CLAIMS

1. A composition for preparing a biocide, the composition comprising:

an ammonium salt comprising ammonium and an anion;

aqueous ammonia; and

sodium bicarbonate;

wherein a total molar amount of ammonia and ammonium in the composition exceeds an equivalent molar amount of the anion in the composition by at least 10%;

wherein the equivalent molar amount of the anion is a molar amount of the anion multiplied by its valence, and

wherein the concentration of the sodium bicarbonate is in a range of about 0.2% w/v to about 10% w/v.

2. The composition according to claim 1, wherein the ammonium salt is selected from the group consisting of ammonium bicarbonate, ammonium bromide, ammonium carbamate, ammonium carbonate, ammonium chloride, ammonium phosphate, ammonium sulfamate and ammonium sulfate.

3. The composition according to claim 1 or 2, wherein the ammonium salt is ammonium bromide or ammonium carbamate.

4. The composition according to any one of claims 1 to 3, wherein the composition is an aqueous solution comprising the ammonium salt at a concentration in a range of about 4% w/w to about 36% w/w.

5. The composition according to any one of claims 1 to 4, wherein the molar ratio of the ammonium salt to the aqueous ammonia is in a range of about 1:10 to about 10:1.

6. The composition according to any one of claims 1 to 5, wherein the molar ratio of the ammonium salt to the aqueous ammonia is in a range of about 1:3 to about 3:1.

7. The composition according to any one of claims 1 to 6, wherein the concentration of the aqueous ammonia is in a range of about 1% w/w to about 21% w/w.

8. The composition according to any one of claims 1 to 7, wherein the concentration of the sodium bicarbonate is in a range of about 1% w/v to about 5% w/v.

9. A method of producing a biocide, comprising:

providing a solution of a hypochlorite oxidant;

providing a composition according to any one of claims 1 to 8; and

mixing said solution of a hypochlorite oxidant with said composition.

10. The method according to claim 9, wherein said hypochlorite oxidant is sodium hypochlorite.

11. The method according to claim 9 or 10, wherein said solution of a hypochlorite oxidant has a concentration in a range of about 3500 to about 7000 ppm.

12. The method according to any one of claims 9 to 11, wherein said composition is prepared by:

combining an ammonium salt stock solution, an aqueous ammonia stock solution and sodium bicarbonate to form a mixture; and

diluting the mixture with water or with said solution of a hypochlorite oxidant.

13. The method according to claim 12, wherein said ammonium salt stock solution and said aqueous ammonia stock solution are equimolar.

14. The method according to any one of claims 9 to 13, further comprising monitoring a control parameter during said mixing.

15. The method according to claim 14, wherein said control parameter is selected from the group consisting of pH, oxidation-reduction potential (ORP), conductivity, dissolved oxygen saturation, and a ratio ORP/pH.

16. The method according to claim 15, wherein said control parameter is the ratio ORP/pH.

17. The method according to claim 15, wherein said control parameter is conductivity.

18. The method according to claim 17, wherein said mixing comprises:

adding said solution of a hypochlorite oxidant to said composition; and

ceasing to add said solution of a hypochlorite oxidant when the conductivity reaches a relative maximum.

19. The method according to claim 18, wherein the conductivity reaches a relative minimum prior to reaching the relative maximum.

20. The method according to any one of claims 9-19, wherein the pH of the biocide remains below 12.5.