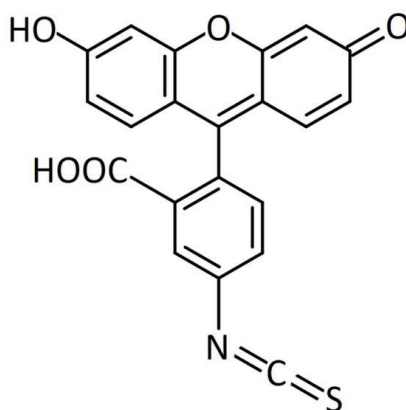


# FITC

(Fluorescein isothiocyanate (5-FITC))

<b>Trade name:</b>	FITC
<b>Empirical formula:</b>	C <sub>21</sub> H <sub>11</sub> NO <sub>5</sub> S
<b>CAS nr.:</b>	3326-32-7
<b>MW:</b>	389,381 g/mol

**Structure:**



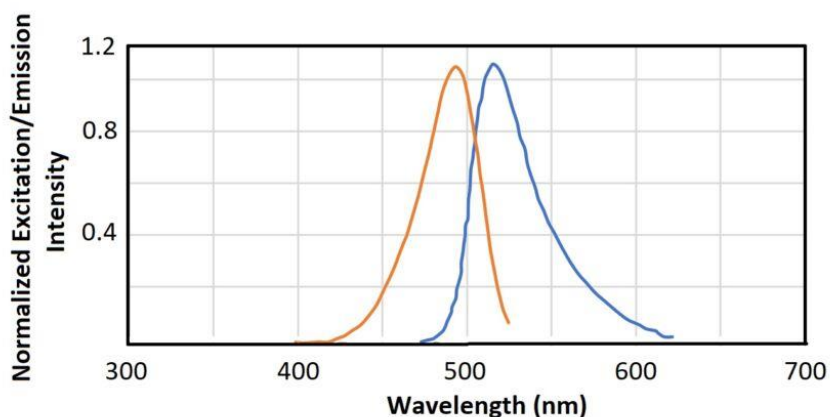
*Fig. 1 Structural representation of FITC isomer I (fluorescein 5-isothiocyanate).*

## Structure

Fluorescein isothiocyanate (widely known as FITC) is a derivative of fluorescein which contains an isothiocyanate group at either position 5 or position 6 of the bottom benzene ring (see structure in Fig.1). The compound is often used in the form of one of its two isomers or sometimes as mixture of the two (CAS nr. of mixture 27072-45-3). It was first described as early as 1942 when it was first utilized to label antibodies.[1] Due to the presence of the isothiocyanate group and because it is highly fluorescent, FITC can be easily used as labelling agent of various substrates such as proteins or polysaccharides. Isothiocyanate easily react with nucleophiles such as amines under mild conditions.

## Properties and Spectral Data

FITC exhibits an excitation maximum at  $\lambda = 495$  nm and emission maximum at approximately  $\lambda = 519$  nm (see Figure 2) [2]. Therefore, the colour of the compound is yellow while the emitted light is green. The variation of the excitation and emission wavelengths among the two isomers of FITC is minor. FITC functionalized biopolymers e.g. FITC-dextrans exhibit similar excitation and emission characteristics with the parent molecule which renders FITC as a perfect candidate for fluorescent labelling.



*Fig. 2 Excitation (orange) and emission (blue) spectrum of FITC isomer I. The excitation maximum is 495 nm and the emission maximum is approximately 519 nm.*

## Stability and Solubility

FITC is quite stable if stored properly. As a powder, FITC can be stored for even two years at temperatures between 0 and 8 °C in a dark and moisture-free environment. Solutions of FITC as well as of various FITC-functionalized products have been reported to be prone to photobleaching. Therefore, solutions of FITC should be protected from light and they should be used directly after their preparation especially in case of imaging applications exploiting the fluorescence of FITC. FITC is soluble in DMSO and other polar organic solvents like formamide and DMF but poorly soluble in water.

## Applications

Applications FITC has a wide range of applications. Including fluorescent labelling of antibodies and flow cytometry [3]. FITC-functionalized products e.g., FITC-dextrans are very useful for studying permeability and transport in a large variety of cells and tissues e.g., intestinal, [4] neoplastic,[5] and ocular [6] tissues as well in research related to brain and neural system [7].

## References

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