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)].


*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.

<table>
<thead>
<tr>
<th>Top of the plate</th>
<th>Reference solution</th>
<th>Test solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quercitrin : an orange zone</td>
<td>An orange zone (quercitrin)</td>
<td>An orange zone</td>
</tr>
<tr>
<td>Rutin : an orange zone</td>
<td>An orange zone</td>
<td>A blue zone</td>
</tr>
<tr>
<td></td>
<td>A blue zone</td>
<td>A blue zone</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>Mobile phase A (per cent V/V)</th>
<th>Mobile phase B (per cent V/V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>2-8</td>
<td>20 → 0</td>
<td>80 → 100</td>
</tr>
</tbody>
</table>

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, $\varnothing = 4$ mm,
— stationary phase: octadecylsilyl silica gel for chromatography R (5 $\mu$m),
— temperature: $25^\circ$C.

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

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>Mobile phase A (per cent $V/V$)</th>
<th>Mobile phase B (per cent $V/V$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>95</td>
<td>5</td>
</tr>
<tr>
<td>2-18</td>
<td>95 $\rightarrow$ 87</td>
<td>5 $\rightarrow$ 13</td>
</tr>
<tr>
<td>18-32</td>
<td>87 $\rightarrow$ 74</td>
<td>13 $\rightarrow$ 26</td>
</tr>
<tr>
<td>32-42</td>
<td>74</td>
<td>26</td>
</tr>
<tr>
<td>42-43</td>
<td>74 $\rightarrow$ 95</td>
<td>26 $\rightarrow$ 5</td>
</tr>
</tbody>
</table>

Flow rate: 1.0 ml/min.

Detection: spectrophotometer at 340 nm.

Injection: 20 $\mu$l.

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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