Acidity or alkalinity. To 2.0 g add 100 ml of *carbon dioxide-free water R* and heat to boiling for 5 min. Filter whilst hot through a sintered-glass filter (40) (*2.1.2*), allow to cool and dilute to 100 ml with *carbon dioxide-free water R*. To 15 ml of the filtrate, add 0.1 ml of *phenolphthalein solution R*. The solution is red. Not more than 0.2 ml of *0.1 M hydrochloric acid* is necessary to change the colour of the indicator. Keep the filtrate for the test for soluble substances.

Acid insoluble substances: maximum 0.1 per cent.

Any residue obtained during the preparation of solution S1, washed, dried and ignited at 600 ± 50 °C, weighs a maximum of 5 mg.

Soluble substances: maximum 1.5 per cent.

Take 50 ml of the filtrate obtained in the test for acidity or alkalinity, evaporate to dryness and dry at 100-105 °C. The residue weighs a maximum of 15 mg.

Chlorides (*2.4.4*): maximum 0.1 per cent.

Dissolve 50 mg in 5 ml of *dilute nitric acid R* and dilute to 15 ml with *water R*.

Sulphates (*2.4.13*): maximum 0.5 per cent.

Dilute 3 ml of solution S2 to 15 ml with *distilled water R*.

Arsenic (*2.4.2, Method A*): maximum 4 ppm, determined on 5 ml of solution S1.

Calcium (*2.4.3*): maximum 1.0 per cent.

Dilute 1 ml of solution S2 to 15 ml with *distilled water R*.

Iron (*2.4.9*): maximum 500 ppm.

Dilute 2 ml of solution S2 to 10 ml with *water R*.

Heavy metals (*2.4.8*): maximum 30 ppm.

To 20 ml of solution S1 add 15 ml of *hydrochloric acid R1* and shake with 25 ml of *methyl isobutyl ketone R* for 2 min. Allow to stand, then separate and evaporate the aqueous layer to dryness. Dissolve the residue in 1.5 ml of *acetic acid R* and dilute to 30 ml with *water R*. 12 ml of the solution complies with test A. Prepare the reference solution using *lead standard solution (1 ppm Pb) R*.

ASSAY

Dissolve 80.0 mg, shaking cautiously, in a mixture, previously cooled to 20 °C, of 10 ml of *sulphuric acid R* and 90 ml of *water R*. Titrate with *0.02 M potassium permanganate* until a pink colour is obtained.

1 ml of *0.02 M potassium permanganate* is equivalent to 2.815 mg of MgO_2.

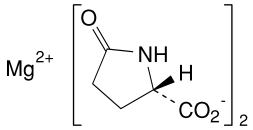
STORAGE

Protected from light.

01/2008:1619

MAGNESIUM PIDOLATE

Magnesii pidolas



$C_{10}H_{12}N_2O_6Mg$ M_r 280.5
[62003-27-4]

DEFINITION

Magnesium bis[(2*S*)-5-oxopyrrolidine-2-carboxylate].

Content: 8.49 per cent to 8.84 per cent of Mg (A_r = 24.31) (anhydrous substance).

CHARACTERS

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

Solubility: very soluble in water, soluble in methanol, practically insoluble in methylene chloride.

IDENTIFICATION

A. Thin-layer chromatography (*2.2.27*).

Test solution. Dissolve 60 mg in 2 ml of *water R* and dilute to 10 ml with *methanol R*.

Reference solution. Dissolve 55 mg of *pidolic acid CRS* in 2 ml of *water R* and dilute to 10 ml with *methanol R*.

Plate: *TLC silica gel plate R*.

Mobile phase: *methanol R, glacial acetic acid R, methylene chloride R* (15:20:65 *V/V/V*).

Application: 1 µl.

Development: over 2/3 of the plate.

Drying: at 100-105 °C for 15 min.

Detection: spray with *concentrated sodium hypochlorite solution R*. Allow to stand for 10 min and spray abundantly with *glacial acetic acid R*. Allow to stand again for 10 min and dry the plate at 100-105 °C for 2 min. Spray with *potassium iodide and starch solution R* until spots appear.

Results: the principal spot in the chromatogram obtained with the test solution is similar in position, colour and size to the principal spot in the chromatogram obtained with the reference solution. The chromatogram obtained with the test solution may show 2 faint secondary spots.

B. To 0.15 ml of solution S (see Tests) add 1.8 ml of *water R*. The solution gives the reaction of magnesium (*2.3.1*).

TESTS

Solution S. Dissolve 5.00 g in *carbon dioxide-free water R* prepared from *distilled 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 B_8 (*2.2.2, Method I*).

pH (*2.2.3*): 5.5 to 7.0 for solution S.

Specific optical rotation (*2.2.7*): – 23.3 to – 26.5 (anhydrous substance), determined on solution S.

Related substances. Liquid chromatography (*2.2.29*).

Test solution. Dissolve 0.500 g of the substance to be examined in the mobile phase and dilute to 100.0 ml with the mobile phase.

Reference solution (a). Dilute 1.0 ml of the test solution to 100.0 ml with the mobile phase.

Reference solution (b). Dissolve 50.0 mg *pidolate impurity B CRS* in the mobile phase and dilute to 100.0 ml with the mobile phase. Dilute 5.0 ml of the solution to 50.0 ml with the mobile phase.

Reference solution (c). Dilute 10.0 ml of reference solution (b) to 100.0 ml with the mobile phase.

Reference solution (d). Dilute 1.0 ml of *nitrate standard solution (100 ppm NO_3) R* to 100.0 ml with the mobile phase.

Reference solution (e). Dilute 6.0 ml of reference solution (a) to 10.0 ml with reference solution (b).

Column:

– *size*: *l* = 0.25 m, Ø = 4.6 mm,

– *stationary phase*: *octadecylsilyl silica gel for chromatography R* (5 µm).

Mobile phase: dissolve 1.56 g of *sodium dihydrogen phosphate R* in 1000 ml of *water R* and adjust to pH 2.5 with a 10 per cent *V/V* solution of *phosphoric acid R*.

Flow rate: 1.5 ml/min.

Detection: spectrophotometer at 210 nm.

Injection: 10 µl loop injector; inject the test solution and reference solutions (b), (c), (d) and (e).

Run time: 4 times the retention time of pidolic acid.

Retention times: pidolic acid = about 4.5 min; impurity B = about 7.5 min.

System suitability: reference solution (e):

– *resolution*: minimum 10 between the peaks due to pidolic acid and to impurity B.

Limits:

– *impurity B*: not more than the area of the principal peak in the chromatogram obtained with reference solution (b) (1.0 per cent),

– *total of other impurities*: not more than half of the area of the principal peak in the chromatogram obtained with reference solution (b) (0.5 per cent),

– *disregard limit*: not more than 0.5 times the area of the principal peak in the chromatogram obtained with reference solution (c) (0.05 per cent); disregard any peak corresponding to the nitrate ion (NO_3^-).

Impurity A. Thin-layer chromatography (*2.2.27*).

Test solution. Dissolve 0.250 g of the substance to be examined in 4 ml of *water R* and dilute to 50.0 ml with *methanol R*.

Reference solution (a). Dissolve 60.0 mg of *glutamic acid R* in 50 ml of *water R* and dilute to 100.0 ml with *methanol R*. Dilute 1.0 ml of the solution to 20.0 ml with *methanol R*.

Reference solution (b). Dissolve 10 mg of *glutamic acid R* and 10 mg of *aspartic acid R* in *water R* and dilute to 25 ml with the same solvent. Dilute 1 ml of the solution to 10 ml with *water R*.

Plate: *TLC silica gel plate R*.

Mobile phase: *glacial acetic acid R, water R, butanol R* (20:20:60 *V/V/V*).

Application: 5 µl.

Development: over 2/3 of the plate.

Drying: in air.

Detection: spray with *ninhydrin solution R* and heat at 100-105 °C for 15 min.

System suitability: the test is not valid unless the chromatogram obtained with reference solution (b) shows 2 clearly separated spots.

Limit:

– *impurity A*: any spot corresponding to impurity A in the chromatogram obtained with the test solution is not more intense that the spot in the chromatogram obtained with reference solution (a) (0.6 per cent).

Chlorides (*2.4.4*): maximum 500 ppm.

Dilute 1.0 ml of solution S to 15.0 ml of *water R*. The solution complies with the limit test for chlorides.

Nitrates. Examine the chromatogram obtained with the test solution in the test for related substances.

Limit:

– *nitrates*: not more than the area of the principal peak in the chromatogram obtained with reference solution (d) (200 ppm).

Sulphates (*2.4.13*): maximum 0.1 per cent.

Dilute 1.5 ml of solution S to 15.0 ml with *distilled water R*. The solution complies with the limit test for sulphates.

Arsenic (*2.4.2*): maximum 2 ppm.

5.0 ml of solution S complies with limit test A.

Iron (*2.4.9*): maximum 200 ppm.

Dilute 0.5 ml of solution S to 10 ml of *water R*. The solution complies with the limit test for iron.

Heavy metals (*2.4.8*): maximum 20 ppm.

12 ml of solution S complies with limit test A. Prepare the standard using *lead standard solution (2 ppm Pb) R*.

Water (*2.5.12*): maximum 8.0 per cent, determined on 0.200 g.

ASSAY

Dissolve 0.300 g in 50 ml of *water R*. Carry out the complexometric titration of magnesium (*2.5.11*).

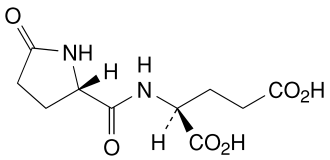
1 ml of *0.1 M sodium edetate* is equivalent to 2.431 mg of Mg.

STORAGE

In an airtight container.

IMPURITIES

A. glutamic acid,



B. (2*S*)-2-[[[(2*S*)-5-oxopyrrolidin-2-yl]carbonyl]amino]pentanedioic acid.

01/2008:0229
corrected 6.0

MAGNESIUM STEARATE

Magnesii stearas

DEFINITION

Magnesium stearate is a mixture of magnesium salts of different fatty acids consisting mainly of stearic (octadecanoic) acid [$(C_{17}H_{35}COO)_2Mg$; M_r 591.3] and palmitic (hexadecanoic) acid [$(C_{15}H_{31}COO)_2$ Mg; M_r 535.1] with minor proportions of other fatty acids. It contains not less than 4.0 per cent and not more than 5.0 per cent of Mg (A_r 24.30), calculated with reference to the dried substance. The fatty acid fraction contains not less than 40.0 per cent of stearic acid and the sum of stearic acid and palmitic acid is not less than 90.0 per cent.

CHARACTERS

A white or almost white, very fine, light powder, greasy to the touch, practically insoluble in water and in ethanol.

IDENTIFICATION

First identification: C, D.