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Thioguanine Tablets

DEFINITION
Thioguanine Tablets contain NLT 93.0% and NMT 107.0% of the labeled amount of thioguanine ($C_5H_5N_5S$).

IDENTIFICATION

Change to read:

• **A.** ▲**Spectroscopic Identification Tests ⟨197⟩, *Infrared Spectroscopy*: 197K.**▲ (CN 1-May-2020) Record the spectra over the range from 3000 cm^{-1} to 650 cm^{-1}.

Sample: Shake a portion of the powdered Tablets equivalent to 0.5 g of thioguanine with 10 mL of 1 M sodium hydroxide, and filter. Acidify the filtrate with hydrochloric acid, filter, and dissolve the precipitate in 25% ammonia water. Evaporate to dryness, and dry the residue at 105° at a pressure not exceeding 0.1 psi for 5 h.

• **B.** The retention time of the major peak of the *Sample solution* corresponds to that of the *Standard solution*, as obtained in the *Assay*.

ASSAY

• **Procedure**

Mobile phase: 6 g/L of anhydrous monobasic sodium phosphate in water adjusted with phosphoric acid to a pH of 3.0

Diluent: 0.01 M sodium hydroxide

Standard stock solution: 0.4 mg/mL of USP Thioguanine RS in *Diluent*

Standard solution: 0.04 mg/mL of USP Thioguanine RS in *Mobile phase* from the *Standard stock solution*

Sample stock solution: Nominally 0.4 mg/mL of thioguanine in *Diluent* prepared as follows. Transfer NLT 20 finely powdered Tablets, equivalent to 40 mg of thioguanine, to a 100-mL volumetric flask. Add 70 mL of *Diluent*, and shake for 15 min. Dilute with *Diluent* to volume.

Sample solution: 0.04 mg/mL of thioguanine in *Mobile phase* from the *Sample stock solution*. Pass a portion of this solution through a suitable filter.

Chromatographic system

(See *Chromatography ⟨621⟩, System Suitability*.)

Mode: LC

Detector: UV 248 nm

Column: 4.6-mm × 5-cm; 5-µm packing L1

Flow rate: 2 mL/min

Injection volume: 10 µL

System suitability

Sample: *Standard solution*

Suitability requirements

Tailing factor: NMT 2.0

Relative standard deviation: NMT 2.0%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of thioguanine ($C_5H_5N_5S$) in the portion of Tablets taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times 100$$

r_U = peak response from the *Sample solution*

r_S = peak response from the *Standard solution*

C_S = concentration of thioguanine in the *Standard solution* (mg/mL)

C_U = nominal concentration of thioguanine in the *Sample solution* (mg/mL)

Acceptance criteria: 93.0%–107.0%

PERFORMANCE TESTS

• **Dissolution ⟨711⟩**

Medium: Water; 900 mL

Apparatus 2: 50 rpm

Time: 45 min

Sample solution: Pass a portion of the solution under test through a suitable filter. Transfer 2 mL of the filtrate and 2 mL of 1 M hydrochloric acid to a 20-mL volumetric flask, and dilute with water to volume.

Standard solution: USP Thioguanine RS in 0.1 M hydrochloric acid with a concentration similar to the *Sample solution*

Instrumental conditions

(See *Ultraviolet-Visible Spectroscopy ⟨857⟩*.)

Mode: UV

Analytical wavelength: 348 nm

Blank: 0.1 M hydrochloric acid

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of thioguanine ($C_5H_5N_5S$) dissolved:

$$\text{Result} = (A_U/A_S) \times C_S \times V \times D \times (1/L) \times 100$$

A_U = absorbance of the *Sample solution*

A_S = absorbance of the *Standard solution*

C_S = concentration of the *Standard solution* (mg/mL)

V = volume of the *Medium*, 900 mL

D = dilution factor for *Sample solution*, 10

L = label claim (mg/Tablet)

Tolerances: NLT 75% (Q) of the labeled amount of thioguanine ($C_5H_5N_5S$) is dissolved.

• **Uniformity of Dosage Units ⟨905⟩:** Meet the requirements

IMPURITIES

• **Organic Impurities**

Mobile phase and **Chromatographic system:** Proceed as directed in the *Assay*.

Diluent: 0.01 M sodium hydroxide

System suitability stock solution: 0.4 mg/mL each of USP Thioguanine RS and USP Guanine RS in 10% (v/v) phosphoric acid. Sonicate to dissolve.

System suitability solution: 0.04 mg/mL each of USP Thioguanine RS and USP Guanine RS in *Mobile phase* from the *System suitability stock solution*

Standard stock solution: 8 µg/mL of USP Thioguanine RS and 0.16 mg/mL of USP Guanine RS in *Diluent*

Standard solution: 0.8 µg/mL of USP Thioguanine RS and 0.016 mg/mL of USP Guanine RS in *Mobile phase* from the *Standard stock solution*

Sample solution: Nominally 0.4 mg/mL of thioguanine prepared as follows. Transfer NLT 20 finely powdered Tablets, equivalent to 40 mg of thioguanine, to a 100-mL volumetric flask. Add 10 mL of *Diluent*, and sonicate for 5 min. Dilute with *Mobile phase* to volume. Pass a portion of this solution through a suitable filter.

System suitability

Sample: *System suitability solution*

Suitability requirements

Resolution: NLT 3.0 between the thioguanine and guanine peaks, *System suitability solution*

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of guanine in the portion of Tablets taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times 100$$

r_U = peak response from the *Sample solution*

r_S = peak response from the *Standard solution*

C_S = concentration of USP Guanine RS in the *Standard solution* (mg/mL)

C_U = nominal concentration of thioguanine in the *Sample solution* (mg/mL)

Calculate the percentage of any individual unspecified impurity in the portion of Tablets taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times 100$$

r_U = peak response of each unspecified impurity from the *Sample solution*

r_S = peak response of thioguanine from the *Standard solution*

C_S = concentration of USP Thioguanine RS in the *Standard solution* (mg/mL)

C_U = nominal concentration of thioguanine in the *Sample solution* (mg/mL)

Acceptance criteria: See *Table 1*. Disregard any impurity peak less than 0.1%.

Table 1

Name	Relative Retention Time	Acceptance Criteria, NMT (%)
Guanine[a]	0.5	4
Thioguanine	1.0	—
Any individual unspecified impurity	—	0.2
Total impurities	—	4.5

[a] 2-Amino-1,7-dihydro-6*H*-purin-6-one.

ADDITIONAL REQUIREMENTS

- **Packaging and Storage:** Preserve in tight containers. Store at 15°–25°.
- **USP Reference Standards** ⟨11⟩

USP Guanine RS

2-Amino-1,7-dihydro-6*H*-purin-6-one.

$C_5H_5N_5O$ 151.13

USP Thioguanine RS

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

Topic/Question	Contact	Expert Committee
THIOGUANINE TABLETS	Documentary Standards Support	SM32020 Small Molecules 3
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM32020 Small Molecules 3

Chromatographic Database Information: Chromatographic Database

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