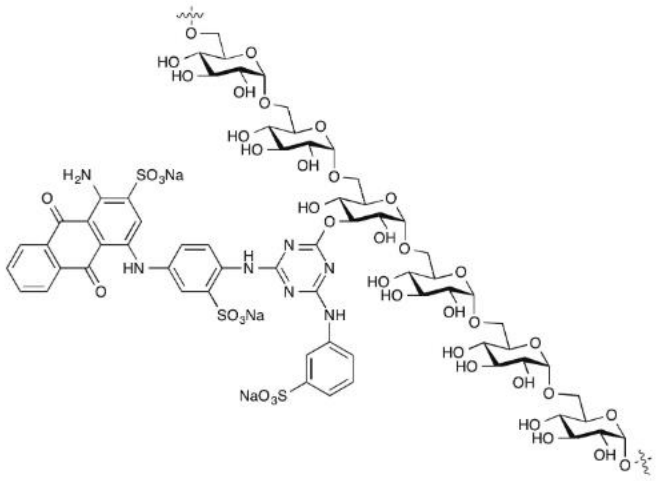
Blue dextran

Trade name: Blue dextran

Chemical name: Dextran, 4—[4-[4-amino-9,10-dihydro-9,10-dioxo-3-sulfo-1-anthraceneyl)amino]-2-sulfophenyl]amino]-6-[[3(or 4)-sulfophenyl]amino]-1,3,5-triazin-2-yl ether, trisodium salt

CAS nr: 87915-38-6



Synthesis and structure

Blue-dextrans are synthesized from controlled dextran fractions by reacting with Cibacron blue F3GA. After purification from non-bound dye, the products are controlled for mean weight average molecular weight (Mw), solubility, degree of substitution, free dye and loss on drying. The low molecular weight blue-dextrans (BD5, BD10 and BD20) require purification by chromatographic methods during production and are therefore more expensive than the larger ones.

The products are designated by the approximate molecular weights of the dextran fractions used. Thus, for example, the product BD5 has a molecular weight of approx. 5000. The actual molecular weight is determined by gel permeation chromatography (GPC). This value is supplied with the Certificate of Analysis. The dextran used is from *Leuconostoc mesenteroides* B-512F which is essentially a linear α-(1-6)-linked glucose chain with a low percentage (2-5%) of α-(1-3) branches distributed along the chain. The dextran fractions used are from weight average molecular weights (Mw) of 4000 to 2000000 and are carefully controlled by GPC, optical rotation, absorbance and other control parameters.

Physical properties

Blue-dextrans are blue, odourless powders which are freely soluble in water or electrolyte solutions. The product has a pronounced amphoteric character by virtue of the presence of both sulphonate and amino groups in Cibacron Blue. Since this property may influence the hydrodynamic volume in

solution and the interactions with gels, some anomalies have been found on running samples on GPC. Blue-dextrans are insoluble in most organic solvents, for example, ethanol, methanol, acetone, chloroform, ethyl acetate etc.FIG. 2 Absorbtion spectrum of blue-dextran 110 in water.The blue chromophore used has an absorbance maximum at 621.5 nm (see Fig.2)

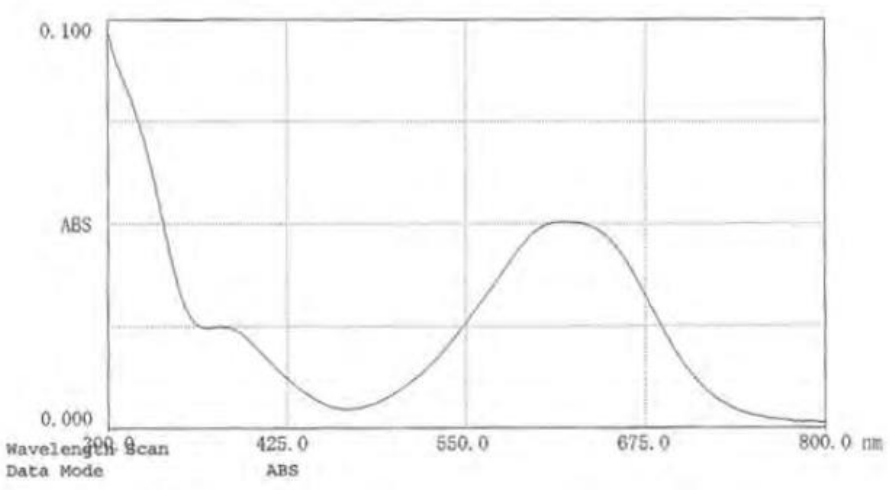


Fig 2. Absorption spectrum of blue-dextran 110 in water.

Stability

No prospective stability studies on blue-dextrans have been performed. However retrospective studies of samples of blue dextran after 3 years at room temperature do not indicate any instability. It is recommended that the products are stored in air-tight containers in the dark. Blue-dextran may be stored at ambient temperatures.

Toxicity

Blue dextran is listed under Haz-Map as a skin, eye and respiratory tract irritant. Like most powders, it is recommended that inhalation should be avoided, particularly repeated exposure.

Applications

Blue dextran 2000 has long been used as a void volume marker in chromatography and Blue-dextran gel conjugates for chromatography have been available for many years (e.g. see GE Healthcare Life Sciences; Size Exclusion Chromatography; Principles and Methods).

The blue dextrans available from TdB Labs now extend the range of applications in Biosciences and are detected with standard UV and RI detectors. Other important spheres of research, where blue-dextrans have been used, are listed below. Studies on lysosomal activity (1), endothelial cell permeability (2), bovine sperm permeability y(3) , cornea permeability(4), flow studies in lung(5-7) , cerebro permeability (8-10), binding of proteins and enzymes to Blue-dextran (11-13).

References

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