# ROUGH HORSETAIL FOR HOMOEOPATHIC PREPARATIONS

# EQUISETUM HIEMALE FOR HOMOEOPATHIC PREPARATIONS

**Equisetum hiemale ad praeparationes homoeopathicas**

## DEFINITION

Fresh, aerial part of *Equisetum hiemale* L., harvested at the end of spring.

## CHARACTERS

Macroscopic characters described under identification.

## IDENTIFICATION

The aerial stems of rough horsetail are all erect and similar. They are glaucous green. Their rough surface is striated longitudinally by 10-30 flattened ridges. These hollow stems with a large central lacuna are swollen between the nodes. Each node is surrounded by a sheath slightly longer than large, applied against the stem and circled with black at the base and the top.

The 10-30 teeth of the scarious sheath are deciduous and leave a blackish scar. Very rarely, the nodes give birth to whorls of small branches, very short and spindly, containing a central lacuna. Some fertile stems end by a small spike, brown mucronate at the top, ovoid, 1-1.5 cm long. This spike is composed of shield-shaped whorls of scales. The sporangia develop on their lower side.

## TEST

**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 2 h.

**Equisetum palustre.** The presence of smooth, green stems, deeply marked longitudinally by 6-8 furrows with a small central cavity, with hollow branches whose surface is furrowed by 4-5 non cutting ridges separated by not very deep furrows, shows adulteration by *Equisetum palustre* L.

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

## STOCK

DEFINITION

Rough horsetail mother tincture complies with the requirements of the general technique for the preparation of the mother tincture (see *Homoeopathic Preparations* (*1038*) and French Pharmacopoeia Supplement). The mother tincture is prepared with ethanol (55 per cent *V/V*), using the fresh, aerial part of *Equisetum hiemale* L.

*Content*: minimum 0.015 per cent *m/m* of total flavonoids, expressed as isoquercitroside ($C_{21}H_{20}O_{12}$; $M_r$ 464.4).

CHARACTERS

Pale green liquid.

IDENTIFICATION

Examine the chromatograms obtained in the test Mother tincture of Equisetum arvense.

*Detection A*: examine in ultraviolet light at 365 nm.

*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** | |
|---|---|
| Quercitrin: a brown zone | A red zone<br>A faint violet-blue zone |
| ------ | ----- |
| Rutin: a brown zone | A violet-blue zone |
| ------ | ----- |
| | A brown zone<br>A blue zone |
| **Reference solution** | **Test solution** |

*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.

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| Top of the plate | |
|---|---|
| Quercitrin: an orange zone<br>-----<br><br>-----<br>Rutin: an orange zone | <br>-----<br>A pale yellow zone<br>-----<br><br>A greenish-yellow zone<br>A greenish-yellow zone |
| **Reference solution** | **Test solution** |

TESTS

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

**Dry residue** (*2.8.16*): minimum 0.7 per cent *m/m.*

**Mother tincture of Equisetum arvense**

Thin-layer chromatography (*2.2.27*).

*Test solution.* Mother tincture.

*Reference solution.* Dissolve 10 mg of *rutin R* and 10 mg of *quercitrin R* in 30 mL of *ethanol* (*96 per cent*) *R*.

*Plate*: *TLC silica gel plate R.*

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

*Application*: 30 µL as bands.

*Development*: over a path of 10 cm.

*Drying*: in air.

*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 for about 30 min. Examine in ultraviolet light at 365 nm.

The absence of 2 greenish-yellow zones below the zone of rutin, obtained in the chromatogram of the reference solution, shows adulteration by the mother tincture of *Equisetum arvense* L.

**Alkaloids.** Evaporate 2 mL of mother tincture. Add 1 mL of *dilute hydrochloric acid R* to the residue and a few drops of *mercuric potassium iodide solution R.* No blur and no precipitate occur.

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ASSAY

Ultraviolet and visible absorption spectrophotometry (*2.2.25*).

*Stock solution.* Evaporate 25.0 g of mother tincture under reduced pressure. Add 1 mL of a 5 g/L solution of *hexamethylenetetramine R*, 20 mL of *acetone R* and 7 mL of *hydrochloric acid R1*. Heat to boiling under a reflux condenser for 30 min. After cooling at room temperature, transfer into a 100.0 mL volumetric flask and dilute to 100.0 mL with *acetone R*, rinsing the flask. Transfer 25.0 mL of this solution into a separating funnel and add 25 mL of *water R*. Shake once with 15 mL then 3 times, each time with a 10 mL of *ethyl acetate R*. Combine the extracts of ethyl acetate into a separating funnel and wash twice with 50 mL of *water R*. Filter the ethyl acetate extracts through 10 g of *anhydrous sodium sulfate R,* collecting the filtrate into a 50.0 mL volumetric flask and dilute to 50.0 mL with *ethyl acetate R*.

*Test solution.* To 10.0 mL of stock solution, add 1.0 mL of *aluminium chloride reagent R* and dilute to 25.0 mL with a solution of *glacial acetic acid* (5 per cent *V/V*) *R* in *methanol R.*

*Compensation liquid.* Take 10.0 mL of stock solution and dilute to 25.0 mL with a solution of *glacial acetic acid* (5 per cent *V/V*) *R* in *methanol R.*

Thirty min later, measure the absorbance of the test solution at 425 nm, in comparison with the compensation liquid.

Calculate the percentage content *m/m* of total flavonoids, expressed as isoquercitroside, from the expression:

$$\frac{A \times 500}{500 \times m}$$

*i.*e. taking the specific absorbance of isoquercitroside, to be 500.

*A* = absorbance at 425 nm,
*m* = mass of the mother tincture sample, in grams.

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