

about one half of absorbance of the underivatized agarose in the visible region (compare FIG. 5 and FIG. 7). On the other hand, the present gels which in addition to the same polymers comprise a cross-linker, showed less than one tenth of absorbance of the gels with no cross-linker. Actually, the absorbance of the present gels comprising hydroxylated agarose and higher amounts of the cross-linker is almost nonexistent in the visible region (FIG. 8).

EXAMPLE 9

Gels comprising agarose and 2,3-dibromopropanol prepared at different polymer/cross-linker ratios. A series of gels comprising 1% agarose polymer and 0.25, 0.5, 1.0, 1.5, 2.0 and 2.5 mmol of 2,3-dibromopropanol in 10 ml was prepared. The gel solution included also sodium hydroxide in 10% molar excess over bromide. The gels were incubated at 35° C. for two days. Electrophoresis of DNA fragments showed improved resolution in the small molecular weight range, especially at 1-2 mmol of the cross-linker. The resolution was somewhat inferior to that achieved with gels cross-linked with 1,3-dichloropropanol. Occasionally, small bubbles could be noticed in the gels.

EXAMPLE 10

Gels comprising agarose and ethyleneglycol diglycidylether prepared at different polymer/cross-linker ratios. A series of gel comprising 1% agarose polymer in 0.1M NaOH and 0.05, 0.1, 0.2, 0.4 and 0.6 ml of ethyleneglycol diglycidylether in 10 ml was prepared by incubation at room temperature for 4 days. Electrophoresis showed reduced migration distances with increasing cross-linker concentration. Resolution was inferior to that obtained with butanediol diglycidylether.

EXAMPLE 11

Gels comprising agarose and divinylsulfone prepared at different polymer/cross-linker ratios at various pH values for different time. Into a warm 1% agarose solution in 0.1M NaOH, 0.010 ml of divinylsulfone was added under rapid stirring. The solution was immediately transferred into a gel mode. The gel solidified within minutes. The solidification was faster at higher cross-linker concentrations which made it practically impossible to reproducibly prepare such gels. Electrophoresis showed a pronounced decrease in migration distances related to those in the standard gel.

Agarose solutions (1%) were prepared in 0.2M bicarbonate-carbonate buffers with pH 8, 9.5 and 11.0. To 20 ml of each of these solutions 0.1 ml of divinylsulfone was added and the gel solutions incubated at 35° C. for 2 days. DNA fragments migrated less and appeared as sharper bands in the gel formed at pH 8 than at pH 9.5. In the gel formed at pH 11 the fragments migrated less than in either of the two gels. The bands corresponding to small DNA fragments were the sharpest in this gel.

A series of gels was prepared which comprised 1% agarose in 10 mM NaOH and 0.020, 0.040, 0.060, 0.080 and 0.100 ml of divinylsulfone per 20 ml. After addition of the cross-linker each gel was immediately poured in the gel mold and left there for 15 min. The gel with 0.100 ml of the cross-linker was too weak for subsequent handling. The other gels were washed in water and equilibrated in the TAE buffer. Electrophoresis showed decreased migration distances with increasing cross-linker concentrations. The DNA bands in all four

gels were more diffuse than in the above gel cross-linked at pH 11 for 2 days.

EXAMPLE 12

Gels comprising agarose and butanediol diglycidylether by addition of the cross-linking reagent to the polymer solutions at different temperatures. To 1% solution of agarose in 0.1M NaOH the cross-linker was added (0.5 ml per 20 ml) at 50° and 70° C. under vigorous stirring. The gel solutions were immediately poured in the gel molds and incubated at 35° C. for three days. Electrophoresis of DNA fragments in the three gels showed essentially the same result, that is the migration distances did not differ more than 1-2 mm after running the gels at 7 V/cm for 1 h and 50 min. A similar result was obtained with 1,3-dichloropropanol as the cross-linker.

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 di-