

CLAIMS

What is claimed is:

1. A sample collection method comprising:
collecting a sample comprising a biological or environmental substance using a swab,
placing the swab with the collected sample in a sample buffer, and
filtering the sample.
2. The sample collection method of claim 1 further comprising contacting the sample in the sample buffer with a protease.
3. The sample collection method of claim 1 wherein the swab is a flocked swab.
4. The sample collection method of claim 1 wherein the collecting step comprises collecting the sample from a sample vessel without pipetting and the swab is configured to absorb and release an amount of the sample within a four-fold volume range.
5. The sample collection method of claim 4 wherein the swab is configured to absorb and release the sample from the biological or environmental substance within a two-fold volume range.
6. The sample collection method of claim 4 wherein the substance is a substance that has a viscosity of 3 cP or greater.
7. The sample collection method of claim 6 wherein the viscous substance is sputum.
8. The sample collection method of claim 1 wherein the sample buffer comprises a detergent in an amount of at least 10% by volume of the sample buffer.

9. The sample collection method of claim 1 wherein the sample buffer comprises a detergent in an amount of at least 12% by volume of the sample buffer.
10. The sample collection method of claim 1 wherein the sample buffer comprises a detergent in an amount in a range of 12% to 18% by volume of the sample buffer.
11. The sample collection method of claim 1 wherein the sample buffer comprises 15% Triton-X by volume of sample buffer.
12. The sample collection method of claim 1 wherein the filtering step comprises drawing the sample through a filter in the presence of a protease.
13. The sample collection method of claim 1 wherein the sample buffer contains an alcohol.
14. The sample collection method of claim 1 wherein the sample buffer does not contain an alcohol.
15. The sample collection method of claim 1 wherein the sample comprises a sample matrix and a pathogen, wherein the swab preferentially retains the sample matrix while preferentially releasing the pathogen into the sample buffer.
16. The sample collection method of claim 1 wherein there is no pretreatment step of more than 5 minutes.
17. The sample collection method of claim 1 wherein there is no pretreatment step of more than 2 minutes.
18. The sample collection method of claim 16 wherein the sample is sputum and the sputum is not heat treated or treated with DTT prior to the placing step.

19. The sample collection method of claim 1 wherein the sample buffer comprises a detergent selected from the group consisting of a non-ionic detergent, an ionic detergent, a zwitterionic detergent, and any combination thereof.

20. The sample collection method of claim 1 wherein the biological or environmental sample is a difficult sample type.

21. A sample collection method comprising:
collecting a sample comprising a biological or environmental substance, and
placing the sample in a sample buffer wherein the sample buffer comprises a detergent in an amount of at least 10% by volume of the sample buffer.

22. The sample collection method of claim 21 further comprising drawing the sample through a filter.

23. The sample collection method of claim 21 further comprising contacting the sample in the sample buffer with a protease.

24. The sample collection method of claim 21 wherein the sample is blood or a blood product.

25. The sample collection method of claim 24 wherein the sample buffer does not contain an alcohol.

26. The sample collection method of claim 21 wherein the sample comprises a sample matrix and at least one pathogen and filtering step separates the sample matrix from the pathogen.

27. The sample collection method of claim 21 wherein the filtering step separates the sample matrix from the pathogen without a pretreatment step of more than 5 minutes.

28. The sample collection method of claim 27 wherein the sample is sputum and the sputum is not heat treated prior to the placing step.

29. The sample collection method of claim 21 wherein the buffer has a pH of about 2 to about 6.

30. The sample collection method of claim 21 wherein the collecting step comprises contacting a sample matrix containing the sample with a material that preferentially collects and releases organism over sample matrix.

31. A sample collection method comprising:
collecting a sample comprising a biological or environmental substance by contacting the sample with a material that preferentially collects and releases the organism over sample matrix, and
placing the material with the collected sample in a sample buffer.

32. The sample collection method of claim 31 wherein the material is a hydrophilic material.

33. The sample collection method of claim 32 wherein a fixed amount of the material reproducibly absorbs and releases an amount of the sample within a four-fold range.

34. The sample collection method of claim 33 wherein the material is provided as a swab.

35. The sample collection method of claim 33 wherein the material is adsorbent and is selected from the group consisting of a swab, brush, sponge, filter, utensil, loop, and paper.

36. The sample collection method of claim 31 further comprising filtering the sample.

37. The sample collection method of claim 31 further comprising subjecting nucleic acids from the collected sample to amplification conditions.

38. A cannulated vial comprising
a vial body having a top surface at one end, a bottom surface at an opposite end, and exterior wall therebetween defining an interior vial volume, the top surface having an opening,

a cannula extending from the bottom surface and having a first end, a second end and an outer surface therebetween defining a cannula volume, the first end in fluid communication with the interior vial volume, and

a filter disposed between the vial body and the cannula, and
an additive provided in the cannulated vial.

39. The cannulated vial of claim 38 wherein the additive is provided in dried form.

40. The cannulated vial of claim 38 wherein the additive is a component of a material used in stabilizing nucleic acids or used to begin sample lysis.

41. The cannulated vial of claim 38 wherein the additive is a protease.

42. A sample container comprising
an opening configured to receive a sample,
a body configured to hold a fluid,
an opening configured to allow the fluid to exit,
a filter disposed between the body and the exit, and
an additive provided for treating the sample.

43. The sample container of claim 42 wherein the additive is provided dried in the sample container.

44. The sample container of 43 wherein the additive is selected from the group consisting of proteases, DNases, DNase inhibitors, RNases, RNase inhibitors, reducing agents, and lysozymes.

45. A method of amplifying nucleic acids from a direct blood sample comprising
- (a) adding the direct blood sample to a sample buffer,
 - (b) bead beating the sample buffer,
 - (c) extracting the nucleic acids from the sample buffer,
 - (d) amplifying the nucleic acids.

46. The method of claim 45 wherein steps (b) through (d) are performed in a closed sample vessel.

47. The method of claim 45 wherein steps (a) through (d) are performed without centrifugation, ethanol precipitation, and DNA digestion.

48. The method of claim 45 wherein the nucleic acids are host RNA.

49. The method of claim 45 wherein the direct blood sample is collected in a RNA stabilized solution.

50. The method of claim 45 wherein the direct blood sample is collected in a non-RNA stabilizing solution.

51. The method of claim 45 wherein the direct blood sample is separated prior to step (a) and a blood fraction is used.

52. The method of claim 45, further comprising filtering the sample between steps (a) and (b).

53. The method of claim 45 wherein the nucleic acids are provided in high copy number.

54. The method of claim 45 wherein the nucleic acids are from microorganisms.

55. The method of claim 45, further comprising washing the nucleic acids following the extracting step, wherein the washing step comprises no more than three washes.