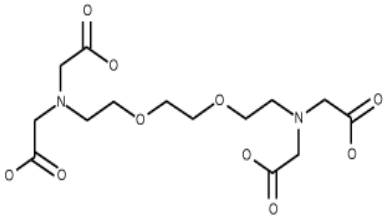
03777 Ethylene glycol-bis(2-aminoethyl)-N,N,N',N'-tetraacetic acid (EGTA)

Properties:

CAS Number	67-42-5
Appearance:	powder, white
Molecular formula:	$C_{14}H_{24}N_2O_{10}$
Formula weight:	380.4 g/mol
Melting Point:	241°C, with decomposition
Solubility:	0.1 M in 1 M NaOH at 20 °C, clear, colorless
pK_{a1}:	< 2[1]
pK_{a2}:	2.7[1]
pK_{a3}:	8.8[1]
pK_{a4}:	9.5[1]



Product Description:
The BioUltra grades are suitable for different applications like purification, precipitation, crystallisation and other applications which require tight control of elemental content. Trace elemental analyses have been performed on the BioUltra qualities and the molecular biology quality is additionally tested for absence of nucleases. The Certificate of Analysis provides lot-specific results.

Applications:
EGTA is a reagent that is used to chelate Ca^{2+} in the presence of Mg^{2+}.[2] EGTA chelates Ca^{2+} at a ratio of 1:1. The log (stability constants) for several cations are as follows:[1]
Mg^{2+} = 5.2
Ca^{2+} = 11.0
Mn^{2+} = 12.1
Fe^{2+} = 11.8
Co^{2+} = 12.3
Ni^{2+} = 11.8
Cu^{2+} = 17.7
Zn^{2+} = 12.9

A protocol for the determination of free calcium in calcium-EGTA solutions has been reported.[3] A procedure for making a calibration standard for calcium ion concentration, with detection accurate to 10 µM in a mixture of EGTA, HEDTA, and NTA has been reported.[4]
EGTA can be used as an anti-coagulant when dissolved at 1 g per 100 ml of blood. EDTA is more commonly used for the same purpose; either agent chelates the calcium ion from blood.
EGTA serves as an effective inhibitor of metalloproteinases.[5,8]
It can induce the rapid and extensive release of calcium from energised mitochondria.[6]
EGTA activates Ca^{2+}-stimulated ATPase of rat liver plasma membranes.[7]
It is used as a buffer component in dideoxy sequencing of RNA using reverse transcriptase.[9]

Preparation Instructions:
This product is soluble in 1 M NaOH (38 mg/ml, or 0.1 M), yielding a clear, colorless solution. A saturated solution at room temperature was found to be 2 mM in EGTA and had a pH of 2.72. This product has the following maximal solubilities in aqueous media at the respective pH values:
pH 8.48 > 0.52 M
pH 5.4 > 0.48 M
pH 4.5 = 0.45 M
pH 4.2 = 0.42 M
pH 4.0 = 0.31 M

Storage/Stability:
Store at Room Temperature

References:

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3. Bers, D.M., A simple method for the accurate determination of free [Ca] in Ca-EGTA solutions. Am. J. Physiol., 242, C404-408 (1982)
4. May, P.M., et al., Calibration of ionized calcium and magnesium with ligand mixtures for intracellular ion-selective electrode measurements. Anal. Chem., 57, 1511-1517 (1985)
5. Brauner, P., Fridlender B., Use of chelating agents as terminators of alkaline phosphatase activity in enzyme-linked immunosorbent assay (ELISA) tests. J. Immunol. Meth. 42, 375 (1981)
6. Riley, W.W., Pfeiffer, D.R., Rapid and extensive release of Ca^{2+} from energized mitochondria induced by EGTA. J. Biol. Chem. 261, 28 (1986)
7. Birch-Machin, M.A., Dawson, A.P., Effects of chelating agents on the Ca^{2+}-stimulated ATPase of rat liver plasma membranes. Biochim. Biophys. Acta 855, 277 (1986)
8. Vidal, H., et al., A test to evaluate the effect of individual components of ethylene glycol bis(beta-aminoethyl ether)-N,N,N',N'-tetraacetic acid buffers on enzymatic activity. Anal. Biochem. 193, 135 (1991)
9. C.S. Hahn et al., Meth. Enzymol. 180, 123 (1989)

Precautions and Disclaimer:
This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.