Test Method for Chromatographic Separation Resin

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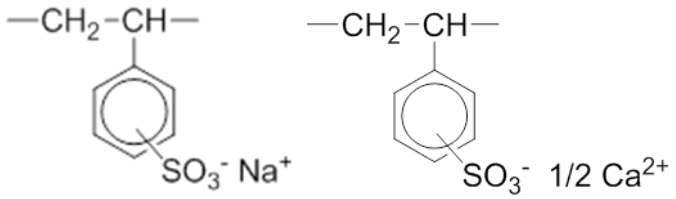
Test method for DIAION UBK series for chromatography

1 Chemical structure of UBK series

The DIAION UBK Series is comprised of strongly acidic cation exchange resins with a uniform small particle diameter and a sulfate group as their functional group.

The DIAION UBK Series has Na form products for ion exclusion for chromatographic separation and Ca form products that use the interaction of Ca and fructose for chromatographic separation (Fig. 1).

The Na form of strongly acidic cation exchange resin utilizes a phenomenon (ion exclusion) whereby ions are excluded from the ion exchange resin due to the Donnan potential produced when electrolytes (ions) are diffused in the ion exchange resin. This phenomenon is used for separation of non-electrolytes such as sugars and electrolytes such as salts, and for separation of oligosaccharides via molecular weight fractionation. The Ca form of strongly acidic cation exchange resin uses the difference in interaction of Ca and sugar for the separation of fructose and glucose.



Na form Ca form

Fig. 1 Chemical Structure of DIAION UBK series

2 Experiment equipment/conditions (Fructose/Glucose separation: Example)

2.1 Experimental equipment

Column: 20–30 mm (dia.) x 1000 mm (H)

Resin layer height: 1000 mm

Minimum resin amount: 300 mL

Raw material load: Raw material solution amount should be 0.05–0.1 times the resin amount

Expansion liquid: Desalinated water (2–3 times the resin amount)

Flow velocity: SV 0.5–1 (provide flow of the same volume as the resin in 0.5–1 hr)

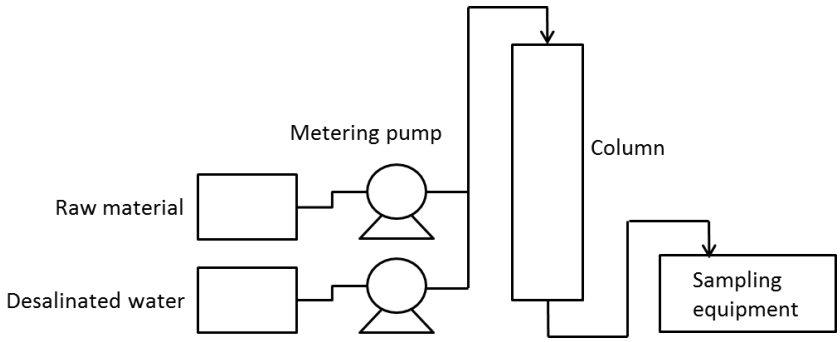


Fig. 2 Experimental equipment

3 Experimental procedure (Fructose/Glucose separation)

3.1 Place resin immersed in water into a graduated cylinder. Tap the graduated cylinder lightly with a rubber rod or similar tool until the surface of the resin stabilizes in the water. Adjust the amount of resin to reach the specified volume.

3.2 Expel air from the filter section in the bottom of the column by passing desalinated water through from the bottom of the column.

3.3 Fill the column with desalinated water to 5 cm from the bottom, then supply the specified volume of resin into the column using desalinated water.

3.4 After filling with resin, adjust water level about 2 cm above the resin surface.

3.5 Next, supply the specified amount of raw material into the column at a flow velocity of SV 0.5–1.

3.6 Next, provide a flow of desalinated water into the column at the same flow velocity.

3.7 Immediately after the water flow begins, sample the effluent in an amount corresponding to 1/10 (fraction) of the resin amount.

3.8 Analyze each sample and plot an outflow pattern (Fig. 3).

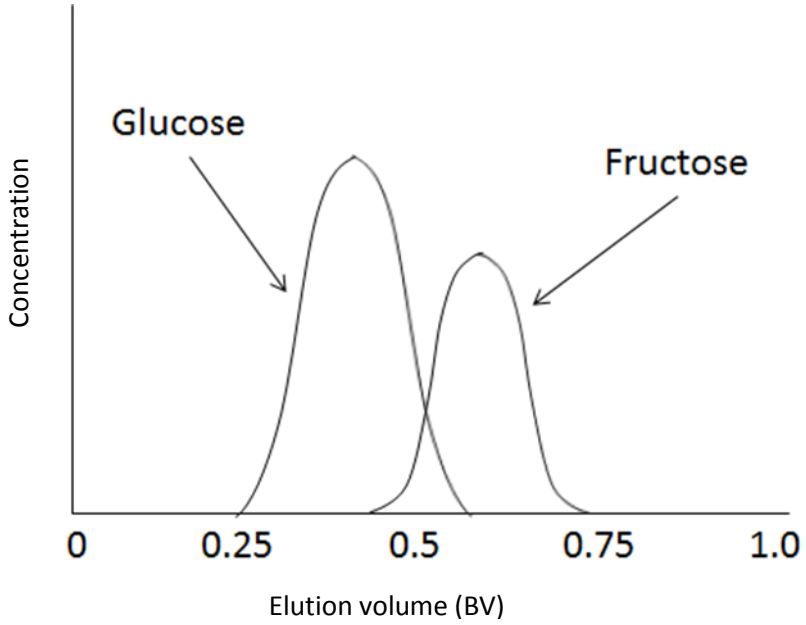


Fig. 3 Outflow pattern