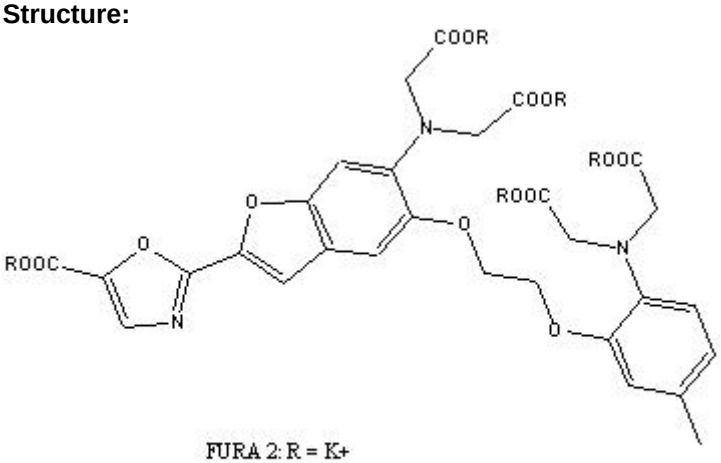
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, Ohio 44139
Telephone: 440/337-1200
Toll Free: 800/854-0530
Fax: 440/337-1180
mailto: biotech@mpbio.com
web: http://www.mpbio.com

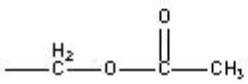
TECHNICAL INFORMATION

Catalog Number: 152285, 152286
Fura 2

Structure:



FURA 2: R = K+

FURA 2-AM: R = 

Molecular Formula:

Fura 2: $C_{29}H_{22}N_3O_{14}K_5$ (Molecular Weight: 831)
Fura 2-AM: $C_{44}H_{47}N_3O_{24}$ (Molecular Weight: 1001.9)

CAS #

96314-98-6 (Fura 2)
108964-32-5 (Fura 2-AM)

Synonym: 1-(2-[5-Carboxyoxazol-2-yl]-6-aminobenzofuran-5-oxy)-2-(2'-amino-5'-methylphenoxy) ethane-N,N,N',N'-tetracetic acid, pentapotassium salt

Physical Description: Pale yellow powder

Solubility: The alkali salt of the chelator is soluble in water (10 mg/ml). It is slightly soluble in alcohol and insoluble in the less polar organic solvents. The acetoxymethyl ester of the chelator is soluble in dimethylsulfoxide (10 mg/ml) and in nonpolar solvents such as chloroform, acetone and benzene. It is insoluble in water or methanol.

Ion Specificity: $Ca^{2+} > Mg^{2+}$, protons

Dissociation Constants:

Ca_{2+} complex - 135 - 224 nM
Mg^{2+} complex - 6 - 10 mM

Extinction Coefficient:

Free anion - 362 (27,000) nm
Ca^{2+} complex - 335 (33,000) nm

Corrected Emission Maxima:

Free anion - 518 nm
Ca^{2+} complex - 510 nm

Stability: The salt form of the chelator is unstable and undergoes continuous decomposition, whether in solution or dry. The partially protonated products of the free acid appear to be even less stable. Thus, stock solutions, if they must be stored, are best kept at high pH (greater than 10). However, it is recommended that solutions be made fresh each time. The acetoxymethyl ester is more stable, and prolonged storage is possible in the freezer under a dry, inert atmosphere and protected from light. Solutions of the acetoxymethyl ester should be stored in a freezer under an inert atmosphere and protected from light.

Storage: For prolonged storage, these products as received should be stored in a freezer under a dry, inert atmosphere and protected from light. Stock solutions should also be stored in a freezer under an inert atmosphere protected from light.

Background Information: In 1980, Tsien introduced the first examples of a new generation of calcium ion chelators. These novel molecules possess backbones that are very similar to EGTA and in addition, they retain the high specificity for Ca^{2+}. An advantage that these new molecules have over EGTA is that they possess aromatic rings that interact electronically with the functional groups participating in the chelation of Ca^{2+}. This interaction during chelation results in changes in the fluorescent and ultraviolet-absorbing properties of the molecules. These spectral changes allow these molecules to be used as very sensitive probes of chelation.

Fura 2 has a slightly lower affinity for Ca^{2+} than BAPTA or QUIN 2. This is advantageous because the Ca^{2+} dissociation constants of Fura 2 and Quin 2 conveniently straddle the Ca^{2+} resting level of approximately 100 nM that is typical of many cells. The intensities of ultra-violet absorption and of fluorescent emission are both substantially enhanced, making it a very sensitive probe for intracellular Ca^{2+}. The acetoxymethyl ester derivative of Fura 2, Fura 2/AM, may be used like QUIN 2/AM to load the chelator into cells.

Availability:

Catalog Number	Description	Size
152285	Fura 2, pentapotassium salt	1 mg 5 mg
152286	Fura 2-AM	0.5 mg 1 mg

References:

– Tsien, R.Y., "New calcium indicators and buffers with High Selectivity against magnesium and protons: Design, synthesis and properties of prototype structures." *Biochemistry*, **v. 19**, 2396 (1980).
– Grynkiewicz, G., et. al., "A new generation of Ca^{2+} indicators with greatly improved fluorescence properties." *J. Biol. Chem.*, **v. 260**, 3440 (1985).
– Almers, W., and Neher, E., "The Ca signal from fura-2 loaded mast cells depends strongly on the method of dye-loading." *FEBS Lett.*, **v. 192**, 13 (1985).
– Poenie, M., et. al., "Changes of free calcium levels with stages of the cell division cycle." *Nature*, **v. 315**, 147 (1985).
– Pritchard, K., and Ashley, C.C., "Na^{+}/Ca^{2+} exchange in isolated smooth muscle cells demonstrated by the fluorescent calcium indicator fura-2" *FEBS Lett.*, **v. 195**, 23 (1986).
– Rao, G.H.R., et. al., "Measurement of ionized calcium in blood platelets with a new generation calcium chelator." *Biochem. Biophys. Res. Comm.*, **v. 132**, 652 (1985).
– Tsien, R.Y., et. al., "Measurement of cytosolic free Ca^{2+} in individual small cells using fluorescence microscopy with dual excitation wavelength." *Cell Calcium*, **v. 6**, 145 (1985).
– Williams, D.A., et. al., "Calcium gradients in single smooth muscle cells revealed by the digital imaging microscope using fura-2." *Nature*, **v. 318**, 558 (1985).