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time to time, and after 30 minutes it is heated for 30-40 minutes on a water bath at 85° C. The reaction product is then cooled, washed repeatedly with distilled water, then with 1 N sodium hydroxide solution and with 1 N hydrochloric acid solution, and filtered. The product remaining on the filter is then treated with equal quantities of 40 ml. of 1 N sodium hydroxide and 1 N hydrochloric acid solutions, and then again with 40 ml. of 1 N sodium hydroxide solution, with filtering each time in vacuum. The product remaining on the filter is then again suspended in 40 ml. of 1 N sodium hydroxide solution, diluted with 150 ml. of distilled water, and stored overnight. On the second day, the supernatant product is decanted, washed several times with distilled water by decanting, filtered, and then dehydrated with ethanol and dried. 8.5 g. of cross-linked diethyl-aminoethyl agarose are obtained containing about 0.8 mequiv./g. of basic groups.

## EXAMPLE 5

Example 2 is repeated using, however, 10 g. of cross-linked agarose instead of the 10 g. simple agarose. Finally, 10 g. of cross-linked agarose are obtained containing about 0.9 mequiv./g. of acid groups.

## EXAMPLE 6

Example 1 is repeated using however only 3 g. of 1-chloro-2-diethyl aminoethane hydrochloride, that is 50% of the above quantity used in the mentioned example. The diethyl-aminoethyl agarose thus obtained contains a quantity of 0.6 mequiv./g. of basic groups.

## EXAMPLE 7

Example 3 is repeated using, however, only 1.5 g. epichlorohydrin. 10.5 g. of a product with a less dense lattice are obtained.

## EXAMPLE 8

Example 3 is repeated using, however, this time only 0.75 g. of epichlorohydrin. 8 g. of cross-linked agarose are obtained.

## EXAMPLE 9

Example 3 is repeated using, however, only 0.2 g. of epichlorohydrin. The resulting product (8 g.) has a great retention capacity for water and its lattice is less dense as compared with the compounds obtained according to Examples 3, 7, and 8.

In the above mentioned examples, the dehydration of the gel particles can also be carried out with acetone. Also, the amounts of 1-chloro-2-diethyl aminoethane hydrochloride, monochloro-acetic acid, or epichlorohydrin

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may be varied by applying other proportions than those specified; thus there are obtained compounds which differ in respect to their characteristics physico-chemical properties. The dehydrated and dried gels have been mechanically broken and selectively sieved in order to separate products with a desired grain size.

The present invention has the following advantages:

By introducing diethyl-aminoethyl and carboxymethyl groups into the molecule of agarose, products are obtained which permit the preparation of a new electrophoretic technique by using ion-exchanging gels which permit separation of macromolecular compounds both by the criterion of the global electric charges and by the criterion of the distribution of the electric groups over the surface of the molecule; these gels may also be in immunodiffusion;

By preparing cross linkage of agarose with epichlorohydrin, products are obtained which may be used in both the separation of various compounds by the criterion of their molecular weight and in the concentration of the solutions containing macromolecular substances;

By introducing diethyl-aminoethyl and carboxymethyl groups into the cross-linked agarose, products are obtained which may be used in the chromatographic separation of macromolecules, the same as the other known ion-exchangers based on cellulose and dextran and also, eventually, for the separation of subcellular fractions.

What is claimed is:

1. Agarose having the molecules thereof cross-linked with epichlorohydrin.

2. Agarose products selected from the group consisting of agarose and the said cross-linked agarose of claim 1, modified by groups selected from diethyl-aminoethyl and carboxymethyl.

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