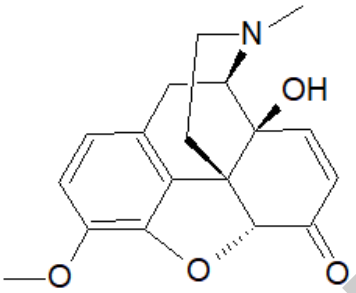
Our Formula. Your Success.

Reference Material Product Information Sheet

Epichem's Quality System conforms to ISO9001:2015 as certified by ECAAS Pty Ltd - Certification number 616061.



Name	14-hydroxycodeinone
BP/EP Name	Oxycodone Impurity D
USP Name	Oxycodone Related Compound A
Synonym(s)	(5α)-7,8-didehydro-4,5-epoxy-14-hydroxy-3-methoxy-17-methylmorphinan-6-one; Oxycodone Related Compound A
Epichem Item #	EPL-AA61 Batch 11
CAS #	508-54-3
Molecular Formula	$C_{18}H_{19}NO_4$
Molecular Weight	313.36 g/mol
Appearance	Off-white powder
Melting Point	269.5-274.0°C (decomposition)
Combustion Analysis	Required (%): C:69.0; H:6.1; N:4.5. Found (%): C:67.5; H:6.0; N:4.4.
Purity	98.4%
Date of Manufacture	24 January 2018
Storage Requirements	Protect from heat, light and moisture.
Special Precautions	**This compound is for laboratory use only. Its toxicological properties may not have been fully established. It should be handled only by suitably qualified personnel.**
Intended Use	This compound is suitable for the identification of impurities and degradants in pharmaceutical materials. The purity assay is considered as relative contribution.
Date of Shipment	TBA
	This certificate is valid for one year from the date of shipment provided the substance is stored under the recommended conditions.
Retest Date	TBA (Proper Storage and Handling Required)

Epichem Pty Ltd, Suite 5, 3 Brodie-Hall Drive, Bentley WA 6102, Australia
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I. Identity

The identity of this product was established using the following analyses:

Ia. ^{1}HNMR Spectrum

Conditions: 400 MHz, DMSO-d_6

^{1}HNMR spectrum consistent with chemical structure.

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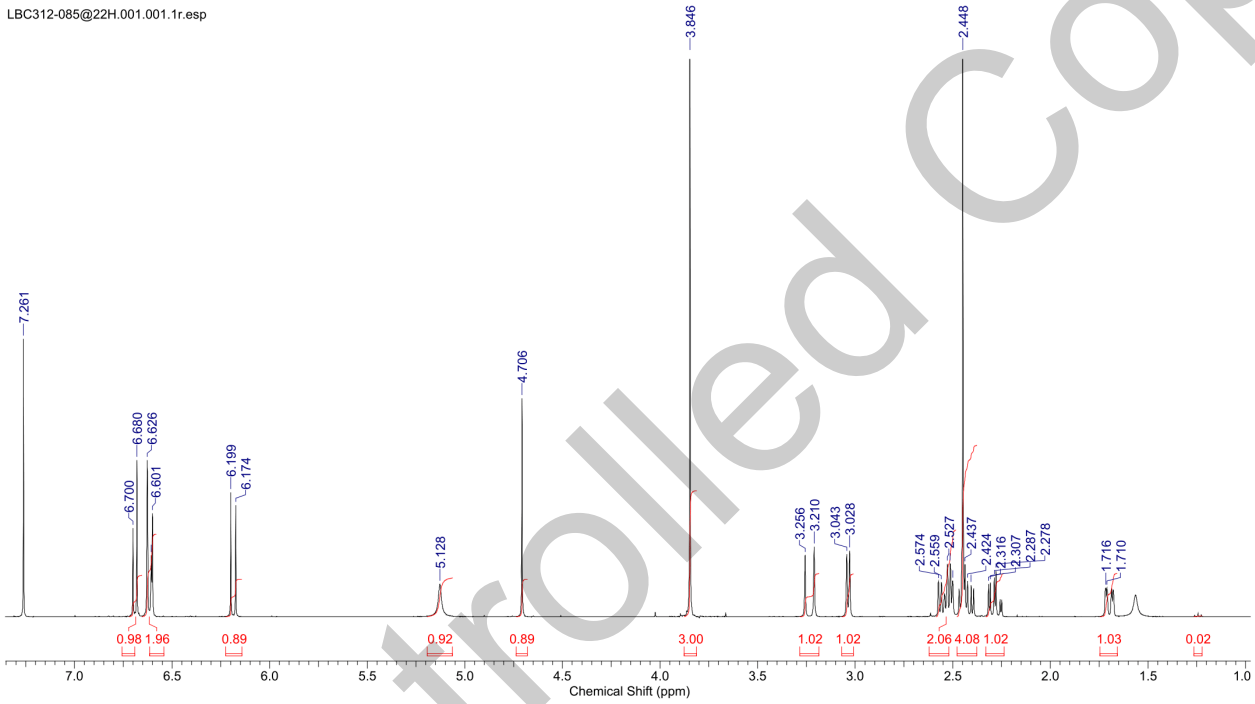
Acquisition Time (sec)	3.7547	***Comment***	LBC312-085@22H 1H CDCl3 {E:\dataexternal\epichem} cygoh 3				
Date	23 Jan 2018 17:21:04			***Date Stamp***	23 Jan 2018 17:21:04		
File Name	\\naphthalene\company\NMR files\LBC312-085@22H\1\pdata\1\1r					***Frequency (MHz)***	400.13
Nucleus	1H	***Number of Transients***	8	***Origin***	spect	***Original Points Count***	24038
Owner	nmr	***Points Count***	32768	***Pulse Sequence***	zg	***Receiver Gain***	161.00
SW(cyclical) (Hz)	6402.05	***Solvent***	CHLOROFORM-d			***Spectrum Offset (Hz)***	2791.4065
Spectrum Type	STANDARD	***Sweep Width (Hz)***	6401.85	***Temperature (degree C)***	26.945		

LBC312-085@22H.001.001.1r.esp



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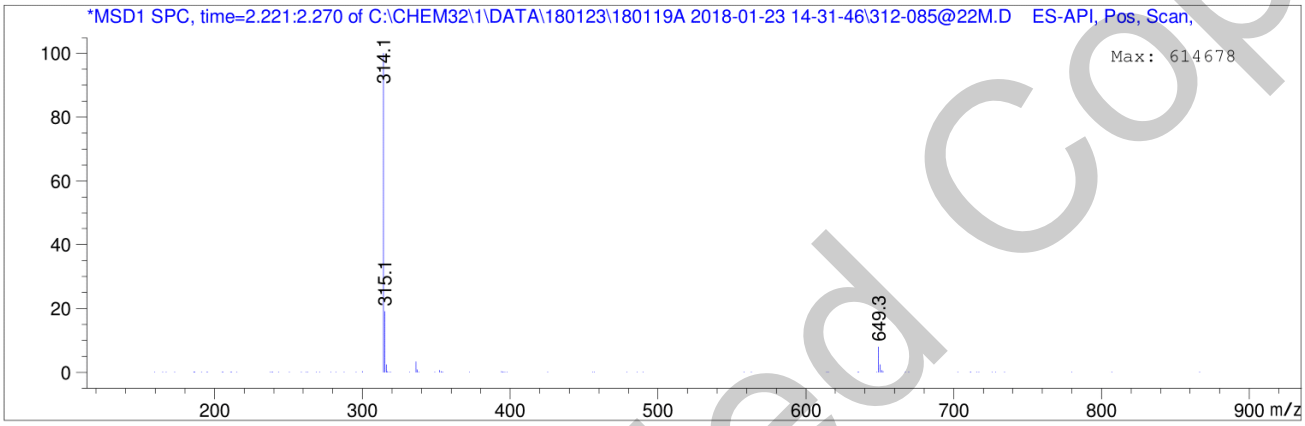
Ib. Mass Spectrum

The mass spectrum of this material was analysed by Liquid Chromatography Mass Spectroscopy (LCMS) using in-house EM005.WI08.

Method: 5% to 100% ACN in water gradient (+0.1% formic acid)

Zorbax Eclipse XDB-C8, 3.0 x 100 mm, 3.5 micron

Retention Time (MS)	MS Area	Mol. Weight or Ion
2.250	4721685	315.10 I
		314.10 I



Theoretical value: 314.1 [M+H]+.

The signal of the Mass Spectrum is consistent with the theoretical value and its interpretation is consistent with the structural formula.

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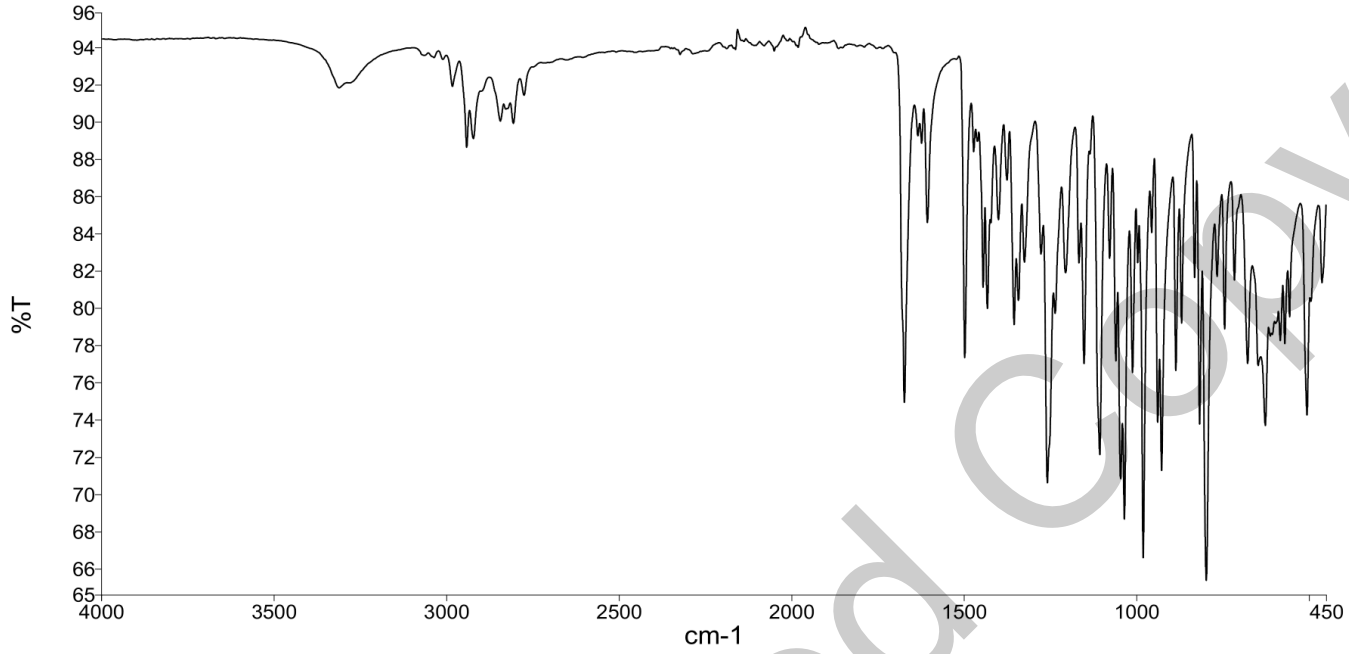
Ic. IR Spectrum

The infra-red spectrum of this material was analysed by Fourier-Transform Infrared Spectroscopy (FTIR) using in-house EM005.WI09.



The interpretation of the signals of the Fourier-Transform Infrared Spectrum is consistent with the structural formula.

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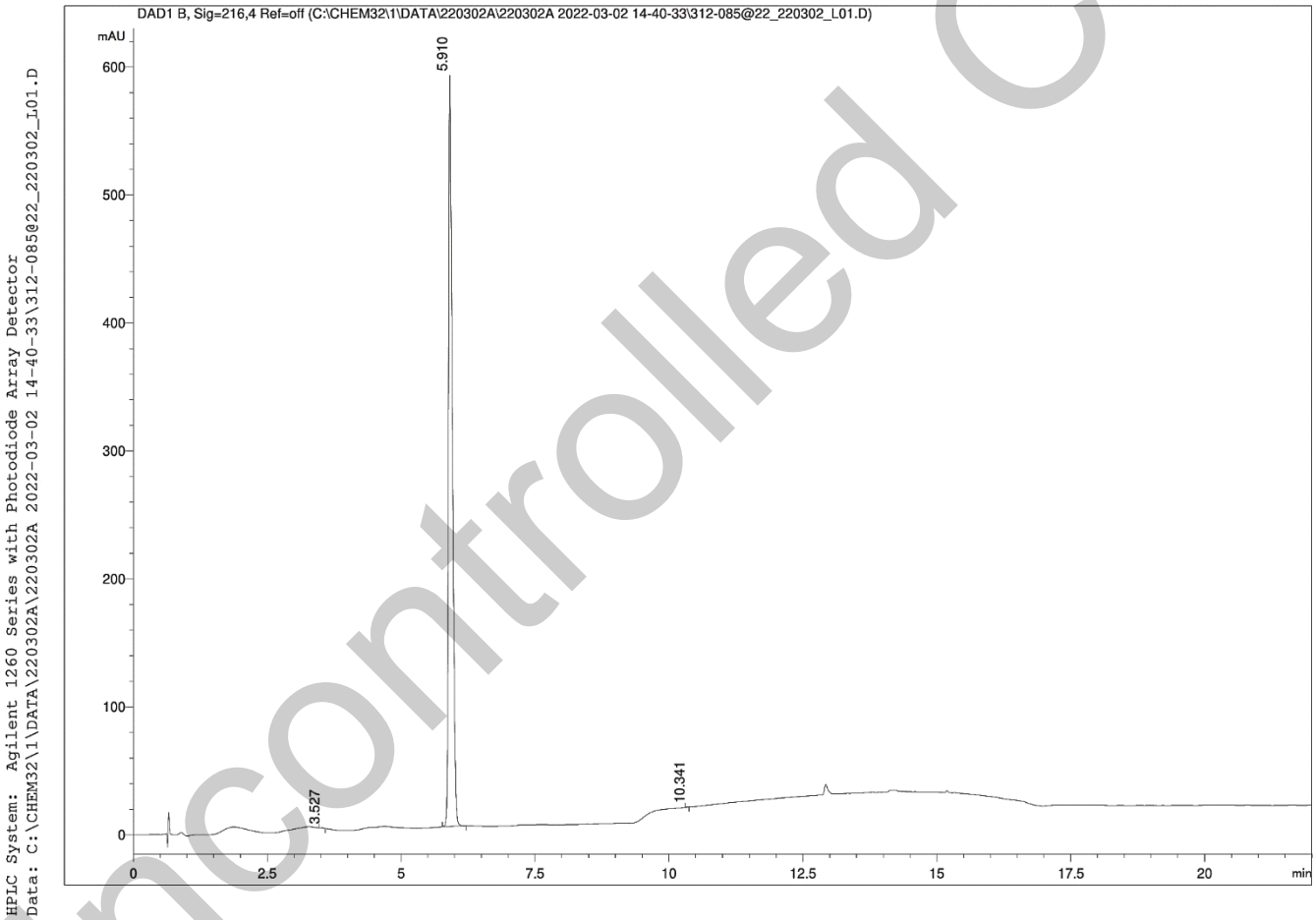
II. Purity

The purity of this material was analysed by high performance liquid chromatography (HPLC) using in-house EM005.WI07.

HPLC Conditions:

Column	Conditions				Detector	Injector
Agilent Poroshell 120 EC-C18 4.6 x 50mm 2.7 micron	40ºC				DAD 216nm	Auto 1.0 µL 0.65 mg/mL in 100% water (+0.1% TFA)
	Time (min)	% Line A (Water + 0.1% (v/v) TFA)	% Line B (Acetonitrile + 0.1% (v/v) TFA)	Flow rate (mL/min)		
	0.00	95	5	1.0		
	8.00	83	17	1.0		
	15.80	5	95	1.0		
	20.80	5	95	1.0		
	21.80	95	5	1.0		
	24.80	95	5	1.0		



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Area Percent Report – Sorted by Signal

Peak Number	Retention Time (rounded)	Area	Area % (rounded)
1	3.53	1.34	0.05
2	5.91	2913.42	99.93
3	10.34	0.61	0.02
Totals			100 (rounded)

For the calculation the system peaks were ignored. The content of the analyte was determined as a ratio of the peak area of the analyte and the cumulative areas of the purities, added up to 100%.

Results:

Average 99.9% (average of duplicate runs)

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III. Water Content

Method: Karl-Fischer titration using in-house EM005.WI04.
Results:
Average 0.1%

IV. Ash Content

Method: BP 2018 Ash (Appendix XI J) Method II
Result:
Contains 1.3% ash.

V. Residual Solvents

Method: ^{1}HNMR
Result:
Contains 0.1% Ethanol by ^{1}H NMR analysis.

VI. Final Result

Chromatographic purity (HPLC)	99.9%
Water content	0.1%
Ash content	1.3%
Residual solvents	0.1%
Purity	98.4%

This purity is assessed to be 98.4%.

Product Reviewed By:

Jacob Heppell, PhD
Chemist

Product Released By:

Carol Worth, PhD
Quality Manager
Release Date: 9 March 2022

The calculation of the purity follows the formula:

$$\text{Purity}(\%) = \frac{((\text{Chromatographicpurity[HPLC]})x(100 - (\text{watercontent} + \text{ashcontent} + \text{volatilecontents})))}{100}$$

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