary ammonium compounds of formula (i) and no quaternary ammonium compounds of formula (ii).

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4. The composition according to claim 1 or 2 which comprises two quaternary ammonium compounds of formula (i) and one quaternary ammonium compound of formula (ii).

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5. The composition according to any preceding claim wherein an R¹ group of one of the quaternary ammonium compounds, is different from the R¹ group or groups of the other quaternary ammonium compound or compounds.

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6. The composition according to any preceding claim wherein at least one R¹ group has 18 carbon atoms.

7. The composition according to any preceding claim wherein one of the quaternary ammonium compounds is 3-(trimethoxysilyl) propyl dimethyl octadecyl ammonium chloride.

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8. The composition according to any preceding claim wherein one of the quaternary ammonium compounds is alkyl silyl dimethyl benzyl ammonium chloride.

9. The composition according to any preceding claim wherein one of the quaternary ammonium compounds is dioctyl silyl dimethyl ammonium bromide.

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10. The composition according to any preceding claim which comprises water and/or ethanol.

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11. The composition according to any preceding claim which comprises the quaternary ammonium compounds in a concentration of from about 0.1 to about 5% by volume, preferably about 0.5 to about 2% by volume.

12. A method of making an anti-microbial composition as defined in any of the preceding claims, the method comprising admixing the at least two quaternary ammonium compounds.

- 5 13. A method of reducing the number of micro-organisms on a surface, comprising contacting said surface with an antimicrobial composition comprising at least two quaternary ammonium compounds selected from:

(i) a quaternary ammonium compound having the formula:

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and

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(ii) a quaternary ammonium compound having the formula:



wherein in each of the at least two quaternary ammonium compounds A, R, R¹, a, Z
20 and n are independently selected, and:

A is a member selected from the group consisting of alkoxy radicals of 1 to 10 carbon atoms, alkylether alkoxy radicals of 2 to 10 carbon atoms, and alkyl radicals with 1 to 10 carbon atoms;

R is a divalent hydrocarbon radical with 1 to 10 carbon atoms;

25 each R¹ is independently a member selected from the group consisting of benzyl, alkyl radicals with 1 to 30 carbon atoms, alkyl ether hydrocarbon radicals of 2 to 30 carbon atoms, hydroxyl-containing alkyl radicals of 1 to 30 carbon atoms, and nitrogen-containing hydrocarbon radicals of 1 to 30 carbon atoms;

30 Z is a member selected from the group consisting of chloride, bromide, iodide, tosylate, hydroxide, sulfate and phosphate;

a is 0, 1 or 2, b is 1, 2 or 3, and the sum of a and b is 3;

c is 0, 1, 2 or 3, d is 1, 2, 3 or 4, and the sum of c and d is 4; and

n is 1, 2 or 3; and

35 wherein the composition comprises at least two quaternary ammonium compounds of formula (i).

14. The method according to claim 13 wherein the composition is as defined in any of claims 1 to 11.

15. The method according to claim 13 or 14 wherein the surface is skin.

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16. The method according to claim 13 or 14 wherein the surface is an inanimate surface.

17. The method according to any of claims 13 to 16 wherein the anti-microbial
10 composition is used as a spray, foam, mist, fog or wipes.