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# Storax

## DEFINITION

Storax is a balsam obtained from the trunk of *Liquidambar orientalis* Miller, known in commerce as Levant Storax, or of *Liquidambar styraciflua* L., known in commerce as American Storax (Fam. Hamamelidaceae).

## CONTAMINANTS

- **Articles of Botanical Origin ⟨561⟩, *Pesticide Residue Analysis*:** Meets the requirements

## SPECIFIC TESTS

- **Loss on Drying ⟨731⟩**

  **Sample:** 2 g

  **Analysis:** Dry the *Sample* at 105° for 2 h.

  **Acceptance criteria:** It loses NMT 20.0% of its weight.

- **Alcohol-Insoluble Substances**

  **Sample:** 10 g of mixed Storax

  **Analysis:** Heat the *Sample* in a beaker at 105° for 30 min, take up the residue in 100 mL of hot alcohol, pass through counter-balanced filters or a tared filter crucible, and wash the residue with small portions of hot alcohol until the last washing is colorless or practically so.

  **Acceptance criteria:** The weight of the residue, after drying at 105° for 1 h, does not exceed 5.0% of the weight of Storax taken.

- **Alcohol-Soluble Substances**

  **Analysis:** Evaporate the combined alcohol filtrate and washings obtained in the test for *Alcohol-Insoluble Substances* at a temperature not exceeding 60°, and dry the residue at 105° for 1 h.

  **Acceptance criteria:** The weight of the yellow-to-brown residue of purified Storax is NLT 70.0% of the weight of Storax taken. [Note—The purified Storax obtained in the test for *Alcohol-Soluble Substances* meets the requirements of the following tests: *Fats and Fixed Oils, Acid Value* and *Saponification Value*, and *Cinnamic Acid*.]

- **Fats and Fixed Oils ⟨401⟩, *Acid Value***

  **Sample:** 1 g of purified Storax

  **Analysis:** Dissolve the *Sample* in 50 mL of neutralized alcohol, add 0.5 mL of phenolphthalein TS, and titrate with 0.5 N sodium hydroxide VS.

  **Acceptance criteria:** 50–85 for Levant Storax; 36–85 for American Storax

- **Fats and Fixed Oils ⟨401⟩, *Saponification Value***

  **Sample:** 2 g of purified Storax

  **Analysis:** Mix the *Sample* with 50 mL of solvent hexane, add 25.0 mL of 0.5 N alcoholic potassium hydroxide VS, and allow the mixture to stand for 24 h with frequent agitation. Then add 0.5 mL of phenolphthalein TS, and titrate the excess alkali with 0.5 N hydrochloric acid VS.

  **Acceptance criteria:** 160–200

- **Cinnamic Acid**

  **Sample solution:** 2 g of purified Storax in 25 mL of 0.5 N alcoholic potassium hydroxide

  **Analysis:** Boil the *Sample solution* for 1 h under a reflux condenser. Add 0.5 mL of phenolphthalein TS, neutralize with 0.5 N sulfuric acid, and evaporate the alcohol on a steam bath. Dissolve the residue in 50 mL of water, and shake the solution with 20 mL of ether. Shake the separated ether with 5 mL of water, adding the washing to the water solution, and discard the ether extract. Add to the water solution 10 mL of diluted sulfuric acid, and shake with four 20-mL portions of ether. Wash the combined ether extracts with 5 mL of water, rejecting the water washing. Transfer to a flask, and distill off the ether. Add to the residue 100 mL of water, and boil the mixture vigorously for 15 min under a reflux condenser. Filter while hot, and allow the filtrate to cool to about 25°. White crystals of cinnamic acid separate. Collect and dry the cinnamic acid by vacuum filtration. Repeat the extraction of the residue twice by boiling each time under a reflux condenser, as previously described, with the filtrate from the preceding crystallization, and collect the additional cinnamic acid in the same crucible. Finally, wash the cinnamic acid with two 10-mL portions of ice-cold water, dry at 80°, and weigh. To 50 mg of the cinnamic acid obtained as directed above, add 5 mL of 2 N sulfuric acid, heat, and add potassium permanganate TS.

**Acceptance criteria:** The weight of the cinnamic acid is NLT 25.0% of the weight of purified Storax taken. A portion of the acid recrystallized from hot water melts at 134°–135°. After adding the 2 N sulfuric acid, and heating and adding potassium permanganate TS, the odor of benzaldehyde is perceptible.

## ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in well-closed containers.

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

| Topic/Question | Contact | Expert Committee |
|---|---|---|
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