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# Disulfiram Tablets

## DEFINITION

Disulfiram Tablets contain NLT 90.0% and NMT 110.0% of the labeled amount of disulfiram ($C_{10}H_{20}N_2S_4$).

## IDENTIFICATION

***Change to read:***

• **A.** ▲**Spectroscopic Identification Tests ⟨197⟩, *Infrared Spectroscopy*:** 197A or 197K▲ (CN 1-May-2020)

**Standard:** USP Disulfiram RS

**Sample:** A portion of powdered Tablets

**Acceptance criteria:** Meet the requirements

• **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**

**Buffer:** 6.8 g/L of monobasic potassium phosphate in water. Adjust with 45% potassium hydroxide TS to a pH of 7.0.

**Mobile phase:** Methanol and *Buffer* (70:30)

**Standard stock solution:** 1 mg/mL of USP Disulfiram RS in alcohol. Use this solution within 5 days.

**Standard solution:** 0.02 mg/mL of USP Disulfiram RS from the *Standard stock solution* diluted with *Mobile phase*. Use this solution within 1 day.

**Sample stock solution:** Nominally 1 mg/mL of disulfiram from Tablets prepared as follows. Powder NLT 20 Tablets and transfer a suitable portion of the powder to an appropriate volumetric flask. Add 70% of the flask volume of alcohol and swirl, sonicate for about 5 min, and shake by mechanical means for 30 min or until dissolved. Dilute with alcohol to volume and pass through a suitable filter. Use the filtrate. Use this solution within 5 days.

**Sample solution:** Nominally 0.02 mg/mL of disulfiram from *Sample stock solution* in *Mobile phase*. Use this solution within 1 day.

**Chromatographic system**

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

**Mode:** LC

**Detector:** UV 250 nm

**Column:** 3.9-mm × 15-cm; 5-µm packing L1

**Flow rate:** 1 mL/min

**Injection volume:** 20 µL

**Run time:** NLT 1.5 times the retention time of disulfiram

**System suitability**

**Sample:** *Standard solution*

**Suitability requirements**

**Tailing factor:** NMT 1.5

**Relative standard deviation:** NMT 1.0%

**Analysis**

**Samples:** *Standard solution* and *Sample solution*

Calculate the percentage of the labeled amount of disulfiram ($C_{10}H_{20}N_2S_4$) 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 Disulfiram RS in the *Standard solution* (mg/mL)

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

**Acceptance criteria:** 90.0%–110.0%

 

**PERFORMANCE TESTS**

• **Disintegration ⟨701⟩**

**Time:** 15 min, the use of disks being omitted

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

**IMPURITIES**

• **Organic Impurities**

**Buffer:** 6.8 g/L of monobasic potassium phosphate in water. Adjust with 45% potassium hydroxide TS to a pH of 7.0.

**Mobile phase:** See *Table 1*.

**Table 1**

| Time (min) | Buffer (%) | Methanol (%) |
|---|---|---|
| 0 | 60 | 40 |
| 8 | 30 | 70 |
| 12.0 | 30 | 70 |
| 12.1 | 60 | 40 |
| 16.0 | 60 | 40 |

**Diluent:** Methanol and *Buffer* (50:50)

**System suitability solution:** 0.05 mg/mL of USP Disulfiram RS and 0.01 mg/mL of sulfiram in *Diluent*. Use this solution within 1 day.

**Standard stock solution:** 0.25 mg/mL of USP Disulfiram RS in methanol. Use this solution within 1 day.

**Standard solution:** 0.002 mg/mL of USP Disulfiram RS from *Standard stock solution* in *Diluent*. Use this solution within 1 day.

**Sensitivity solution:** 0.001 mg/mL of USP Disulfiram RS from *Standard solution* in *Diluent*. Use this solution within 1 day.

**Sample stock solution:** Nominally 2.5 mg/mL of disulfiram from NLT 5 Tablets in methanol. Store at 4° and use it within 2 h.

**Sample solution:** Nominally 1 mg/mL of disulfiram from *Sample stock solution* in *Diluent*. Store at 4° and use it within 2 h.

**Chromatographic system**

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

**Mode:** LC

**Detector:** UV 250 nm

**Column:** 3.9-mm × 15-cm; 5-µm, 300 Å packing L1

**Autosampler temperature:** 4°

**Flow rate:** 1 mL/min

**Injection volume:** 15 µL

**System suitability**

**Samples:** *System suitability solution*, *Standard solution*, and *Sensitivity solution*

[Note—See *Table 2* for relative retention times.]

**Suitability requirements**

**Resolution:** NLT 8.0 between sulfiram and disulfiram, *System suitability solution*

**Relative standard deviation:** NMT 5.0%, *Standard solution*

**Signal-to-noise ratio:** NLT 10, *Sensitivity solution*

**Analysis**

**Samples:** *Standard solution* and *Sample solution*

Calculate the percentage of each impurity in the portion of Tablets taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times (1/F) \times 100$$

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

$r_S$ = peak response of disulfiram from the *Standard solution*

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

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

$F$ = relative response factor (see *Table 2*)

**Acceptance criteria:** See *Table 2*. The reporting threshold is 0.1%.

**Table 2**

 

| Name | Relative Retention Time | Relative Response Factor | Acceptance Criteria, NMT (%) |
|---|---|---|---|
| Diethyldithiocarbamic acid | 0.18 | 1.2 | 0.2 |
| Tetraethylthiourea[a] | 0.69 | 1.1 | 0.2 |
| Sulfiram[b] | 0.80 | 0.55 | 0.2 |
| Disulfiram | 1.0 | — | — |
| Any other individual impurity | — | 1.0 | 0.2 |
| Total impurities | — | — | 1.0 |

[a] 1,1,3,3-Tetraethylthiourea.

[b] Diethylthiocarbamic thioanhydride.

**ADDITIONAL REQUIREMENTS**

- **Packaging and Storage:** Preserve in tight, light-resistant containers. Store at controlled room temperature.
- **USP Reference Standards** (11)
  USP Disulfiram RS

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

| Topic/Question | Contact | Expert Committee |
|---|---|---|
| DISULFIRAM TABLETS | Documentary Standards Support | SM42020 Small Molecules 4 |

**Chromatographic Database Information:** Chromatographic Database

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