Mobile phase: *glacial acetic acid R, water R, methanol R* (1:30:70 *V/V/V*).

Application: 2 µL of test solution (b) and reference solutions (a) and (b).

Development: over 2/3 of the plate.

Drying: in air.

Detection: examine in ultraviolet light at 254 nm.

System suitability: reference solution (b):

– the chromatogram shows 2 clearly separated principal spots.

Results: the principal spot in the chromatogram obtained with test solution (b) is similar in position and size to the principal spot in the chromatogram obtained with reference solution (a).

TESTS

Solution S. Dissolve 1.0 g in *ethanol (96 per cent) R* and dilute to 10 mL with the same solvent.

Appearance of solution. Solution S is clear (*2.2.1*) and not more intensely coloured than reference solution BY_6 (*2.2.2, Method II*).

Acidity. To 2 mL of solution S add 3 mL of *ethanol (96 per cent) R*, 5 mL of *carbon dioxide-free water R* and 0.1 mL of *bromocresol green solution R*. Not more than 0.1 mL of *0.1 M sodium hydroxide* is required to change the colour of the indicator to blue.

Related substances. Liquid chromatography (*2.2.29*).

Test solution. Dissolve 50.0 mg of the substance to be examined in 2.5 mL of *methanol R* and dilute to 50.0 mL with the mobile phase. Dilute 10.0 mL of this solution to 100.0 mL with the mobile phase.

Reference solution (a). Dissolve 5 mg of *4-hydroxybenzoic acid R* (impurity A), 5 mg of *ethyl parahydroxybenzoate R* (impurity C) and 5 mg of the substance to be examined in the mobile phase and dilute to 100.0 mL with the mobile phase. Dilute 1.0 mL of this solution to 10.0 mL with the mobile phase.

Reference solution (b). Dissolve 50.0 mg of *propyl parahydroxybenzoate CRS* in 2.5 mL of *methanol R* and dilute to 50.0 mL with the mobile phase. Dilute 10.0 mL of this solution to 100.0 mL with the mobile phase.

Reference solution (c). Dilute 1.0 mL of the test solution to 20.0 mL with the mobile phase. Dilute 1.0 mL of this solution to 10.0 mL with the mobile phase.

Column:

– *size*: *l* = 0.15 m, Ø = 4.6 mm;

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

Mobile phase: 6.8 g/L solution of *potassium dihydrogen phosphate R, methanol R* (35:65 *V/V*).

Flow rate: 1.3 mL/min.

Detection: spectrophotometer at 272 nm.

Injection: 10 µL of the test solution and reference solutions (a) and (c).

Run time: 2.5 times the retention time of propyl parahydroxybenzoate.

Relative retention with reference to propyl parahydroxybenzoate (retention time = about 4.5 min): impurity A = about 0.3; impurity C = about 0.7.

System suitability: reference solution (a):

– *resolution*: minimum 3.0 between the peaks due to impurity C and propyl parahydroxybenzoate.

Limits:

– *correction factor*: for the calculation of content, multiply the peak area of impurity A by 1.4;

– *impurity A*: not more than the area of the principal peak in the chromatogram obtained with reference solution (c) (0.5 per cent);

– *unspecified impurities*: for each impurity, not more than the area of the principal peak in the chromatogram obtained with reference solution (c) (0.5 per cent);

– *total*: not more than twice the area of the principal peak in the chromatogram obtained with reference solution (c) (1.0 per cent);

– *disregard limit*: 0.2 times the area of the principal peak in the chromatogram obtained with reference solution (c) (0.1 per cent).

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

ASSAY

Liquid chromatography (*2.2.29*) as described in the test for related substances with the following modification.

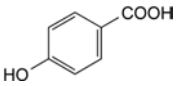
Injection: test solution and reference solution (b).

Calculate the percentage content of $C_{10}H_{12}O_3$ from the declared content of *propyl parahydroxybenzoate CRS*.

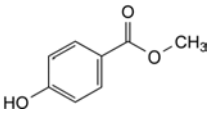
IMPURITIES

Specified impurities: *A*.

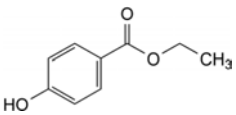
Other detectable impurities (the following substances would, if present at a sufficient level, be detected by one or other of the tests in the monograph. They are limited by the general acceptance criterion for other/unspecified impurities and/or by the general monograph *Substances for pharmaceutical use (2034)*. It is therefore not necessary to identify these impurities for demonstration of compliance. See also *5.10. Control of impurities in substances for pharmaceutical use*): *B, C, D*.



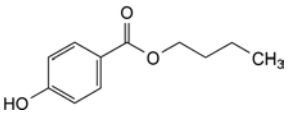
A. 4-hydroxybenzoic acid,



B. methyl 4-hydroxybenzoate (methyl parahydroxybenzoate),



C. ethyl 4-hydroxybenzoate (ethyl parahydroxybenzoate),

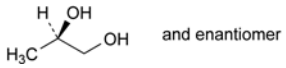


D. butyl 4-hydroxybenzoate (butyl parahydroxybenzoate).

01/2008:0430

PROPYLENE GLYCOL

Propylenglycolum



$C_3H_8O_2$ M_r 76.1

[57-55-6]

DEFINITION

Propylene glycol is (*RS*)-propane-1,2-diol.

CHARACTERS

A viscous, clear, colourless, hygroscopic liquid, miscible with water and with ethanol (96 per cent).

IDENTIFICATION

A. Relative density (see Tests).

B. Refractive index (see Tests).

C. Boiling point (*2.2.12*): 184 °C to 189 °C.

D. To 0.5 mL add 5 mL of *pyridine R* and 2 g of finely ground *nitrobenzoyl chloride R*. Boil for 1 min and pour into 15 mL of cold *water R* with shaking. Filter, wash the precipitate with 20 mL of a saturated solution of *sodium hydrogen carbonate R* and then with *water R* and dry. Dissolve in boiling *ethanol (80 per cent V/V) R* and filter the hot solution. On cooling, crystals are formed which, after drying at 100-105 °C, melt (*2.2.14*) at 121 °C to 128 °C.

TESTS

Appearance. It is clear (*2.2.1*) and colourless (*2.2.2, Method II*).

Relative density (*2.2.5*): 1.035 to 1.040.

Refractive index (*2.2.6*): 1.431 to 1.433.

Acidity. To 10 mL add 40 mL of *water R* and 0.1 mL of *bromothymol blue solution R1*. The solution is greenish-yellow. Not more than 0.05 mL of *0.1 M sodium hydroxide* is required to change the colour of the indicator to blue.

Oxidising substances. To 10 mL add 5 mL of *water R*, 2 mL of *potassium iodide solution R* and 2 mL of *dilute sulfuric acid R* and allow to stand in a ground-glass-stoppered flask protected from light for 15 min. Titrate with *0.05 M sodium thiosulfate*, using 1 mL of *starch solution R* as indicator. Not more than 0.2 mL of *0.05 M sodium thiosulfate* is required.

Reducing substances. To 1 mL add 1 mL of *dilute ammonia R1* and heat in a water-bath at 60 °C for 5 min. The solution is not yellow. Immediately add 0.15 mL of *0.1 M silver nitrate* and allow to stand for 5 min. The solution does not change its appearance.

Heavy metals (*2.4.8*). Mix 4 mL with 16 mL of *water R*. 12 mL of the solution complies with test A for heavy metals (5 ppm *m/V*). Prepare the reference solution using *lead standard solution (1 ppm Pb) R*.

Water (*2.5.12*). Not more than 0.2 per cent, determined on 5.00 g by the semi-micro determination of water.

Sulfated ash (*2.4.14*). Heat 50 g until it burns and ignite. Allow to cool. Moisten the residue with *sulfuric acid R* and ignite; repeat the operations. The residue weighs not more than 5 mg (0.01 per cent).

STORAGE

Store in an airtight container.

01/2008:2122

PROPYLENE GLYCOL DICAPRYLOCAPRATE

Propylenglycoli dicaprylocapras

DEFINITION

Propylene glycol diesters of saturated fatty acids, mainly caprylic (octanoic) acid and capric (decanoic) acid, of vegetable origin.

CHARACTERS

Appearance: almost colourless to light yellow, oily liquid.

Solubility: practically insoluble in water, soluble in fatty oils and in light petroleum, slightly soluble in anhydrous ethanol.

IDENTIFICATION

A. Refractive index (*2.2.6*): 1.439 to 1.442.

B. Relative density (*2.2.5*): 0.910 to 0.930.

C. Viscosity (*2.2.9*): 9 mPa·s to 12 mPa·s.

D. Composition of fatty acids (see Tests).

TESTS

Appearance. The substance to be examined is clear (*2.2.1*) and not more intensely coloured than reference solution BY_6 (*2.2.2, Method II*).

Acid value (*2.5.1*): maximum 0.2.

Hydroxyl value (*2.5.3, Method A*): maximum 10.

Iodine value (*2.5.4*): maximum 1.0.

Peroxide value (*2.5.5, Method A*): maximum 1.0.

Saponification value (*2.5.6*): 320 to 340.

Unsaponifiable matter (*2.5.7*): maximum 0.3 per cent, determined on 5.0 g.

Alkaline impurities. Dissolve 2.00 g of the substance to be examined in a mixture of 1.5 mL of *ethanol (96 per cent) R* and 3.0 mL of *ether R*. Add 0.05 mL of *bromophenol blue solution R*. Not more than 0.15 mL of *0.01 M hydrochloric acid* is required to change the colour of the indicator to yellow.

Composition of fatty acids. Gas chromatography (*2.4.22, Method C*). Prepare reference solution (a) as indicated in Table 2.4.22.-2.

Column:

– *material*: fused silica,

– *size*: *l* = 30 m, Ø = 0.32 mm,

– *stationary phase*: *macrogol 20 000 R* (film thickness 0.5 µm),

Carrier gas: *helium for chromatography R*.

Flow rate: 1.3 mL/min.

Split ratio: 1:100.

Temperature:

	Time (min)	Temperature (°C)
Column	0 - 1	70
	1 - 35	70 → 240
	35 - 50	240
Injection port		250
Detector		250

Detection: flame ionisation.

Composition of the fatty acid fraction of the substance to be examined:

– *caproic acid*: maximum 2.0 per cent,

– *caprylic acid*: 50.0 per cent to 80.0 per cent,

– *capric acid*: 20.0 per cent to 50.0 per cent,

– *lauric acid*: maximum 3.0 per cent,

– *myristic acid*: maximum 1.0 per cent.

Water (*2.5.12*): maximum 0.1 per cent, determined on 5.00 g.

Total ash (*2.4.16*): maximum 0.1 per cent, determined on 2.0 g.

STORAGE

Protected from light.

01/2008:2087

PROPYLENE GLYCOL DILAURATE

Propylenglycoli dilauras

DEFINITION

Mixture of propylene glycol mono- and diesters of lauric (dodecanoic) acid.

Content: minimum 70.0 per cent of diesters and maximum 30.0 per cent of monoesters.