Cetirizine Hydrochloride Oral Solution

Cetirizine Hydrochloride Oral Solution contains not less than 90.0 per cent and not more than 110.0 per cent of the stated amount of cetirizine hydrochloride, $C_{21}H_{25}N_2O_3CI$, 2HCl.

Usual strength.1 mg per ml.

Identification

A. In the Assay, the principal peak in the chromatogram obtained with the test solution corresponds to the peak in the chromatogram obtained with the reference solution.

B. It gives reaction (A) of chlorides (2.3.1).

Tests

pH(2.4.24). 4.0 to 5.1.

Related substances. Determine by liquid chromatography (2.4.14).

Solution A. Transfer 50 ml of *water* to a 100-ml volumetric flask, add slowly 5.5 ml of *sulphuric acid* and dilute to volume with *water.*

Solvent mixture. 35 volumes of *acetonitrile* and 65 volumes of *water*.

Test solution. Dissolve a suitable quantity of the oral solution in the solvent mixture with the aid of ultrasound for 10 minutes, to obtain solution containing 0.06 per cent w/v of Cetirizine Hydrochloride, filter.

Reference solution. A 0.0006 per cent w/v solution of *cetirizine hydrochloride IPRS*in the solvent mixture.

Chromatographic system
- a stainless steel column 25 cm x 4.6 mm, packed with porous silica particles (5 µm), (Such as Spherisorb silica)
- mobile phase: a mixture of a 96.5 volumes of *acetonitrile,* 3.3 volumes of *water* and 0.1 volume of solution A.
- flow rate: 2 ml per minute,
- spectrophotometer set at 230 nm,
- injection volume: 10 µl.

Name	Relative retention time
Cetirizine acetic acid1*	0.69
2-Chlorocetirizine[2*]	0.83
Cetirizine	1.00
Cetirizine ethanol[3*]	1.30
Ethoxycetirizine[4*]	1.38
CBHP[5*]	1.52
Propylene glycol ester of cetirizine (diastereomer 1)[6]	1.53
Propylene glycol ester of cetirizine (diastereomer 2)[7]	1.61
Deschlorocetirizine[8*]	1.65
Glyceryl ester of Cetirizine[9]	2.20

*Process related impurity, included for identification only and not to included in the total degradation product.
[1]2-[4-[(4-Chlorophenyl)phenylmethyl]piperazin-1-yl]acetic acid,
[3]2-[2-[4-[(2-Chlorophenyl)phenylmethyl]piperazin-1-yl]ethoxy]acetic acid,
[4]2-[4-[(4-Chlorophenyl)phenylmethyl]piperazin-1-yl]ethanol,
[5]2-[2-[2-[4-[(4-Chlorophenyl)phenylmethyl]piperazin-1-yl]ethoxy] ethoxy]acetic acid (ethoxycetirizine),
[6] 1-[(4-Chlorophenyl)phenylmethyl]piperazine,
[7] 2-Hydroxypropyl 2-(2-{4-[(4-chlorophenyl)phenylmethyl]piperazin-1-yl}ethoxy)acetate,
[8] 2-{2-[4-(Diphenylmethyl)piperazin-1-yl]ethoxy]acetic acid,
[9]2,3-Dihydroxypropyl 2-(2-{4-[(4-chlorophenyl)phenylmethyl]piperazin-1-yl}ethoxy)acetate.

Inject the reference solution. The test is not valid unless the column efficiency is not less than 10,000 theoretical plates, the tailing factor is not more than 1.5 and the relative standard deviation for replicate injections is not more than 5.0 per cent.

Inject the reference solution and the test solution. In the chromatogram obtained with the test solution, the area of the peak corresponding to propylene glycol ester of cetirizine (diastereomer 1) and propylene glycol ester of cetirizine (diastereomer 2), each of, is not more than 0.2 times the area of the principal peak in the chromatogram obtained with the reference solution (0.2 per cent), the area of any peak corresponding to deschlorocetirizine is not more than 0.5 times the area of the principal peak in the chromatogram obtained with the reference solution (0.5 per cent), the area of any other secondary peak is not more than 0.2 times the area of the principal peak in the chromatogram obtained with the reference solution (0.2 per cent) and the sum of areas of all the secondary peaks is not more than 0.8 times the area of the principal peak in the chromatogram obtained with the reference solution (0.8 per cent).

Other tests. Comply with the tests stated under Oral Liquids.

Microbial contamination (2.2.9).Total aerobic microbial count is not more than 100 CFU per ml and total yeast and mould count not more than 10 CFU per ml. 1 ml is free from *Escherichia coli.*

Assay. Determine by liquid chromatography (2.4.14).

Solvent mixture. 30 volumes of *acetonitrile* and 70 volumes of *water*.

Test solution. Dissolve a suitable quantity of the oral solution in the solvent mixture with aid of ultrasound for 3 minutes with swirling to obtain a solution containing 0.01 per cent w/v of Cetirizine Hydrochloride.

Reference solution. A 0.5 per cent w/v solution of *cetirizine hydrochloride IPRS* in *water.* Dilute 1.0 ml of the solution to 50.0 ml with the solvent mixture.

Chromatographic system

- a stainless steel column 25 cm x 4.6 mm, packed with cyanopropyl groups bonded to porous silica (5µm),
- mobile phase: A. *acetonitrile*,
  B. a buffer solution prepared by dissolving 1.36 g of *dipotassiumhydrogen phosphate* in 1000 ml of *water*, adjusted to pH 3.5 with 2 per cent v/v solution of *orthophosphoric acid* in *water.*
- column temperature: 50°,
- flow rate: 2 ml per minute,
- spectrophotometer set at 233 nm,
- injection volume: 20 µl.

Time (in min.)	Mobile phase A (per cent v/v)	Mobile phase B (per cent v/v)
0	5	95
15	5	95
22	25	75
35	25	75
40	5	95
50	5	95

Inject the reference solution. The test is not valid unlessthe tailing factor is not more than 1.5 and the relative standard deviation for replicate injections is not more than 1.0 per cent.

Inject the reference solution and the test solution.

Determine the weight per ml of the oral suspension (2.4.29) and calculate the content of $C_{21}H_{25}N_2O_3CI$, 2HCl in the oral solution.

Storage. Store protected from light and moisture, at temperature not exceeding 30º.