absorbance is not less than that of a standard prepared in the same manner using 0.35 mg of *oxalic acid R* instead of the substance to be examined.

Heavy metals (*2.4.8*). 1.0 g complies with limit test C for heavy metals (20 ppm). Prepare the standard using 2 ml of *lead standard solution (10 ppm Pb) R*.

Loss on drying (*2.2.32*). Not more than 10.0 per cent, determined on 1.000 g by drying over *diphosphorus pentoxide R* at 105 °C and at a pressure of 300 Pa to 600 Pa.

ASSAY

Dissolve 0.200 g with heating in a mixture of 5 ml of *2-propanol R* and 25 ml of *ethylene glycol R*. Cool and add 30 ml of *dioxan R*. Titrate with *0.1 M perchloric acid*, determining the end-point potentiometrically (*2.2.20*).

1 ml of *0.1 M perchloric acid* is equivalent to 25.62 mg of $C_{23}H_{14}Na_2O_{11}$.

STORAGE

Store in an airtight container, protected from light.

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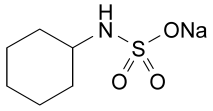
corrected 6.0

SODIUM CYCLAMATE

Natrii cyclamas



$C_6H_{12}NNaO_3S$ M_r 201.2
[139-05-9]

DEFINITION

Sodium *N*-cyclohexylsulphamate.

Content: 98.5 per cent to 101.0 per cent (dried substance).

CHARACTERS

Appearance: white or almost white, crystalline powder or colourless crystals.

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

IDENTIFICATION

First identification: A, E.

Second identification: B, C, D, E.

A. Infrared absorption spectrophotometry (*2.2.24*).
Comparison: *sodium cyclamate CRS*.

B. Examine the chromatograms obtained in the test for impurity A.
Results: the principal spot in the chromatogram obtained with test solution (b) is similar in position, colour and size to the principal spot in the chromatogram obtained with reference solution (a).

C. To 1 ml of solution S (see Tests), add 1 ml of *water R* and 2 ml of *silver nitrate solution R1*, then shake. A white, crystalline precipitate is formed.

D. To 1 ml of solution S add 5 ml of *water R*, 2 ml of *dilute hydrochloric acid R* and 4 ml of *barium chloride solution R1* and mix. The solution is clear. Add 2 ml of *sodium nitrite solution R*. A voluminous white precipitate is formed and gas is given off.

E. A mixture of 1 ml of solution S and 1 ml of *water R* gives reaction (a) of sodium (*2.3.1*).

TESTS

Solution S. Dissolve 5 g in *carbon dioxide-free water R* prepared from *distilled water R* and dilute to 50 ml with the same solvent.

Appearance of solution. Solution S is clear (*2.2.1*) and colourless (*2.2.2, Method II*).

pH (*2.2.3*): 5.5 to 7.5 for solution S.

Absorbance (*2.2.25*): maximum 0.10, determined at 270 nm on solution S.

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

Test solution (a). Solution S.

Test solution (b). Dilute 1 ml of test solution (a) to 10 ml with *water R*.

Reference solution (a). Dissolve 0.10 g of *sodium cyclamate CRS* in *water R* and dilute to 10 ml with the same solvent.

Reference solution (b). Dissolve 10 mg of *sulphamic acid R* (impurity A) in *water R* and dilute to 100 ml with the same solvent.

Plate: *TLC silica gel G plate R.*

Mobile phase: *concentrated ammonia R, water R, ethyl acetate R, propanol R* (10:10:20:70 *V/V/V/V*).

Application: 2 µl.

Development: over a path of 12 cm.

Drying: in a current of warm air, then heat at 105 °C for 5 min.

Detection: spray the hot plate with *strong sodium hypochlorite solution R* diluted to a concentration of 5 g/l of active chlorine. Place in a current of cold air until an area of coating below the points of application gives at most a faint blue colour with a drop of *potassium iodide and starch solution R*; avoid prolonged exposure to cold air. Spray with *potassium iodide and starch solution R* and examine the chromatograms within 5 min.

Limit: test solution (a):

– *impurity A*: any spot due to impurity A is not more intense than the corresponding spot in the chromatogram obtained with reference solution (b) (0.1 per cent).

Impurities B, C and D. Gas chromatography (*2.2.28*).

Internal standard solution. Dissolve 2 µl of *tetradecane R* in *methylene chloride R* and dilute to 100 ml with the same solvent.

Test solution. Dissolve 2.00 g of the substance to be examined in 20 ml of *water R*, add 0.5 ml of *strong sodium hydroxide solution R* and shake with 30 ml of *toluene R*. Shake 20 ml of the upper layer with 4 ml of a mixture of equal volumes of *dilute acetic acid R* and *water R*. Separate the lower layer, add 0.5 ml of *strong sodium hydroxide solution R* and 0.5 ml of the internal standard solution and shake. Use the lower layer immediately after separation.

Reference solution. Dissolve 10.0 mg (about 12 µl) of *cyclohexylamine R* (impurity C), 1.0 mg (about 1.1 µl) of *dicyclohexylamine R* (impurity D) and 1.0 mg (about 1 µl) of *aniline R* (impurity B) in *water R*, then dilute to 1000 ml with the same solvent. Dilute 10.0 ml of this solution to 100.0 ml with *water R* (solution A). To 20.0 ml of solution A, add 0.5 ml of *strong sodium hydroxide solution R* and extract with 30 ml of *toluene R*. Shake 20 ml of the upper layer with 4 ml of a mixture of equal volumes of *dilute acetic acid R* and *water R*. Separate the lower layer, add 0.5 ml of *strong sodium hydroxide solution R* and 0.5 ml of the internal standard solution and shake. Use the lower layer immediately after separation.

Column:

– *material*: fused silica;

– *size*: *l* = 25 m, Ø = 0.32 mm;

– *stationary phase*: *poly(dimethyl)(diphenyl)siloxane R* (film thickness 0.51 µm).

Carrier gas: *helium for chromatography R*.

Flow rate: 1.8 ml/min.

Temperature:

	Time (min)	Temperature (°C)
Column	0 - 1	85
	1 - 9	85 → 150
	9 - 13	150
Injection port		250
Detector		270

Detection: flame ionisation.

Injection: 1.5 µl; use a split vent at a flow rate of 20 ml/min.

Relative retention with reference to impurity C (retention time = about 2.3 min): impurity B = about 1.4; tetradecane = about 4.3; impurity D = about 4.5.

Limits:

– *impurity C*: maximum 10 ppm;

– *impurities B, D*: for each impurity, maximum 1 ppm.

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

Dilute 1.5 ml of solution S to 15 ml with *distilled water R*.

Heavy metals (*2.4.8*): maximum 10 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 1.0 per cent, determined on 1.000 g by drying in an oven at 105 °C for 4 h.

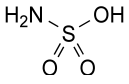
ASSAY

Dissolve without heating 0.150 g in 60 ml of *anhydrous acetic acid R*. Titrate with *0.1 M perchloric acid*, determining the end-point potentiometrically (*2.2.20*).

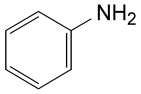
1 ml of *0.1 M perchloric acid* is equivalent to 20.12 mg of $C_6H_{12}NNaO_3S$.

IMPURITIES

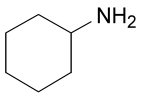
Specified impurities: A, B, C, D.



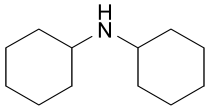
A. sulphamic acid,



B. aniline (phenylamine),



C. cyclohexanamine,



D. *N*-cyclohexylcyclohexanamine.

01/2008:0194
corrected 6.0

SODIUM DIHYDROGEN PHOSPHATE DIHYDRATE

Natrii dihydrogenophosphas dihydricus

$NaH_2PO_4,2H_2O$ M_r 156.0
[13472-35-0]

DEFINITION

Content: 98.0 per cent to 100.5 per cent (dried substance).

CHARACTERS

Appearance: white or almost white powder or colourless crystals.

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

IDENTIFICATION

A. Solution S (see Tests) is slightly acid (*2.2.4*).

B. Solution S gives the reactions of phosphates (*2.3.1*).

C. Solution S previously neutralised using a 100 g/l solution of *potassium hydroxide R* gives reaction (a) of sodium (*2.3.1*).

TESTS

Solution S. Dissolve 10.0 g in *carbon dioxide-free water R* prepared from *distilled water R* and dilute to 100 ml with the same solvent.

Appearance of solution. Solution S is clear (*2.2.1*) and colourless (*2.2.2, Method II*).

pH (*2.2.3*): 4.2 to 4.5.

To 5 ml of solution S add 5 ml of *carbon dioxide-free water R*.

Reducing substances. To 5 ml of solution S add 0.25 ml of *0.02 M potassium permanganate* and 5 ml of *dilute sulphuric acid R* and heat in a water-bath for 5 min. The solution retains a slight red colour.

Chlorides (*2.4.4*): maximum 200 ppm.

Dilute 2.5 ml of solution S to 15 ml with *water R*.

Sulphates (*2.4.13*): maximum 300 ppm.

To 5 ml of solution S add 0.5 ml of *hydrochloric acid R* and dilute to 15 ml with *distilled water R*.

Arsenic (*2.4.2, Method A*): maximum 2 ppm, determined on 0.5 g.

Iron (*2.4.9*): maximum 10 ppm, determined on solution S.

Heavy metals (*2.4.8*): maximum 10 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*): 21.5 per cent to 24.0 per cent, determined on 0.50 g by drying in an oven at 130 °C.