

EUROPEAN PHARMACOPOEIA

Third Edition

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Solution S. Shake 1.0 g with 50 ml of *distilled water R*, add 5 ml of *dilute sodium hydroxide solution R* and dilute to 100 ml with *distilled water R*.

pH (2.2.3). Shake 1 g for 5 min with 100 ml of *carbon dioxide-free water R*. The pH of the suspension is 4.5 to 6.0.

Silica. Not more than 0.6 per cent. To the residue obtained in the test for sulphated ash add sufficient *alcohol R* to moisten the residue completely. Add 6 ml of *hydrofluoric acid R* in small portions. Evaporate to dryness at 95 °C to 105 °C, taking care to avoid loss from sputtering. Cool and rinse the wall of the platinum crucible with 6 ml of *hydrofluoric acid R*. Add 0.5 ml of *sulphuric acid R* and evaporate to dryness. Progressively increase the temperature, ignite at 900 °C, allow to cool in a desiccator and weigh. The difference between the mass of the residue obtained in the test for sulphated ash and the mass of the final residue is equal to the amount of silica in the substance to be examined.

Chlorides (2.4.4). Heat 20 ml of solution S with 10 ml of *dilute nitric acid R* on a water-bath until a flocculent precipitate is produced. Cool, centrifuge and separate the supernatant liquid. Wash the precipitate with three quantities, each of 10 ml, of *water R*, centrifuging each time. Combine the supernatant liquid and the washings and dilute to 100 ml with *water R*. To 25 ml add 6 ml of *dilute nitric acid R* and dilute to 50 ml with *water R*. 10 ml of the solution diluted to 15 ml with *water R* complies with the limit test for chlorides (0.5 per cent).

Sulphates (2.4.13). Heat 20 ml of solution S with 1 ml of *hydrochloric acid R* on a water-bath until a flocculent precipitate is produced. Cool, centrifuge and separate the supernatant liquid. Wash the precipitate with three quantities, each 10 ml, of *water R*, centrifuging each time. Combine the supernatant liquid and the washings and dilute to 100 ml with *distilled water R*. To 25 ml add 1 ml of *dilute hydrochloric acid R* and dilute to 50 ml with *distilled water R*. 15 ml of the solution complies with the limit test for sulphates (1 per cent).

Heavy metals (2.4.8). 1.0 g complies with limit test D 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 in an oven at 100 °C to 105 °C.

Sulphated ash (2.4.14). 10.0 per cent to 20.0 per cent, determined on 1.000 g in a platinum crucible and calculated with reference to the dried substance. Moisten with a mixture of equal volumes of *water R* and *sulphuric acid R*.

STORAGE

Store in a well-closed container.

CARMELLOSE SODIUM

Carmellosum natriicum

DEFINITION

Carmellose sodium (carboxymethylcellulose sodium) is the sodium salt of a partly *O*-carboxymethylated cellulose. It contains not less than 6.5 per cent and not more than 10.8 per cent of sodium (Na), calculated with reference to the dried substance.

CHARACTERS

A white or almost white, granular powder, hygroscopic after drying, practically insoluble in acetone, in ethanol, in ether and in toluene. It is easily dispersed in water giving colloidal solutions.

IDENTIFICATION

- To 10 ml of solution S (see Tests) add 1 ml of *copper sulphate solution R*. A blue, cottonlike precipitate is formed.
- Boil 5 ml of solution S for a few minutes. No precipitate is formed.
- The solution prepared from the sulphated ash in the test for heavy metals gives the reactions of sodium (2.3.1).

TESTS

Solution S. Sprinkle a quantity of the substance to be examined equivalent to 1.0 g of the dried substance onto 90 ml of *carbon dioxide-free water R* at 40 °C to 50 °C stirring vigorously. Continue stirring until a colloidal solution is obtained, cool and dilute to 100 ml with *carbon dioxide-free water R*.

Appearance of solution. Solution S is not more opalescent than reference suspension III (2.2.1) and not more intensely coloured than reference solution Y₆ (Method II, 2.2.2).

pH (2.2.3). The pH of solution S is 6.0 to 8.0.

Apparent viscosity. While stirring, introduce a quantity of the substance to be examined equivalent to 2.00 g of the dried substance into 50 ml of *water R* heated to 90 °C. For a product of low viscosity, use if necessary, the quantity required to give the concentration indicated on the label. Allow to cool, dilute to 100.0 ml with *water R* and stir until dissolution is complete. Determine the viscosity (2.2.10) using a rotating viscometer at 20 °C and a shear rate of 10 s⁻¹. If it is impossible to obtain a shear rate of exactly 10 s⁻¹, use a shear rate slightly higher and a rate slightly lower and interpolate. The apparent viscosity is not less than 75 per cent and not more than 140 per cent of the value stated on the label.

Sodium glycollate. Place a quantity of the substance to be examined equivalent to 0.500 g of dried substance in a beaker. Add 5 ml of *acetic acid R* and 5 ml of *water R*. Stir until dissolution is complete (about 30 min). Add 80 ml of *acetone R* and 2 g of *sodium chloride R*. Filter through a fast filter paper impregnated with *acetone R* into a volumetric flask, rinse the beaker and filter with *acetone R* and dilute the filtrate to 100.0 ml with the same solvent. Allow to stand for 24 h without shaking. Use the clear supernatant liquid to prepare the test solution. In a volumetric flask, dissolve 0.310 g of *glycollic acid R*, previously dried *in vacuo* over *diphosphorus pentoxide R*, in *water R* and dilute to 1000.0 ml with the same solvent. Place 5.0 ml of this solution in a volumetric flask, add 5 ml of *acetic acid R* and allow to stand for about 30 min. Add 80 ml of *acetone R* and 2 g of *sodium chloride R* and dilute to 100.0 ml with *acetone R*. Use this solution to prepare the reference solution.

Place 2.0 ml of each solution in a separate 25 ml volumetric flask. Heat on a water-bath to eliminate acetone. Cool to room temperature and add 5.0 ml of *2,7-dihydroxynaphthalene solution R*. Shake and add 15.0 ml of *2,7-dihydroxynaphthalene solution R*. Close the flasks with aluminium foil and heat in a water-bath for 20 min. Cool under running water and dilute to 25.0 ml with *sulphuric acid R*. Within 10 min, transfer 10.0 ml of each solution to a flat-bottomed tube. Examine the solutions viewing vertically. The test solution is not more intensely coloured than the reference solution (0.4 per cent of sodium glycollate).

Chlorides (2.4.4). 2 ml of solution S diluted to 15 ml with *water R* complies with the limit test for chlorides (0.25 per cent).

Heavy metals (2.4.8). To the residue obtained in the determination of the sulphated ash add 1 ml of *hydrochloric acid R* and evaporate on a water-bath. Take up the residue in 20 ml of *water R*. 12 ml of the solution complies with limit test A for heavy metals (20 ppm). Prepare the standard using *lead standard solution (1 ppm Pb) R*.

Loss on drying (2.2.32). Not more than 10.0 per cent, determined on 1.000 g by drying in an oven at 100 °C to 105 °C.

Sulphated ash (2.4.14). 20.0 per cent to 33.3 per cent, determined on 1.0 g using a mixture of equal volumes of *sulphuric acid R* and *water R* and calculated with reference to the dried substance. These limits correspond to a content of 6.5 per cent to 10.8 per cent of Na.

STORAGE

Store in a well-closed container.

LABELLING

The label states:

- the apparent viscosity in millipascal seconds for a 20 g/l solution; for a product of low viscosity, the label states the concentration of the solution to be used and the apparent viscosity in millipascal seconds,
- that the product is not intended for parenteral administration.

CARNAUBA WAX

Cera carnauba

DEFINITION

Carnauba wax is the purified wax obtained from the leaves of *Copernicia cerifera* Mart.

CHARACTERS

Pale-yellow or yellow powder, flakes or hard masses, practically insoluble in water and in alcohol, soluble on warming in ethyl acetate and in xylene.

It has a relative density of about 0.97.

IDENTIFICATION

Examine by thin-layer chromatography (2.2.27), using *silica gel c R* as the coating substance.

Test solution. Dissolve 0.10 g of the substance to be examined with warming in 5 ml of *chloroform R*. Use the warm solution.

Reference solution. Dissolve 5 mg of *menthol R*, 5 µl of *menthyl acetate R* and 5 mg of *thymol R* in 10 ml of *toluene R*.

Apply separately to the plate as bands 20 mm by 3 mm, 30 µl of the test solution and 10 µl of the reference solution. Develop over a path of 10 cm using a mixture of 2 volumes of *ethyl acetate R* and 98 volumes of *chloroform R*. Allow the plate to dry and spray with a freshly prepared 200 g/l solution of *phosphomolybdic acid R* in *alcohol R*, using about 10 ml for a plate 200 mm square and heat at 100 °C to 105 °C for 10 min to 15 min. The chromatogram obtained with the reference solution shows in the lower part a dark blue zone (menthol), above this zone a reddish zone (thymol) and in the upper part a dark blue zone (menthyl acetate). The chromatogram obtained with the test solution shows a large blue zone (triacontanol = melissyl alcohol) at a level between the thymol and menthol zones in the chromatogram obtained with the reference solution. Further blue zones are visible in the upper part of the chromatogram obtained with the test solution, at levels between those of the menthyl acetate and thymol zones in the chromatogram obtained with the reference solution; above these zones further zones are visible in the chromatogram obtained with the test solution; the zone with the highest *R_f* value is very pronounced. A number of faint zones are visible below the triacontanol zone and the starting point is coloured blue.

TESTS

Appearance of solution. Dissolve 0.10 g with heating in *chloroform R* and dilute to 10 ml with the same solvent. The solution is clear (2.2.1) and not more intensely coloured than a 0.05 g/l solution of *potassium dichromate R* (Method II, 2.2.2).

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