Pterocarpus marsupium Heartwood

Proposed For Development Version 0.1

Pterocarpus marsupium Heartwood

DEFINITION
The article consists of the dried heartwood of *Pterocarpus marsupium* Roxb. (Family Fabaceae). It contains NLT 0.5% of pterostilbene, calculated on the dried basis.

SYNONYMS
*Lingonum marsupium* (Roxb.) Kuntze
*Pterocarpus bilobus* G.Don

POTENTIAL CONFOUNGING MATERIALS
None known

SELECTED COMMON NAMES
**Bengali:** Pitsal, pitshul, piyashal
**Dutch:** Kinoboom, kino de malobar
**English:** East Indian kino, Indian kino, Malabar kino
**Hindi:** Vijayasara, bija, asana

CONSTITUENTS OF INTEREST
**Stilbene:** Pterostilbene
**Flavonoids:** Pseudobaptigenin, liquiritigenin, and garbanzol
**Chalcone:** Isoliquiritigenin and pterosupin
**Sesquiterpene alcohols:** β-Eudesmol, selin-4(15)-en-1β,11-diol, pterocarpol A, and pterocarpol B

IDENTIFICATION

**A. BOTANICAL CHARACTERISTICS**
- **Macroscopic:** Irregular pieces in variable size and thickness, golden yellowish-brown with darker streaks; on soaking in water, gives yellow color with blue fluorescence; strong, tough, very hard, moderately heavy, fracture, difficult to break but brittle
- **Microscopic:** Transverse section shows alternating bands of larger and smaller polygonal cells consisting of tracheids, fiber tracheids, and xylem parenchyma, and traversed by xylem rays; numerous xylem vessels distributed throughout, in singles or in groups of 2–3, showing tyloses filled with tannin, in isolated preparations; vessels drum- or barrel-shaped with well-marked perforation rims and bordered pits; tracheids numerous, long, thick-walled with tapering ends and simple pits; fiber tracheids elongated, thick-walled with narrow lumen and simple pits; xylem parenchyma rectangular with simple pits, paratracheal; surrounding vessels, xylem rays uni-to-biseriate.

**B. THIN-LAYER CHROMATOGRAPHY**

**Standard solution A:** 0.5 mg/mL of USP Pterostilbene RS in methanol
**Standard solution B:** 1.0 mg/mL of USP *Pterocarpus marsupium* Heartwood Dry Extract RS in methanol. Sonicate for 10 min, centrifuge, and use the supernatant.
**Sample solution:** Exhaustively extract 50 g of *Pterocarpus marsupium* Heartwood, finely powdered, using hot methanol with reflux. Dry the extract under reduced pressure. Reconstitute 50 mg of dried extract with 10 mL of methanol.

**Chromatographic system**
(See *Chromatography* <621>, *Thin-Layer Chromatography*.)
- **Adsorbent:** Use a suitable chromatographic material with an average particle size of 5 µm (HPTLC plates).
- **Application volume:** 10 µL each of *Standard solution A, Standard solution B*, and *Sample solution*, as 8-mm bands
- **Relative humidity:** Condition the plate to a relative humidity of about 33% using a suitable device.
- **Developing solvent system:** Chloroform and methanol (9:1)
- **Developing distance:** 10 cm
- **Derivatization reagent:** Use a suitable reagent, if applicable.
Analysis

**Samples:** Standard solution A, Standard solution B, and Sample solution

Apply the Samples as bands to a suitable HPTLC plate and dry in air. Develop the chromatograms in a saturated chamber, remove the plate from the chamber, dry, and examine under UV light at 254 nm and 366 nm.

**System suitability:** Under UV light at 254 nm, Standard solution B exhibits, in the upper half, an intense dark band corresponding in color and Rf to the pterostilbene band in Standard solution A. A pale dark band appears above the pterostilbene band. Under UV light at 366 nm, Standard solution B exhibits three quenching bands with the most intense and lowest Rf band corresponding to the pterostilbene band in Standard solution A.

**Acceptance criteria:** Under UV light at 254 nm, the Sample solution exhibits, in the upper half, an intense dark band corresponding in color and Rf to the pterostilbene band in Standard solution A. About three or four dark bands appear in the lower half. Under UV light at 366 nm, the Sample solution exhibits four quenching bands. In the upper half, three quenching bands appear with the lowest Rf band corresponding to the pterostilbene band in Standard solution A. One intense quenching band appears in the middle of lower half.

• C. HPLC

**Analysis:** Proceed as directed in the Assay for Content of Pterostilbene.

**Acceptance criteria:** The chromatogram of the Sample solution exhibits peaks at the retention times corresponding to the peaks due to pterostilbene in Standard solution B.

ASSAY

• **Content of Pterostilbene**

**Mobile phase:** Water and acetonitrile (50:50)

**Standard solution A:** 0.06 mg/mL of USP Pterostilbene RS in methanol

**Standard solution B:** Dissolve a weighed amount of USP Pterocarpus marsupium Heartwood Dry Extract RS in methanol to obtain a concentration of 0.06 mg/mL of pterostilbene.

**Sample solution:** Transfer about 100 g of Pterocarpus marsupium Heartwood, finely powdered and accurately weighed, into a 500-mL round bottom flask and add 300 mL of methanol. Reflux for 45 min. Cool and filter the supernatant. Repeat the step three times using 300 mL of methanol each time. Combine the filtrate and evaporate the solvent under vacuum.

**Chromatographic system**

(See Chromatography <621>, System Suitability.)

- **Detector:** UV 300 nm
- **Column:** 4.6-mm × 25-cm; 5 µm packing L1
- **Flow rate:** 1.0 mL/min
- **Injection volume:** 20 µL

**System suitability**

**Samples:** Standard solution A and Standard solution B

**Suitability requirements**

- **Chromatogram similarity:** The chromatogram of Standard solution B is similar to the reference chromatogram provided with the lot of USP Pterocarpus marsupium Heartwood Dry Extract RS being used.
- **Theoretical plates:** NLT 5000
- **Tailing factor:** NMT 1.5 for pterostilbene peak, Standard solution A
- **Relative standard deviation:** NMT 2.0% determined from the pterostilbene peak in repeated injection, Standard solution A

**Analysis**

**Samples:** Standard solution A, Standard solution B, and Sample solution

Using the chromatograms of Standard solution A, Standard solution B, and the reference chromatogram provided with the lot of USP Pterocarpus marsupium Heartwood Dry Extract RS being used, identify the retention time of the peaks corresponding to pterostilbene in the Sample solution.

Separately calculate the percentage of pterostilbene in the portion of Pterocarpus marsupium Heartwood taken:

\[
\text{Result} = \left( \frac{r_U}{r_S} \right) \times C_S \times \left( \frac{V}{W} \right) \times 100
\]

- \( r_U \) = peak area of pterostilbene from the Sample solution
- \( r_S \) = peak area of pterostilbene from Standard solution A
- \( C_S \) = concentration of Standard solution A (mg/mL)
- \( V \) = volume of the Sample solution (mL)
- \( W \) = weight of Pterocarpus marsupium Heartwood taken to prepare the Sample solution (mg)

**Acceptance criteria:** NLT 0.5% of pterostilbene on the dried basis
CONTAMINANTS

• **ELEMENTAL IMPURITIES—PROcedures <233>**
  
  Acceptance criteria
  
  **Arsenic:** NMT 2.0 µg/g
  
  **Cadmium:** NMT 1.0 µg/g
  
  **Lead:** NMT 5.0 µg/g
  
  **Mercury:** NMT 0.2 µg/g

• **ARTICLES OF BOTANICAL ORIGIN, General Method for Pesticide Residues Analysis <561>:** Meets the requirements

• **MICROBIAL ENUMERATION TESTS <61>:** The total aerobic bacterial count does not exceed $10^5$ cfu/g, the total combined molds and yeasts count does not exceed $10^3$ cfu/g, and the bile-tolerant Gram-negative bacteria does not exceed $10^3$ cfu/g.

• **TESTS FOR SPECIFIED MICROORGANISMS <62>:** Meets the requirements of the tests for the absence of *Salmonella* species and *Escherichia coli*

• **ARTICLES OF BOTANICAL ORIGIN, Aflatoxins <561>:** Meets the requirements

SPECIFIC TESTS

• **Loss on Drying <731>**
  
  **Sample:** 2 g *Pterocarpus marsupium* Heartwood, finely powdered
  
  **Analysis:** Dry the Sample at 80°C.
  
  **Acceptance criteria:** NMT 10%

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in well-closed containers, protected from light and moisture, and store at room temperature.

• **Labeling:** The label states the Latin binomial and the part(s) of the plant contained in the article.

• **USP Reference Standards <11>**
  
  USP *Pterocarpus marsupium* Heartwood Dry Extract RS
  
  USP Pterostilbene RS

Source URL (modified on 2014/07/24 - 8:18am): https://hmc.usp.org/monographs/pterocarpus-marsupium-heartwood-0-1