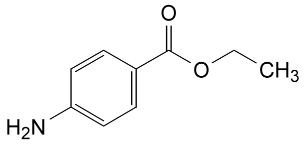
01/2008:0011
corrected 6.0

BENZOCAINE

Benzocainum



$C_9H_{11}NO_2$ M_r 165.2
[94-09-7]

DEFINITION

Ethyl 4-aminobenzoate.

Content: 99.0 per cent to 101.0 per cent (dried substance).

CHARACTERS

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

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

IDENTIFICATION

First identification: A, B.

Second identification: A, C, D.

A. Melting point (*2.2.14*): 89 °C to 92 °C.

B. Infrared absorption spectrophotometry (*2.2.24*).
Comparison: *benzocaine CRS.*

C. To about 50 mg in a test tube add 0.2 ml of a 500 g/l solution of *chromium trioxide R*. Cover the mouth of the tube with a piece of filter paper moistened with a freshly prepared mixture of equal volumes of a 50 g/l solution of *sodium nitroprusside R* and a 200 g/l solution of *piperazine hydrate R*. Boil gently for at least 30 s. A blue colour develops on the filter paper.

D. Dissolve about 50 mg in *ethanol (96 per cent) R* and dilute to 100 ml with the same solvent. 2 ml of the solution gives the reaction of primary aromatic amines (*2.3.1*).

TESTS

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

Dissolve 1.0 g in *ethanol (96 per cent) R* and dilute to 20 ml with the same solvent.

Acidity or alkalinity. Dissolve 0.5 g in 10 ml of *ethanol (96 per cent) R* previously neutralised to 0.05 ml of *phenolphthalein solution R*. Add 10 ml of *carbon dioxide-free water R*. The solution remains colourless and not more than 0.5 ml of *0.01 M sodium hydroxide* is required to change the colour of the indicator.

Loss on drying (*2.2.32*): maximum 0.5 per cent, determined on 1.00 g by drying *in vacuo*.

Sulphated ash (*2.4.14*): maximum 0.1 per cent, determined on 1.0 g.

ASSAY

Carry out the determination of primary aromatic amino-nitrogen (*2.5.8*), using 0.400 g dissolved in a mixture of 25 ml of *hydrochloric acid R* and 50 ml of *water R*.

1 ml of *0.1 M sodium nitrite* is equivalent to 16.52 mg of $C_9H_{11}NO_2$.

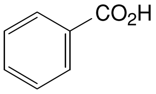
STORAGE

Protected from light.

01/2008:0066
corrected 6.0

BENZOIC ACID

Acidum benzoicum



$C_7H_6O_2$ M_r 122.1
[65-95-0]

DEFINITION

Benzenecarboxylic acid.

Content: 99.0 per cent to 100.5 per cent.

CHARACTERS

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

Solubility: slightly soluble in water, soluble in boiling water, freely soluble in ethanol (96 per cent) and in fatty oils.

IDENTIFICATION

A. Melting point (*2.2.14*): 121 °C to 124 °C.

B. Solution S (see Tests) gives reaction (a) of benzoates (*2.3.1*).

TESTS

Solution S. Dissolve 5.0 g in *ethanol (96 per cent) 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*).

Carbonisable substances. Dissolve 0.5 g with shaking in 5 ml of *sulphuric acid R*. After 5 min, the solution is not more intensely coloured than reference solution Y_5 (*2.2.2, Method I*).

Oxidisable substances. Dissolve 0.2 g in 10 ml of boiling *water R*. Cool, shake and filter. To the filtrate add 1 ml of *dilute sulphuric acid R* and 0.2 ml of *0.02 M potassium permanganate*. After 5 min, the solution is still coloured pink.

Halogenated compounds and halides: maximum 300 ppm.

All glassware used must be chloride-free and may be prepared by soaking overnight in a 500 g/l solution of nitric acid R, rinsed with water R and stored full of water R. It is recommended that glassware be reserved for this test.

Solution (a). Dissolve 6.7 g in a mixture of 40 ml of *1 M sodium hydroxide* and 50 ml of *ethanol (96 per cent) R* and dilute to 100.0 ml with *water R*. To 10.0 ml of this solution add 7.5 ml of *dilute sodium hydroxide solution R* and 0.125 g of *nickel-aluminium alloy R* and heat on a water-bath for 10 min. Allow to cool to room temperature, filter into a 25 ml volumetric flask and wash with 3 quantities, each of 2 ml, of *ethanol (96 per cent) R*. Dilute the filtrate and washings to 25.0 ml with *water R*. This solution is used to prepare solution A.

Solution (b). In the same manner, prepare a similar solution without the substance to be examined. This solution is used to prepare solution B.

In four 25 ml volumetric flasks, place separately 10 ml of solution (a), 10 ml of solution (b), 10 ml of *chloride standard solution (8 ppm Cl) R* (used to prepare solution C) and 10 ml of *water R*. To each flask add 5 ml of *ferric ammonium sulphate solution R5*, mix and add dropwise and with swirling 2 ml of *nitric acid R* and 5 ml of *mercuric thiocyanate solution R*. Shake. Dilute the contents of each flask to 25.0 ml with *water R* and allow the solutions to stand in a water-bath at 20 °C for 15 min. Measure at 460 nm the absorbance (*2.2.25*) of solution A using solution B as the compensation liquid, and the absorbance of solution C using the solution obtained with 10 ml of *water R* as the compensation liquid. The absorbance of solution A is not greater than that of solution C.

Heavy metals (*2.4.8*): maximum 10 ppm.

12 ml of solution S complies with test B. Prepare the reference solution using a mixture of 5 ml of *lead standard solution (1 ppm Pb) R* and 5 ml of *ethanol (96 per cent) R*.

Sulphated ash (*2.4.14*): maximum 0.1 per cent, determined on 1.0 g.

ASSAY

Dissolve 0.200 g in 20 ml of *ethanol (96 per cent) R* and titrate with *0.1 M sodium hydroxide*, using 0.1 ml of *phenol red solution R* as indicator, until the colour changes from yellow to violet-red.

1 ml of *0.1 M sodium hydroxide* is equivalent to 12.21 mg of $C_7H_6O_2$.

01/2008:2158

BENZOIN, SIAM

Benzoe tonkinensis

DEFINITION

Resin obtained by incising the trunk of *Styrax tonkinensis* (Pierre) Craib ex Hartwich.

Content: 45.0 per cent to 55.0 per cent of total acids, calculated as benzoic acid ($C_7H_6O_2$; M_r 122.1) (dried drug).

CHARACTERS

Characteristic odour of vanillin.

IDENTIFICATION

A. Siam benzoin occurs as opaque, granular, rounded or ovoid masses (tears), varying in size from a few millimeters up to 3 cm, separated or sometimes agglomerated together by a reddish-brown, transparent resin. Individual tears are yellowish-white to reddish externally with a waxy, whitish fracture which becomes reddish on exposure to air.

B. Examine the chromatograms obtained in test B for *Styrax benzoin*.

Results: see below the sequence of the zones present in the chromatograms obtained with the reference solution and the test solution. Furthermore, other faint fluorescent zones may be present in the chromatogram obtained with the test solution.

Top of the plate	
———	———
Methyl cinnamate: a very prominent quenching zone	
Benzoic acid: a quenching zone	A quenching zone (benzoic acid)
Cinnamic acid: a prominent quenching zone	
———	———
	A quenching zone
	A very prominent quenching zone
Vanillin: a quenching zone	A quenching zone (vanillin)
	Series of unresolved zones including a quenching zone
Reference solution	**Test solution**

TESTS

Styrax benzoin

A. To 0.2 g of the finely powdered drug add 10 ml of *ethanol (96 per cent) R*. Shake vigorously until almost completely dissolved and filter. Place 5 ml of the filtrate in a test-tube and add 0.5 ml of a 50 g/l solution of *ferric chloride R* in *ethanol (96 per cent) R*. A green colour is produced. No yellow colour is produced.

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

Test solution. Sonicate 0.2 g of the finely powdered drug in 5 ml of *ethanol (96 per cent) R* and filter. Collect the filtrate.

Reference solution. Dissolve 20 mg of *benzoic acid R*, 10 mg of *trans-cinnamic acid R*, 4 mg of *vanillin R* and 20 mg of *methyl cinnamate R* in 10 ml of *ethanol (96 per cent) R*.

Plate: *TLC silica gel* F_{254} *plate R*.

Mobile phase: *glacial acetic acid R, di-isopropyl ether R, hexane R* (10:40:60 *V/V/V*).

Application: 10 μl as bands.

Development: over a path of 12 cm.

Drying: in air.

Detection: examine in ultraviolet light at 254 nm.

Results: the chromatogram obtained with the test solution shows no zone in the same position as the zone due to cinnamic acid in the chromatogram obtained with the reference solution.

Matter insoluble in ethanol: maximum 5 per cent.

To 2 g of the powdered drug add 25 ml of *ethanol (90 per cent V/V) R*. Boil until almost completely dissolved. Filter through a previously tared sintered-glass filter (16) (*2.1.2*) and wash with 3 quantities, each of 5 ml, of boiling *ethanol (90 per cent V/V) R*. Heat the glass filter and its contents in an oven at 100-105 °C for 2 h. Weigh after cooling.

Loss on drying (*2.2.32*): maximum 5.0 per cent, determined on 2.00 g of the coarsely powdered drug by drying *in vacuo* for 4 h.

Total ash (*2.4.16*): maximum 2.0 per cent.

ASSAY

Place 0.750 g of the finely powdered drug in a 250 ml borosilicate glass flask and add 15.0 ml of *0.5 M alcoholic potassium hydroxide*. Boil under a reflux condenser on a water-bath for 30 min. Allow to cool and rinse the condenser with 20 ml of *ethanol (96 per cent) R*. Titrate the excess