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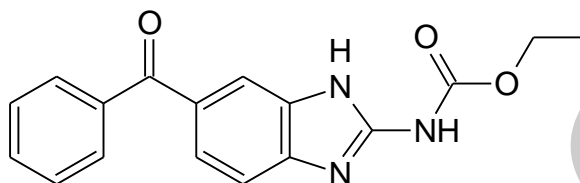
The results of the tests, calibrations and/or measurements included in this document are traceable to Australia/national standards.
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Our Formula. Your Success.

Reference Material Product Information Sheet

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



Name	<i>N</i> -(6-benzoyl-1 <i>H</i> -benzimidazol-2-yl)carbamic acid ethyl ester
Synonym(s)	ethyl (6-benzoyl-1 <i>H</i> -benzimidazole-2-yl)carbamate
BP Name	Mebendazole Impurity E
Epichem Item #	EPL-AA251 Batch 1
CAS #	31340-19-0
Molecular Formula	C ₁₇ H ₁₅ N ₃ O ₃
Molecular Weight	309.33 g/mol
Appearance	White powder
Melting Point	307.0-314.2°C (decomposition)
Combustion Analysis	Required (%): C: 66.0, H: 4.9, N: 13.6. Found (%): C: 65.3, H: 4.7, N: 13.4.
Purity*	98.5%
Date of Manufacture	8 November 2019
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 unopened and stored under the recommended conditions.
Retest Date	TBA (Proper Storage and Handling Required)

* NATA accreditation does not cover the performance of this service

EPL-AA251 Batch 1

Revision 1

Epichem Pty Ltd, Suite 5, 3 Brodie-Hall Drive, Bentley WA 6102, Australia
Tel + 61 (0)8 6167 5200 Fax + 61 (0)8 6167 5201 www.epichem.com.au ABN 80 106 769 902

I. Identity

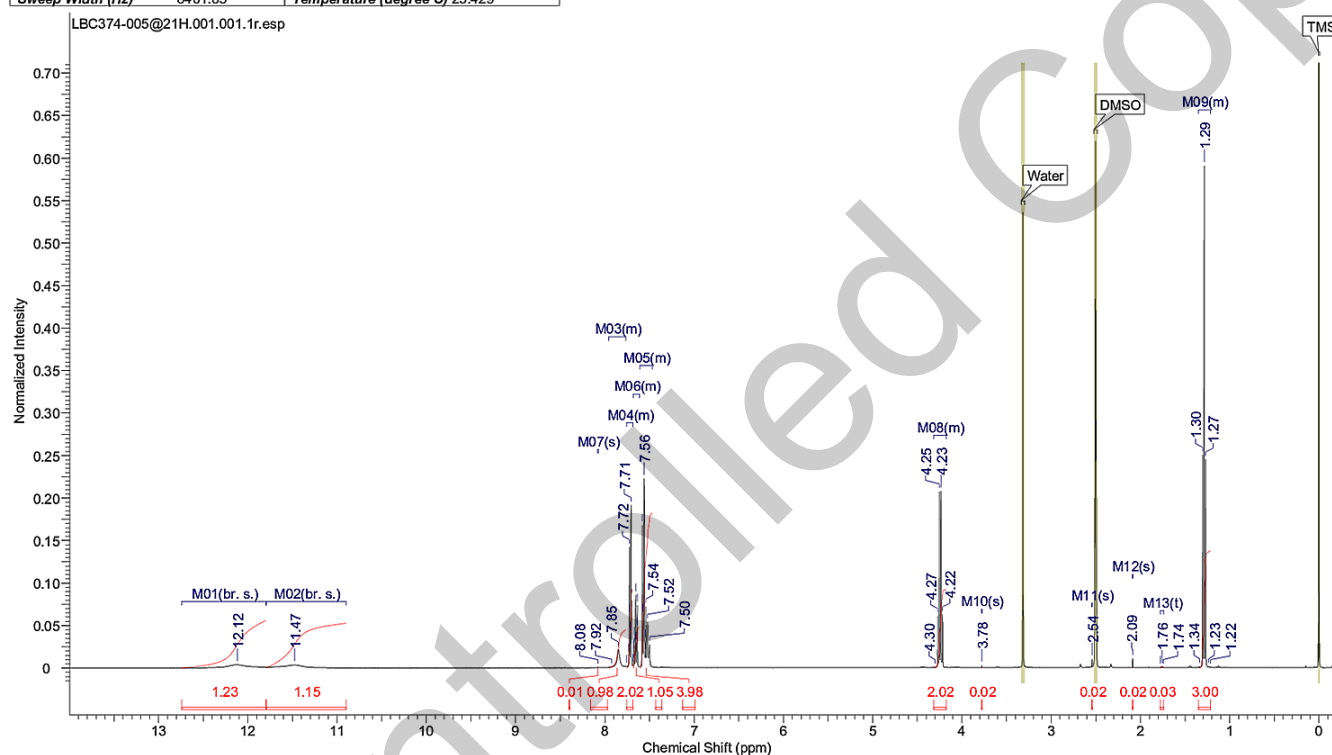
The identity of this product was established using the following analyses:

Ia. ¹H NMR Spectrum

Conditions: 400 MHz, DMSO-d₆

¹H NMR spectrum consistent with chemical structure.

Acquisition Time (sec)	3.7547	Comment	LBC374-005@2H 1H DMSO (E:\data\external\epichem) cvgoh 20				
Date	08 Nov 2019 17:36:00	Date Stamp	08 Nov 2019 17:36:00				
File Name	\naphthalene\company\NMR files\LBC374-005@21H1\data\11r		Frequency (MHz)	400.13			
Nucleus	1H	Number of Transients	64	Origin	spect	Original Points Count	24038
Owner	nmr	Points Count	32768	Pulse Sequence	zg	Receiver Gain	203.00
SW(cyclical) (Hz)	6402.05	Solvent	DMSO-d6	Spectrum Offset (Hz)	2797.9487	Spectrum Type	STANDARD
Sweep Width (Hz)	6401.85	Temperature (degree C)	25.429				



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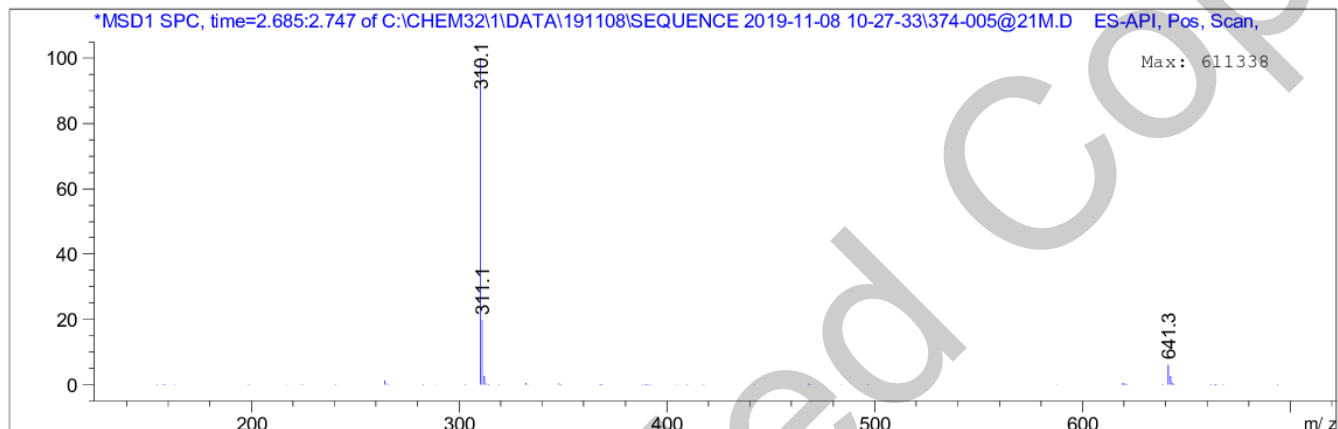
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Ib. Mass Spectrum

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

Method: ACN/water gradient (+0.1% formic acid)
ZORBAX SB-C8, 4.6 x 30 mm, 3.5 micron

Retention Time (MS)	MS Area	Mol. Weight or Ion
2.714	5251090	311.15 I 310.15 I



Theoretical value: 310.1 [M+H]⁺

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

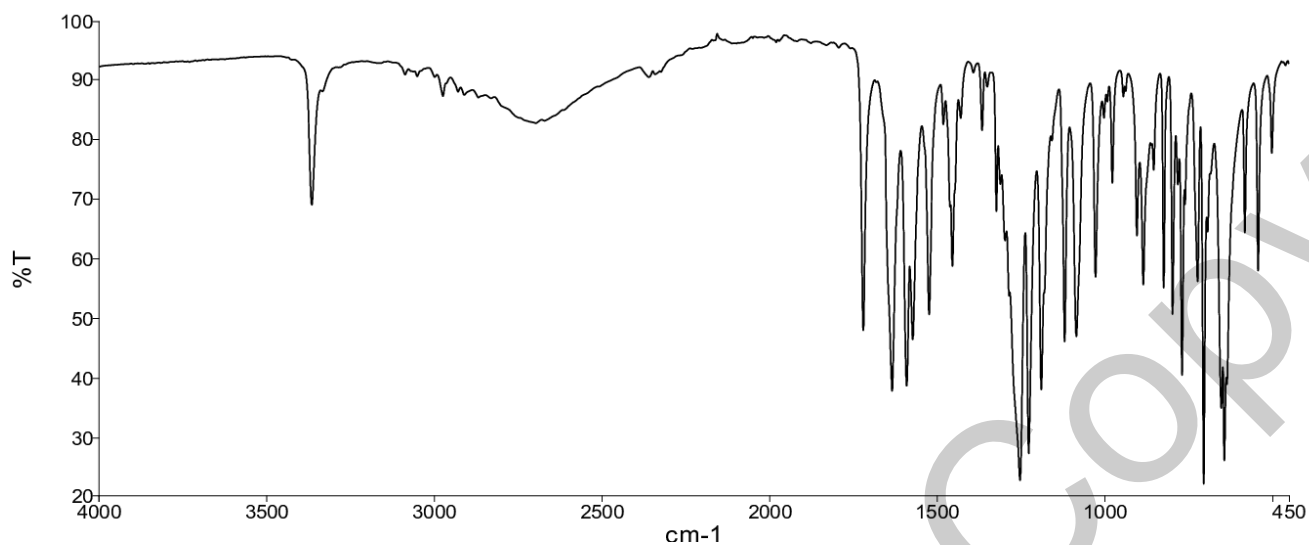
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Ic. IR Spectrum

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



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

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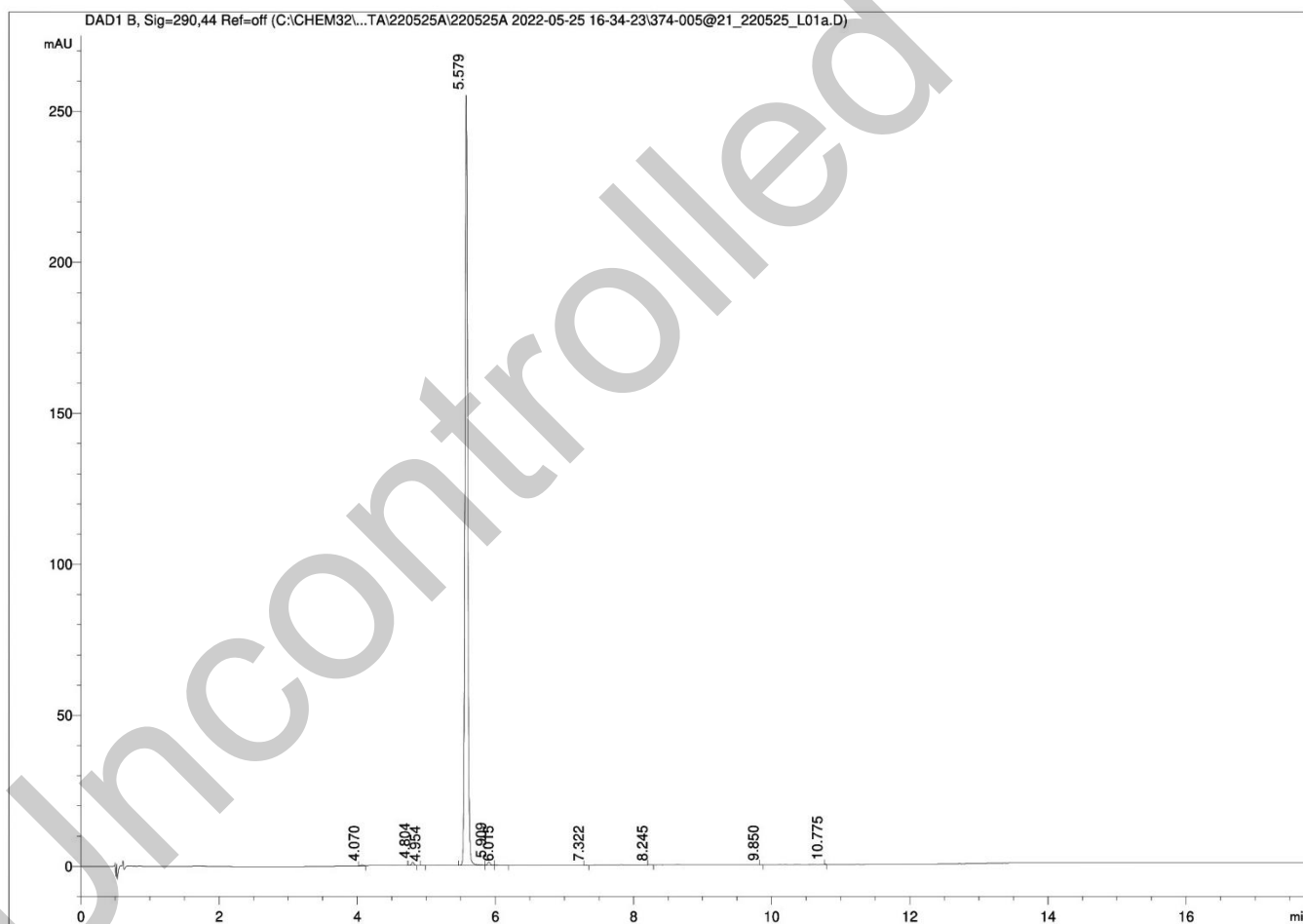
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II. Purity

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	25°C				DAD 290nm	Auto 1.0 µL 0.25mg/mL in 50% acetonitrile 50% dimethylsulfoxide (NO MODIFIERS)
	Time (min)	% Line A (Water + 0.1% (v/v) TFA)	% Line B (Acetonitrile + 0.1% (v/v) TFA)	Flow rate (mL/min)		
	0.00	85	15	1.0		
	6.00	61	39	1.0		
	11.60	5	95	1.0		
	16.60	5	95	1.0		
	17.60	85	15	1.0		
	20.60	85	15	1.0		



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Area Percent Report – Sorted by Signal

Peak Number	Retention Time (rounded)	Area	Area % (rounded)
1	4.07	0.67	0.10
2	4.80	2.60	0.37
3	4.95	0.06	0.01
4	5.58	692.33	98.97
5	5.91	3.19	0.46
6	6.02	0.31	0.04
7	7.32	0.05	0.01
8	8.24	0.10	0.01
9	9.85	0.04	0.01
10	10.78	0.17	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 99.0% (average of 10 duplicate analyses)

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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 2019 Ash Appendix XIJ Method II

Result:

Contains 0.3% ash.

V. Residual Solvents

Method: ¹H NMR

Result:

Contains 0.1wt% tetrahydrofuran; acetone <0.1%, other trace solvent <0.1% by ¹H NMR analysis.

VI. Final Result

Chromatographic purity (HPLC)	99.0%
Water content	0.1%
Ash content	0.3%
Residual solvents	0.1%
Purity*	98.5%

This purity is assessed to be 98.5%

Product Reviewed By:

Product Released By:

James Rixson, PhD
Head of Production

Jason Chaplin
Principal Chemist

Release Date: 2 June 2022

*NATA accreditation does not cover the performance of this service.

The calculation of the purity follows the formula:

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

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