



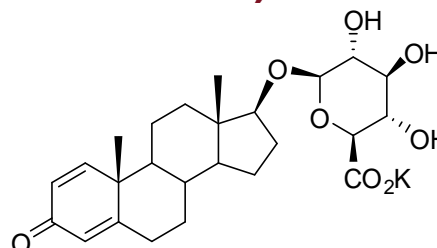
CERTIFIED REFERENCE MATERIAL CERTIFICATE OF ANALYSIS

NMIA D862: Boldenone glucuronide (potassium salt)

Report ID: D862.2021.01 (Ampouled 100329)

Chemical Formula: $C_{25}H_{33}O_8K$

Molecular Weight: 500.6 g/mol



Certified value

Batch No.	CAS No.	Mass per ampoule
03-S-17	Not available	941 ± 12 µg

The uncertainty has been calculated according to ISO Guide 35 and is stated at the 95% confidence limit ($k = 2$).

Synonyms: (17β)-3-Oxoandrosta-1,4-dien-17-yl-β-D-glucopyranosiduronic acid potassium salt .

Expiration of certification: The property values are valid till 7 July 2026, 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 expiry date/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 under an atmosphere of argon. The CRM is intended for a single use to prepare a standard solution containing D862. This material was prepared by sourced from an external supplier and certified for identity and purity by NMIA.

Intended use: This certified reference material is suitable for use as a primary calibrator.

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 941 ± 12 µg of anhydrous boldenone glucuronide (potassium salt). The mass of analyte in each ampoule is calculated from the assigned purity of the bulk and the concentration of bulk material in a stock solution used to prepare the ampoules.

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.

Metrological traceability: The certified purity value is traceable to the SI unit for mass (kg) through Australian national standards via balance calibration. In the mass balance approach all impurities are quantified as a mass fraction and subtracted from 100%.

Stability: This material has demonstrated stability over a minimum period of three years. The measurement uncertainty at the 95% confidence interval includes a stability component which has been estimated from annual stability trials. 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 UV 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 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.
9 July 2021

This report supersedes any issued prior to 9 July 2021.

NATA logo notice: Accredited for compliance with ISO 17034. Accreditation No. 198 / Corporate Site No. 14214. 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:	Waters Model 1525 Binary pump, 717 plus autosampler or Shimadzu Binary pump LC-20AB, SIL-20 A HT autosampler
	Column:	Alltima C-18, 5 µm (4.6 mm x 150 mm)
	Mobile Phase:	20 mM NH ₄ OAc buffer, pH 4.2/Acetonitrile/ (A/B) Gradient 0-8 min 75%A, 12-15 min 20%A, 20-25 min 75%A Or Gradient 0-10 min 77%A, 17-20 min 20%A, 23-28 min 77%A
	Flow rate:	1 mL/min
	Detector:	Waters PDA 996/2998 at 246 nm or Shimadzu PDASPD-M20A
	Relative mass fraction of the main component:	
	Initial analysis:	Mean = 98.9%, s = 0.004% (7 ampoules in duplicate, June 2010)
	Re-analysis:	Mean = 98.9%, s = 0.01% (5 ampoules in duplicate, September 2012)
	Re-analysis:	Mean = 98.9%, s = 0.01% (5 ampoules in duplicate, August 2013)
	Re-analysis:	Mean = 98.8%, s = 0.02% (5 ampoules in duplicate, June 2016)
	Re-analysis:	Mean = 98.9%, s = 0.01% (5 ampoules in duplicate, July 2021)

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 certified purity value was obtained by mass balance from a combination of traditional analytical techniques, including HPLC with UV 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 elemental microanalysis.

HPLC:	Instrument:	Waters Model 1525 Binary pump, 717 plus autosampler
	Column:	Alltima C-18, 5 µm (4.6 mm x 150 mm)
	Mobile Phase:	Acetonitrile/20 mM NH ₄ OAc buffer, pH 4.2 (25:75)
	Flow rate:	1 mL/min
	Detector:	Waters PDA 996 at 246 nm
	Relative mass fraction of the main component:	
	Initial analysis:	Mean = 99.0%, s = 0.03% (5 sub samples in duplicate, January 2004)
	Re-analysis:	Mean = 98.9%, s = 0.07% (5 sub samples in duplicate, June 2005)
	Re-analysis:	Mean = 98.9%, s = 0.05% (5 sub samples in duplicate, July 2007)
	Re-analysis:	Mean = 98.8%, s = 0.02% (7 sub samples in duplicate, June 2010)

Karl Fischer analysis: Moisture content 3.3% mass fraction (July 2006 & July 2007)

Thermogravimetric analysis: Volatile content 4.7% mass fraction (March 2004, December 2005 & July 2006)

Spectroscopic and other characterisation data

ESI-MS:	Instrument:	Micromass Quatro Micro
	Operation:	Negative ion mode, direct infusion at 5 μ L/min
	Ionisation:	ESI spray voltage at 3.0 kV negative ion
	EM voltage:	650 V
	Cone voltage:	40 V
	Peak:	461.3 (M-K) <i>m/z</i>
TLC:	Conditions:	Kieselgel 60F ₂₅₄ . Ethyl acetate/methanol/acetic acid (67:30:3) Single spot observed, R _f = 0.26. Visualization with vanillin
IR:	Instrument:	BioRad FTS3000MX FT-IR
	Range:	4000-400 cm^{-1} , KBr powder
	Peaks:	3429, 3284, 2936, 1666, 1612, 1407, 1295, 1159, 1061, 886 cm^{-1}
¹ H NMR:	Instrument:	Bruker DMX-500
	Field strength:	500 MHz Solvent: D ₂ O (4.79 ppm)
	Key spectral data:	δ 0.86 (3H, s), 1.25 (3H, s), 2.39 (1H, bd), 2.54 (1H, ddd), 3.75 (1H, t), 4.45 (1H, d), 6.13 (1H, s) 6.28 (1H, d), 7.42 (1H, d) ppm ¹ H NMR indicates the presence of methanol (ca.2 % mass fraction)
¹³ C NMR:	Instrument:	Bruker DMX-300
	Field strength:	75 MHz Solvent: D ₂ O
	Spectral data:	δ 11.4, 18.1, 22.9, 23.2, 28.2, 33.1, 33.8, 35.0, 37.5, 43.4, 45.3, 50.3, 53.4, 72.4, 73.7, 76.1, 76.8, 88.9, 102.7, 122.5, 126.2, 161.7, 175.9, 176.5, 189.7 ppm
Melting point:		286 °C (decomposition)
Microanalysis:	Found:	C = 57.2%; H = 6.8% (December 2003)
	Calculated:	C = 57.2%; H = 6.9% (Calculated based on 2% mass fraction methanol and 4% mass fraction water)