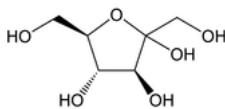


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Fructose



$C_6H_{12}O_6$ 180.16
 D-Fructose CAS RN®: 57-48-7.

DEFINITION

Fructose, dried under vacuum at 70° for 4 h, contains NLT 98.0% and NMT 102.0% of fructose ($C_6H_{12}O_6$).

IDENTIFICATION

- **A. SPECTROSCOPIC IDENTIFICATION TESTS (197), Infrared Spectroscopy:** 197K

Sample: Previously dried

Acceptance criteria: Meets the requirements

ASSAY

PROCEDURE

Sample: 10 g, previously dried

Optical rotation

(See [Optical Rotation \(781\), Procedures, Angular Rotation](#).)

Tube length: 100 mm

Temperature: 25°

Analysis: Transfer the *Sample* to a 100-mL volumetric flask, and dissolve in 50 mL of [water](#). Add 0.2 mL of [6 N ammonium hydroxide](#), and dilute with [water](#) to volume. After 30 min, determine the angular rotation. The observed rotation, in degrees, represents the weight, in g. Calculate the percentage of fructose ($C_6H_{12}O_6$) in the portion of Fructose taken.

$$\text{Result} = [(a \times F)/W] \times 100$$

a = observed rotation of the sample (°)

F = correction factor, -1.124

W = weight of the *Sample* (g)

Acceptance criteria: 98.0%–102.0% on a previously dried basis

IMPURITIES

- **RESIDUE ON IGNITION (281):** NMT 0.5%

- **CHLORIDE AND SULFATE (221), Chloride**

Sample: 2.0 g

Control: 0.50 mL of 0.020 N [hydrochloric acid](#)

Acceptance criteria: NMT 0.018%; the *Sample* shows no more chloride than corresponds to the *Control*.

- **CHLORIDE AND SULFATE (221), Sulfate**

Sample: 2.0 g

Control: 0.50 mL of 0.020 N [sulfuric acid](#)

Acceptance criteria: NMT 0.025%; the *Sample* shows no more sulfate than corresponds to the *Control*.

Delete the following:

- ▲ **ARSENIC (211), Method II**

Test preparation: Prepare by heating the acidified mixture nearly to dryness. Cool, and add 30% hydrogen peroxide.

Acceptance criteria: NMT 1 µg/g ▲ (USP 1-May-2022)

- **CALCIUM AND MAGNESIUM (AS CALCIUM)**

Sample: 20 g

Titrimetric system

Mode: Direct titration

Titrant: 0.005 M edetate disodium VS

Endpoint detection: Visual

Analysis: Dissolve the *Sample* in 200 mL of [water](#). Add 2 drops of [hydrochloric acid](#), 5 mL of ammonia–ammonium chloride buffer TS, and 8 drops of [eriochrome black TS](#), and mix. Titrate with *Titrant* to a blue endpoint. Each mL of *Titrant* is equivalent to 200.4 µg of Ca.

Acceptance criteria: 0.005% of Ca; NMT 5.0 mL of *Titrant* is consumed.

• **LIMIT OF HYDROXYMETHYLFURFURAL**

Resorcinol solution: 10 mg/mL of [resorcinol](#) in [hydrochloric acid](#)

Sample solution: 100 mg/mL

Analysis: To 10 mL of *Sample solution* add 5 mL of [ethyl ether](#), and shake vigorously. Transfer 2 mL of the ether layer to a test tube, and add 1 mL of *Resorcinol solution*.

Acceptance criteria: A slight pink color may develop, but no cherry-red color appears immediately.

SPECIFIC TESTS

• **COLOR OF SOLUTION**

Sample solution: 25 g of Fructose in water to make 50 mL

Comparison solution: Mix 1.0 mL of [cobaltous chloride CS](#), 3.0 mL of [ferric chloride CS](#), and 2.0 mL of [cupric sulfate CS](#) with [water](#) to make 10 mL, and dilute 3 mL of this solution with [water](#) to make 50 mL.

Analysis: View the *Sample solution* and *Comparison solution* downward in matched color-comparison tubes against a white surface.

Acceptance criteria: The *Sample solution* has no more color than the *Comparison solution*.

• **ACIDITY**

Sample: 5.0 g

Titrimetric system

Mode: Direct titration

Titrant: [0.02 N sodium hydroxide VS](#)

Endpoint detection: Visual

Analysis: Dissolve the *Sample* in 50 mL of [carbon dioxide-free water](#). Add [phenolphthalein TS](#), and titrate with *Titrant* to a distinct pink color.

Acceptance criteria: NMT 0.50 mL of *Titrant* is needed for neutralization.

• **LOSS ON DRYING (731)**

Analysis: Dry under vacuum at 70° for 4 h.

Acceptance criteria: NMT 0.5%

ADDITIONAL REQUIREMENTS

• **PACKAGING AND STORAGE:** Preserve in well-closed containers.

• **USP REFERENCE STANDARDS (11)**

[USP Fructose RS](#)

Auxiliary Information - Please [check for your question in the FAQs](#) before contacting USP.

Topic/Question	Contact	Expert Committee
FRUCTOSE	Documentary Standards Support	SM52020 Small Molecules 5

Chromatographic Database Information: [Chromatographic Database](#)

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