HORSERADISH
FOR HOMOEOPATHIC PREPARATIONS

COCHLEARIA ARMORACIA
FOR HOMOEOPATHIC PREPARATIONS

Armoracia rusticana ad praeparationes homoeopathicas

DEFINITION

Fresh root of *Armoracia rusticana* Gaertn., Mey. et Scherb.

CHARACTERS

Odourless when whole and intact, giving off a strong, characteristic, eye-watering odour when broken or crushed.

IDENTIFICATION

Horseradish root is thick and fleshy, reaching up to 1 m in length and 3-4 cm in diameter. It is grey-yellow and somewhat glossy. It is covered in long, fine rootlets. The fracture is white, short and non-fibrous.

TESTS

Foreign matter (*2.8.2*): maximum 5 per cent.

Loss on drying (*2.2.32*): minimum 60.0 per cent, determined on 5.0 g of finely cut drug, by drying in an oven at 105 °C, for 2 h.

STOCK

DEFINITION

Horseradish mother tincture is prepared with ethanol (55 per cent *V/V)*, using the fresh root of *Armoracia rusticana* Gaertn., Mey. et Scherb.

Content: minimum 0,030 per cent *m/m* of total glucosinolates, expressed as sinigrin ($C_{10}H_{16}NO_9S_2K$, H_2O; M_r 415.5).

The General Chapters and General Monographs of the European Pharmacopoeia and Preamble of the French Pharmacopoeia apply.

PRODUCTION

Method 1.1.10 (2371). Drug fragmented into segments 3-5 cm long. Maceration time: 3-5 weeks.

CHARACTERS

Appearance: yellow liquid.

Strong, characteristic odour.

IDENTIFICATION

Thin-layer chromatography (*2.2.27*).

Test solution. Mother tincture.

Reference solution. Dissolve 10 mg of *kaempferol-3-glucoside R* and 10 mg of *rutin R* in 10 mL of *methanol R* [or 10 mg of *kaempferol-3-glucoside R* and 10 mg of *rutin R* in 100 mL of *methanol R].*

Plate: *TLC silica gel plate R (5-40 µm)* [or TLC *silica gel plate R (2-10 µm)*].

Mobile phase: *anhydrous formic acid R, water R, ethyl acetate R* (10:10:80 *V/V/V*).

Application: 40 µL [or 20 µl], as bands.

Development: over a path of 10 cm [or 7 cm].

Drying: in air.

Detection: first spray with a 10 g/L solution of *diphenylboric acid aminoethyl ester R* in *methanol R* then spray with a 50 g/L solution of *macrogol 400 R* in *methanol R*. Allow the plate to dry in air for about 30 min. Examine in ultraviolet light at 365 nm.

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

Top of the plate	
	A green zone
-----	-----
Kaempferol-3-glucoside: a yellow zone	A greenish-yellow zone
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Rutin: an orange zone	A greenish yellow zone
Reference solution	**Test solution**

The General Chapters and General Monographs of the European Pharmacopoeia and Preamble of the French Pharmacopoeia apply.

TESTS

Ethanol (*2.9.10*): 50 per cent *V/V* to 60 per cent *V/V*.

Dry residue (*2.8.16*): minimum 1.2 per cent *m/m*.

ASSAY

Liquid chromatography (*2.2.29*).

Test solution. Dilute 1.250 g of mother tincture in *water R* and dilute to 20.0 mL with the same solvent.

Reference solution. Dissolve 10.0 mg of *sinigrin monohydrate R* in *water R* and dilute to 100.0 mL with the same solvent. Take up 10.0 mL of this solution and complete to 20.0 mL with *water R*.

Column:
– *size*: *l* = 0.25 m, *Ø* = 4 mm,
– *stationary phase*: *octadecylsilyl silica gel for chromatography R* (5 µm),
– *temperature*: 30 °C.

Mobile phase A: mix 1 volume of *phosphate buffer solution pH 7.0 R* and 19 volumes of *water R.*

Mobile phase B: 2.45 g/L solution of *tetraheptylammonium bromide R* in *methanol R*.

Mobile phase: mobile phase A, mobile phase B (40:60 *V/V*)

Flow rate: 0.6 mL/min.

Detection: spectrophotometer at 227 nm.

Injection: 20 µL.

Relative retention with reference to sinigrin (retention time = about 11 min) *of principal peak located in front of sinigrin = about 0.7.*

System suitability: *test solution*.
- *Resolution*: minimum 4.0 between the principal peak due to glucosinolate other than sinigrin, and the peak due to sinigrin.

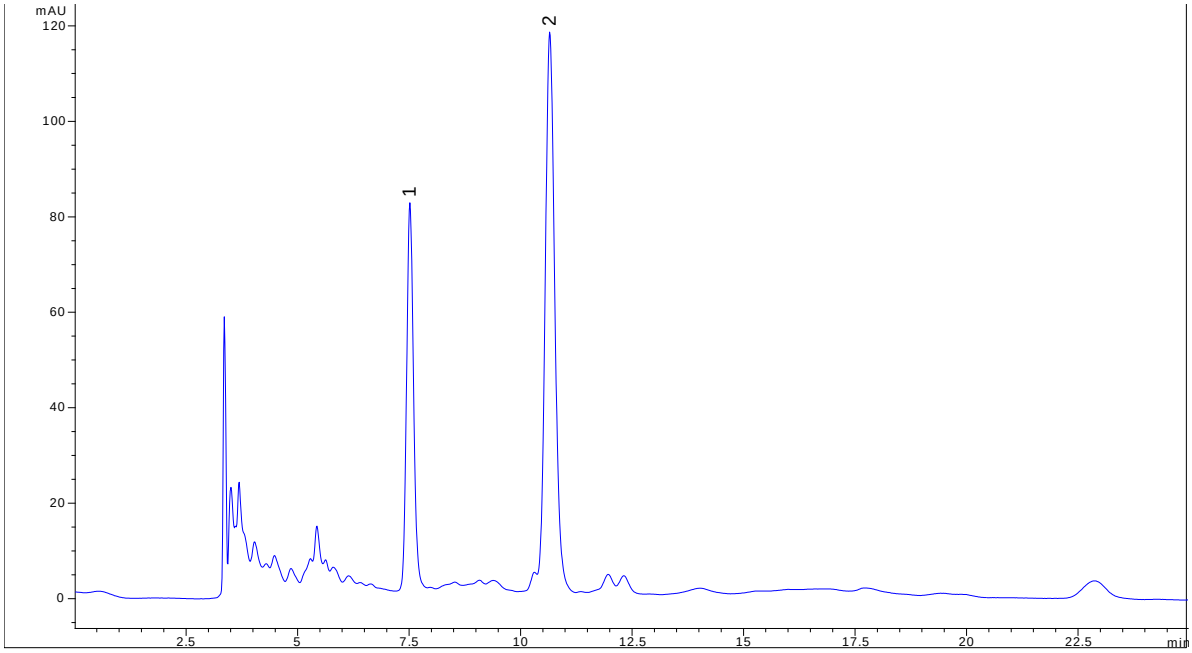
Calculate the percentage content of total glucosinolates, expressed as sinigrin, from the expression:

$$\frac{(A_1 + A_2) \times m_2 \times p}{A_3 \times m_1 \times 10}$$

A_1 = area of the principal peak due to glucosinolate other than sinigrin in the chromatogram obtained with the test solution,
A_2 = area of the peak due to sinigrin in the chromatogram obtained with the test solution,

The General Chapters and General Monographs of the European Pharmacopoeia and Preamble of the French Pharmacopoeia apply.

A_3 = area of the peak due to sinigrin in the chromatogram obtained with the reference solution,
m_1 = mass of the sample of mother tincture in test solution, in grams,
m_2 = mass of the sample of sinigrin in reference solution, in grams,
p = percentage content of sinigrin in *sinigrin monohydrate R.*



1 = principal glucosinolate other than sinigrin
2 = sinigrin

Chromatographic profile of mother tinture

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