POISON IVY FOR HOMOEOPATHIC PREPARATIONS
RHUS TOXICODENDRON
FOR HOMOEOPATHIC PREPARATIONS

Rhus toxicodendron ad praeparationes homoeopathicas

DEFINITION

Fresh, young, leafy twigs of *Rhus toxicodendron* L. harvested in summer.

IDENTIFICATION

Take all the required precaution while manipulating : irritant product.

A. Young, pubescent twig bearing big, alternate, composite, imparipinnate leaves on long, glabrous, petioles. Leaflets amounting to 3, ovate, angular, acuminate, heart-shaped at the base ; middle leaflet measuring 6-10 cm long and 4-6 cm large with a long petiole ; two asymmetric, nearly sessile side leaflets of a smaller size ; lamina of a limp consistency, slightly indented on the edges, bright green upper side, pubescent underside, getting stained by a black sap, consisting of dried latex.

B. Examine a fragment of abaxial epidermis of the leaf, under a microscope, using *chloral hydrate solution R* : lamina epidermis covered with a smooth cuticle, composed of cells with slightly sinuous cell-walls ; anomocytic stomata (*2.8.3*) surrounded by 4-6 cells and glandular trichomes with unicellular foot and multicellular, club-shaped head of (4-8) cells ; epidermis most of the time with spongy parenchyma, containing very numerous elongated cells with calcium oxalate clusters ; epidermis of the cuticle-covered rib showing elongated, polyhedral or parallelipipedic cells, scarce stomata ; some glandular trichomes similar to those described on the lamina epidermis and unicellular covering trichomes with slightly thickened and echinulate cell-walls.

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 100-105 °C for 2 h.

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STOCK

DEFINITION

Poison ivy mother tincture is prepared with ethanol (65 per cent *V*/*V*), using the fresh, young, leafy twig of *Rhus toxicodendron* L.

Content : minimum 0.080 per cent *m*/*m* of total flavonoids, expressed as quercitrin ($C_{21}H_{20}O_{11}$; M_r 448.4).

PRODUCTION

Method 4c (2371). Drug fragmented into segments, smaller than 5 cm long. Maceration time : about 3 weeks.

CHARACTERS

Greenish-brown liquid.

IDENTIFICATION

Thin-layer chromatography (*2.2.27*).

Test solution. Mother tincture.

Reference solution. Dissolve 5 mg of *quercitrin R* and 5 mg of *rutin R* in 20 ml of *ethanol* (*96 per cent*) *R*.

Plate : TLC silica gel plate R (5-40 μm) [or *TLC silica gel plate R* (2-10 μm)].

Mobile phase : water R, methanol R, glacial acetic acid R, methylene chloride R (2:3:8:15 *V*/*V*/*V*/*V*).

Application : 20 μl [or 5 μl] as bands.

Development : over a path of 10 cm [or 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. Further-

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more other faint, fluorescent zones may be present in the chromatogram obtained with the test solution.

Top of the plate	
Quercitrin : an orange zone ------ Rutin : an orange zone ------	A blue zone An orange zone (quercitrin) ------ An orange zone A blue zone ------ A blue zone A blue zone
Reference solution	**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 1.5 per cent *m*/*m*.

Urushiols (*2.2.29*) : maximum 0.05 per cent *m*/*m* of urushiols, expressed as 4-dodecylresorcinol.

Test solution. In a 100 ml flask with a ground glass-neck, place 10.000 g of mother tincture and evaporate to dryness, under reduced pressure on a water-bath at 40 °C. Dissolve the residue in 10 ml of *water R* then add 10 ml of *heptane R*. Close the flask. Shake vigorously for 15 min with the aid of a magnetic stirring rod. Allow to separate. Collect the heptane upper layer with a glass pipette avoiding the suspended particles and filter it through *anhydrous sodium sulphate R*. Extract again, twice with 10 ml of *heptane R* following the process as previously described. Discard the remaining aqueous layer and rinse the flask with 10 ml of *heptane R*. Filter this solution through *anhydrous sodium sulphate R*. Evaporate to dryness the combined heptane layers under reduced pressure on a water-bath at 40 °C. Dissolve the residue in 2.0 ml of *methanol R*.

Reference solution. In a 100.0 ml volumetric flask, dissolve 350.0 mg of *4-dodecylresorcinol R* in *methanol R* and dilute to 100.0 ml with the same solvent. Place 10.0 ml of this solution into a 20.0 ml volumetric flask and dilute to 20.0 ml with *methanol R*.

Column :

— *size : l* = 0.25 m, Ø = 4.6 mm,
— *stationary phase* : *octadecylsilyl silica gel for chromatography R* (5 μm),
— *temperature* : 30 °C.

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Mobile phase :

— *mobile phase A* : *phosphoric acid* (*0.2 per cent V/V*) *R,*
— *mobile phase B* : *methanol R.*

Time (min)	Mobile phase A (per cent *V/V*)	Mobile phase B (per cent *V/V*)
0-2 2-82	20 20 → 0	80 80 → 100

Flow rate : 1.0 ml/min.

Detection : spectrophotometer at 276 nm.

Injection : 20 µl.

Relative retention : with reference to the peak of urushiol 2 (main peak) (retention time = about 35 min.) : urushiol 1 = 0.8 ; urushiol 3 = 1.2 and urushiol 4 = 1.5.

Calculate the percentage content *m/m* of urushiols, expressed as 4-dodecylresorcinol, from the expression :

$$\frac{\sum A_1 \times m_2 \times p \times 1.13}{A_2 \times m_1 \times 100}$$

$\sum A_1$ = sum of the peak areas due to urushiols 1 to 4 in the chromatogram obtained with the test solution,

A_2 = area of the peak due to 4-dodecylresorcinol in the chromatogram obtained with the reference solution,

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

m_2 = mass of *4-dodecylresorcinol R* sample, in grams,

p = percentage content of 4-dodecylresorcinol in *4-dodecylresorcinol R*.

ASSAY

Liquid chromatography (*2.2.29*).

Test solution. Place 1.000 g of mother tincture into a 10.0 ml volumetric flask and dilute to 10.0 ml with a mixture of 50 volumes of *methanol R* and 50 volumes of *water R*.

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Reference solution. In a 10.0 ml volumetric flask, dissolve 1.8 mg of *quercitrin R* in a mixture of 50 volumes of *methanol R* and 50 volumes of *water R* and dilute to 10.0 ml with the same solvent.

Column :

— *size : l* = 0.25 m, Ø = 4 mm,
— *stationary phase* : *octadecylsilyl silica gel for chromatography R* (5 μm),
— *temperature* : 25 °C.

Mobile phase :

— *mobile phase A* : *water R* acidified to pH 2.3 with *phosphoric acid R*,
— *mobile phase B : acetonitrile R*.

Time (min)	**Mobile phase A (per cent *V/V*)**	**Mobile phase B (per cent *V/V*)**
0-2	95	5
2-18	95 → 87	5 → 13
18-32	87 → 74	13 → 26
32-42	74	26
42-43	74 → 95	26 → 5

Flow rate : 1.0 ml/min.

Detection : spectrophotometer at 340 nm.

Injection : 20 μl.

Relative retention : with reference to quercitrin (retention time = about 32 min) : flavonoid 1 = 0.9 and flavonoid 2 = 1.1. Additional peaks may occur.

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

$$\frac{\sum A_1 \times m_2 \times p}{A_2 \times m_1}$$

$\sum A_1$ = sum of the 3 peak areas due to quercitrin and flavonoids 1 and 2 in the test solution,

A_2 = area of the peak due to quercitrin in the reference solution,

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

m_2 = mass of *quercitrin R* sample in the reference solution, in grams,

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

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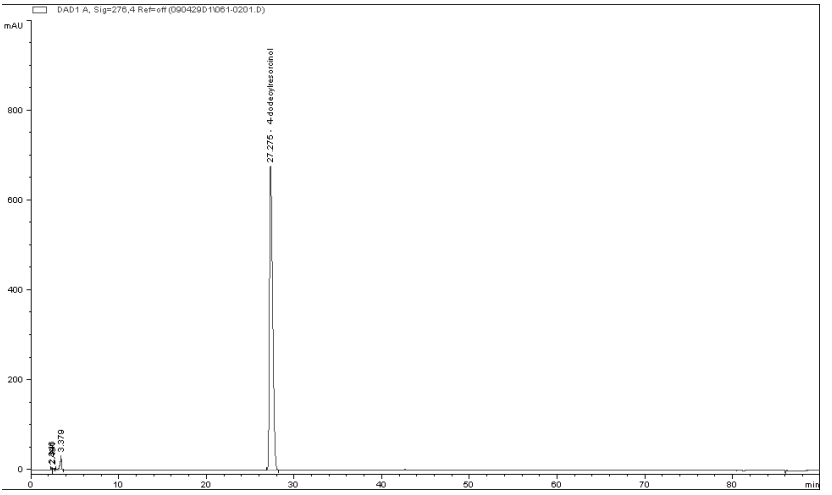
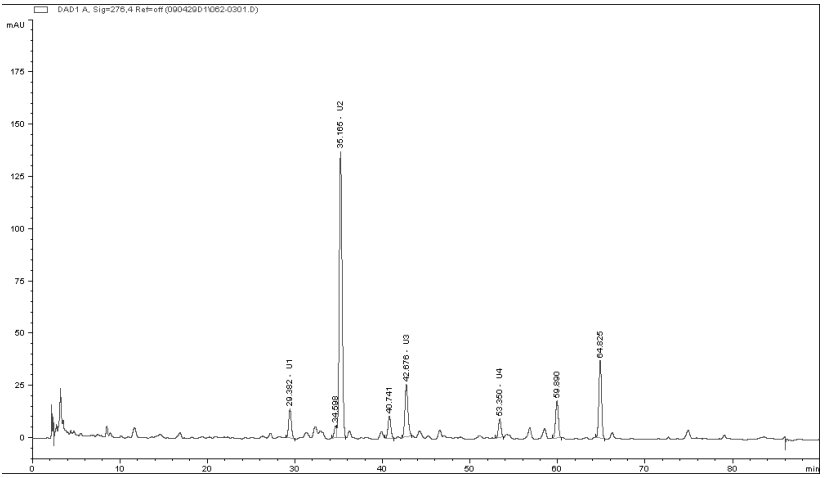


Test : LC profile of the reference solution



Test : LC profile of the mother tincture

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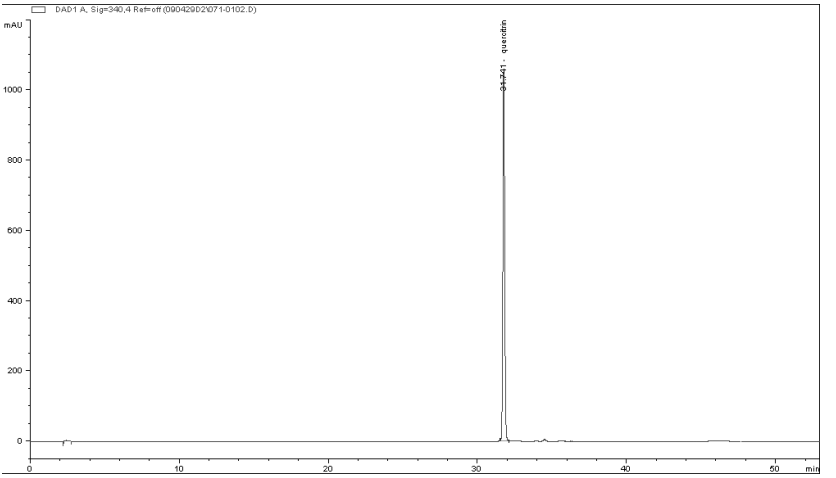
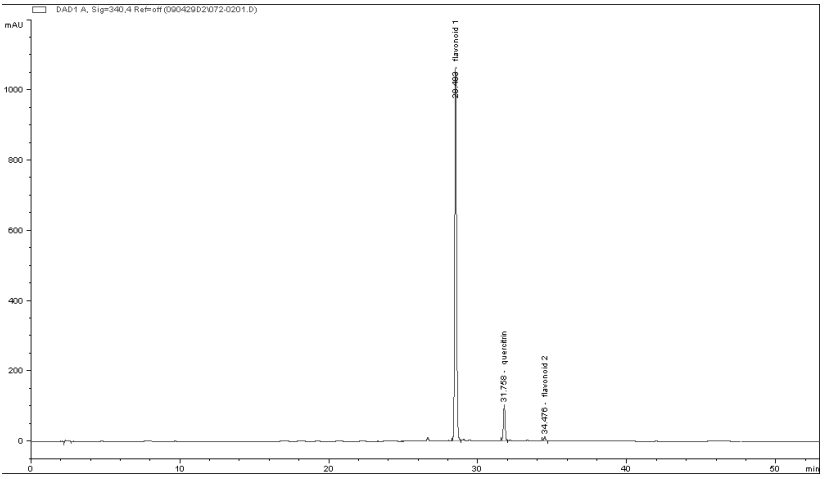


Assay : LC profile of the reference solution



Assay : LC profile of the mother tincture

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