

Status: Currently Official on 17-Feb-2025
 Official Date: Official as of 01-Dec-2015
 Document Type: Dietary Supplement Monographs
 DocId: GUID-04C052C4-15ED-4F60-87C7-AF54356F6015_1_en-US
 DOI: https://doi.org/10.31003/USPNF_M33060_01_01
 DOI Ref: ru87r

© 2025 USPC
 Do not distribute

Feverfew

DEFINITION

Feverfew consists of the dried leaves of *Tanacetum parthenium* (L.) Sch. Bip. (Fam. Asteraceae), collected when the plant is in flower.

IDENTIFICATION

• **A.** The retention time of the parthenolide peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the test for *Content of Parthenolide*.

• B. THIN-LAYER CHROMATOGRAPHIC IDENTIFICATION TEST

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

Sample solution: Transfer 1.0 g of finely powdered Feverfew to a suitable flask. Add 20 mL of methanol, heat the flask over a water bath at 60° for 15 min, cool, and filter. Evaporate the filtrate under reduced pressure to dryness, and dissolve the residue in 2.0 mL of methanol.

Adsorbent: 0.5-mm layer of chromatographic silica gel, typically 20 cm long (TLC plates)

Application volume: 20 µL

Developing solvent system: Toluene and acetone (85:15)

Spray reagent: 0.5% Solution of vanillin in a mixture of sulfuric acid and alcohol (4:1)

Analysis

Samples: *Standard solution* and *Sample solution*

Develop the chromatograms until the solvent front has moved three-fourths of the length of the plate. Remove the plate from the chromatographic chamber, mark the solvent front, and allow it to air-dry. Spray the plate with *Spray reagent*. After 5 min, examine the plate under white light.

Acceptance criteria: A blue spot in the middle portion of the chromatogram of the *Sample solution* that corresponds in color and R_f value to the principal spot obtained in the chromatogram of the *Standard solution* indicates the presence of parthenolide. The lower one-third of the chromatogram of the *Sample solution* may exhibit two pink spots, and the upper one-third may exhibit one pink spot.

• C. THIN-LAYER CHROMATOGRAPHIC IDENTIFICATION TEST

Standard solution: 0.25 mg/mL of [USP Rutin RS](#) in methanol

Sample solution: To 1 g of finely powdered Feverfew, add 10 mL of methanol, and heat on a water bath at 60° for 15 min. Cool, and filter.

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

Application volume: 20 µL

Developing solvent system: Ethyl acetate, anhydrous formic acid, glacial acetic acid, and water (10:1.1:1.1:2.7)

Spray reagent A: 1% Solution of 2-aminoethyl diphenylborinate in methanol

Spray reagent B: 5% (w/v) Solution of polyethylene glycol 4000 in alcohol

Analysis

Samples: *Standard solution* and *Sample solution*

Develop the chromatogram until the solvent front has moved three-fourths of the length of the plate. Remove the plate from the chromatographic chamber, and allow it to air-dry. Spray the plate with *Spray reagent A* followed by *Spray reagent B*, and examine the plate under UV light at 366 nm.

Acceptance criteria: Relative to the R_f value of the principal spot of the *Standard solution*, the chromatogram of the *Sample solution* exhibits no blue spot at R_f 1.1 (distinction from Roman chamomile) but exhibits a green spot at R_f 2.3 (distinction from *Matricaria*), and colored spots at the R_f values indicated are as follows: 1.5 (yellowish orange), 1.65 (yellowish green), 2.0 (greenish blue), and 2.25 (whitish blue).

COMPOSITION

• CONTENT OF PARTHENOLIDE

Mobile phase: Acetonitrile and water (9:11)

Standard solution: 0.04 mg/mL of [USP Parthenolide RS](#) in methanol

Sample stock solution: Reduce 100 g of Feverfew to a fine powder. Transfer about 1.0 g of the finely powdered Feverfew, accurately weighed, to a suitable flask. Add 100 mL of methanol, and heat on a water bath at 60° for 10 min. Remove the flask from the water bath, cool, and filter. Rinse the flask with three 5-mL portions of methanol, and filter, adding the rinsings to the filtrate. Transfer the residue left within the filter to the same flask. Add 50 mL of methanol, and continue the rinse procedure as described above. Evaporate the combined filtrates under reduced pressure to dryness, and dissolve the residue in 20.0 mL of methanol.

Sample solution: Transfer 10 mL of the *Sample stock solution* to a 25-mL volumetric flask, and dilute with methanol to volume.

Chromatographic system

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

Mode: LC

Detector: UV 210 nm

Column: 4.6-mm × 25-cm; packing L1

Flow rate: 2 mL/min

Injection volume: 10 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 2.0 for the parthenolide peak

Relative standard deviation: NMT 2.0% for the parthenolide peak in repeated injections

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of parthenolide in the portion of Feverfew taken to prepare the *Sample solution*:

$$\text{Result} = (r_U/r_S) \times C_S \times (V/W) \times D \times 100$$

r_U = peak area of the parthenolide peak in the *Sample solution*

r_S = peak area of the parthenolide peak in the *Standard solution*

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

V = final volume of the *Sample stock solution* (mL)

W = weight of Feverfew used to prepare the *Sample stock solution* (mg)

D = dilution factor to prepare the *Sample solution* from the *Sample stock solution*

Acceptance criteria: NLT 0.2% on the dried basis

CONTAMINANTS

- [ARTICLES OF BOTANICAL ORIGIN, Limits of Elemental Impurities \(561\)](#): Meets the requirements
- [ARTICLES OF BOTANICAL ORIGIN, Pesticide Residue Analysis \(561\)](#): Meets the requirements
- [MICROBIAL ENUMERATION TESTS \(2021\)](#): The total bacterial count does not exceed 10^4 cfu/g, and the total combined molds and yeasts count does not exceed 10^2 cfu/g.
- [ABSENCE OF SPECIFIED MICROORGANISMS \(2022\)](#): It meets the requirements of the tests for the absence of *Salmonella* species and *Escherichia coli*.

SPECIFIC TESTS

BOTANICAL CHARACTERISTICS

Macroscopic: Yellowish green, petiolate, usually 2–5 cm in length but sometimes up to 10 cm, ovate, deeply divided into 5 or occasionally 7 segments, each with a coarsely crenate margin and obtuse apex; both surfaces downy and the mid-rib prominent on the lower surface

Microscopic: Upper and lower epidermal cells with wavy anticlinal walls, striated cuticle and anomocytic stomata, more frequent on the lower epidermis; trichomes, more abundant on the lower epidermis, of two types; covering trichomes uniseriate with up to 6 small isodiametric basal cells and elongated, tapering apical cells, often at right angles to the axis of the basal cells; glandular trichomes slightly sunken, composed of a short, biseriate, 2- or 4-celled stalk and a biseriate head of 4 cells, around which the cuticle forms a bladder-like covering

- [ARTICLES OF BOTANICAL ORIGIN, Foreign Organic Matter \(561\)](#): NMT 10.0%, including the stalk
- [ARTICLES OF BOTANICAL ORIGIN, Water-Soluble Extractives, Method 2 \(561\)](#): NLT 15.0%
- [LOSS ON DRYING \(731\)](#)

Sample: 1.0 g of finely powdered Feverfew

Analysis: Dry the *Sample* at 105° for 1 h.

Acceptance criteria: NMT 10.0%

- [ARTICLES OF BOTANICAL ORIGIN, Total Ash \(561\)](#): NMT 12.0%
- [ARTICLES OF BOTANICAL ORIGIN, Acid-Insoluble Ash \(561\)](#): NMT 3.0%

ADDITIONAL REQUIREMENTS

- **PACKAGING AND STORAGE:** Preserve in well-closed containers, and store in a dry place, protected from light.
- **LABELING:** The label states the Latin binomial and, following the official name, the part of the plant contained in the article.
- [USP REFERENCE STANDARDS \(11\)](#)
[USP Parthenolide RS](#)
[USP Rutin RS](#)