Ribose

C₅H₁₀O₅ 150.13
(2S,3R,4S,5R)-5-(Hydroxymethyl)oxolane-2,3,4-triol; d-Ribose [50-69-1].

DEFINITION
Ribose contains NLT 98.0% and NMT 102.0% of d-ribose (C₅H₁₀O₅), calculated on the dried basis.

IDENTIFICATION
• A. SPECTROSCOPIC IDENTIFICATION TESTS (197), Infrared Spectroscopy: 197K
• B. It meets the requirements in Specific Tests for Optical Rotation (781S), Procedures, Specific Rotation.
• C. 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: Degassed water
  System suitability solution: 20 mg/mL of USP Ribose RS and 0.2 mg/mL of USP Arabinose RS in Mobile phase
  Standard solution: 20 mg/mL of USP Ribose RS in Mobile phase
  Sample solution: 20 mg/mL of Ribose in Mobile phase
  Chromatographic system
  (See Chromatography (621), System Suitability.)
  Mode: LC
  Detector: Refractive index
  Column: 8.0-mm × 30-cm; 6-µm packing L22
  Temperatures
    Detector: 40°
    Column: 80°
  Flow rate: 1.0 mL/min
  Injection volume: 10 µL
  System suitability
  Samples: System suitability solution and Standard solution
  [NOTE—The relative retention times for arabinose and ribose are 0.9 and 1.0, respectively.]
  Suitability requirements
    Resolution: NLT 1.2 between ribose and arabinose, System suitability solution
    Tailing factor: NMT 1.5, Standard solution
    Column efficiency: NLT 2500 theoretical plates for the ribose peak, Standard solution
    Relative standard deviation: NMT 2.0%, Standard solution
  Analysis
Samples: Standard solution and Sample solution

Calculate the percentage of d-ribose in the portion of Ribose taken:

\[ \text{Result} = \left( \frac{r_U}{r_S} \right) \times \left( \frac{C_S}{C_U} \right) \times 100 \]

- \( r_U \) = peak response from the Sample solution
- \( r_S \) = peak response from the Standard solution
- \( C_S \) = concentration of USP Ribose RS in the Standard solution (mg/mL)
- \( C_U \) = concentration of Ribose in the Sample solution (mg/mL)

Acceptance criteria: 98.0–102.0% on the dried basis

IMPURITIES

- **Residue on Ignition (281)**: NMT 0.2%
- **Chloride and Sulfate (221), Chloride**
  
  Standard: 0.10 mL of 0.020 N hydrochloric acid
  
  Sample: 3.6 g of Ribose
  
  Acceptance criteria: NMT 0.002%

- **Chloride and Sulfate (221), Sulfate**
  
  Standard: 0.10 mL of 0.020 N sulfuric acid
  
  Sample: 3.3 g of Ribose
  
  Acceptance criteria: NMT 0.003%

- **Related Compounds**

  Mobile phase, System suitability solution, Sample solution, Chromatographic system, and System suitability: Proceed as directed in the Assay.

  Standard solution: 0.02 mg/mL of USP Arabinose RS in Mobile phase

  Analysis

  Samples: Standard solution and Sample solution

  Calculate the percentage of arabinose in the portion of Ribose taken:

  \[ \text{Result} = \left( \frac{r_U}{r_S} \right) \times \left( \frac{C_S}{C_U} \right) \times 100 \]

  - \( r_U \) = peak response of arabinose from the Sample solution
  - \( r_S \) = peak response of arabinose from the Standard solution
  - \( C_S \) = concentration of USP Arabinose RS in the Standard solution (mg/mL)
  - \( C_U \) = concentration of Ribose in the Sample solution (mg/mL)

  Calculate the percentage of any unspecified impurity in the portion of Ribose taken:

  \[ \text{Result} = \left( \frac{r_U}{r_T} \right) \times 100 \]

  - \( r_U \) = peak response of any unspecified impurity from the Sample solution
  - \( r_T \) = sum of all the peak responses from the Sample solution

  **Acceptance criteria**

  - **Arabinose**: NMT 1.0%
  - **Unspecified impurity**: NMT 0.1%
  - **Total unspecified impurities**: NMT 1.0%

SPECIFIC TESTS
• **Optical Rotation** *(781S), Procedures, Specific Rotation*

Sample solution: 20 mg/mL in *water*
Acceptance criteria: −18.0° to −22.0°

• **Color of Solution**

Sample solution: Dissolve 5.0 g of Ribose in 50 mL of *water*. Centrifuge or filter, if necessary, to obtain a clear solution.

Blank solution: *Water*

Analysis: Absorbance at 430 nm in a 1-cm cell
Acceptance criteria: NMT 0.2 AU

*Change to read:*

• **Loss on Drying** *(731)*

Analysis: ▲Dry at 60° under vacuum of NLT 50 mmHg for 3.5 h.▲ *(IRA 1-Mar-2021)*
Acceptance criteria: NMT 0.5%

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in tight, light-resistant containers.

• **USP Reference Standards** *(11)*

  USP Arabinose RS  
  USP Ribose RS

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Page Information:

Not Applicable

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