CLAIMS:

1. A method of preparing nucleic acids from a biological sample comprising a) cellular material having a cell membrane, or b) cellular material having a cell wall, or c) viral material having a viral envelope or d) viral material having a viral capsid; the method comprising contacting the sample with a substrate, the substrate being functionalised with a biocidal agent which is capable of i) weakening the cell membrane, cell wall, viral envelope, or viral capsid; or ii) lysing cellular or viral material; wherein the biocidal agent comprises multiple functional groups, the multiple functional groups comprising a binding moiety, which is involved in binding the agent to the substrate; a hydrophobic moiety; and a charged moiety.

2. The method of claim 1, further comprising the step of subjecting the sample to heat after the contacting step.

3. The method of claim 1 or 2, wherein the substrate is a cellulose material; preferably a cellulose filter paper or a cellulose matrix.

4. The method of claim 3 wherein the cellulose material is a composite paper.

5. The method of claim 4 wherein the composite paper comprises a lateral flow layer, to remove liquid and low molecular weight contaminants and inhibitors from the sample which is deposited on a surface of the paper.

6. The method of any of claims 1 or 2 wherein the substrate is glass or plastic.

7. The method of any preceding claim wherein the substrate is in the form of a microfluidic channel or a reaction vessel or other container.

8. The method of any preceding claim wherein the hydrophobic moiety comprises an alkyl chain, for example C5-C30 alkyl, preferably C10-C20 alkyl.

9. The method of any preceding claim wherein the charged moiety is positively charged.

10. The method of any any preceding claim wherein the charged moiety is a quaternary ammonium group.

11. The method of any preceding claim wherein the binding moiety comprises a hydroxyl group.

12. The method of any preceding claim wherein the functional groups are an alkyl chain, a silyl group, and an ammonium chloride group.

13. The method of any preceding claim wherein the biocidal agent is a silylated quaternary ammonium compound (SiQAC).

14. The method of any preceding claim wherein the biocidal agent is 3-(trimethoxysilyl) propyldimethyloctadecyl ammonium chloride.

15. The method of any of claims 1 to 11 wherein the biocidal agent is selected from

a) telechelic poly(2-alkyl-1,3-oxazolines);

b) cellulose with an antimicrobial DDA group;

c) a saponin

16. The method of any preceding claim wherein the biological sample comprises cellular material having a cell wall.

17. The method of any preceding claim wherein the cellular material comprises a prokaryotic cell.

18. The method of any of claims 1 to 16 wherein the cellular material comprises plant or fungal cells.

19. The method of any of claims 1 to 15 wherein the biological sample comprises eukaryotic animal cells.

20. The method of any of claims 1 to 15 wherein the biological sample comprises viral material.

21. A method of amplifying nucleic acids in a biological sample, the method comprising: preparing nucleic acids according to the method of any of claims 1 to 20; and subjecting the prepared acids to a nucleic acid amplification step, preferably a polymerase chain reaction (PCR) amplification.

22. A device for preparing nucleic acids from a biological sample comprising a) cellular material having a cell membrane, or b) cellular material having a cell wall, or c) viral material having a viral envelope or d) viral material having a viral capsid; the device comprising a substrate functionalised with a biocidal agent which is capable of i) weakening the cell membrane, cell wall, viral envelope, or viral capsid; or ii) lysing cellular or viral material, wherein the biocidal agent comprises multiple functional groups, the multiple functional groups comprising a binding moiety, which is involved in binding the agent to the substrate; a hydrophobic moiety; and a charged moiety.

23. The device of claim 22, wherein the substrate is a cellulose material; preferably a cellulose filter paper or a cellulose matrix.

24. The device of claim 23 wherein the cellulose material is a composite paper.

25. The device of claim 22 wherein the substrate is glass or plastic.

26. The device of any of claims 22 to 25 wherein the substrate is in the form of a microfluidic channel or a reaction vessel or other container.

27. The device of any of claims 22 to 26 wherein the hydrophobic moiety comprises an alkyl chain, for example C5-C30 alkyl, preferably C10-C20 alkyl.

28. The device of any of claims 22 to 27 wherein the charged moiety is positively charged.

29. The device of any of claims 22 to 28 wherein the charged moiety is a quaternary ammonium group.

30. The device of any of claims 22 to 29 wherein the binding moiety comprises a hydroxyl group.

31. The device of any of claims 22 to 30 wherein the functional groups are an alkyl chain, a silyl group, and an ammonium chloride group.

32. The device of any of claims 22 to 31 wherein the biocidal agent is a silylated quaternary ammonium compound (SiQAC).

33. The device of any of claims 22 to 32 wherein the biocidal agent is 3-(trimethoxysilyl) propyldimethyloctadecyl ammonium chloride.

34. The device of claim 22 wherein the biocidal agent is selected from

a) telechelic poly(2-alkyl-1,3-oxazolines);

b) cellulose with an antimicrobial DDA group;

c) a saponin

35. The device of any of claims 22 to 34 wherein the substrate is integrated into a sample preparation cartridge or the like.

CLAIMS:

1. A method of preparing nucleic acids from a biological sample comprising a) cellular material having a cell membrane, or b) cellular material having a cell wall, or c) viral material having a viral envelope or d) viral material having a viral capsid; the method comprising contacting the sample with a substrate, the substrate being functionalised with a biocidal agent which is capable of i) weakening the cell membrane, cell wall, viral envelope, or viral capsid; or ii) lysing cellular or viral material; wherein the biocidal agent comprises multiple functional groups, the multiple functional groups comprising a silyl group, which is involved in binding the agent to the substrate; an alkyl chain; and an ammonium chloride group.

2. The method of claim 1, further comprising the step of subjecting the sample to heat after the contacting step.

3. The method of claim 1 or 2, wherein a) the substrate is a cellulose material; preferably a cellulose filter paper or a cellulose matrix; more preferably wherein the cellulose material is a composite paper; most preferably wherein the composite paper comprises a lateral flow layer, to remove liquid and low molecular weight contaminants and inhibitors from the sample which is deposited on a surface of the paper; or b) wherein the substrate is glass or plastic.

4. The method of any preceding claim wherein the substrate is in the form of a microfluidic channel or a reaction vessel or other container.

5. The method of any preceding claim wherein the alkyl chain is C5-C30 alkyl, preferably C10-C20 alkyl.

6. The method of any preceding claim wherein the biocidal agent is a silylated quaternary ammonium compound (SiQAC); more preferably wherein the biocidal agent is 3-(trimethoxysilyl) propyldimethyloctadecyl ammonium chloride

7. The method of any preceding claim

i. wherein a) the biological sample comprises cellular material having a cell wall; b) the biological sample comprises eukaryotic animal cells; or c) the biological sample comprises viral material; or

ii. wherein the cellular material comprises a prokaryotic cell, or wherein the cellular material comprises plant or fungal cells.

8. A method of amplifying nucleic acids in a biological sample, the method comprising: preparing nucleic acids according to the method of any of claims 1 to 7; and subjecting the prepared acids to a nucleic acid amplification step, preferably a polymerase chain reaction (PCR) amplification.

9. A device for preparing nucleic acids from a biological sample comprising a) cellular material having a cell membrane, or b) cellular material having a cell wall, or c) viral material having a viral envelope or d) viral material having a viral capsid; the device comprising a substrate functionalised with a biocidal agent which is capable of i) weakening the cell membrane, cell wall, viral envelope, or viral capsid; or ii) lysing cellular or viral material, wherein the biocidal agent comprises multiple functional groups, the multiple functional groups comprising a silyl group, which is involved in binding the agent to the substrate; an alkyl chain; and an ammonium chloride group.

10. The device of claim 9, wherein the substrate is a) a cellulose material; preferably a cellulose filter paper or a cellulose matrix; more preferably wherein the cellulose material is a composite paper; or b) is glass or plastic.

11. The device of any of claims 9 or 10 wherein the substrate is in the form of a microfluidic channel or a reaction vessel or other container.

12. The device of any of claims 9-11 wherein the alkyl chain is C5-C30 alkyl, preferably C10-C20 alkyl.

13. The device of any of claims 9-12 wherein the biocidal agent is a silylated quaternary ammonium compound (SiQAC); more preferably wherein the biocidal agent is 3-(trimethoxysilyl) propyldimethyloctadecyl ammonium chloride.

14. The device of any of claims 9 to 13 wherein the substrate is integrated into a sample preparation cartridge or the like.