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Add the following:

^Cinnamomum verum Bark Powder

DEFINITION

Cinnamomum verum Bark Powder consists of the dried bark from trunks or branches grown on the trunk of *Cinnamomum verum* J.Presl (syn. *Cinnamomum zeylanicum* Blume) (Fam. Lauraceae), freed from the outer cork and the underlying parenchyma, reduced to a fine or very fine powder. It contains NLT 1.1% and NMT 3.5% of total phenylpropanoids, calculated as the sum of 2-hydroxycinnamaldehyde ($C_9H_8O_2$), cinnamic acid ($C_9H_8O_2$), cinnamaldehyde (C_9H_8O), 2-methoxycinnamaldehyde ($C_{10}H_{10}O_2$), eugenol ($C_{10}H_{12}O_2$), and, if detectable, cinnamyl alcohol ($C_9H_{10}O$); NLT 1.0% and NMT 3.2% of cinnamaldehyde; and NLT 0.4% of proanthocyanidins calculated as the sum of procyanidin B₂ ($C_{30}H_{26}O_{12}$) and cinnamtannin B₁ ($C_{45}H_{36}O_{18}$), all on the anhydrous basis.

IDENTIFICATION

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

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

Standard solution B: 200 mg/mL of [USP Cinnamomum verum Bark Powder RS](#) in [methanol](#). Sonicate for 10 min, centrifuge, and evaporate 5.0 mL of the supernatant to dryness under reduced pressure. Add 1.0 mL of [toluene](#) to the residue, sonicate for about 2 min, centrifuge, and use the supernatant.

Sample solution: 2 g of *Cinnamomum verum* Bark Powder in 10 mL of [methanol](#). Sonicate for 10 min, centrifuge, and evaporate 5.0 mL of the supernatant to dryness under reduced pressure. Add 1.0 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 µL

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. *Standard solution B* exhibits an intense quenching band corresponding in R_f to cinnamaldehyde in *Standard solution A*. In the lower-third section, *Standard solution B* exhibits a quenching band close to the application position due to cinnamic acid and a 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* and a yellow band immediately below the cinnamaldehyde band 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 above cinnamaldehyde. In the lower-third section, a quenching band due to cinnamic acid is observed close to the application position and a quenching band is observed above cinnamic acid corresponding in R_f to the same bands in *Standard solution B*. A weak quenching band due to coumarin may be observed in the upper part of the lower-third section.

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* and a yellow band immediately below cinnamaldehyde due to 2-methoxycinnamaldehyde (a distinction from the bark of *Cinnamomum burmanni*).

• **B. HPTLC FOR ARTICLES OF BOTANICAL ORIGIN (203): PROANTHOCYANIDINS**

Standard solution A: 1.0 mg/mL of [USP Cinnamtannin B₁ RS](#) in [methanol](#)

Standard solution B: 100 mg/mL of [USP Cinnamomum verum Bark Powder RS](#) in [methanol](#). Sonicate for 15 min, centrifuge, and use the supernatant.

Sample solution: 200 mg of *Cinnamomum verum* Bark Powder in 2 mL of [methanol](#). Sonicate for 15 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: 4 μ L

Developing solvent system: [Ethyl acetate](#), [methyl ethyl ketone](#), [water](#), and [formic acid](#) (5: 3: 0.5: 0.5)

Derivatization reagent: Same as the *Derivatization reagent* used in *Identification A*

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 105° for 5 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 cinnamtannin B₁ in the upper-half section. *Standard solution B* exhibits a quenching band corresponding in R_f to cinnamtannin B₁ in *Standard solution A*, a quenching band below cinnamtannin B₁, and a dark quenching band close to the solvent front.

Under long-wave UV light: After derivatization, *Standard solution A* exhibits a brown band due to cinnamtannin B₁ in the upper-half section. *Standard solution B* exhibits a brown band corresponding in R_f to cinnamtannin B₁ in *Standard solution A*, a brown band below cinnamtannin B₁, and an intense black-blue band close to the solvent front.

Acceptance criteria

Under short-wave UV light: Prior to derivatization, the *Sample solution* exhibits a quenching band in the upper-half section corresponding in R_f to cinnamtannin B₁ (a distinction from the barks of *Cinnamomum cassia* and *Cinnamomum loureiroi*) in *Standard solution A*, a quenching band below cinnamtannin B₁, and a dark quenching band close to the solvent front, corresponding in R_f to the same bands in *Standard solution B*.

Under long-wave UV light: After derivatization, the *Sample solution* exhibits a brown band corresponding in R_f to cinnamtannin B₁ (a distinction from the barks of *C. cassia* and *C. loureiroi*) in *Standard solution A*, a brown band below cinnamtannin B₁, and an intense black-blue band close to the solvent front, corresponding in R_f to the same bands in *Standard solution B*.

• **C. HPLC**

Analysis: Proceed as directed in the test for *Content of Total Phenylpropanoids and Proanthocyanidins*.

Acceptance criteria: The most intense peak in the *Sample solution* corresponds to cinnamaldehyde in *Standard solution B*. The *Sample solution* exhibits three peaks corresponding to, respectively, cinnamtannin B₁ (a distinction from the barks of *C. cassia* and *C. loureiroi*; these two species do not contain a significant peak due to cinnamtannin B₁), cinnamic acid, and eugenol (a distinction from the barks of *C. cassia*, *C. burmanni*, and *C. loureiroi*; these three species do not contain a significant peak due to eugenol) in *Standard solution A*; it also exhibits peaks due to procyanidin B₂, 2-hydroxycinnamaldehyde, and 2-methoxycinnamaldehyde corresponding to those same constituents in *Standard solution B*. Peaks due to coumarin and cinnamyl alcohol may be observed. In addition, an unidentified peak is observed between procyanidin B₂ and cinnamtannin B₁ with an intensity higher than the former but lower than the latter (the barks of *C. cassia* and *C. loureiroi* do not contain that unidentified peak; the bark of *C. burmanni* contains that unidentified peak but with an intensity higher than those of procyanidin B₂ and cinnamtannin B₁). The content ratio of procyanidin B₂ to cinnamtannin B₁ is between 0.04 and 0.30; the content ratios of each phenylpropanoid relative to cinnamic acid are within the typical ranges listed in [Table 2](#). The content of cinnamaldehyde is NLT 85% of the content of total phenylpropanoids.

COMPOSITION

• **CONTENT OF TOTAL PHENYLPROPANOIDS AND PROANTHOCYANIDINS**

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