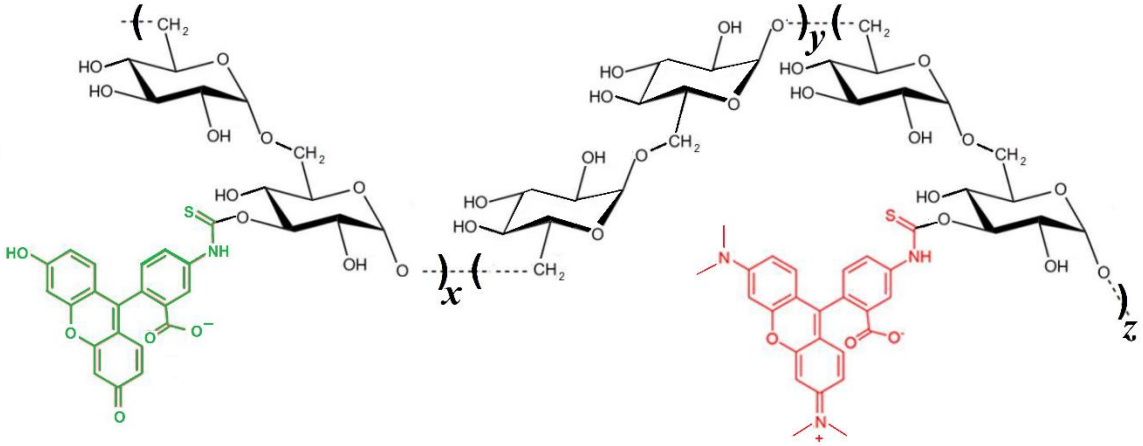
FITC-TRITC-dextran

Catalogue number: FTD

CAS Nr.: N/A

Structure:



x≈z<<y

Fig. 1 Structural representation of FITC-TRITC-dextran

Brief description

FITC-TRITC-dextran (FTD) is a dually labelled dextran derivative involving two fluorophores namely: FITC and TRITC (see Fig. 1). This derivative is currently produced at a molecular weight (MW) of 500 kDa and it is suitable for applications requiring pH-monitoring in living cells or tissue. FTD can operate at a wide range of pH spanning from 3.5 to 8.0.

Synthesis and Structure

FTD is synthesized from well-characterized dextran fractions derived from *Leuconostoc mesenteroides*. Dual labelling of dextran with FITC and TRITC is achieved via a well-optimized method allowing control of the FITC/TRITC labelling ratio.

Structurally, each of the fluorophores (FITC and TRITC) are bound to dextran through thiourethane linkages (Fig. 1). The degree of substitution (DS) lies in the range from 0.001 to 0.020 mol of dye per mole of glucose units for each of the fluorophores. The molar ratio of FITC/TRITC bound to dextran can vary between 1:1 and 2:1 and it is assessed spectrophotometrically at neutral pH.

The purification process (very similar to corresponding FITC- and TRITC-dextrans) leads to final FITC-TRIC-dextran product with no traceable free-dye (i.e. non-bound dye or dye byproducts). After purification from non-bound dye, the products are controlled for MW, appearance, solubility, DS, and fluorescence. The actual molecular weight is determined by GPC. This value is supplied with the Certificate of Analysis.

Properties

As a result of the dual fluorescent labelling of dextran, FITC-TRITC-dextran exhibits fluorescence emission at λ_{fl}=517±5nm when photoexcited at λ_{ex}=493 nm (due to FITC) and at λ_{fl}=575±5nm when photoexcited at λ_{ex}=550 nm (due to TRITC).

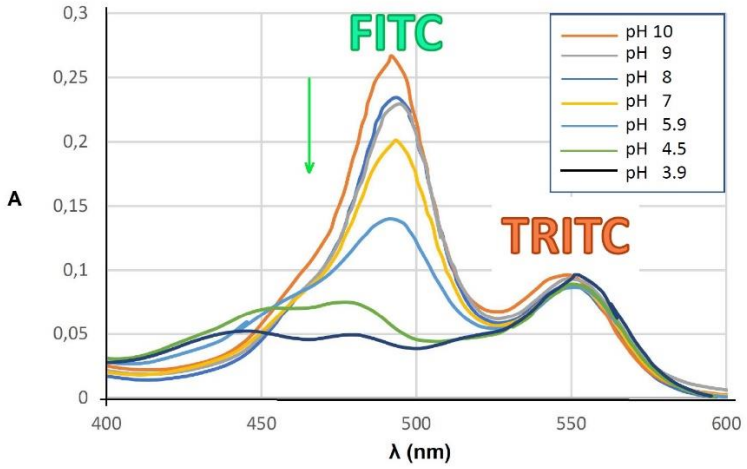


Fig. 2 *UV-Vis spectra depicting the dependence of two visible features of FTD upon varying pH*

What renders this TdB Labs product unique is that the fluorescence (as well as the absorbance) of one of the fluorophores (FITC) is highly dependent on pH while the corresponding ones of the other fluorophore (TRITC) remains nearly unchanged between pH 2 and 10 (see Fig. 2). This allows for accurate determination of pH in living cells or tissues and thereby renders this product an invaluable tool for intravital microscopy.

The excellent performance of FTD is well illustrated through the sigmoidal curves of Fig. 3. When comparing pH dependence on the ratios of emission and absorbance of FITC-TRITC-dextran 500 (FTD500) to those of a single-fluorophore-involving dextran (FITC-dextran 500 kDa) of equal MW (FD500), the measurable pH-range appears to be extended for FTD500 (see green-dashed and blue-dashed curves compared to orange line; Fig. 3).

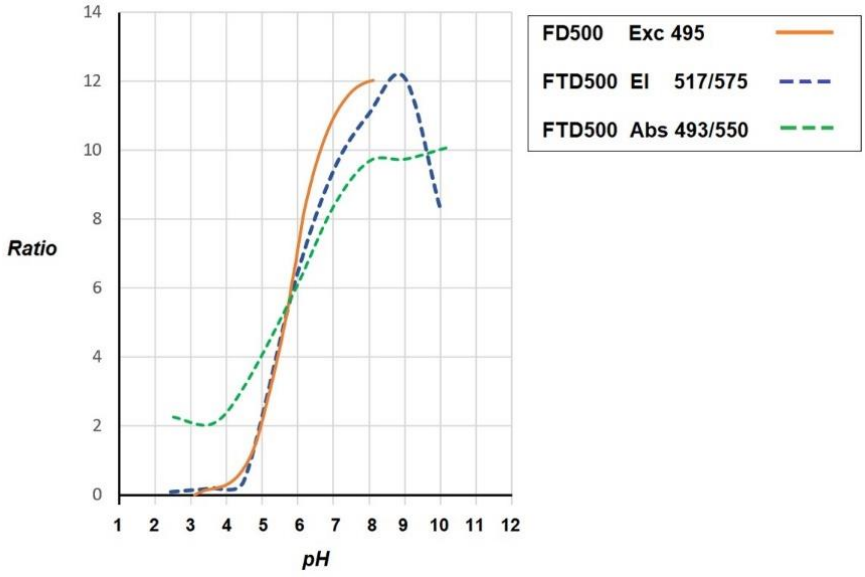


Fig. 3 *pH-dependence on the ratios of emission and absorbance of FTD500 and those of a single-fluorophore involving dextran analogue (FITC-Dextran) of equal MW (FD500)*