

**FIELD HORSETAIL  
FOR HOMOEOPATHIC PREPARATIONS**

**EQUISETUM ARVENSE  
FOR HOMOEOPATHIC PREPARATIONS**

**Equisetum arvense ad praeparationes homoeopathicas**

DEFINITION

Fresh, sterile, aerial part of *Equisetum arvense* L.

CHARACTERS

Macroscopic characters described under identification.

IDENTIFICATION

Field horsetail measures up to 60 cm high, first slightly creeping, subsequently erect. It is pale green and rough to the touch. Its surface presents 8-12 deep, longitudinal striations. The inside of the stem contains a central lacuna whose diameter may reach a third of the stem diameter.

Nodes surrounded by a loose brownish sheath articulate each stem. This sheath is composed of ten or so acute teeth representing rudimentary, whorled leaves. Whorls of branches emerging at the nodes on the upper part of the stem, in number equal to the number of teeth of the sheath, simple, erect, same colour as the stem and deprived of central lacuna. Their surface is furrowed by 4 main, cutting ridges and they also bear nodes surrounded by sheaths similar to those on the stem.

TEST

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

**Loss on drying** (2.2.32): minimum 70.0 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.

**STOCK**

DEFINITION

Field horsetail mother tincture complies with the requirements of the general technique for the

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preparation of the mother tincture (see *Homeopathic Preparations (1038)* and French Pharmacopoeia Supplement). The mother tincture is prepared with ethanol (55 per cent V/V), using the fresh, sterile, aerial part of *Equisetum arvense* L.

*Content*: minimum 0.010 per cent *m/m* of total flavonoids, expressed as isoquercitroside (C<sub>21</sub>H<sub>20</sub>O<sub>12</sub>; M<sub>r</sub> 464.4).

## CHARACTERS

*Appearance*: greenish-brown liquid.

## IDENTIFICATION

Examine the chromatograms obtained in the test "Mother tincture of *Equisetum hiemale*"

*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<br>----- | A red zone<br>A blue zone<br><br>----- |
| -----<br>Rutin: a brown zone      | A brown zone<br>A blue zone<br>-----   |
| <b>Reference solution</b>         | <b>Test solution</b>                   |

*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                    |  |
|-------------------------------------|--|
| Quercitrin: an orange zone<br>----- | -----                                  |
| -----<br>Rutin: an orange zone      | An orange zone<br>A blue zone<br>----- |
| <b>Reference solution</b>           | <b>Test solution</b>                   |

## TESTS

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

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

**Mother tincture of *Equisetum hiemale*.**

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 presence of 2 greenish-yellow zones below the zone of rutin, obtained in the reference solution, shows adulteration by the mother tincture of *Equisetum hiemale* 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.

**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 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*.

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Thirty minutes 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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