Claims

1. An automatic dishwashing composition comprising a chelating agent selected from hydroxyethyliminodiacetic acid, glucoheptonic acid, hydroxyethylethylenediaminetriacetic acid, poly(acrylic acid-co-hypophosphite), and salts, complexes and mixtures thereof; wherein the composition is substantially free of phosphate containing builders and substantially free of bleaching compounds.

2. An automatic dishwashing composition according to claim 1 which comprises from 2 to 30 wt% of the chelating agent.

3. An automatic dishwashing composition according to claim 1 or claim 2 which further comprises one or more further chelating agents selected from 1-hydroxyethylidene –1,1–diphosphonic acid (HEDP), ethylenediamine disuccinic acid (EDDS), methylglycinediacetic acid (MGDA), glutamic acid, N,N-diacetic acid (GLDA), iminodisuccinic acid (IDS); ethylenediaminetetraacetic acid (EDTA) diethylenetriaminepentaacetic acid (DTPA), diethylenetriamine-penta-methylene phosphonic acid (DETPMP), nitrilotriacetic acid (NTA), aspartic acid diethoxysuccinic acid (AES), aspartic acid-N,N-diacetic acid (ASDA), diethylenetriaminepentamethylene-phosphonic acid (DTPMPA), ethylenediamine tetra methylene phosphonic acid (EDTMP), iminodifumaric (IDF), iminoditartaric acid (IDT), iminodimaleic acid (IDMAL), iminodimalic acid (IDM), ethylenediaminedifumaric acid (EDDF), ethylenediaminedimalic acid (EDDM), ethylenediamineditartaric acid (EDDT), ethylenediaminedimaleic acid and (EDDMAL), aminotri(methylenephosphonic acid) (ATMP), and salts complexes and mixtures thereof.

4. An automatic dishwashing composition according to any preceding claim comprising:

i) a chelating agent selected from hydroxyethyliminodiacetic acid, glucoheptonic acid, hydroxyethylethylenediaminetriacetic acid, poly(acrylic acid-co-hypophosphite), and salts, complexes and mixtures thereof; and

ii) one or more chelating agents selected from the group consisting of phosphonate based chelating agents and biodegradable chelating agents (but not being a chelating agent of group i).

5. An automatic dishwashing composition according to claim 4 wherein component (ii) is selected from 1-hydroxyethylidene–1,1–diphosphonic acid (HEDP), diethylenetriamine-pentamethylene-phosphonic acid (DTPMPA), aminotri(methylene-phosphonic acid) (ATMP), ethylenediamine tetra methylene phosphonic acid (EDTMP), ethylenediamine disuccinic acid (EDDS), methylglycinediacetic acid (MGDA), glutamic acid, N,N-diacetic acid (GLDA),

iminodisuccinic acid (IDS), nitrilotriacetic acid (NTA) and salts, complexes and mixtures thereof.

6. An automatic dishwashing composition according to claim 5 wherein component (ii) is selected from 1-hydroxyethylidene–1,1–diphosphonic acid (HEDP), diethylenetriamine-pentamethylene-phosphonic acid (DTPMPA), ethylenediamine tetra methylene phophonic acid (EDTMP), aminotri(methylenephosphonic acid) (ATMP) and salts, complexes and mixtures thereof.

7. An automatic dishwashing composition according to claim 5 wherein component (ii) is selected from ethylenediamine disuccinic acid (EDDS), methylglycinediacetic acid (MGDA), glutamic acid, N,N-diacetic acid (GLDA), iminodisuccinic acid (IDS), nitrilotriacetic acid (NTA) and salts, complexes and mixtures thereof.

8. An automatic dishwashing composition according to any preceding claim comprising:

a) a chelating agent selected from hydroxyethyliminodiacetic acid, glucoheptonic acid, hydroxyethylethylenediaminetriacetic acid, poly(acrylic acid-co-hypophosphite), and salts, complexes and mixtures thereof;
b) one or more phosphonate based chelating agents; and
c) one or more additional chelating agents, which are not phosphonate based and which are biodegradable.

9. An automatic dishwashing composition according to claim 8 wherein component (b) is selected from 1-hydroxyethylidene–1,1–diphosphonic acid (HEDP), diethylenetriamine-pentamethylene-phosphonic acid (DTPMPA), ethylenediamine tetra methylene phophonic acid (EDTMP), aminotri(methylenephosphonic acid) (ATMP) and salts, complexes and mixtures thereof.

10. An automatic dishwashing composition according to claim 8 or claim 9 wherein component (c) is selected from ethylenediamine disuccinic acid (EDDS), methylglycinediacetic acid (MGDA), glutamic acid, N,N-diacetic acid (GLDA), iminodisuccinic acid (IDS), nitrilotriacetic acid (NTA) and salts, complexes and mixtures thereof.

11. An automatic dishwashing composition according to any preceding claim which comprises 1-hydroxyethylidene–1,1–diphosphonic acid (HEDP), ethylenediamine disuccinic acid (EDDS), or salts, complexes or mixtures thereof.

12. The use of a composition as claimed in any preceding claim to remove stubborn stains, for example tannin-containing stains from dishware.

13. The use of a chelating agent selected from hydroxyethyliminodiacetic acid, glucoheptonic acid, hydroxyethylethylenediaminetriacetic acid, poly(acrylic acid-co-hypophosphite), and salts, complexes and mixtures thereof to improve the stain-removing performance of an automatic dishwashing composition wherein the composition is substantially free of phosphate containing builders and substantially free of bleaching compounds.

14. A use according to claim 13 to improve the removal of stubborn stains, for example tannin-containing stains, from dishware wherein the automatic dishwashing composition comprises a phosphonate-based chelating agent and a biodegradable chelating agent.

15. A method of washing dishware in an automatic dishwasher, the method comprising adding to the dishwasher a unit dose of a composition as claimed in any of claims 1 to 11 and running a cycle of the dishwasher.

Claims

1. Use of an automatic dishwashing composition comprising:

(i) a chelating agent selected from hydroxyethyliminodiacetic acid, glucoheptonic acid, hydroxyethylethylenediaminetriacetic acid, poly(acrylic acid-co-hypophosphite), and salts, complexes and mixtures thereof; and

(ii) one or more further chelating agents selected from 1-hydroxyethylidene –1,1–diphosphonic acid (HEDP), ethylenediamine disuccinic acid (EDDS), methylglycinediacetic acid (MGDA), glutamic acid, N,N-diacetic acid (GLDA), iminodisuccinic acid (IDS); ethylenediaminetetraacetic acid (EDTA) diethylenetriaminepentaacetic acid (DTPA), diethylenetriamine-penta-methylene phosphonic acid (DETPMP), nitrilotriacetic acid (NTA), aspartic acid diethoxysuccinic acid (AES), aspartic acid-N,N-diacetic acid (ASDA), diethylenetriaminepentamethylene-phosphonic acid (DTPMPA), ethylenediamine tetra methylene phosphonic acid (EDTMP), iminodifumaric (IDF), iminoditartaric acid (IDT), iminodimaleic acid (IDMAL), iminodimalic acid (IDM), ethylenediaminedifumaric acid (EDDF), ethylenediaminedimalic acid (EDDM), ethylenediamineditartaric acid (EDDT), ethylenediaminedimaleic acid and (EDDMAL), aminotri(methylenephosphonic acid) (ATMP), and salts complexes and mixtures thereof; to remove tannin-containing stains from dishware;

wherein the composition is substantially free of phosphate containing builders and substantially free of bleaching compounds.

2. The use according to claim 1, wherein said automatic dishwashing composition comprises from 2 to 30 wt% of the chelating agent.

3. The use according to any preceding claim wherein:

i) said chelating agent is selected from hydroxyethyliminodiacetic acid, glucoheptonic acid, hydroxyethylethylenediaminetriacetic acid, poly(acrylic acid-co-hypophosphite), and salts, complexes and mixtures thereof; and

ii) said one or more further chelating agents is selected from the group consisting of phosphonate based chelating agents and biodegradable chelating agents (but not being a chelating agent of group i).

4. The use according to claim 3 wherein component (ii) is selected from 1-hydroxyethylidene–1,1–diphosphonic acid (HEDP), diethylenetriamine-pentamethylene-phosphonic acid (DTPMPA), aminotri(methylene-phosphonic acid) (ATMP), ethylenediamine tetra methylene phosphonic acid (EDTMP), ethylenediamine disuccinic acid (EDDS), methylglycinediacetic acid (MGDA), glutamic acid, N,N-diacetic acid (GLDA), iminodisuccinic acid (IDS), nitrilotriacetic acid (NTA) and salts, complexes and mixtures thereof.

5. The use according to claim 4 wherein component (ii) is selected from 1-hydroxyethylidene–1,1–diphosphonic acid (HEDP), diethylenetriamine-pentamethylene-phosphonic acid (DTPMPA), ethylenediamine tetra methylene phophonic acid (EDTMP), aminotri(methylenephosphonic acid) (ATMP) and salts, complexes and mixtures thereof.

6. The use according to claim 4 wherein component (ii) is selected from ethylenediamine disuccinic acid (EDDS), methylglycinediacetic acid (MGDA), glutamic acid, N,N-diacetic acid (GLDA), iminodisuccinic acid (IDS), nitrilotriacetic acid (NTA) and salts, complexes and mixtures thereof.

7. The use according to any preceding claim wherein the automatic dishwashing composition comprises:

a) a chelating agent selected from hydroxyethyliminodiacetic acid, glucoheptonic acid, hydroxyethylethylenediaminetriacetic acid, poly(acrylic acid-co-hypophosphite), and salts, complexes and mixtures thereof;
b) one or more phosphonate based chelating agents; and
c) one or more additional chelating agents, which are not phosphonate based and which are biodegradable.

8. An automatic dishwashing composition comprising:

(a) a chelating agent selected from hydroxyethyliminodiacetic acid, glucoheptonic acid, hydroxyethylethylenediaminetriacetic acid, poly(acrylic acid-co-hypophosphite), and salts, complexes and mixtures thereof; and

(b) one or more phosphonate based chelating agents selected from 1-hydroxyethylidene –1,1–diphosphonic acid (HEDP), diethylenetriaminepentamethylene-phosphonic acid (DTPMPA), ethylenediamine tetra methylene phosphonic acid (EDTMP), aminotri(methylenephosphonic acid) (ATMP), and salts complexes and mixtures thereof; and

(c) one or more additional chelating agents,which are not phosphonate based and whicha re biodegradable, selected from ethylenediamine disuccinic acid (EDDS), methylglycinediacetic acid (MGDA), glutamic acid, N,N-diacetic acid (GLDA), iminodisuccinic acid (IDS), nitrilotriacetic acid (NTA) and salts, complexes and mixtures thereof;

wherein the composition is substantially free of phosphate containing builders and substantially free of bleaching compounds.

9. An automatic dishwashing composition according to claim 8 wherein component (b) is selected from 1-hydroxyethylidene–1,1–diphosphonic acid (HEDP), diethylenetriamine-pentamethylene-phosphonic acid (DTPMPA), ethylenediamine tetra methylene phophonic acid (EDTMP), aminotri(methylenephosphonic acid) (ATMP) and salts, complexes and mixtures thereof.

10. An automatic dishwashing composition according to claim 8 or claim 9 wherein component (c) is selected from ethylenediamine disuccinic acid (EDDS), methylglycinediacetic acid (MGDA), glutamic acid, N,N-diacetic acid (GLDA), iminodisuccinic acid (IDS), nitrilotriacetic acid (NTA) and salts, complexes and mixtures thereof.

11. An automatic dishwashing composition according to any one of claims 8 to 10 which comprises 1-hydroxyethylidene–1,1–diphosphonic acid (HEDP), ethylenediamine disuccinic acid (EDDS), or salts, complexes or mixtures thereof.

12. The use of a composition as claimed in any one of claims 8 to 11 to remove stubborn stains, for example tannin-containing stains from dishware.

13. The use of a chelating agent selected from hydroxyethyliminodiacetic acid, glucoheptonic acid, hydroxyethylethylenediaminetriacetic acid, poly(acrylic acid-co-hypophosphite), and salts, complexes and mixtures thereof to improve the stain-removing performance of an automatic dishwashing composition wherein the composition is substantially free of phosphate containing builders and substantially free of bleaching compounds.

14. A use according to claim 13 to improve the removal of stubborn stains, for example tannin-containing stains, from dishware wherein the automatic dishwashing composition comprises a phosphonate-based chelating agent and a biodegradable chelating agent.

15. A method of washing dishware in an automatic dishwasher, the method comprising adding to the dishwasher a unit dose of a composition as claimed in any of claims 8 to 11 and running a cycle of the dishwasher.