



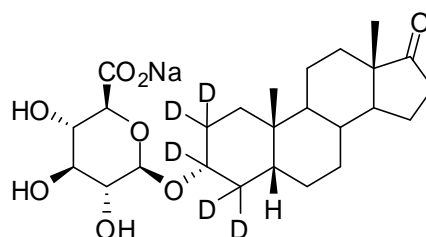
DEUTERATED INTERNAL STANDARD PRODUCT INFORMATION SHEET

NMIA S020: d₅-Etiocholanolone glucuronic acid sodium salt

Report ID: S020.2019.01 (Ampouled 160714)

Chemical Formula: C₂₅H₃₂D₅O₈Na

Molecular Weight: 493.6 g/mol



Property value

Batch No.	CAS No.	Mass per ampoule
13-S-01	Not available	869 µg

IUPAC name: Sodium (3 α ,5 β)-17-Oxo(2,2,3,4,4-²H₅)androstan-3-yl β -D-glucopyranosiduronate

Expiration of certification: The property values are valid till 21 June 2024, i.e. five years from the date of re-certification provided the **unopened** material is handled and stored in accordance with the recommendations below. The material as issued in the unopened container and stored as recommended below should be suitable for use beyond this date, subject to confirmation of batch stability from the issuing body. The shelf life does not apply to ampoules that have been opened. In such cases it is recommended that the end-user conduct their own in-house stability trials.

Description: The compound is supplied as a dried aliquot in a sealed ampoule and is intended for a single use to prepare a standard solution containing S020. The material was prepared by synthesis, and certified for identity and purity by NMIA.

Intended use: The isotopic purity of this material is an estimate only. This material should be considered for use as an internal standard only.

Instructions for use: Open the ampoule and carefully rinse the interior at least three times with a suitable organic solvent (e.g. methanol). This will transfer approximately 896 µg of anhydrous etiocholanolone glucuronic acid sodium salt (d₅, d₄, d₃, d₂, d₁ and d₀).

Recommended storage: When not in use, this material should be stored at or below 4 °C in a closed container in a dry, dark area.

Stability: In the absence of long term stability data the measurement uncertainty at the 95% coverage interval has been expanded to accommodate any potential change in the property value. The long-term stability of the compound in solution has not been examined.

Homogeneity assessment: The homogeneity of the material was assessed using purity assay by HPLC with ELS detection on seven randomly selected ampoules of the material. The material was judged to be sufficiently homogeneous at this level of sampling as the variation in analysis results between samples was not significantly different at a 95% confidence level from that observed on repeat analysis of the same sample.

Safety: Treat as a hazardous substance. Use appropriate work practices when handling to avoid skin or eye contact, ingestion or inhalation of dust. Refer to the provided safety data sheet.

S. R. Davies

Dr Stephen R. Davies,
Team Leader,
Chemical Reference Materials, NMI.
20 December 2019.

This report supersedes any issued prior to 20 December, 2019.

NATA logo notice: Accredited for compliance with ISO Guide 17034. Accreditation No. 198 / Corporate Site No. 20844. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Legal notice: Terms and Conditions associated with the provision of this reference material can be found on the NMIA website.

Characterisation Report:

HPLC:	Instrument:	Shimadzu Binary pump LC-20AB, SIL-20 A HT autosampler
	Column:	Alltima C-18, 5µm (4.6 mm × 150 mm)
	Column oven:	40 °C
	Mobile Phase:	Methanol/MilliQ water (65:35) 0.5% Formic acid was present in the aqueous phase.
	Flow Rate:	1.0 mL/min
	Detector:	Shimadzu ELS detector
	Relative peak area of the main component:	
	Initial analysis:	Mean = 99.7%, s = 0.08% (7 ampoules in duplicate, July 2016)
	Re-analysis:	Mean = 99.7%, s = 0.06% (5 sub samples in duplicate, June 2019)

The following analytical data was obtained on the bulk material subsequently used in the preparation of the ampoules.

The identity was confirmed by a range of spectroscopic techniques, NMR, IR and MS. The purity value was obtained by mass balance from a combination of traditional analytical techniques, including HPLC with ELS detection, thermogravimetric analysis, Karl Fischer analysis and ¹H NMR spectroscopy. The purity value is calculated as per Equation 1.

$$\text{Purity} = (100 \% - I_{\text{ORG}}) \times (100 \% - I_{\text{VOL}} - I_{\text{NVR}}) \quad \text{Equation 1}$$

I_{ORG} = Organic impurities of related structure, I_{VOL} = volatile impurities, I_{NVR} = non-volatile residue.

Supporting evidence is provided by qualitative elemental microanalysis.

The main component of this material is d₅-etiocholanolone-β-glucuronic acid sodium salt. d₄, d₃-, d₂-, d₁- and d₀- Etiocholanolone-β-glucuronic acid sodium salt are also present. The stated chemical purity of the analyte represents the combined mass fractions of deuterated (d₅, d₄, d₃, d₂ and d₁) and d₀- etiocholanolone-β-glucuronic acid sodium salt in the material.

The isotopic purity of this material is an estimate only. This material should be considered for use as an internal standard only.

Isotopic Purity: d₅ ≈ 93% [= d₅/(d₅ + d₄ + d₃ + d₂ + d₁ + d₀) × 100]
 d₀ < 0.2% [= d₀/(d₅ + d₄ + d₃ + d₂ + d₁ + d₀) × 100]

HPLC:	Instrument:	Waters Model 1525 Binary pump, 717 plus autosampler
	Column:	Alltima C-18, 5 µm (4.6 mm × 150 mm)
	Column oven:	40 °C
	Mobile Phase:	Methanol/MilliQ water (65:35) 0.5% Formic acid was present in the aqueous phase.
	Flow rate:	1 mL/min
	Detector:	Waters 2424 ELS detector
	Relative peak area of the main component:	
	Initial analysis:	Mean = 99.5%, s = 0.1% (7 sub samples in duplicate, January 2013)
	Re-analysis:	Mean = 99.6%, s = 0.1% (5 sub samples in duplicate, January 2016)

Thermogravimetric analysis: Volatile content 7.8% and non volatile residue 7.1% mass fraction (February 2013)

Karl Fischer analysis: Moisture content 10.4% mass fraction (March 2013)
 Moisture content 10.4% mass fraction (January 2016)

Spectroscopic and other characterisation data

ESI-MS:	Instrument: Waters Acquity UPLC/TQD Ionisation mode: Electrospray negative ion, direct infusion at 5 µL/min Capillary voltage: 3.0 kV Cone voltage: 55 V Source temp: 80 °C Desolvation gas temp: 150 °C Cone gas flow rate: 2 L/hr Desolvation gas flow: 550 L/hr Peak: 470.3 (M-Na+) <i>m/z</i>
GC-MS:	The free steroid was liberated upon treatment with β-glucuronidase enzyme (E. Coli K12) and derivatised with MSTFA. Instrument: Agilent 6890/5973 Column: HP Ultra 1, 17 m × 0.22 mm I.D. × 0.11 µm Program: 180 °C, 3 °C /min to 240 °C, 10 °C/min to 265 °C, 30 °C/min to 310 °C Injector: 260 °C Transfer line temp: 300 °C Carrier: Helium, 1.0 mL/min Split ratio: 14/1 The retention time of the <i>bis</i> -TMS derivative of d ₅ -etiocholanolone is reported along with the major peaks in the mass spectrum. The latter are reported as mass/charge ratios and (in brackets) as a percentage relative to the base peak. <i>Bis</i> -TMS (9.4 min): 439 (M+, 23), 424 (36), 334 (20), 244 (12), 182 (12), 169 (20), 73 (100) <i>m/z</i>
TLC:	Conditions: Kieselgel 60F ₂₅₄ . Chloroform/methanol (4/1) Single spot observed, R _f = 0.17. Visualisation with vanillin
IR:	Instrument: Biorad FTS3000MX FT-IR Range: 4000-400 cm ⁻¹ , KBr powder Peaks: 3615, 3520, 3454, 2934, 2923, 2866, 2853, 2200, 2130, 1730, 1612, 1408, 1376, 1295, 1167, 1087, 1070, 1042, 1027 cm ⁻¹
¹ H NMR:	Instrument: Bruker Avance III-400 Field strength: 400 MHz Solvent: CD ₃ OD (3.31 ppm) Spectral data: δ 0.87 (3H, s), 0.98 (3H, s), 1.01 (1H, s), 1.20-1.45 (6H, m), 1.50-1.67 (5H, m), 1.75-1.84 (2H, m), 1.89-1.99 (2H, m), 2.08 (1H, m), 2.44 (1H, dd, <i>J</i> = 8.5, 19.2 Hz), 3.18 (1H, dd, <i>J</i> = 8.0, 8.9 Hz), 3.39 (1H, t, <i>J</i> = 8.8 Hz), 3.43 (1H, t, <i>J</i> = 8.7 Hz) 3.55 (1H, d, <i>J</i> = 9.4 Hz), 4.40 (1H, d, <i>J</i> = 7.7 Hz) ppm
¹³ C NMR:	Instrument: Bruker Avance III-400 Field strength: 101 MHz Solvent: CD ₃ OD (49.0 ppm) Spectral data: δ 14.2, 21.2, 22.8, 23.8, 26.5, 28.0, 33.0, 35.9, 36.1, 36.7, 36.8, 42.1, 43.4, 49.17, 52.8, 73.3, 75.0, 76.2, 77.9, 101.8, 176.9, 224.5 ppm
Melting point:	> 220 °C decomposition
Microanalysis:	Found: C = 55.0%; H = 7.7% (February, 2013) Calculated: C = 60.8%; H = 7.7% (Calculated for C ₂₅ H ₃₂ D ₅ O ₈ Na) Calculated: C = 54.8%; H = 8.0% (Calculated for C ₂₅ H ₃₂ D ₅ O ₈ Na + 10% H ₂ O)