

Test solution. Dissolve 1.00 g of the substance to be examined in *water R* and dilute to 25.0 ml with the same solvent.

Reference solutions. Prepare the reference solutions using *potassium standard solution (0.2 per cent K) R*, diluted as necessary with *water R*.

Wavelength: 766.7 nm.

Sodium: maximum 0.50 per cent.

Atomic emission spectrometry (2.2.22, *Method II*).

Test solution. Dissolve 1.00 g of the substance to be examined in *water R* and dilute to 100.0 ml with the same solvent.

Reference solutions. Prepare the reference solutions using *sodium standard solution (200 ppm Na) R*, diluted as necessary with *water R*.

Wavelength: 589.0 nm.

Strontium: maximum 5.00×10^2 ppm.

Atomic emission spectrometry (2.2.22, *Method II*).

Test solution. Dissolve 2.00 g of the substance to be examined in *water R* and dilute to 100.0 ml with the same solvent.

Reference solutions. Prepare the reference solutions using *strontium standard solution (1.0 per cent Sr) R*, diluted as necessary with *water R*.

Wavelength: 460.7 nm.

Heavy metals (2.4.8): maximum 20 ppm.

Dissolve 2.0 g in *water R* and dilute to 20 ml with the same solvent. 12 ml of the solution complies with limit test A. Prepare the reference solution using *lead standard solution (2 ppm Pb) R*.

Water (2.5.12): maximum 7.0 per cent, determined on 0.100 g. Add 2 ml of *anhydrous acetic acid R* to the titration vessel in addition to the methanol. Clean the titration vessel after each determination.

ASSAY

Dissolve 0.150 g in 15 ml of *water R*, add 5 ml of *diethylamine R*. Titrate with 0.1 M *sodium edetate*, determining the end-point using *methylthymol blue mixture R*.

1 ml of 0.1 M *sodium edetate* is equivalent to 15.82 mg of $C_4H_6CaO_4$.

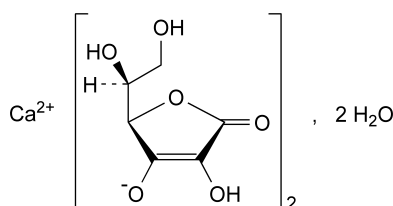
STORAGE

In an airtight container.

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corrected 6.0

CALCIUM ASCORBATE

Calcii ascorbas



$C_{12}H_{14}CaO_{12} \cdot 2H_2O$
[5743-28-2]

M_r 426.3

DEFINITION

Calcium di[(*R*)-2-[(*S*)-1,2-dihydroxyethyl]-4-hydroxy-5-oxo-2*H*-furan-3-olate] dihydrate.

Content: 99.0 per cent to 100.5 per cent of $C_{12}H_{14}CaO_{12} \cdot 2H_2O$.

CHARACTERS

Appearance: white or slightly yellowish, crystalline powder.

Solubility: freely soluble in water, practically insoluble in ethanol (96 per cent).

IDENTIFICATION

First identification: A, B, E.

Second identification: A, C, D, E.

A. Specific optical rotation (see Tests).

B. Infrared absorption spectrophotometry (2.2.24).

Comparison: *Ph. Eur. reference spectrum of calcium ascorbate*.

C. Dilute 1 ml of solution S (see Tests) to 10 ml with *water R*. To 2 ml of the solution add 0.2 ml of a 100 g/l solution of *ferrous sulphate R*. A deep violet colour develops.

D. To 1 ml of solution S add 0.2 ml of *dilute nitric acid R* and 0.2 ml of *silver nitrate solution R2*. A grey precipitate is formed.

E. The substance gives reaction (b) of calcium (2.3.1).

TESTS

Solution S. Dissolve 5.00 g in *carbon dioxide-free water R* and dilute to 50.0 ml with the same solvent.

Appearance of solution. Solution S is clear (2.2.1) and not more intensely coloured than reference solution Y_6 (2.2.2, *Method II*). Examine the colour of the solution immediately after preparation of the solution.

pH (2.2.3): 6.8 to 7.4 for solution S.

Specific optical rotation (2.2.7): + 95 to + 97 (dried substance), determined using freshly prepared solution S.

Related substances. The thresholds indicated under Related substances (Table 2034.-1) in the general monograph *Substances for pharmaceutical use (2034)* do not apply.

Fluorides: maximum 10.0 ppm.

Potentiometry (2.2.36, *Method I*).

Test solution. In a 50 ml volumetric flask, dissolve 1.000 g in a 10.3 g/l solution of *hydrochloric acid R*, add 5.0 ml of *fluoride standard solution (1 ppm F) R* and dilute to 50.0 ml with a 10.3 g/l solution of *hydrochloric acid R*. To 20.0 ml of the solution add 20.0 ml of *total-ionic-strength-adjustment buffer R* and 3 ml of an 82 g/l solution of *anhydrous sodium acetate R*. Adjust to pH 5.2 with *ammonia R* and dilute to 50.0 ml with *distilled water R*.

Reference solutions. To 0.25 ml, 0.5 ml, 1.0 ml, 2.0 ml and 5.0 ml of *fluoride standard solution (10 ppm F) R* add 20.0 ml of *total-ionic-strength-adjustment buffer R* and dilute to 50.0 ml with *distilled water R*.

Indicator electrode: fluoride selective.

Reference electrode: silver-silver chloride.

Take into account the addition of fluoride to the test solution for the calculation.

Copper: maximum 5.0 ppm.

Atomic absorption spectrometry (2.2.23, *Method I*).

Test solution. Dissolve 2.0 g in a 9.7 g/l solution of *nitric acid R* and dilute to 25.0 ml with the same acid solution.

Reference solutions. Prepare the reference solutions using *copper standard solution (10 ppm Cu) R*, diluting with a 9.7 g/l solution of *nitric acid R*.

Source: copper hollow-cathode lamp.

Wavelength: 324.8 nm.

Atomisation device: air-acetylene flame.

Iron: maximum 2.0 ppm.

Atomic absorption spectrometry (2.2.23, *Method I*).

Test solution. Dissolve 5.0 g in a 9.7 g/l solution of *nitric acid R* and dilute to 25.0 ml with the same acid solution.

Reference solutions. Prepare the reference solutions using *iron standard solution (10 ppm Fe) R*, diluting with a 9.7 g/l solution of *nitric acid R*.

Source: iron hollow-cathode lamp.

Wavelength: 248.3 nm.

Atomisation device: air-acetylene flame.

Heavy metals (2.4.8): maximum 10 ppm.

2.0 g complies with test D. Prepare the reference solution using 2.0 ml of *lead standard solution (10 ppm Pb) R*.

Loss on drying (2.2.32): maximum 0.1 per cent, determined on 1.000 g by drying in an oven at 105 °C for 2 h.

ASSAY

Dissolve 80.0 mg in a mixture of 10 ml of *dilute sulphuric acid R* and 80 ml of *carbon dioxide-free water R*. Add 1 ml of *starch solution R*. Titrate with 0.05 M *iodine* until a persistent violet-blue colour is obtained.

1 ml of 0.05 M *iodine* is equivalent to 10.66 mg of $C_{12}H_{14}CaO_{12} \cdot 2H_2O$.

STORAGE

In a non-metallic container, protected from light.

Chlorides (2.4.4): maximum 330 ppm.

Dilute 3 ml of solution S to 15 ml with *water R*.

Sulphates (2.4.13): maximum 0.25 per cent.

Dilute 1.2 ml of solution S to 15 ml with *distilled water R*.

Arsenic (2.4.2, Method A): maximum 4 ppm, determined on 5 ml of solution S.

Barium. To 10 ml of solution S add 10 ml of *calcium sulphate solution R*. After at least 15 min, any opalescence in the solution is not more intense than that in a mixture of 10 ml of solution S and 10 ml of *distilled water R*.

Iron (2.4.9): maximum 200 ppm.

Dissolve 50 mg in 5 ml of *dilute hydrochloric acid R* and dilute to 10 ml with *water R*.

Magnesium and alkali metals: maximum 1.5 per cent.

Dissolve 1.0 g in 12 ml of *dilute hydrochloric acid R*. Boil the solution for about 2 min and add 20 ml of *water R*, 1 g of *ammonium chloride R* and 0.1 ml of *methyl red solution R*. Add *dilute ammonia RI* until the colour of the indicator changes and then 2 ml in excess. Heat to boiling and add 50 ml of hot *ammonium oxalate solution R*. Allow to stand for 4 h, dilute to 100 ml with *water R* and filter through a suitable filter. To 50 ml of the filtrate add 0.25 ml of *sulphuric acid R*. Evaporate to dryness on a water-bath and ignite to constant mass at 600 ± 50 °C. The residue weighs a maximum of 7.5 mg.

Heavy metals (2.4.8): maximum 20 ppm.

12 ml of solution S complies with test A. Prepare the reference solution using *lead standard solution (1 ppm Pb) R*.

Loss on drying (2.2.32): maximum 2.0 per cent, determined on 1.000 g by drying in an oven at 200 ± 10 °C.

ASSAY

Dissolve 0.150 g in a mixture of 3 ml of *dilute hydrochloric acid R* and 20 ml of *water R*. Boil for 2 min, allow to cool and dilute to 50 ml with *water R*. Carry out the complexometric titration of calcium (2.5.11).

1 ml of 0.1 M *sodium edetate* is equivalent to 10.01 mg of $CaCO_3$.

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corrected 6.0

CALCIUM CARBONATE

Calcii carbonas

$CaCO_3$
[471-34-1]

M_r 100.1

DEFINITION

Content: 98.5 per cent to 100.5 per cent (dried substance).

CHARACTERS

Appearance: white or almost white powder.

Solubility: practically insoluble in water.

IDENTIFICATION

- It gives the reaction of carbonates (2.3.1).
- 0.2 ml of solution S (see Tests) gives the reactions of calcium (2.3.1).

TESTS

Solution S. Dissolve 5.0 g in 80 ml of *dilute acetic acid R*. When the effervescence ceases, boil for 2 min. Allow to cool, dilute to 100 ml with *dilute acetic acid R* and filter, if necessary, through a sintered-glass filter (2.1.2).

Substances insoluble in acetic acid: maximum 0.2 per cent.

Wash any residue obtained during the preparation of solution S with 4 quantities, each of 5 ml, of hot *water R* and dry at 100-105 °C for 1 h. The residue weighs a maximum of 10 mg.

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corrected 6.0

CALCIUM CHLORIDE DIHYDRATE

Calcii chloridum dihydricum

$CaCl_2 \cdot 2H_2O$
[10035-04-8]

M_r 147.0

DEFINITION

Content: 97.0 per cent to 103.0 per cent of $CaCl_2 \cdot 2H_2O$.

CHARACTERS

Appearance: white or almost white, crystalline powder, hygroscopic.

Solubility: freely soluble in water, soluble in ethanol (96 per cent).

IDENTIFICATION

- Solution S (see Tests) gives reaction (a) of chlorides (2.3.1).