Status: Currently Official on 14-Feb-2025
Official Date: Official Prior to 2013
Document Type: USP Monographs
DocId: GUID-5D97C71F-B8F9-4AF9-8C6E-80D2A7437805_1_en-US
DOI: https://doi.org/10.31003/USPNF_M29160_01_01
DOI Ref: g8keg

Elm

DEFINITION

Elm is the dried inner bark of *Ulmus rubra* Muhl. (*Ulmus fulva* Michx.) (Fam. Ulmaceae).

IDENTIFICATION

- **A. Mucilaginous Substance**

  Sample: 1 g of finely powdered Elm

  Analysis: Macerate the *Sample* with 40 mL of cold water for 1 h.

  Acceptance criteria: The resulting mixture is of a thick mucilaginous consistency and yellowish brown in color.

- **B. Thin-Layer Chromatographic Identification Test**

  Standard solution: 0.025% rutin in methanol

  Sample solution: Extract 1 g of powdered Elm with 10 mL of 60% methanol on a water bath for 15 min. Cool, filter, and concentrate the filtrate to 2.5 mL.

  Chromatographic system

  (See *Chromatography ⟨621⟩, Thin-Layer Chromatography*.)

  Adsorbent: 0.25-mm layer of chromatographic silica gel mixture, typically 20 cm long (TLC plates)

  Application volume: 20 µL

  Developing solvent system: Ethyl acetate, anhydrous formic acid, glacial acetic acid, and water (100:11:11:27)

  Spray reagent: 1% solution of 2-aminoethyl diphenylborinate ester in methanol, followed by a 5% solution of polyethylene glycol 4000 in alcohol

  Analysis

  Samples: *Standard solution* and *Sample solution*

  Develop the chromatograms in the *Developing solvent system* until the solvent front has moved three-fourths of the length of the plate. Remove the plate from the chromatographic chamber, and allow to air-dry. Spray the plate with *Spray reagent*, and examine the plate under UV light at 366 nm.

  Acceptance criteria: The R_F values of the principal spots relative to rutin are 1.05 (blue) and 0.8 (orange).

SPECIFIC TESTS

- **Botanic Characteristics**

  Macroscopic

  Unground Elm: Unground Elm occurs as broad, flat, oblong pieces 1–4 mm in thickness. The outer surface is yellow-orange with some brown outer bark or cork layers attached; the inner surface, which is pale yellow, is marked faintly with striated phloem lines. The fracture is fibrous with projections of five bast bundles.

  Powdered Elm:

  Weak yellowish orange with a distinctive fenugreek-like odor

  Microscopic

  Powdered Elm: Bast fibers are numerous, very long, usually broken, up to 25 µm in diameter, thick-walled, unlignified, or with only a thin outer sheath of the wall lignified; have calcium oxalate prisms 10–35 µm in length; have starch grains that are spheroidal, or polygonal, usually 3–15 µm in diameter, occasionally up to 25 µm in length; and have numerous mucilage fragments, frequently lamellated. Cork cells are few or absent.

- **Outer Bark:** Contains NMT 2% of adhering outer bark
- **Articles of Botanical Origin,** *Foreign Organic Matter*⟨561⟩**:** NMT 2%
- **Loss on Drying** ⟨731⟩**:** Dry 2 g at 105° to constant weight: it loses NMT 12% of its weight.
- **Articles of Botanical Origin,** *Total Ash*⟨561⟩**:** NMT 10% on the dried basis
- **Articles of Botanical Origin,** *Acid-Insoluble Ash*⟨561⟩**:** NMT 0.65% on the dried basis

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in well-closed containers, and store in a cool, dry place.

Auxiliary Information - Please check for your question in the FAQs before contacting USP.

Topic/Question	Contact	Expert Committee
ELM	Nam-Cheol Kim Scientific Liaison	BDSHM2020 Botanical Dietary Supplements and Herbal Medicines

Chromatographic Database Information: Chromatographic Database

Most Recently Appeared In:
Pharmacopeial Forum: Volume No. Information currently unavailable

Current DocID: GUID-5D97C71F-B8F9-4AF9-8C6E-80D2A7437805_1_en-US

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