INDIAN CRESS FOR HOMOEOPATHIC PREPARATIONS
TROPAEOLUM MAJUS FOR HOMOEOPATHIC PREPARATIONS

Tropaeolum majus ad praeparationes homoeopathicas

DEFINITION

Whole, fresh, blooming, cultivated plant *Tropaeolum majus* L.

IDENTIFICATION

A. Herbaceous, annual, glabrous and crassulescent plant that may reach 50 cm high. Trailing roots, fibrous and yellowish-white, emitting succulent and cylindrical stems, branching out and becoming creeping. Long petioled, alternate leaves, 4-15 cm in diameter, deprived of stipules; peltate, rounded, pale green on the upper side and paler on the underside. Solitary flowers, hermaphrodite and zygomorphic; 3-6 cm in diameter and fixed at the axil of the leaves by a long peduncle. Calyx composed of 5 triangular and yellowish sepals showing an elongated, rear conical spur. Five petals brightly coloured in red, orange or yellow; alternating with the sepals. Two rear, erect petals, the others longer, narrower, and pendent, bearing laciniate straps. Eight diplostemone stamens surrounding an ovary composed of 3 carpels, each one topped by a long, triangular style ending in a stigma. Each loculus encloses an ovum.

B. Take a sample of epidermis from the underside. Examine under a microscope, using *chloral hydrate solution R:* stomatiferous abaxial epidermis bearing numerous covering trichomes. Epidermic cells of the lamina deeply lobed. Stomata (20-25 μm long), of anomocytic type (*2.8.3*), ususally surrounded by 4 subsidiary cells. Uniseriate covering trichomes of various length reaching up to 250 μm, comprising up to 10 cells. Distal cell with a rounded apex; basal epidermic cell, hypertrophied and measuring about 200 μm in its wider length.

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

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

Indian cress mother tincture is prepared with ethanol (45 per cent *V*/*V*) using the whole, fresh, blooming, cultivated plant *Tropaeolum majus* L.

Content : minimum 0.30 per cent *m*/*m* of glucotropeolin ($C_{14}H_{19}O_9S_2$; M_r 409.4), expressed as sinigrin ($C_{10}H_{16}NO_9S_2K$; M_r 397.4).

PRODUCTION

Method 4c (2371). Drug fragmented into segments 5-7 cm long. Maceration time : 3-5 weeks.

CHARACTERS

Brownish-yellow liquid.

IDENTIFICATION

Thin layer chromatography (*2.2.27*).

Test solution. Mother tincture.

Reference solution. Dissolve 10 mg of *isoquercitrin* R and 5 mg of *rutin R* in 10 ml of *ethanol* (*96 per cent*) R.

Plate : TLC silica gel plate R.

Mobile phase : water R, *methanol R*, *glacial acetic acid R, methylene chloride R* (2 :3 :8 :15 *V*/*V*/*V*/*V*).

Application : 20 µl, as bands.

Development : over a path of 10 cm.

Drying : in air.

Detection A : examine in ultraviolet light at 365 nm.

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

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

Top of the plate	
	A pinkish zone A greenish-blue zone
Isoquercitrin : a brown zone	A brown zone (isoquercitrin)
Rutin : a brown zone	
	A blue zone
Reference solution	**Test solution**

Detection B : first spray with a 10 g/l solution of *diphenylboric acid aminoethyl ester R* in *methanol R* then 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 B : see below the sequence of fluorescent zones present in the chromatograms obtained with the reference solution and the test solution. Furthermore other faint, fluorescent zones may be present in the chromatogram obtained with the test solution.

Top of the plate	
	A pale pink zone A light blue zone
Isoquercitrin : an orange zone	An orange zone (isoquercitrin)
Rutin : an orange zone	A yellow zone
Reference solution	**Test solution**

TESTS

Ethanol content (*2.9.10*) : 40 per cent *V*/*V* to 50 per cent *V*/*V*.

Dry residue (*2.8.16*) : minimum 1.5 per cent *m*/*m*.

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2009.

ASSAY

Liquid chromatography (*2.2.29*).

Test solution. In a 20.0 ml volumetric flask, place 1.000 g of mother tincture and dilute to 20.0 ml with *water R*.

Reference solution. In a 20.0 ml volumetric flask, dissolve 8.0 mg of *sinigrin R* in a mixture of 4 volumes of *methanol* R and 6 volumes of *water R* and dilute to 20.0 ml with the same solvent.

Column :

— *size* : $l = 0.25$ m, $Ø = 4.6$ mm,

— *stationary phase* : *octadecylsilyl silica gel for chromatography R* (5 μm).

— *temperature* : *room temperature*.

Mobile phase : phosphate buffer solution pH 7.0 R diluted twenty fold, solution of *tetraheptylammonium bromide R* in *methanol R* 0.005 M *(40 :60 V/V)*.

Flow rate : 1.0 ml/min.

Detection : spectrophotometer at 220 nm.

Injection : 20 μl.

The retention time of glucotropeolin is somewhat similar to the retention time of *sinigrin R* in the reference solution : about 4.2 min.

Calculate the percentage content *m/m* of glucotropeolin, expressed as sinigrin from the expression :

$$\frac{A_1 \times m_2 \times p}{A_2 \times m_1}$$

A_1 = area of the peak due to glucotropeolin in the chromatogram obtained with the test solution,

A_2 = area of the peak due to sinigrin in the chromatogram obtained with the reference solution,

m_1 = mass of the mother tincture sample in the test solution, in grams,

m_2 = mass of sinigrin sample in the reference solution, in grams,

p = percentage content of sinigrin in *sinigrin R*.

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