

**JACOBEA MARITIMA
FOR HOMOEOPATHIC PREPARATIONS****CINERARIA MARITIMA
FOR HOMOEOPATHIC PREPARATIONS****Jacobaea maritima ad praeparationes homoeopathicas**Other Latin name used in homoeopathy: **Senecio cineraria****DEFINITION**

Whole, fresh, blooming plant, *Jacobaea maritima* (L.) Pelsler and Meijden (*Senecio maritimus* (L.) Rchb.; *Cineraria maritima* (L.)).

IDENTIFICATION

- A. Perennial, rhizomatous, erect plant. Stem ligneous at the base, thoroughly tomentose, reaching up to 70 cm high. Alternate leaves, markedly white, downy underneath, deeply divided into segments more or less uneven, themselves divided too. Tight corymb composed of yellow capitulae. Each capitulum with an involucre with downy and white bracts; 9-12 flowers in strips on the periphery; tubular flowers in the centre with stigma hair-covered at the end and truncated at the apex.
- B. Examine a fragment of abaxial epidermis of the leaf, under a microscope using *chloral hydrate solution R*: abaxial epidermis thoroughly covered with uniseriate, multicellular trichomes measuring more than 500 µm long, curled with a rounded tip.

TESTS

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

Loss on drying (2.2.32): minimum 65.0 per cent, determined on 5.0 g of finely-cut drug, by drying in an oven at 105 °C for 2 h.

STOCK**DEFINITION**

Jacobaea maritima mother tincture is prepared with ethanol (65 per cent V/V), using the whole, fresh, blooming plant *Jacobaea maritima* (L.) Pelsler and Meijden.

Content: minimum 0.03 per cent *m/m* of total hydroxycinnamic derivatives, expressed as chlorogenic acid (C₁₆H₁₈O₉; *M_r* 354.3).

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

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PRODUCTION

Method 1.1.10 (2371). Drug fragmented into segments 2-6 cm long. Maceration time: 2-4weeks.

CHARACTERS

Appearance: greenish liquid.

IDENTIFICATION

Thin-layer chromatography (2.2.27).

Test solution. Mother tincture.

Reference solution. Dissolve 5 mg of *rutin R* and 5 mg of *quercitrin R* in 10 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, methyl ethyl ketone R, ethyl acetate R (10:20:30:50 V/V/V/V).

Application: 20 μL [15 μL] as bands.

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

Drying: in air.

Detection: 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 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 faint, fluorescent zones may be present in the chromatogram obtained with the test solution.

Top of the plate	
Quercitrin: an orange zone -----	A blue zone -----
Rutin: an orange zone -----	A blue zone An orange zone may occur -----
Reference solution	Test solution

TESTS

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

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

Pyrrrolizidine alkaloids expressed as senecionine: maximum 0.025 per cent *m/m*.

Ultraviolet and visible absorption spectrophotometry (2.2.25).

Test solution. Evaporate the alcohol of 5.000 g of mother tincture, accurately weighed, on a water-bath, under reduced pressure, at a temperature below 50 °C. Add 30 mL of *water R* then acidify to pH 2 with *hydrochloric acid R*. Add 2 g of *zinc powder R*. Cover and allow to work for 2 h, shaking from time to time. Filter. Alkalinise the filtrate with *concentrated ammonia R* until the solution becomes limpid again (pH 9 - pH 11). Shake with 3 quantities, each of 30 mL of *methylene chloride R*. Filter the combined organic phases through *anhydrous sodium sulfate R*. Evaporate to dryness on a water-bath, under reduced pressure, at a temperature below 50 °C. Dilute the residue in 5.0 mL of *ethanol (96 per cent) R*. To 1.0 mL of the solution, add 2.0 mL of a solution of *chloranil (1 g/L) R* in *ethanol (96 per cent) R*. Heat at 75 °C for 5 min. Bring back to room temperature by rapidly cooling within icy water. Dilute to 10.0 mL with a solution of *dimethylaminobenzaldehyde (20 g/L) R* in 85 mL of *acetic acid R* and 15 mL of *hydrochloric acid R*. Heat at 75 °C for exactly 2 min. Bring back to room temperature by rapidly cooling within icy water.

Compensation liquid. To 1.0 mL of *ethanol (96 per cent) R*, add 2.0 mL of a solution of *chloranil (1 g/L) R* in *ethanol (96 per cent) R*. Heat at 75 °C for 5 min. Bring back to room temperature by rapidly cooling within icy water. Dilute to 10.0 mL with a solution of *dimethylaminobenzaldehyde (20 g/L) R* in 85 mL of *acetic acid R* and 15 mL of *hydrochloric acid R*. Heat at 75 °C for exactly 2 min. Bring back to room temperature by rapidly cooling within icy water.

Immediately measure the absorbance of the test solution at 567 nm, in comparison with the compensation liquid.

The absorbance of the test solution must not be over 0.3 (corresponding to the percentage content in pyrrolizidine alkaloids, expressed as senecionine, close to 0.025 per cent *m/m*).

ASSAY

Ultraviolet and visible absorption spectrophotometry (2.2.25).

Test solution. To 10.000 g of mother tincture add *ethanol (50 per cent V/V) R* and dilute to 50.0 mL with the same solvent. To 2.0 mL of this solution and add successively, shaking after each addition, 4.0 mL of 0.5 M *hydrochloric acid*, 4.0 mL of a 100 g/L solution of *sodium nitrite R* and 100 g/L solution of *sodium molybdate R*, 4.0 mL of *sodium hydroxide dilute solution R* and dilute to 20.0 mL with *water R*.

Reference solution. Dissolve 0.010 g of *chlorogenic acid R* with a few millilitres of *ethanol (50 per cent V/V) R* then dilute to 100.0 mL with the same solvent. To 2.0 mL of this solution and add successively, shaking after each addition, 4.0 mL of 0.5 M *hydrochloric acid*, 4.0 mL of a 100 g/L solution of *sodium nitrite R* and 100 g/L solution of *sodium molybdate R*, 4.0 mL of *sodium hydroxide dilute solution R* and dilute to 20.0 mL with *water R*.

Compensation liquid 1. To 10.000 g of mother tincture add *ethanol (50 per cent V/V) R* and dilute to 50.0 mL with the same solvent. To 2.0 mL of the solution and add 4.0 mL of 0.5 M *hydrochloric acid*, 4.0 mL of *sodium hydroxide dilute solution R* and dilute to 20.0 mL with *water R*.

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Compensation liquid 2. Dissolve 0.010 g of *chlorogenic acid R* with a few millilitres of *ethanol* (50 per cent V/V) *R* then dilute to 100.0 mL with the same solvent. To 2.0 mL of this solution and add 4.0 mL of 0.5 M *hydrochloric acid*, 4.0 mL of *sodium hydroxide dilute solution R* and dilute to 20.0 mL with *water R*.

Immediately measure at 525 nm the absorbance of the test solution in comparison with the compensation liquid 1 and the absorbance of the reference solution in comparison with the compensation liquid 2.

Calculate the percentage content *m/m* of total hydroxycinnamic derivatives, expressed as chlorogenic acid, from the expression:

$$\frac{A_1 \times m_2 \times 50}{A_2 \times m_1}$$

A_1 = absorbance of the test solution,

A_2 = absorbance of the reference solution,

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

m_2 = mass of chlorogenic acid in the reference solution, in grams.