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Add the following:

^Cinnamomum cassia Bark

DEFINITION

Cinnamomum cassia Bark consists of the dried bark from the trunk of *Cinnamomum cassia* auctt. [syn. *Cinnamomum aromaticum* Nees] (Fam. Lauraceae) collected in autumn. It contains NLT 3.2% of total phenylpropanoids, calculated as the sum of 2-hydroxycinnamaldehyde ($C_9H_8O_2$), cinnamic acid ($C_9H_8O_2$), cinnamaldehyde (C_9H_8O), and 2-methoxycinnamaldehyde ($C_{10}H_{10}O_2$); NLT 3.0% of cinnamaldehyde; and NLT 0.03% of procyanidin B_2 ($C_{30}H_{26}O_{12}$), all on the anhydrous basis.

IDENTIFICATION

• A. HPTLC FOR ARTICLES OF BOTANICAL ORIGIN (203)

Standard solution A: 0.5 mg/mL each of [USP Cinnamaldehyde RS](#) and coumarin in [methanol](#)

Standard solution B: 200 mg/mL of [USP Cinnamomum cassia Twig Powder RS](#) in [methanol](#). Sonicate for 10 min, centrifuge, and withdraw the supernatant and evaporate to dryness under reduced pressure. Add a volume of [toluene](#) equivalent to one-fifth of the volume of [methanol](#) used for the extraction of the residue. Sonicate for about 2 min, centrifuge, and use the supernatant.

Sample solution: 1 g of powdered *Cinnamomum cassia* Bark in 10 mL of [methanol](#). Sonicate for 10 min, centrifuge, and withdraw the supernatant and evaporate to dryness under reduced pressure. Add 2 mL of [toluene](#) to the residue, sonicate for about 2 min, centrifuge, and use the supernatant.

Chromatographic system

(See standard parameters as defined in [HPTLC for Articles of Botanical Origin \(203\), Table 1.](#))

Application volume: 5 μ L

Developing solvent system: [Toluene](#) and [ethyl acetate](#) (19:1)

Derivatization reagent: [Methanol](#), [acetic acid](#), [sulfuric acid](#), and [p-anisaldehyde](#) (170:20:10:1). Prepare on the day of use. Slowly add sulfuric acid to ice-cold methanol, followed by acetic acid and *p*-anisaldehyde.

Analysis

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

Apply the *Samples* as bands and dry in air. Develop in a saturated chamber, remove the plate from the chamber, and dry in air. Examine under short-wave UV light. Then treat the plate with the *Derivatization reagent*, heat at 100° for 4 min, and examine under long-wave UV light.

System suitability

Under short-wave UV light: Prior to derivatization, *Standard solution A* exhibits a quenching band due to cinnamaldehyde in the middle-third section and a quenching band due to coumarin in the upper part of the lower-third section. *Standard solution B* exhibits, in the middle-third section, a quenching band corresponding in R_f to cinnamaldehyde in *Standard solution A* and a weak quenching band immediately below cinnamaldehyde. In the lower-third section, *Standard solution B* exhibits a weak quenching band due to coumarin in the upper part, a weak quenching band immediately below coumarin, a quenching band close to the application position due to cinnamic acid, and a weak quenching band above cinnamic acid.

Under long-wave UV light: After derivatization, *Standard solution B* exhibits a band corresponding in R_f and color to cinnamaldehyde in *Standard solution A*, as well as a yellow band immediately below cinnamaldehyde due to 2-methoxycinnamaldehyde.

Acceptance criteria

Under short-wave UV light: Prior to derivatization, the most intense quenching band in the *Sample solution* is observed in the middle-third section and corresponds in R_f to cinnamaldehyde in *Standard solution A*, while a weak quenching band may be observed immediately below cinnamaldehyde. In the lower-third section, the *Sample solution* exhibits additional bands corresponding to similar bands in *Standard solution B*: a quenching band in the upper part due to coumarin and a quenching band close to the application position due to cinnamic acid. The *Sample solution* also exhibits two close weak quenching bands above cinnamic acid, one of them corresponding in R_f to the same band in *Standard solution B*.

Under long-wave UV light: After derivatization, the *Sample solution* exhibits a band corresponding in R_f and color to cinnamaldehyde in *Standard solution A*, as well as a yellow band immediately below cinnamaldehyde due to 2-methoxycinnamaldehyde (a distinction from *Cinnamomum burmanni* bark).

• B. HPLC

Analysis: Proceed as directed in the test for *Content of Total Phenylpropanoids, Procyanidin B₂, and Coumarin*.

Acceptance criteria: The most intense peak in the *Sample solution* is observed corresponding to cinnamaldehyde in *Standard solution B*. The *Sample solution* also exhibits two peaks corresponding to procyanidin B₂ and cinnamic acid, respectively, in *Standard solution A* and peaks due to coumarin, 2-hydroxycinnamaldehyde, and 2-methoxycinnamaldehyde corresponding to the same constituents in *Standard solution B*. No peak due to eugenol is observed at a relative retention time of about 1.2, relative to cinnamaldehyde eluting after 2-methoxycinnamaldehyde (a distinction from *Cinnamomum verum* bark). No significant peak due to cinnamtannin B₁ is observed at a relative retention time of about 1.5, relative to procyanidin B₂ (a distinction from the barks of *C. verum* and *C. burmanni*). The content ratios of phenylpropanoids and coumarin each to cinnamic acid are within the typical ratio ranges listed in [Table 2](#). The content of cinnamaldehyde is NLT 80% of the content of total phenylpropanoids.

COMPOSITION

• CONTENT OF TOTAL PHENYLPROPANOIDS, PROCYANIDIN B₂, AND COUMARIN

[NOTE—Protect from light and proceed under low actinic light. The *Standard solutions* and the *Sample solution* are stable for 24 h at room temperature.]

Solution A: 0.1% [formic acid](#) in [water](#)

Solution B: [Acetonitrile](#)

Mobile phase: See [Table 1](#).

Table 1

Time (min)	Solution A (%)	Solution B (%)
0	92	8
8	88	12
15	82	18
25	65	35
30	65	35
30.1	10	90
40	10	90
40.1	92	8
45	92	8

Solvent: [Methanol](#) and [water](#) (7:3)

Standard solution A: 0.05 mg/mL of [USP Cinnamic Acid RS](#) and 0.025 mg/mL of [USP Procyanidin B₂ RS](#) in *Solvent*

Standard solution B: Transfer about 500 mg of [USP Cinnamomum cassia Twig Powder RS](#) into 25 mL of *Solvent*. Sonicate for 30 min. Before injection, pass through a suitable membrane filter of 0.22-μm pore size.

Sample solution: Transfer about 100 mg of powdered *Cinnamomum cassia* Bark, accurately weighed, to a suitable flask, add 20.0 mL of *Solvent*, and close tightly. Weigh the filled flask accurately and sonicate for 30 min. Cool to room temperature and, if necessary, adjust with *Solvent* to the initial weight. Before injection, pass through a suitable membrane filter of 0.22-μm pore size, discarding the first 2 mL of the filtrate.

Chromatographic system

(See [Chromatography \(621\), System Suitability](#).)

Mode: LC

Detector: UV 280 nm

Column: 2.1-mm × 10-cm; 1.8-μm packing [L1](#)

Column temperature: 40°

Flow rate: 0.4 mL/min

Injection volume: 2 μL

System suitability

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

Suitability requirements

Resolution: NLT 1.5 between the cinnamic acid and cinnamaldehyde peaks, *Standard solution B*

Tailing factor: NMT 2.0 for the procyanidin B₂ and cinnamic acid peaks, *Standard solution A*

Relative standard deviation: NMT 2.0% for the procyanidin B₂ and cinnamic acid peaks in replicate injections, *Standard solution A*