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Senna Pods

DEFINITION

Senna Pods are the dried ripe fruits of *Senna alexandrina* Mill., also known as *Cassia acutifolia* Delile (Alexandrian senna) or *C. angustifolia* Vahl (Tinnevely senna), (Fam. Fabaceae). Senna Pods contain NLT 3.4% (Alexandrian senna) and NLT 2.2% (Tinnevely senna) of anthraquinone glucosides, calculated as sennosides, on the dried basis.

IDENTIFICATION

• A.

Potassium hydroxide solution: 100 mg/mL of potassium hydroxide in alcohol

Sample: 500 mg of finely powdered Senna Pods

Analysis: Add 10 mL of *Potassium hydroxide solution* to the *Sample*. Boil for 2 min, dilute with 10 mL of water, and filter. Acidify the filtrate with hydrochloric acid. Shake it with ether, remove the ether layer, and shake it with 5 mL of 6 N ammonium hydroxide.

Acceptance criteria: The aqueous layer is orange or bluish red.

ASSAY

• PROCEDURE

[NOTE—Conduct all sample preparations with minimal exposure to subdued light, and use low-actinic glassware to protect solutions from light.]

Ferric chloride solution: 105 mg/mL of ferric chloride

Methanolic magnesium acetate solution: 5 mg/mL of magnesium acetate in methanol

Sodium bicarbonate solution: 5 mg/mL of sodium bicarbonate

Standard solution: 0.13 mg/mL of [USP Sennosides RS](#) in *Sodium bicarbonate solution*

Sample solution: Weigh and pulverize 10 g of Senna Pods. Transfer 0.15 g to a 100-mL round-bottom flask. Add 30 mL of water. Mix, weigh, attach a condenser, and reflux in a water bath for 15 min. Cool to room temperature, weigh, and adjust to the original weight with water. Centrifuge, and transfer 20.0 mL of the supernatant to a 150-mL separatory funnel. Add 0.1 mL of diluted hydrochloric acid, and shake with three 15-mL quantities of chloroform. Allow to separate, and discard the chloroform layer after each addition. Add about 0.1 g of sodium bicarbonate, shake for 3 min, and centrifuge. Use the supernatant as the *Sample solution*.

Instrumental conditions

(See [Ultraviolet-Visible Spectroscopy \(857\)](#).)

Mode: Vis

Wavelength: 515 nm

Cell: Quartz

Blank: Methanol

Analysis

Samples: *Standard solution*, *Sample solution*, and *Blank*

Transfer 10.0 mL each of the *Standard solution* and the *Sample solution* to separate 100-mL round-bottom flasks equipped with condensers. Add 20 mL of *Ferric chloride solution*, and mix. Reflux in a water bath for 20 min. Add 1 mL of hydrochloric acid, and reflux for an additional 20 min, with frequent shaking, to dissolve the precipitates. Cool to room temperature, transfer the mixtures to separate 100-mL separatory funnels, and shake with three 25-mL quantities of ether previously used to rinse the flasks. Combine the ether extracts, mix, and wash with two 15-mL quantities of water. Transfer the ether layers to separate 100-mL volumetric flasks. Dilute with ether to volume, and mix. Evaporate 10.0 mL of the ether extracts to dryness, and dissolve the residue in 10.0 mL of *Methanolic magnesium acetate solution*. Determine the absorbance of the resulting solution from the *Standard solution* and the *Sample solution*, with a suitable spectrophotometer fitted with matched quartz cells, using the *Blank*.

Calculate the percentage of sennosides in the portion of Senna Pods taken:

$$\text{Result} = (A_U/A_S) \times C_S \times (V/W) \times 100$$

A_U = absorbance of the *Sample solution*

A_s = absorbance of the *Standard solution*

C_s = concentration of [USP Sennosides RS](#) in the *Standard solution* (mg/mL)

V = volume of water to prepare the *Sample solution*, 30 mL

W = weight of powdered Senna Pods taken (mg)

Acceptance criteria: NLT 3.4% (Alexandrian senna) and NLT 2.2% (Tinnevelly senna) of anthraquinone glucosides, calculated as sennosides, on the dried basis

CONTAMINANTS

- **MICROBIAL ENUMERATION TESTS (2021):** The total 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 count does not exceed 10^3 cfu/g.
- **ABSENCE OF SPECIFIED MICROORGANISMS (2022), *Test Procedures, Test for Absence of Salmonella Species*** and ***Test for Absence of Escherichia coli***: Meet the requirements
- **ARTICLES OF BOTANICAL ORIGIN (561), *Pesticide Residue Analysis***: Meet the requirements

SPECIFIC TESTS

BOTANICAL CHARACTERISTICS

Macroscopic

Unground Alexandrian senna pods: Occur as flattened, reniform, membranous, leathery pods; green to greenish brown with brown patches at the positions corresponding to the seeds; 40–50 mm in length and at least 20 mm wide; at one end is a styler point and at the other a short stalk. The pods contain six or seven flattened and obovate seeds, green to pale brown, with a continuous network of prominent ridges on the testa.

Unground Tinnevelly senna pods: Occur as flattened, slightly reniform, membranous, leathery pods; brown to yellowish brown with brown patches at the positions corresponding to the seeds; slightly longer but narrower than Alexandrian senna pods, 35–60 mm in length and 14–18 mm wide; at one end is a styler point and at the other a short stalk. The pods contain 5–8 flattened and obovate seeds, green to pale brown, with incomplete, wavy, transverse ridges on the testa.

Powdered Senna Pods: Brown powder

Microscopic

Senna Pods: Senna Pods show epicarp with very thick cuticulated polygonal cells, occasional anomocytic or paracytic stomata, and very few nonglandular, one-celled, conical, often curved hairs, with thick papillose walls, 100–350 μ m in length; mesocarp consists of parenchymatous tissue containing a layer of calcium oxalate prisms and vascular bundles partially enclosed by fibers; endocarp with two crossed layers of fibers; seeds with a subepidermal layer of palisade cells with thick outer walls and endosperm of polyhedral cells with mucilaginous walls.

Powdered Senna Pods: Polygonal cells with occasional small numbers of nonglandular hairs and anomocytic or paracytic stomata, fibers in two crossed layers accompanied by a crystal sheath of calcium oxalate prisms, isolated hairs, masses of palisade cells of the seeds, clusters, and prisms of calcium oxalate.

- **ARTICLES OF BOTANICAL ORIGIN (561), *Methods of Analysis, Foreign Organic Matter***: NMT 1.0%
- **ARTICLES OF BOTANICAL ORIGIN (561), *Methods of Analysis, Total Ash***: NMT 9.0%
- **ARTICLES OF BOTANICAL ORIGIN (561), *Methods of Analysis, Acid-Insoluble Ash***: NMT 2.0%
- **LOSS ON DRYING (731)**

Sample: 1.0 g of finely powdered Senna Pods

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

Acceptance criteria: It loses NMT 12.0% of its weight.

ADDITIONAL REQUIREMENTS

- **PACKAGING AND STORAGE:** Preserve against attack by insects and rodents. Store protected from light and moisture at room temperature.
- **LABELING:** The label states the Latin binomial and, following the official name, the part(s) of the plant contained in the article.
- **USP REFERENCE STANDARDS (11).**
[USP Sennosides RS](#)

Auxiliary Information - Please [check for your question in the FAQs](#) before contacting USP.