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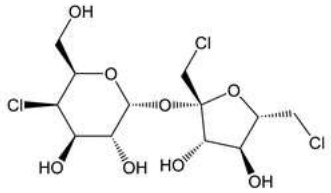
Sucralose



$C_{12}H_{19}Cl_3O_8$ 397.63

1,6-Dichloro-1,6-dideoxy-β-D-fructofuranosyl-4-chloro-4-deoxy-α-D-galactopyranoside;
1',4,6'-Trichlorogalactosucrose CAS RN®: 56038-13-2.

DEFINITION

Sucralose contains NLT 98.0% and NMT 102.0% of sucralose ($C_{12}H_{19}Cl_3O_8$), calculated on the anhydrous basis.

IDENTIFICATION

• **A. Spectroscopic Identification Tests ⟨197⟩, *Infrared Spectroscopy*:** 197K

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

• **C.** The R_F value of the principal spot of the *Sample solution* corresponds to that of *Standard solution A*, as obtained in the test for *Related Compounds*.

ASSAY

Change to read:

• **Procedure**

Mobile phase: Acetonitrile and water (3:17)

Standard solution: 1 mg/mL of USP Sucralose RS in *Mobile phase*

Sample solution: 1 mg/mL of Sucralose in *Mobile phase*

Chromatographic system

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

Mode: LC

Detector: Refractive index

Column: 8-mm × 10-cm; ▲5-µm▲ (NF 1-Dec-2023) packing L1

Flow rate: 1.5 mL/min

Injection volume: 20 µL

System suitability

Sample: *Standard solution*

[Note—The retention time of sucralose is about 9 min.]

Suitability requirements

Relative standard deviation: NMT 2.0%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of sucralose ($C_{12}H_{19}Cl_3O_8$) in the portion of Sucralose taken:

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

r_U = peak response of sucralose from the *Sample solution*

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

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

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

Acceptance criteria: 98.0%–102.0% on the anhydrous basis

IMPURITIES

• **Residue on Ignition ⟨281⟩:** NMT 0.7%

Change to read:

• **Limit of Methanol**

▲**Standard stock solution:** 1000 µg/mL of methanol in water

Standard solution: Transfer 1.000 g of Sucralose to a 22-mL headspace vial. Add 4.0 mL of 10% (w/v) sodium chloride solution. Add 1.00 mL of the *Standard stock solution*. Crimp a cap with a Teflon seal tightly onto the vial, and mix the solution well.

Sample solution: Add 1.000 g of Sucralose to a 22-mL headspace vial. Add 4.0 mL of a 10% (w/v) sodium chloride solution. Add 1.00 mL of water. Crimp a cap with a Teflon seal tightly onto the vial, and mix the solution well.

Chromatographic system

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

Mode: GC with balanced-pressure headspace sampler

Detector: Flame ionization

Column: 0.32-mm × 30-m; 1.0-µm layer of phase G16

Temperatures

Injection port: 110°

Detector: 250°

Column: See *Table 1*.

Table 1

Initial Temperature (°)	Temperature Ramp (°/min)	Final Temperature (°)	Hold Time at Final Temperature (min)
50	0	50	3
50	10	80	0
80	50	230	10

Carrier gas: Helium

Headspace sampler

[Note—The capillary column is installed through the GC inlet and through the transfer line to give on-column injection.]

Temperatures

Equilibration: 90°

Needle: 100°

Transfer line: 110°

Times

Equilibration: 10 min

Pressurization: 3.0 min

Withdrawal: 0.5 min

Injection: 0.15 min

Cycle: 25 min

Sampler delivery system: Helium set at 90 psi (not to exceed 100 psi)

System suitability

Sample: *Standard solution*

Suitability requirements

Relative standard deviation: NMT 10.0%

Analysis

Samples: *Standard solution* and *Sample solution*

Calculate the percentage of methanol in the portion of Sucralose taken:

$$\text{Result} = (r_U \times W_S)/[(r_S - r_U) \times W_U] \times 100$$

r_U = peak area of methanol from the *Sample solution*

W_S = weight of methanol in the *Standard solution* (g)

r_S = peak area of methanol from the *Standard solution*

W_U = weight of Sucralose to prepare the *Sample solution* (g)

▲ (NF 1-Dec-2023)

Acceptance criteria: NMT 0.1%

• **Related Compounds**

Adsorbent: 0.20-mm layer of octadecylsilanized chromatographic silica gel. The thin-layer chromatographic plate also has a preadsorbent zone.

Detection reagent: Sulfuric acid in methanol (3 in 20)

Standard solution A: 10.0 mg/mL of USP Sucralose RS in methanol

Standard solution B: 0.5 mL of *Standard solution A* diluted with methanol to 10.0 mL

Sample solution: 100.0 mg/mL of Sucralose in methanol

Developing solvent system: Acetonitrile and sodium chloride solution (1 in 20) (3:7)

Application volume: 5 µL

Analysis

Samples: *Standard solution A*, *Standard solution B*, and *Sample solution*

Proceed as directed under *Chromatography ⟨621⟩, Thin-Layer Chromatography*. Spray the plate with *Detection reagent*. Heat the plate for 10 min at 125°.

Acceptance criteria: The R_F value of the principal spot from the *Sample solution* corresponds to that obtained from *Standard solution A*, and the color of any other single spot from the *Sample solution* is not more intense than that of the principal spot from *Standard solution B* (0.5%).

Change to read:

• **Limit of Hydrolysis Products**

[Note—This test does not require a developing solvent.]

Adsorbent: 0.25-mm layer of chromatographic silica gel

Spray reagent: 12.3 mg/mL of *p*-anisidine and 16.6 mg/mL of phthalic acid in methanol. Store the solution in the dark and refrigerate to prevent discoloration. Discard if the solution becomes discolored. [**Caution—***p*-Anisidine is toxic if inhaled or if absorbed through the skin.]

Standard solution A: 100 mg/mL of mannitol

Standard solution B: 0.4 mg/mL of fructose and 100 mg/mL of mannitol

Sample solution: 250 mg/mL of Sucralose in methanol

Application volume: 5-µL portions separately applied in 1-µL increments, allowing the plate to dry between applications

Analysis

Samples: ▲*Standard solution A*, *Standard solution B*,▲ (NF 1-Dec-2023) and *Sample solution*

Proceed as directed under *Chromatography ⟨621⟩, Thin-Layer Chromatography*. Spray the plate with *Spray reagent*, and heat the plate at 100 ± 2° for 15 min. If the spot from *Standard solution A* has darkened, repeat the test, heating for a shorter period of time. Immediately after heating, view the plate against a dark background.

Acceptance criteria: The color of the spot from the *Sample solution* is not more intense than that from *Standard solution B* (0.1%).

SPECIFIC TESTS

Change to read:

• **Optical Rotation** ⟨781S⟩, *Procedures, Specific Rotation*

Sample solution: 10 mg/mL of Sucralose ▲, calculated on the anhydrous basis▲ (NF 1-Dec-2023)

Acceptance criteria: +84.0° to +87.5° at 20°

• **Water Determination** ⟨921⟩, *Method I*: NMT 2.0%

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in well-closed containers, in a cool, dry place, at a temperature not exceeding 21°.

• **USP Reference Standards** ⟨11⟩

USP Sucralose RS

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

Topic/Question	Contact	Expert Committee
SUCRALOSE	Documentary Standards Support	SE2020 Simple Excipients

Chromatographic Database Information: Chromatographic Database

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