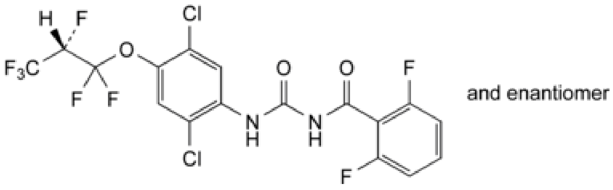
Edition: BP 2025 (Ph. Eur. 11.6 update)

Lufenuron

General Notices

Anhydrous Lufenuron

(Lufenuron for Veterinary Use, Ph. Eur. monograph 2177)



$C_{17}H_8Cl_2F_8N_2O_3$ 511.1 *103055-07-8*

Action and use

Ectoparasiticide.

Ph Eur

DEFINITION

N-[[2,5-Dichloro-4-[(2*RS*)-1,1,2,3,3,3-hexafluoropropoxy]phenyl]carbamoyl]-2,6-difluorobenzamide.

Content

98.0 per cent to 102.0 per cent (dried substance).

CHARACTERS

Appearance

White or pale yellow powder.

Solubility

Practically insoluble in water, freely soluble in acetonitrile, soluble in anhydrous ethanol.

It shows polymorphism (*5.9*).

mp

About 172 °C.

IDENTIFICATION

Infrared absorption spectrophotometry (2.2.24).

Comparison lufenuron CRS.

If the spectra obtained in the solid state show differences, dissolve the substance to be examined and the reference substance separately in 2-propanol R, evaporate to dryness and record new spectra using the residues.

TESTS

Related substances

Liquid chromatography (2.2.29).

Solvent mixture water R, acetonitrile R (30:70 *V/V*).

Test solution (a) Dissolve 40.0 mg of the substance to be examined in the solvent mixture by sonicating for about 10 min and dilute to 100.0 mL with the solvent mixture.

Test solution (b) Dilute 1.0 mL of test solution (a) to 10.0 mL with the solvent mixture.

Reference solution (a) Dilute 1.0 mL of test solution (b) to 100.0 mL with the solvent mixture.

Reference solution (b) Dissolve 7 mg of lufenuron impurity G CRS in test solution (a) and dilute to 50 mL with test solution (a).

Reference solution (c) Dissolve the contents of a vial of lufenuron for peak identification CRS (containing impurities B and C) in 1 mL of the solvent mixture.

Reference solution (d) Dissolve 40.0 mg of lufenuron CRS in the solvent mixture by sonicating for about 10 min and dilute to 100.0 mL with the solvent mixture. Dilute 1.0 mL of the solution to 10.0 mL with the solvent mixture.

Column:

- *size*: *l* = 0.25 m, Ø = 4.0 mm;
- *stationary phase*: end-capped octadecylsilyl silica gel for chromatography R (5 µm).

Mobile phase:

- *mobile phase A*: a 0.01 per cent *V/V* solution of phosphoric acid R;
- *mobile phase B*: acetonitrile R;

Time (min)	**Mobile phase A (per cent *V/V*)**	**Mobile phase B (per cent *V/V*)**
0 - 5	30	70
5 - 15	30 → 10	70 → 90
15 - 17	10	90

Flow rate 1.0 mL/min.

Detection Spectrophotometer at 255 nm.

Injection 20 µL of test solution (a) and reference solutions (a), (b) and (c).

Identification of impurities Use the chromatogram supplied with lufenuron for peak identification CRS and the chromatogram obtained with reference solution (c) to identify the peaks due to impurities B and C.

Relative retention With reference to lufenuron (retention time = about 9 min): impurity B = about 0.3; impurity C = about 0.7; impurity G = about 0.9.

System suitability Reference solution (b):

— *resolution*: minimum 3.0 between the peaks due to impurity G and lufenuron.

Limits:

— *correction factors*: for the calculation of content, multiply the peak areas of the following impurities by the corresponding correction factor: impurity B = 1.3; impurity C = 1.3;

— *impurity C*: not more than 4 times the area of the principal peak in the chromatogram obtained with reference solution (a) (0.4 per cent);

— *impurity B*: not more than 3 times the area of the principal peak in the chromatogram obtained with reference solution (a) (0.3 per cent);

— *unspecified impurities*: for each impurity, not more than twice the area of the principal peak in the chromatogram obtained with reference solution (a) (0.20 per cent);

— *total*: not more than 10 times the area of the principal peak in the chromatogram obtained with reference solution (a) (1.0 per cent);

— *disregard limit*: the area of the principal peak in the chromatogram obtained with reference solution (a) (0.10 per cent).

Loss on drying (*2.2.32*)

Maximum 0.5 per cent, determined on 1.000 g by drying in an oven at 105 °C.

Sulfated ash (*2.4.14*)

Maximum 0.1 per cent, determined on 1.0 g in a platinum crucible.

ASSAY

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

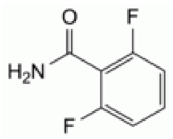
Injection Test solution (b) and reference solution (d).

Calculate the percentage content of $C_{17}H_8Cl_2F_8N_2O_3$ taking into account the assigned content of *lufenuron CRS*.

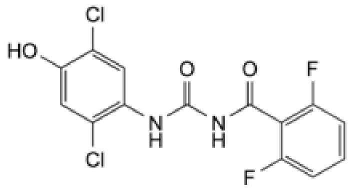
IMPURITIES

Specified impurities *B, C*.

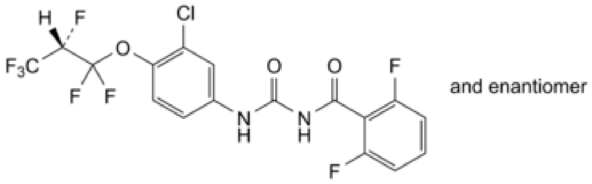
Other detectable impurities (the following substances would, if present at a sufficient level, be detected by one or other of the tests in the monograph. They are limited by the general acceptance criterion for other/unspecified impurities and/or by the general monograph Substances for pharmaceutical 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) *A, D, E, F, G, H*.



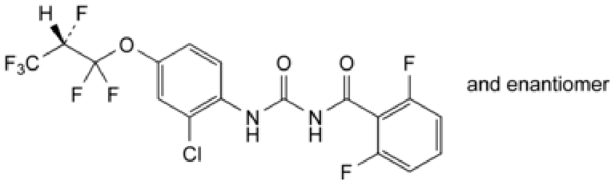
A. 2,6-difluorobenzamide,



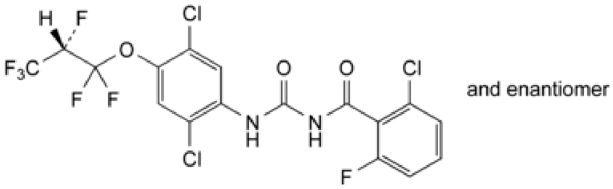
B. *N*-[(2,5-dichloro-4-hydroxyphenyl)carbamoyl]-2,6-difluorobenzamide,



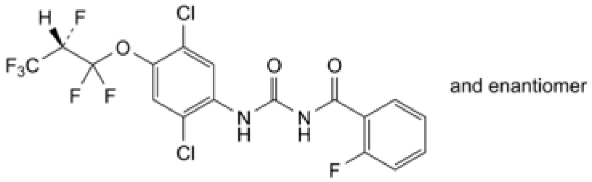
C. *N*-[[3-chloro-4-[(2*RS*)-1,1,2,3,3,3-hexafluoropropoxy]phenyl]carbamoyl]-2,6-difluorobenzamide,



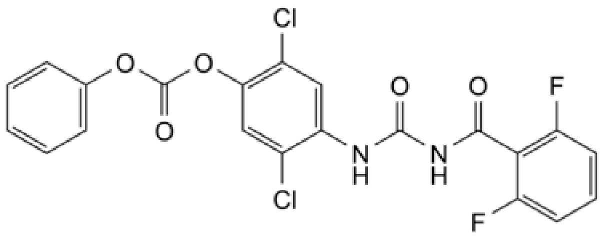
D. *N*-[[2-chloro-4-[(2*RS*)-1,1,2,3,3,3-hexafluoropropoxy]phenyl]carbamoyl]-2,6-difluorobenzamide,



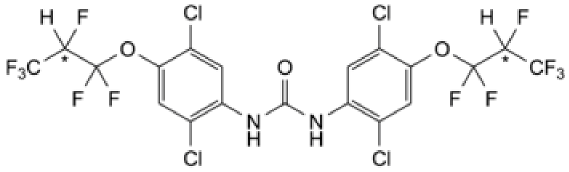
E. 2-chloro-*N*-[[2,5-dichloro-4-[(2*RS*)-1,1,2,3,3,3-hexafluoropropoxy]phenyl]carbamoyl]-6-fluorobenzamide,



F. *N*-[[2,5-dichloro-4-[(2*RS*)-1,1,2,3,3,3-hexafluoropropoxy]phenyl]carbamoyl]-2-fluorobenzamide,



G. 2,5-dichloro-4-[[(2,6-difluorobenzoyl)carbamoyl]amino]phenyl phenyl carbonate,



H. *N*,*N′*-bis[2,5-dichloro-4-[(2*Ξ*)-1,1,2,3,3,3-hexafluoropropoxy]phenyl]urea.

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