FITC-CM-dextran

Chemical names: FITC-Carboxymethyl-dextran

Fluorescein- thiocarbamoyl-(O-carboxymethyl)-dextran

Trade name: FITC-CM-dextran

CAS nr: N/A

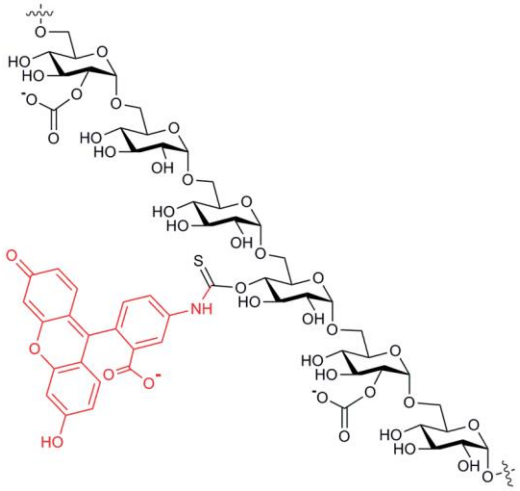

Fig. 1. Structural representation of CM-dextran.

Properties

FITC-CM-dextrans are manufactured by reacting selected dextran fractions with an activated carboxymethyl derivative in alkali whereby O-carboxymethyl groups are introduced along the dextran chain. The carboxyl content is approximately 5% which is equivalent to about one CM group for every five glucose units. Thereafter, fluorescein groups are introduced by reaction with fluorescein isothiocyanate. The DS (FITC) lies between 0.003 - 0.008. FITC-CM-dextrans are supplied as a yellow powder which is freely soluble in water or electrolyte solutions. The products have a pronounced polyanionic character by virtue of the negatively charged carboxyl groups attached. The solution properties of FITC-CM-dextrans are expected to be comparable with those for CM-dextran (1-3). In neutral solutions, the carboxymethyl substituents will repel each other leading to an expansion of the dextran coil. FITC-CM-dextrans are insoluble in most organic solvents, for example, ethanol, methanol, acetone, chloroform, ethyl acetate.

Spectral properties

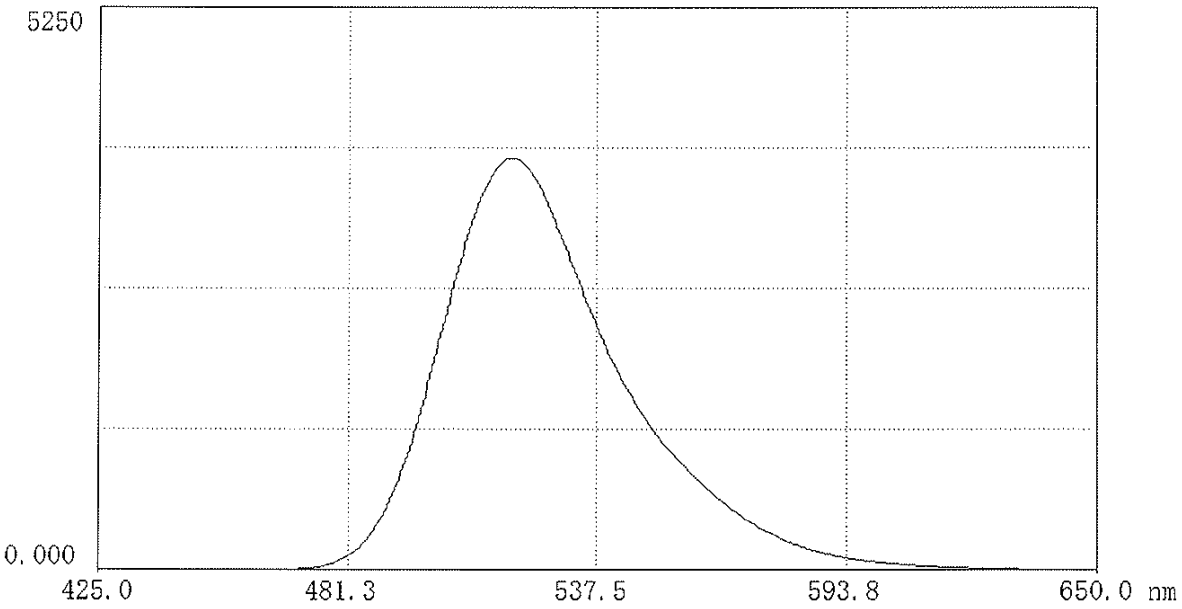

Fig. 2. Fluorescence scan of FITC-CM-dextran in 0.025M borate pH 9.0 (10mg in 50 ml buffer). Excitation 493nm; Emission 519nm.

Storage and stability

Prospective stability studies have established that CM-dextrans maintain their potency and purity for at least 3 years (unpublished studies) and from our experience with FITC-dextrans, we predict a similar stability for FITC-CM-dextrans. It is recommended that FITC-CM-dextrans are stored in air-tight containers in the dark at ambient temperatures.

Applications

CM-dextran itself has been found to be biocompatible and is used as a starting material in several pharmaceutical and diagnostic applications. The toxicity of FITC-CM-dextran is likewise anticipated also to be low. The insertion of a carboxyl group in the dextran chain provides further opportunities for immobilizing molecules with interesting biological activity (pharmaceuticals, enzymes, diagnostic tracers) on to dextrans. The carboxyl moiety may be used in many reactions, for example, esterification, amidation with amines, UGI or Passerini reactions. Simple ion-binding reactions can also provide a range of derivatives incorporating different cationic molecules (4,5). The carboxyl groups will also impart an overall negative charge to the molecule, which may be valuable in gaining information on the permeability characteristics of cell membranes and tissues (6). The application of FITC-CM-dextran in studies of drug delivery systems has been reported (7).

References

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