NUTMEG FOR HOMOEOPATHIC PREPARATIONS NUX MOSCHATA FOR HOMOEOPATHIC PREPARATIONS

Myristica fragans ad praeparationes homoeopathicas

DEFINITION

Dried kernel of the seed of *Myristica fragrans* Houtt.

Content : minimum 50.0 ml/kg of essential oil (anhydrous drug).

CHARACTERS

Characteristic aromatic odour.

IDENTIFICATION

A. Rounded-ovoid kernel, without its integument, usually covered with chalky dust averaging 25-30 mm long and 15-18 mm in diameter ; reddish-grey surface marked with numerous anastomosed grooves and a narrow furrow running from the hilium to the chalaza, on the least convex side ; longitudinal section showing a small embryo with vase-shaped rim cotyledons near the hilium ; the rest of the kernel consists of voluminous, waxy, brownish-grey albumen ; where extensions of the seminal integument run through forming sinuous, brown lines that give a ruminate appearance.

B. Reduce the nutmeg to a powder (355). The powder is greenish-grey. Examine under a microscope using *chloral hydrate solution R*. The powder shows the following elements : fragments of albumen whose cells sometimes store red contents, numerous yellow oil globules. Examine under a microscope using *glycerol* (50 per cent *V*/*V*) *R*. The powder shows numerous, spherical starch granules 5-7 μm in diameter, usually in groups of 3 or 4 elements.

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

C. Thin layer chromatography (*2.2.27*).

Test solution. Add 30 ml of *ethanol* (65 per cent *V/V*) *R* to 3 g of the powdered nutmeg (355), then heat under a reflux condenser for 30 min. Allow the plate to cool. Filter.

Reference solution (a). Dissolve 10 µl of *anisaldehyde R* and 20 mg of *vanillin R* in 10 ml of *methanol R*.

Reference solution (b). Dissolve 10 mg of *thymol R* and 10 mg of *β-sitosterol R* in 10 ml of *ethanol (96 per cent) R*.

Plate : TLC silica gel GF_{254} plate R.

Mobile phase : isopropyl ether R, toluene R (20:80 *V/V*).

Application : 40 µl, as bands of test solution and 5 µl, as bands of reference solution.

Development : over a path of 10 cm.

Drying : in air.

Detection A : examine in ultraviolet light at 254 nm.

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

Top of the plate	
	A dark zone A dark zone
------	------
Anisaldehyde : a dark zone	
------	------
	A dark zone
Vanillin : a dark zone	
	A dark zone
	A dark zone
Reference solution (a)	**Test solution**

Detection B: spray with *anisaldehyde solution R* and heat for 5 min at 100-105 °C. Examine in daylight.

Results B : see below the sequence of zones present in the chromatograms of reference solution (b) and the test solution. Furthermore other faint zones may be present in the chromatogram obtained with the test solution.

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Top of the plate	
Thymol : a pink zone ------ ------ β-Sitosterol : a purple zone	A pink zone ------ A pink zone ------ A purple zone A purple zone
Reference solution (b)	**Test solution**

TESTS

Water (2.2.13) : maximum 7.0 per cent, determined on 50.0 g of powdered nutmeg (180), by distillation.

Total ash (2.4.16) : maximum 2.5 per cent.

ASSAY

Carry out the determination of essential oils in herbal drugs (*2.8.12*). Use 15.0 g of nutmeg, a 1.000 ml volumetric flask and 300 ml of *water R* as the distillation liquid. Distil for 3 h at a rate of 3-4 ml/min, with 0.50 ml of *xylene R* in the graduated tube.

STOCK

DEFINITION

Nutmeg mother tincture is prepared with ethanol (65 per cent *V*/*V*) using the dried kernel of the seed of *Myristica fragrans* Houtt.

Content : minimum 0.08 per cent *m*/*m* of myristicin ($C_{11}H_{12}O_3$; M_r 192.2).

PRODUCTION

Method 4c (2371). Drug crushed just before use. Maceration time : 3-5 weeks.

CHARACTERS

Yellow or orange-yellow liquid.

Characteristic aromatic odour

IDENTIFICATION

Thin layer chromatography (*2.2.27*).

Test solution. Mother tincture.

Reference solution (a). Dissolve 10 µl of *anisaldehyde R* and 20 mg of *vanillin R* in 10 ml of *methanol R*.

Reference solution (b).Dissolve 10 mg of *thymol R* and 10 mg of *β-sitosterol R* in 10 ml of *ethanol (96 per cent) R*.

Plate : TLC silica gel GF_{254} plate R.

Mobile phase : isopropyl ether R, toluene R (20:80 *V/V*).

Application : 40 µl, as bands of test solution and 5 µl, as bands of reference solution.

Development : over a path of 10 cm.

Drying : in air.

Detection A : examine in ultraviolet light at 254 nm.

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

Top of the plate	
	A dark zone A dark zone
------	------
Anisaldehyde : a dark zone	
------	------
	A dark zone
Vanillin : a dark zone	
	A dark zone A dark zone
Reference solution (a)	**Test solution**

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

Detection B: spray with *anisaldehyde solution R* and heat for 5 min at 100-105 °C. Examine in daylight.

Results B: see below the sequence of zones present in the chromatograms of reference solution (b) and the test solution. Furthermore other faint zones may be present in the chromatogram obtained with the test solution.

Top of the plate	
Thymol: a pink zone	A pink zone
------	------
	A pink zone
------	------
β-Sitosterol: a purple zone	A purple zone
	A purple zone
Reference solution (b)	**Test solution**

TESTS

Ethanol content (*2.9.10*): 60 per cent *V*/*V* to 70 per cent *V*/*V*.

Dry residue (*2.8.16*): minimum 0.5 per cent *m*/*m*.

ASSAY

Gas chromatography (*2.2.28*).

Internal standard solution. Place 120.0 mg of *camphor R* into a 100.0 ml volumetric flask and dilute to 100.0 ml with *ethanol* (*65 per cent V*/*V*) *R*.

Test solution. Place 2.000 g of mother tincture in a 20.0 ml volumetric flask, add 2.0 ml of internal standard solution and dilute to 20.0 ml with *ethanol* (*65 per cent V*/*V*) *R*.

Reference solution. In a 25.0 ml volumetric flask, place 20.0 mg of *myristicin R*, and dilute to 25.0 ml with *ethanol* (96 *per cent*) *R*. Take 4.0 ml of this solution, add 2.0 ml of internal standard solution and dilute to 20.0 ml with *ethanol* (*65 per cent V*/*V*) R.

Column:
– *material*: fused silica,

– *size*: *l* = 30 cm, Ø = 0.53 mm,

– *stationary phase*: *macrogol 20.000 R* (film thickness: 1.33 μm).

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Carrier gas : helium for chromatography R.

Flow rate : 1.5 ml/min.

Temperature :

– *column :* 80 °C,

– *temperature program as follows :*

	Time (min)	Temperature (°C)	Rate (°C/min)
Column	0-25 25-43 43-59	80 → 130 130 → 220 220	2 5
Injection port		220	
Detector		250	

Detection : flame ionisation.

Injection : 1 μml.

Retention time : camphor: about 8 min, myristicin: about 35 min.

Elution order : camphor, myristicin.

Calculate the percentage content m/m of myristicin in mother tincture, from the expression:

$$\frac{A_1 \times A'_{EI} \times m_2 \times 0.16 \times p}{A_2 \times A_{EI} \times m_1}$$

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

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

A_{EI} = peak area due to the internal standard chromatogram obtained with the test solution,

A'_{EI} = peak area due to the internal standard chromatogram obtained with the reference solution,

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

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

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

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