Status: Currently Official on 14-Feb-2025
Official Date: Official as of 01-May-2020
Document Type: USP Monographs
DocId: GUID-B28A31C7-B3C8-4A4E-8B33-4173E45E850E_4_en-US
DOI: https://doi.org/10.31003/USPNF_M28930_04_01
DOI Ref: x03ci

Edetate Calcium Disodium

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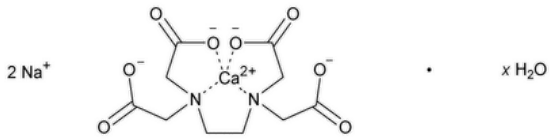

$C_{10}H_{12}CaN_2Na_2O_8 \cdot xH_2O$ 374.27

Calciate (2-), [[*N*,*N*'-1,2-ethanediylbis[*N*-(carboxymethyl) glycinato]](4-)-*N*,*N*',*O*,*O*',O^N,$O^{N'}$]-, disodium, hydrate, (*OC*-6-21)-;
Disodium[(ethylenedinitrilo)tetraacetato]calciate(2-) hydrate CAS RN®: 23411-34-9.
Anhydrous CAS RN®: 62-33-9.

DEFINITION

Edetate Calcium Disodium contains NLT 98.0% and NMT 102.0% of edetate calcium disodium ($C_{10}H_{12}CaN_2Na_2O_8$), calculated on the anhydrous basis.

IDENTIFICATION

Change to read:

• ◆**A.** ▲**Spectroscopic Identification Tests** ⟨197⟩, *Infrared Spectroscopy*: **197M**▲ (CN 1-May-2020) ◆

• **B. Procedure**

Sample: 2 g

Analysis: Dissolve the *Sample* in 10 mL of water, add 6 mL of lead (II) nitrate solution (33 in 1000), shake, and add 3 mL of potassium iodide TS: no yellow precipitate is formed. Make this solution alkaline by the addition of diluted ammonia solution (7 in 50), and add 3 mL of ammonium oxalate TS.

Acceptance criteria: A white precipitate is formed.

• **C. Procedure**

Sample: 0.5 g

Analysis: Dissolve 0.5 g in 10 mL of water, and add 10 mL of potassium pyroantimonate TS.

Acceptance criteria: A white, crystalline precipitate is formed. The formation of the precipitate is accelerated by rubbing the inside wall of the test tube with a glass rod.

ASSAY

• **Procedure**

Sample: 500 mg of Edetate Calcium Disodium

Analysis: Transfer the *Sample* into a 200-mL volumetric flask. Dissolve in and dilute with water to volume, and mix. Pipet 20 mL of this solution to 80 mL of water, and adjust with diluted nitric acid to a pH of 2–3. Add two drops of xylenol orange TS, and titrate with 0.01 M bismuth nitrate VS until the color of the solution changes from yellow to red. Each mL of 0.01 M bismuth nitrate VS is equivalent to 3.743 mg of edetate calcium disodium ($C_{10}H_{12}CaN_2Na_2O_8$).

Acceptance criteria: 98.0%–102.0% on the anhydrous basis

IMPURITIES

• **Chloride and Sulfate,** *Chloride*⟨221⟩

Sample solution: To 0.70 g of Edetate Calcium Disodium add 20 mL of water and 30 mL of diluted nitric acid. Allow to stand for 30 min, and filter. To 10 mL of the filtrate add water to make 50 mL.

Control solution: Prepare with 0.40 mL of 0.01 M hydrochloric acid VS.

Analysis: Proceed as directed in the chapter.

Acceptance criteria: NMT 0.10%

Organic Impurities

• **Procedure 1: Disodium Edetate**

Sample: 1.00 g of Edetate Calcium Disodium

Analysis: Dissolve the *Sample* in 50 mL of water. Add 5 mL of ammonia–ammonium chloride buffer TS, and 40 mg of eriochrome black T–sodium chloride indicator. Titrate with 0.01 M magnesium chloride VS until the color of the solution changes from blue to red-violet.

Acceptance criteria: NMT 3.0 mL of 0.01 M magnesium chloride VS is consumed (NMT 1.0%).

- **Procedure 2: Limit of Nitrilotriacetic Acid**

Mobile phase: Add 10 mL of 1.0 M tetrabutylammonium hydroxide in methanol to 200 mL of water, and adjust with 1 M phosphoric acid to a pH of 7.5 ± 0.1. Transfer the solution to a 1000-mL volumetric flask, add 90 mL of methanol, dilute with water to volume, pass through a filter of 0.5-µm or finer pore size, and degas.

Cupric nitrate solution: 10 mg/mL of cupric nitrate [$Cu(NO_3)_2$] in water

Standard stock solution: Transfer 100 mg of nitrilotriacetic acid to a 10-mL volumetric flask, add 0.5 mL of ammonium hydroxide, and mix. Dilute with water to volume, and mix.

Standard solution: Transfer 1.0 g of Edetate Calcium Disodium to a 100-mL volumetric flask, add 100 µL of *Standard stock solution*, dilute with *Cupric nitrate solution* to volume, and mix. Sonicate, if necessary, to achieve complete solution.

System suitability solution: Transfer 10 mg of Edetate Calcium Disodium to a 100-mL volumetric flask, add 100 µL of *Standard stock solution*, dilute with *Cupric nitrate solution* to volume, and mix. Sonicate, if necessary, to dissolve.

Sample solution: 10 mg/mL of Edetate Calcium Disodium in *Cupric nitrate solution*. Sonicate, if necessary, to achieve complete solution.

Chromatographic system

(See *Chromatography ⟨621⟩, System Suitability*.)

Mode: LC

Detector: UV 254 nm

Column: 4.6-mm × 15-cm; packing L7

Flow rate: 2 mL/min

Injection volume: 50 µL

System suitability

Samples: *System suitability solution* and *Standard solution*

[Note—The relative retention times for nitrilotriacetic acid, copper, and edetate are about 0.35, 0.65, and 1.0, respectively.]

Suitability requirements

Resolution: NLT 3 between nitrilotriacetic acid and copper, *System suitability solution*

Relative standard deviation: NMT 2.0%, *Standard solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Measure the responses for the major peaks.

Acceptance criteria: The peak response of nitrilotriacetic acid from the *Sample solution* does not exceed the difference between the nitrilotriacetic acid peak responses obtained from the *Standard solution* and the *Sample solution* (0.1%).

SPECIFIC TESTS

- **pH ⟨791⟩**

Sample solution: A solution (1 in 5)

Acceptance criteria: 6.5–8.0

- **Water Determination, *Method I*⟨921⟩**

Sample: 0.2 g

Acceptance criteria: 5.0%–13.0%

ADDITIONAL REQUIREMENTS

- **Packaging and Storage:** Preserve in tight containers. No storage requirements specified.
- **USP Reference Standards ⟨11⟩**

USP Edetate Calcium Disodium RS

Auxiliary Information - Please check for your question in the FAQs before contacting USP.

Topic/Question	Contact	Expert Committee
EDETATE CALCIUM DISODIUM	Documentary Standards Support	SE2020 Simple Excipients

Chromatographic Database Information: Chromatographic Database

Most Recently Appeared In:
Pharmacopeial Forum: Volume No. 50(1)

Current DocID: GUID-B28A31C7-B3C8-4A4E-8B33-4173E45E850E_4_en-US

DOI: https://doi.org/10.31003/USPNF_M28930_04_01
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