

Interchim Innovations

Interbiotech - BioScience Innovations

H10E

Chelate chemistry

■ Chelate Labeling/Conjugation

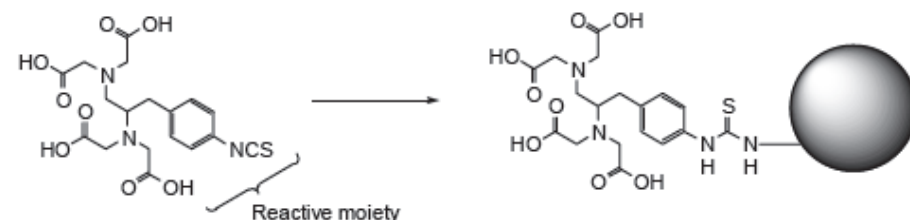
Chelate labeling reagents are used for the binding of metal ions to a macromolecule. Macromolecules labeled using radioactive metal ions such as ^{99}Tc and ^{111}In are used for radioimaging with a scintillation camera to investigate macromolecule distribution in the body.

Meares' reagents are chelate labeling reagents that have an EDTA structure and a reactive functional group such as isothiocyanate, maleimide, and bromoacetamide. Bromoacetamide-type Meares' reagent, called BABE 4-bromoacetamidobenzyl-EDTA), is used for the analysis of protein-protein or protein-DNA interaction sites.

NTA (carboxy-pentyl)iminodiacetic acid) is a chelating agent useful to bind in presence of metal ions such as Ni(II) to hexahistidine, an extension typically used as terminus in genetically expressed protein (poly-His tag). Purposes include detection of recombinant proteins (probes) and purification (immobilization), and the modification of surfaces for preparing i.e. biocaptors (SPR: surface plasmon resonance; QCM: Quartz Crystal Microbalance) and structural analysis of proteins by the x-ray interference.

DTPA (

Chelating moiety



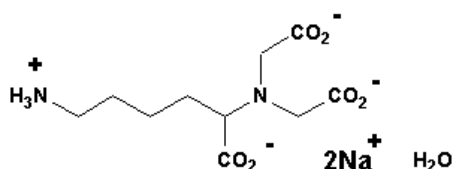
Description	MW (CAS)	Cat.number, Unit
Maleimido-C3-NTA	489.39	T3212A, 10 mg
Reactive with thiol group; Soluble 10mg/ml in water; (K)		
AB-NTA free acid	262.26	BE8210, 100mg
Reactive with aldehyde and NHS group; Soluble 30mg/ml in water; (Z)		
BABE	518.33 (81677-64-7)	T30570, 10mg
Reactive with thiol group; Soluble 1mg/ml in water; Water content: 3.0-6.0 %; >95% (HPLC); melting point: 112-114°C, (M)		
DTPA	393.35 (67-43-6)	T31040, 1gT31041, 5g
DiEthyleneTriAminePentaacetic acid ; Soluble 16.6mg/ml in DMSO;(Z)		
DTPA dianhydride	357.32 (23911-26-4)	394915, 1g94916, 5g
DiEthyleneTriAminePentaacetic acid dianhydride; Soluble 16.6mg/ml in DMSO;(Z)		
Aminobenzyl-EDTA	397.38	T32100, 25 mg
Reactive with aldehyde and NHS group; Soluble 2mg/ml in Acetonitrile:100mM phosphoric acid 1:1 ; (M)		
Isothiocyanobenzyl-EDTA	439.44 (105394-74-9)	T32110, 10 mg
Reactive with amine group, Meare's reagent ; Soluble 3mg/ml in Acetonitrile:100mM phosphoric acid 1:1 ; (M)		
SHNH Crosslinker (HyNic for Technitium Labeling)	BL9360, 10mg	
See the description in the Hydrazone chemistry section.		

Featured products:

AB-NTA #T3212

N-(5-Amino-1-carboxypentyl)iminodiacetic acid

Aminobutyl-NTA was first reported by Dr. Hochuli in 1987 for the purification of recombinant proteins (the so-called " His-tag " technique). Since then, the compound has found many applications as



an indispensable tool to immobilize proteins with high specificity on a solid surface such as glass or the Au electrode. A solid surface is modified by AB-NTA, and bio-functionalized via Ni (II) with a genetically expressed protein bearing a hexahistidine extension at its terminus.

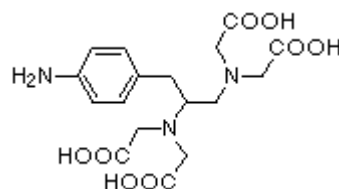
The His-tag technique has become increasingly important, particularly in the surface plasmon resonance and in the structural analysis of proteins by the x-ray interference. Using this technique, Dr. Noji was able to directly observe the rotation of F1-ATPase by the fluorescence microscope.

Aminobenzyl-EDTA #BE8210

1-(4-Aminobenzyl)ethylenediamine-N,N,N',N'-tetraacetic acid

Aminobenzyl-EDTA reacts with activated carboxylates such as succinimidylester, p-nitrophenylester, and acid chloride.

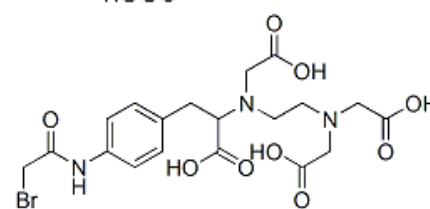
AB-NTA free acid replaces AB-NTA (disodium salt form). The new free acid form is less hygroscopic than the disodium salt form. The procedure stays the same as the disodium salt when dissolving in a buffer. It can also be dissolved in water with sonication (up to 3%).



BABE #T30570

1-(p-Bromoacetamidobenzyl)-ethylenediamine N,N,N',N'-tetraacetic acid

Bromoacetamidobenzyl-EDTA (BABE) is a Meares' Reagent, a bifunctional conjugation agent used to couple metal ions to biological molecules. It possess a strong metal-binding motif (chelate) and a Sulfhydryl reactivity (Bromo). BABE adds EDTA moieties to proteins through their sulfhydryl groups. Applications include radiopharmaceutical synthesis and targeted protein hydrolysis (for 3-D structure study, see FeBABE reagent #UP994760)



DTPA #T31040

DiEthyleneTriAminePentaacetic acid

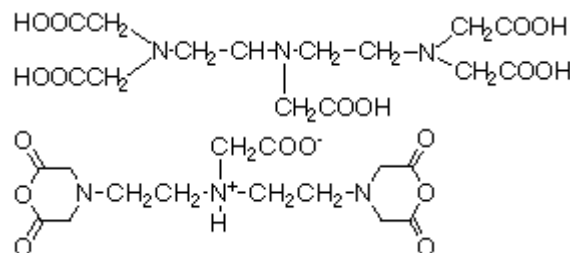
DTPA, anhydridous #394915

Diethylenetriamine-N,N,N',N''',N''-pentaacetic dianhydride

DTPA anhydride is utilized to add chelate function to molecules or surfaces with amine groups, and subsequently metal ions, such as radioisotopes. IgG was labeled with radioactive indium [In(III)] with the use of DTPA-anhydride and further used in vitro or in vivo.

Ref.: 1. D. J. Hnatowich, W. W. Layne, R. L. Childs, J. Appl. Radiat. Isot., 33, 327 (1982).

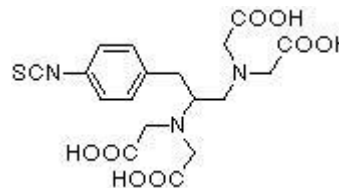
2. D. J. Hnatowich, W. W. Layne, R. L. Childs, D. Lantaigne, M. A. Davis, T. W. Grifftin, P. W. Doherty, Science, 220, 613 (1983).



Isothiocyanobenzyl-EDTA #T32110

1-(4-Isothiocyanatobenzyl)ethylenediamine-N,N,N',N'-tetraacetic acid

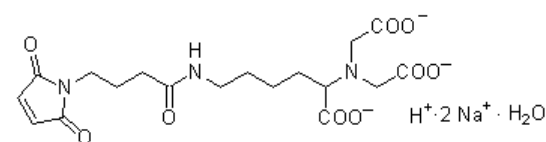
Isothiocyanobenzyl-EDTA is one of the protein modification reagents that enable the protein to have EDTA moieties through the amine groups. The resulting protein may be labeled by radioactive metals such as ¹¹¹In and ⁹⁹Tc, and is used for immunoimaging.



Maleimido-C3-NTA #53212A

N-(5-(3-Maleimidopropionylamino)-1-carboxy-pentyl)iminodiacetic acid, disodium salt, monohydrate

Maleimido-C3-NTA is utilized to modify the surfaces on which thiol groups are attached. Through the NTA moiety attached on the surface, genetically expressed protein, bearing a hexahistidine extension at its terminus, can be immobilized via Ni (II) (His-Tag method). Using this technique, Dr. Noji and coworkers were able to directly observe the rotation of F1-ATPase with a fluorescence microscope.



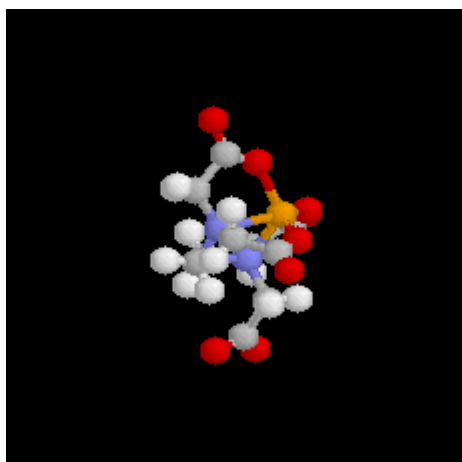
- **EDTA & analogs chelating agents**

Chelating agents are organic compounds that are used to trap metal ion in circular structures (chelate circles) by several coordinations bounds. Most include oxygen, nitrogen and (or) sulfur, and are base on ethylenediamine, acetylacetone, and oxine. EDTA is popular because it is very stable. These chelated are used for titration (colorimetry, fluorimetry), isolation and separation of metal ions. They are also used in masking of certain ions, solubilization of metals in organic solvents, gas chromatography of metal ions..

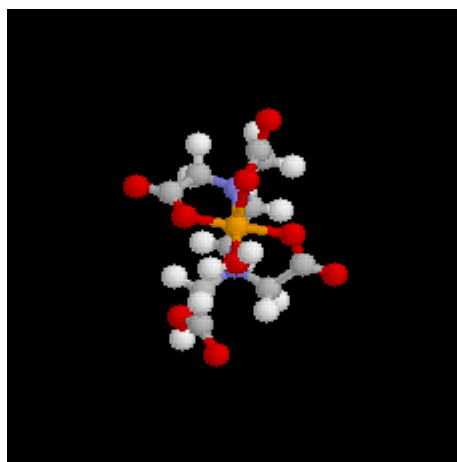
Most chelating reagents include oxygen, nitrogen or sulfur atoms in their molecules. Chelate structures with five or six member rings form the most stable chelate circle. In chelating reactions of typical chelating agents, such as ethylenediamine, acetylacetone and oxine, several molecules are coordinated with one metal ion. Ethylenediamine tetraacetic acid (EDTA), which has many coordinated atoms, forms a very stable chelate between one molecule of EDTA and metal ion.

Decreasing binding is for $\text{Fe}^{3+} \gg$ mercury, copper, aluminum, nickel, lead, cobalt, zinc, Fe^{2+} , cadmium, manganese, magnesium, calcium.

Metal indicators are chelating reagents that can be used to colorimetrically or fluorometrically determine metal ion concentration in solutions. Acetylacetone (AA) and its analogs are utilized for solvent extractions of metal ions from aqueous solutions. These metal complexes are used as catalysts of polymerization, dryness and combustion. Chelating reagents, including EDTA, EDTA analogs, metal salts and others, are available in bulk quantities.



complex with EDTA as a pentadentate ligand



octehedral complex with EDTA and water

CHELATING AGENTS / EDTA

Name	Cat. Number	Quantity	MW		Solubility
4H(EDTA.free acid)	T31710	500 g	292.24.	Chelate titration, metal masking, metal isolation	34 mg/100ml water
2Na(EDTA.2Na)	T32140	500 g	372.24	Chelate titration, metal masking, metal isolation	11,1 g/100ml water
3Na(EDTA.3Na)	R49090	500 g	472.23	Chelate titration, metal masking, metal isolation	46,5 g/100 ml water
4Na(EDTA.4Na)	T32160	500 g	452.23	Chelate titration, metal masking, metal isolation	60 g/100 ml water
2K(EDTA.2K)	T31910	50 g	404.45	Chelate titration, metal masking, metal isolation	100 g/100 ml water
3K(EDTA.3K)	T31920	50 g	442.54	Chelate titration, metal masking, metal isolation	100 g/100 ml water
2NH4(EDTA.2NH4)	T32180	500 g	326.3	Chelate titration, metal masking, metal isolation	5 g/100ml water
Ca(II)-EDTA	T31340	50 g	410.3		
Cu(II)-EDTA	T31360	25 g	469.8		
Fe(III)-EDTA	T31370	50 g	421.09		
Mg(II)-EDTA	T31380	25 g	430.56		
Zn(II)-EDTA	T31400	25 g	471.64		

CHELATING AGENTS/ EDTA Analogs

Name	Cat. Number	Quantity	MW		Solubility
CyDTA	T30610	25 g	364.35	Metal masking	
DTPA	T31040	5 g	393.35		
EDDP	T31320	5 g	277.15	Chelate titration, metal masking, metal isolation	1 g/100ml water
EDTA-OH	T31330	5 g	278.26	Chelate titration, metal masking, metal isolation	
GEDTA (EGTA)	T31560				
HIDA	T31730	5 g	177.16	Chelating agent	1 g/100ml water
IDA	T31860	25 g	133.1	Intermediate of chelating agent synthesis	1 g/100ml water
NTA	T32240	500 g	191.14	Metal masking, metal isolation	
NTPO	T32290	5 g	365	Chelate titration, metal masking, metal isolation	2 g/100 ml water
TTHA	T33110	5 g	494.45	Chelate titration, metal masking, metal isolation	

Please inquire for specifications, technical information (stability constants).

Example of product description: EDTA

EDTA diSodium salt

UP036290, 1Kg

EthyleneDiamineTetraAcetic acid diHydrate; MW: 372.24; DNase, RNase: none detected

Chelating agent of divalentions. Inhibits enzymes such as metalloproteases, taht require divalent cations for activity. Suggested starting concentration: 0.2-0.5mg/ml (0.5-0.13mM)

Related products/documents

[Products HighLights Overview](#), including:

[Crosslinking tools](#) – PEO/PEG biotinylation agents and AmineControlled conjugation kit

[FluoProbes labeling agents](#)

[Dialysis and Desalting tools](#) – CelluSep tubings, SpectraPor tubings, GebaFlex, FloatALyser, SlideALyser,...

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