

**YARROW
FOR HOMOEOPATHIC PREPARATIONS**

**MILLEFOLIUM
FOR HOMOEOPATHIC PREPARATIONS**

***Achillea millefolium* ad praeparationes homoeopathicas**

DEFINITION

Whole, fresh flowering plant, *Achillea millefolium* L.

CHARACTERS

Macroscopic and microscopic characters described under identifications A and B.

IDENTIFICATION

- A. Perennial herb with brown precumbent, slender rhizome and numerous adventive roots of more or less reddish colour. The grooved stalk may reach about 70 cm high. The alternate leaves are 3 times longer than large, divided into many narrow segments displayed in different, widely dissected plans with a pointed tip. Flower heads, 2-8 mm large are gathered at the end of the stalk in tight corymbs. Scarce ligulate peripheral white or rose flowers. Yellow central tubular flowers. Ovoid involucre with hairy bracts and narrow membranous margin sometimes of brown colour.
- B. Take a sample of epidermis from the underside of the leaf. Examine under a microscope, using *chlorate hydrate solution R*: epidermis from the lamina made up of sinuous puzzle-like walled cells; numerous anomocytic stomata with 3-5 subsidiary cells (2.8.3); covering and glandular trichomes. Uniseriate multi-cellular covering trichomes consisting of a base of 4-5 short cells and a flagellate distal cell. Sessile, biseriate secretory trichomes of Asteraceae-type.

TESTS

Foreign matter (2.8.2): maximum 5 per cent.

Loss on drying (2.2.32): minimum 55.0 per cent determined on 5.0 g of finely-cut drug by drying in an oven at 105 °C for 2h.

STOCK

DEFINITION

Yarrow mother tincture complies with the requirements of the general technique for the preparation of mother tinctures (see *Homoeopathic Preparations (1038)* and French Pharmacopoeia Authority Supplement). The mother tincture is prepared with ethanol (65 per cent V/V), using the whole, fresh flowering plant, *Achillea millefolium* L.

Content: minimum 0.05 per cent *m/m* of total flavonoids expressed as luteolin-3',7-di-O-glucoside (C₂₇H₃₀O₁₆; Mr 610).

CHARACTERS

Appearance: green-brown liquid.

IDENTIFICATION

A. Thin-layer chromatography (2.2.27). *Test solution.* Mother tincture.

Reference solution. Dissolve 5 mg of *luteolin R* and 5 mg of *chlorogenic acid R* in 20 mL of *methanol R*.

Plate: TLC silica gel plate R.

Mobile phase: anhydrous formic acid R, ethyl acetate R, toluene R (20:40:40 V/V/V).

Application: 20 mL, as bands. *Development:* over a path of 10 cm.

Drying: in air.

Detection: 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 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 and test solutions. Furthermore other faint fluorescent zones may be present in the chromatogram obtained with the test solution.

Top of the plate	
Luteolin: an orange zone ----- -----	A green-yellow zone An orange zone Two green-blue zones more or less intense -----
Chlorogenic acid: a blue-green zone	A yellow-green to green-blue zone
Reference solution	Test solution

B. Thin-layer chromatography (2.2.27).

Test solution. Mother tincture.

Reference solution. Dissolve 10 mg of *cineole R* and 10 mg of *guaiazulene R* in 20 mL of *toluene R*.

Plate: TLC silica gel plate R.

Mobile phase: ethylacetate R, toluene R (5:95 V/V).

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

Application: 20 mL, as bands.

Development: over a path of 10 cm.

Drying: in air.

Detection: spray with *anisaldehyde solution R* and heat at 100-105 °C for 5 to 10 min. Examine in daylight.

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

Top of the plate	
Guaiazulene: an orange-red zone -----	A grey-violet to grey zone -----
Cineole: a brown-violet zone -----	Series of violet zones -----
Reference solution	Test solution

TESTS

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

Dry residue (2.8.16): minimum 1.0 per cent *m/m*.

ASSAY

Ultraviolet and visible absorption spectrophotometry (2.2.25).

Stock solution. In a 100 mL volumetric flask, introduce 10.00 g of mother tincture and complete to 100.0 mL with *ethanol R* (60 per cent V/V).

Test solution. In a 25.0 mL volumetric flask, introduce 2.0 mL of stock solution, 2.0 mL of a 20 g/L solution of *aluminium chloride R* in *methanol R*, and dilute to 25.0 mL with *methanol R*.

Compensation liquid. In a 25.0 mL volumetric flask, introduce 2.0 mL of stock solution and dilute to 25.0 mL with *methanol R*.

Twenty-five min after the last addition of reagent, measure the absorbance of the test solution at 390 nm, by comparison with the compensation liquid.

Calculate the percentage content *m/m* of total flavonoids, expressed as luteolin-3',7-di-O-glucoside, from the expression:

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

$$\frac{A \times 1250}{196 \times m}$$

i.e. taking the specific absorbance to be 196.

A = absorbance of the test solution at 390 nm,
 m = mass of the sample in grams.