

## EXAMPLE 13

Gels comprising hydroxyethylcellulose and butanediol diglycidyl ether. A 5% solution of hydroxyethylcellulose (Fluka, Cat. No. 54290) was prepared in 0.1M NaOH by prolonged stirring (1-2 days). To 10 ml of this solution 0.5 ml of butanediol diglycidylether was added under stirring and the solution incubated at room temperature for three days. Another gel was prepared by diluting the polymer solution with 0.1M NaOH to 4% and adding the same amount of the cross-linker. Fully transparent gels of good mechanical stability were formed from both solutions. Following washing and equilibration, electrophoresis of DNA fragments showed very sharp bands and good resolution of DNA fragments in the size range from 75 to 2000 bp in the 4% gel. All fragments migrated much less in the 5% gel and the resolution was not as good as in the 4% gel. In some similar gels incubated at 35° C. small bubbles were occasionally observed, probably caused by gel shrinkage.

## EXAMPLE 14

Gels comprising dextran and butanediol diglycidylether. Solutions (6, 8 and 10%) of dextran (Fluka, Cat. No. 31392) in 0.1M NaOH were prepared and to 20 ml of each of these solutions 0.5 ml of the cross-linker was added. The solutions were incubated at room temperature for three days. During washing in water and equilibration in the TAE buffer it was observed that the all gels swelled. The swelling was accompanied by distortion of sample wells which almost closed, making sample application difficult. Electrophoresis of DNA fragments showed moderate resolution in the 6% gel and very poor resolution in the 8 and 10% gels. In all gels the shape of DNA bands was crescent.

## EXAMPLE 15

Attempted preparation of gels comprising starch and butanediol diglycidylether. A 2% solution of starch (Fluka, Cat. No. 85645) was prepared in 0.1M NaOH and 0.5, 1.0 and 1.5 ml of the cross-linker added per 20 ml of the polymer solution. No manageable gel formed after incubation at 35° C. for two days.

## EXAMPLE 16

Gels comprising agarose, butanediol diglycidylether or 1,3-dichloropropanol and additional polymers comprising hydroxyethyl cellulose, polyvinyl alcohol, starch and dextran. A solution of 1% agarose polymers and 0.5% of starch was prepared in 0.1M NaOH and to 20 ml of this solution 0.5 ml of butanediol diglycidylether was added. A gel which formed after incubation at 35° C. for 2 days showed very good resolution of DNA fragments in the 100-2000 bp range. Another gel was prepared under identical conditions but it contained 0.5% dextran instead of starch. The separation range was the same but DNA bands were less sharp than in the gel comprising starch. A gel comprising 0.5% hydroxyethylcellulose and 1% agarose polymers was also prepared by incubation for 1 day at 35° C. Resolution of DNA fragments was very good and the 104 bp fragment migrated about 0.5 cm less than in the gel comprising starch. Two gels comprising polyvinylalcohol, 0.5 and 1%, in addition to 1% agarose polymers were prepared in the same way. The gel which comprised 0.5% of polyvinylalcohol showed sharper bands and very good resolution in the size range from 120 to 3000 bp.

Gels were also prepared in which the order of reagent addition was changed. Thus, one gel was prepared by adding

2.5 mmol of 1,3-dichloropropanol to a solution of agarose and hydroxyethylcellulose (10 ml, both polymers at 1%) and the other by adding 2.5 mmol of 1,3-dichloropropanol to a solution of agarose followed by addition of hydroxyethylcellulose. The final concentration of each polymer was 1%. The solutions contained 5 mmol of NaOH before addition of the cross-linker. Following incubation at 35° C. for two days, electrophoresis of DNA fragments showed essentially no difference in migration distances between identical DNA fragments run in the two gels.

## EXAMPLE 17

Gels comprising agarose and epichlorhydrin prepared by dilution of the cross-linker prior to its addition into the polymer solution. Dioxane (1 ml) was used to dilute the cross-linker (1 mmol) before it was added to 9 ml of 1.1% agarose solution containing 1.1 mmol of NaOH. The gel solution was incubated at 35° C. for two days. Following washing and equilibration, electrophoresis showed very good resolution of DNA fragments.

TABLE 1

Absorbance at 500 nm of gels comprising 2% agarose polymers cross-linked with different amounts of 1,3-dichloropropanol (mmol in 10 ml of gel) prepared as described in Example 7.								
mmol	0.0	0.1	0.2	0.4	0.6	1.0	2.0	4.0
A <sub>500</sub>	0.396	0.191	0.128	0.058	0.024	0.028	0.027	0.040

While this invention has been illustrated and described by the specific figures and examples, it is recognized that variations and changes may be made without departing from the invention as set forth in the claims.

What is claimed is:

1. A method of submerged gel electrophoresis of a mixture of molecules which comprises passing said molecules through a substantially continuous bed of a substantially water insoluble, substantially transparent, substantially uniform composition 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, 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.

2. A method as claimed in claim 1 wherein said linear polysaccharide comprises agarose.

3. A method as claimed in claim 1 wherein said linear polysaccharide comprises hydroxyethyl cellulose.

4. A method as claimed in claim 1 wherein said linear polysaccharide comprises hydroxyethyl agarose.

5. A method as claimed in claim 1 wherein said gel comprises a linear polysaccharide and at least one additional polysaccharide.

6. A method as claimed in claim 5 wherein said linear polysaccharide comprises agarose, and said additional polysaccharide comprises dextran.

7. A method as claimed in claim 5 wherein said linear polysaccharide comprises agarose, and said additional polysaccharide comprises starch.