

8. A method as claimed in claim 1 wherein said linear polysaccharide comprises a mixture of agarose and hydroxyethyl cellulose.

9. A method as claimed in claim 1 wherein said polysaccharide comprises a mixture of agarose, dextran, and hydroxyethyl cellulose.

10. A method as claimed in claim 1 wherein said polysaccharide comprises a mixture of agarose, starch, and hydroxyethyl cellulose.

11. A method as claimed in claim 1 wherein said gel comprises said linear polysaccharide and at least one synthetic polymer with hydroxyl groups.

12. A method as claimed in claim 11 wherein said synthetic polymer comprises polyvinyl alcohol.

13. A method as claimed in claim 1 wherein said cross linker is at least one member selected from the group consisting of dihaloalkyl alcohols, halohydrins, bisepoxides, divinyl sulfone, alkanediol dialkyl sulfonates, and alkanediol diaryl sulfonates.

14. A method as claimed in claim 13 wherein said substantially simultaneous gelation and reaction between said polysaccharide and said cross linker is carried out at a pH of about 8 and 14.

15. A method as claimed in claim 13 wherein said substantially simultaneous gelation and reaction between said polysaccharide and said cross linker is carried out at a temperature of about 4° to 65° C.

16. A method as claimed in claim 13 wherein said substantially simultaneous gelation and reaction between said polysaccharide and said cross linker is carried out for a time of about 15 minutes to 5 days.

17. A method as claimed in claim 13 wherein said substantially simultaneous gelation and reaction between said polysaccharide and said cross linker is carried out in a solvent comprising water.

18. A method as claimed in claim 13 wherein said substantially simultaneous gelation and reaction between said polysaccharide and said cross linker is carried out in a solvent comprising a mixture of water and an organic solvent.

19. A method as claimed in claim 1 wherein said mixture of molecules comprises nucleic acids.

20. A method as claimed in claim 1 wherein said mixture of molecules comprises proteins.

21. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and smaller molecular sizes, which method comprises: migrating said mixture of larger and smaller molecules through a substantially continuous bed of a substantially water insoluble, substantially transparent, substantially uniform composition submerged gel comprising a gelled, ether cross linked, reaction product of a quiescent composition comprising a solution comprising at least one linear polysaccharide and at least one cross linking agent, which cross linking agent is sufficiently macro molecular branched to at least retard the migration of said larger molecules therethrough, wherein said cross linking agent comprises a compound which is substantially devoid of functional groups which are charged, or which become charged upon contact with water, in a pH range of about 2 to 11, and which reacts with said polysaccharide to form ether linkages therewith, wherein said cross linked reaction product gel has a sufficiently low charge that it does not interfere with the use of said gel in submerged gel electrophoresis, and wherein said cross linked reaction product gel was made by substantially simultaneous cross linking and gelation.

22. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and

smaller molecular sizes as claimed in claim 21 wherein said linear polysaccharide comprises agarose.

23. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and smaller molecular sizes as claimed in claim 21 wherein said linear polysaccharide comprises hydroxyethyl cellulose.

24. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and smaller molecular sizes as claimed in claim 21 wherein said linear polysaccharide comprises hydroxyethyl agarose.

25. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and smaller molecular sizes as claimed in claim 21 wherein said gel comprises a linear polysaccharide and at least one additional polysaccharide.

26. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and smaller molecular sizes as claimed in claim 25 wherein said linear polysaccharide comprises agarose, and said additional polysaccharide comprises dextran.

27. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and smaller molecular sizes as claimed in claim 25 wherein said linear polysaccharide comprises agarose, and said additional polysaccharide comprises starch.

28. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and smaller molecular sizes as claimed in claim 21 wherein said linear polysaccharide comprises a mixture of agarose and hydroxyethyl cellulose.

29. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and smaller molecular sizes as claimed in claim 21 wherein said polysaccharide comprises a mixture of agarose, dextran, and hydroxyethyl cellulose.

30. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and smaller molecular sizes as claimed in claim 21 wherein said polysaccharide comprises a mixture of agarose, starch, and hydroxyethyl cellulose.

31. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and smaller molecular sizes as claimed in claim 21 wherein said gel comprises said linear polysaccharide and at least one synthetic polymer with hydroxyl groups.

32. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and smaller molecular sizes as claimed in claim 31 wherein said synthetic polymer comprises polyvinyl alcohol.

33. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and smaller molecular sizes as claimed in claim 32 wherein said substantially simultaneous gelation and reaction between said polysaccharide and said cross linker is carried out at a pH of about 8 to 14.

34. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and smaller molecular sizes as claimed in claim 32 wherein said substantially simultaneous gelation and reaction between said polysaccharide and said cross linker is carried out at a temperature of about 4° to 65° C.

35. A method of carrying out submerged gel electrophoresis of a mixture of molecules having, respectively, larger and smaller molecular sizes as claimed in claim 32 wherein said substantially simultaneous gelation and reaction between said polysaccharide and said cross linker is carried out for a time of about 15 minutes to 5 days.