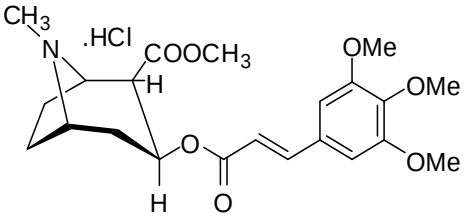
REFERENCE MATERIAL PRODUCT INFORMATION SHEET

NMIA D864: trans-3,4,5-Trimethoxycinnamoylcocaine hydrochloride

Report ID: D864.2012.02

Chemical Formula: $C_{22}H_{29}NO_7$.HCl

Molecular Weight: 455.9 g/mol (HCl), 419.5 (base) g/mol



Property value

Batch No.	CAS No.	Purity estimate
04-D-09	156407-24-8 (base)	89.6 %

Synonyms: [1R-(exo,exo)]-8-methyl-3-[(1-oxo-3-(3,4,5-trimethoxyphenyl)-2-propenyl)oxy]-8-azabizoclo[3.2.1]octane-2-carboxylic acid methyl ester

Expiration of certification: The property values are valid till 11th April 2017, i.e. five years from the date of 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 sample bottles that have been opened. In such cases it is recommended that the end-user conduct their own in-house stability trials. This material has been given a shelf life of five years from the date ofcertification. The material will be re-tested on an annual basis to ensure that the property values are still valid. In the event a product fails the stability trial, notification will be sent to all impacted customers.

Description: White powder prepared by synthesis or sourced from an external supplier, certified for identity and purity by NMIA. Packaged in amber glass bottles with a septum and crimped aluminium cap or screw top cap.

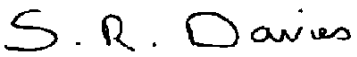
Intended use: This reference material should be used for qualitative analysis only.

Instructions for use: Equilibrate the bottled material to room temperature before opening.

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

Stability: In the absence of stability data the measurement uncertainty at the 95% coverage interval has been expanded to accommodate any potential change in the property value. The stability component has been estimated from stability trials conducted on similar materials by NMI Australia over the last 10 years. The long-term stability of the compound in solution has not been examined

Caution: 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.



Dr Stephen R. Davies,
Team Leader,
Chemical Reference Materials, NMI.
6 May 2020

This report supersedes any issued prior to 28 April 2020.

NATA logo notice: Accredited for compliance with ISO 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:

The identity was confirmed by a range of spectroscopic techniques, NMR, IR and MS. Impurities of related structure were assessed by GC-FID. The purity value was obtained by mass balance from a combination of traditional analytical techniques, including GC-FID. The purity value is calculated as per Equation 1.

Purity = (100 % - I_{ORG}) x (100 % - I_{VOL} – I_{NVR}) Equation 1

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

Supporting evidence is provided by ^{1}H NMR spectroscopy.

Note: This material is very hygroscopic. Avoid contact with air. 1 mg of D864 is equivalent to ca. 824 µg of 3,4,5-trimethoxycinnamoylcocaine free base

GC-FID (Free base)	Instrument:	HP 5890
	Column:	Zebron ZB-1, 29.1 m x 0.32 mm I.D. x 0.25 µm
	Program	200 ºC (1 min), 10 ºC/min to 300 ºC (5 min)
	Injector:	180 °C
	Detector Temp:	300 °C
	Carrier:	Helium
	Split ratio:	20/1
	Relative peak area of the main component:	
	Initial analysis: Mean = 93.7%, s = 0.2 (10 replicates in duplicate, May 2005)	
GC-FID:	Instrument:	Agilent 6890
	Column:	HP-1, 30 m × 0.32 mm I.D. × 0.25 µm
	Program:	180 °C (1 min), 10 °C/min to 315 °C (3min)
	Injector:	250 °C
	Detector Temp:	320 °C
	Carrier:	Helium
	Split ratio:	20/1
	Relative peak area of the main component:	
	Re-analysis:	Mean = 92.9%, s = 0.1 % (5 sub samples in duplicate, April 2007)
	Re-analysis:	Mean = 95.3%, s = 0.2 % (5 sub samples in duplicate, April 2012)

Karl Fischer analysis: N/A due to the hygroscopic nature of the material.

Spectroscopic and other characterisation data

GC-MS:	Instrument:	HP6890/5973
(Free base)	Column:	DB1701, 30 m x 0.25 mm I.D. x 0.30µm
	Program:	180 °C (1 min), 4 °C/min to 200 °C, 6 °C/min to 275 °C (11.5 min), 6 °C/min to 300 °C (5.83 min)
	Injector:	220 °C
	Transfer line temp:	280 °C
	Carrier:	Helium, 1.0 ml/min
	Split ratio:	20/1
	The retention time of the free base of the parent compound 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.	
	(Free base) 34.4 min:	419 (M^+, 18), 238 (27), 221 (15), 182 (74), 96 (54), 82 (100) *m/z*
ESI-MS:	Instrument:	Micromass Quattro Micro
	Operation:	Negative ion mode, direct infusion at 5µL/min with 0.1% NH_4OH
	Solvent:	MeOH
	Ionisation:	ESI spray voltage at 3.50 kV for negative ion mode
	Desolvation temp:	200 ºC
	Multiplier (V):	650
	Scan Range:	50-500 *m/z*
	Peak:	420 ($M+H^+$, 100), 221 (68), 182 (75) *m/z*
IR:	Instrument:	BioRad FTS3000MX FT-IR
	Range:	4000-400 cm^{-1}, KBr powder
	Peaks:	3396, 2953, 2840, 1713, 1633, 1582, 1505, 1276, 1247, 1150, 1125, 1003, 830, 609 cm^{-1}
^1H NMR:	Instrument:	Bruker DMX-300
	Field strength:	300.2 MHz
	Solvent:	D_2O (4.79 ppm)
	Key spectral data:	δ 2.00-2.70 (6H, m), 2.98 (3H, s), 3.64 (1H, bdd, *J* = 2.6, 7.2), 3.85 (3H, s), 3.88 (3H, s), 3.93 (6H, s), 4.18 (1H, bd, *J* = 5.6), 4.31 (1H, bd, *J* = 5.6 Hz), 5.49 (1H, dd, *J* = 7.9, 17.7 Hz), 6.43 (1H, d, *J* = 15.9), 6.92 (2H, s), 7.57 (1H, d, 16.2 Hz) ppm A quantitative ^1H NMR experiment was used to give a volatile content of 3.8%.
^{13}C NMR:	Instrument:	Bruker DMX-300
	Field strength:	75.5 MHz
	Solvent:	D_2O
	Spectral data:	δ 22.4, 23.5, 32.5, 38.7, 46.0, 53.2, 56.0, 60.9, 63.0, 63.7, 63.9, 105.9, 115.8, 130.0, 139.1, 146.4, 152.6, 167.2, 173.1 ppm
Micro Analysis		N/A due to the hygroscopic nature of the material.
Melting point:		154-161 ºC