BDG SYNTHESIS

Certificate of Analysis

BDG Synthesis certifies that this reference material meets or exceeds the specifications stated herein.

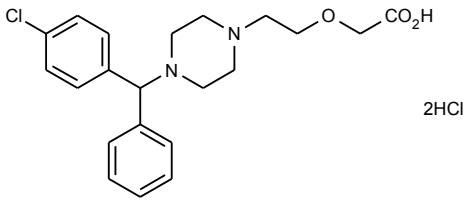
Barry Dent

Barry R. Dent, PhD, Director
12 September 2009

Name: **Cetirizine Dihydrochloride**

CAS Number: 83881-52-1

Structure:



Molecular Weight: $C_{21}H_{25}ClN_2O_3 \cdot 2HCl = 461.81$

Lot Number: BDG 5710.1

Appearance: White, powder

Corrected Purity: 99.4 % (HPLC) - 0.3 % (methanol) - 1.5 % (water) = 97.6 %

Re-test Date: 12 September 2010

Storage and Handling:

Temperature:	ambient laboratory temperature; may be refrigerated.
Humidity:	may be hygroscopic; store desiccated; recommended to determine water content periodically.
Light:	protect from strong sunlight.
Caution:	only experienced laboratory personnel should handle the material. Avoid dissolving the sample in alcoholic solvents - ester formation may be promoted as a result.

Mailing:
BDG Synthesis
PO Box 38 627, Wellington Mail Centre,
Wellington, New Zealand.

Shipping:
BDG Synthesis
Gracefield Research Centre, Building F,
Gracefield Road, Lower Hutt, New Zealand.

Phone: + 64 4 569 0520
Fax: + 64 4 569 0521

info@bdg.co.nz
www.bdg.co.nz

Identity and Purity

Proton NMR Spectrum

Identity: the signals are consistent with the proposed structure and in accord with literature where available.
Residual Solvents: a small amount of methanol (0.3 % *w/w*) is observed.
Impurities: no significant impurities are evident in the spectrum.

Carbon-13 NMR Spectrum

Identity: the signals are consistent with the proposed structure and in accord with literature where available.

High-resolution Mass Spectrum (ESI+)

Found *m/z* 389.1644. $C_{21}H_{26}{}^{35}ClN_2O_3$ [free base, $M+H]^+$ requires *m/z* 389.1626. The deviation of 4.5 ppm is within normally accepted limits for the establishment of identity by HRMS.

HPLC

A sharp, symmetrical peak is observed (99.4 %). Note: in the absence of reference materials for preparing calibration curves, it is assumed that all peaks have the same detector response. Where possible, the conditions of analysis follow a pharmacopeial or literature method, or have been adapted from same.

Elemental Analysis

	Found:	C 53.28, H 5.88, Cl 23.26, N 5.86 %
$C_{21}H_{25}ClN_2O_3{\cdot}2HCl{\cdot}0.5H_2O$	Requires:	C 53.57, H 5.99, Cl 22.59, N 5.95 %
$C_{21}H_{25}ClN_2O_3{\cdot}2HCl$	Requires:	C 54.62, H 5.89, Cl 23.03, N 6.07 %

The elemental analyses fall slightly outside those expected for anhydrous material; the presence of water is reasonably expected from the method of purification and/or the type of material, and the “best-fit” hydrated molecular formula is given.

Karl-Fischer Analysis

	Found:	H_2O 1.5 %
$C_{21}H_{25}ClN_2O_3{\cdot}2HCl{\cdot}0.5H_2O$	Requires:	H_2O 1.9 %

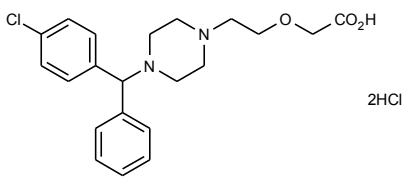
Of necessity, only a small sample could be used and only a single or duplicate analysis performed. We are unable to state what the errors in the reported water content are, but recommend that the result be used, as the best available, when determining corrected purity.

The available quantity of custom-synthesised material is always small, and this limits the extent and type of analytical data which can be obtained. This Certificate is presented in descriptive format for use by analytical chemists who are trained in the use of custom-synthesised materials. Custom materials often contain higher levels of residual solvents and/or water, and we urge you to use the corrected purity where needed rather than the raw HPLC purity. This compound is intended for use as an analytical reference material and it is not for human administration. Structures are shown with relative stereochemistry unless otherwise specified.

The re-test date is assigned from experience gained with the material in the laboratory and/or on storage. It is not possible to perform formal storage studies because of the small amount of material available.

BDG SYNTHESIS

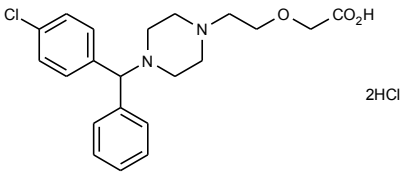
Proton NMR Spectrum of Cetirizine Dihydrochloride in D_2O



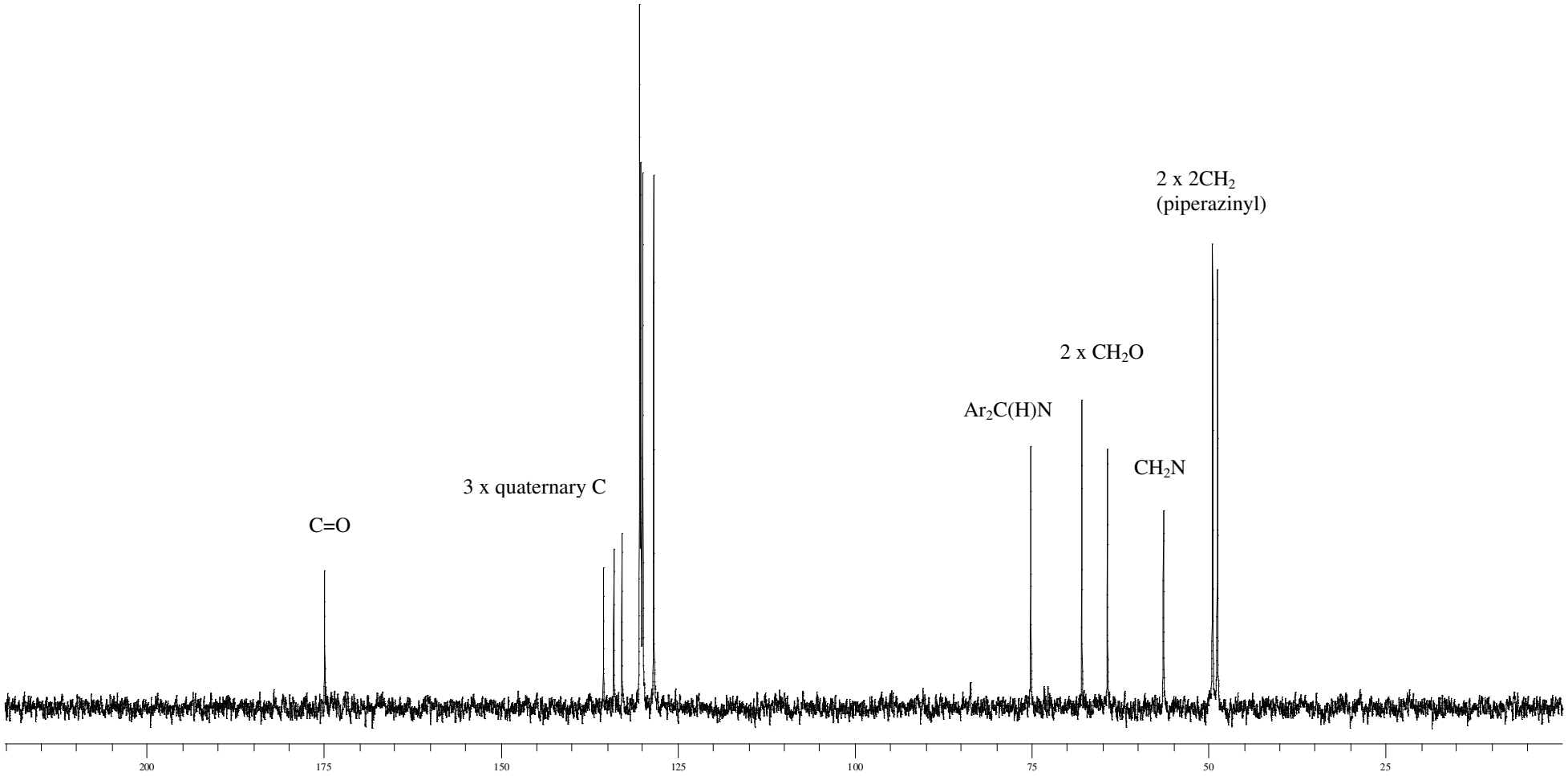
Lot Number: BDG 5710.1

BDG SYNTHESIS

Carbon-13 NMR Spectrum of Cetirizine Dihydrochloride in D_2O



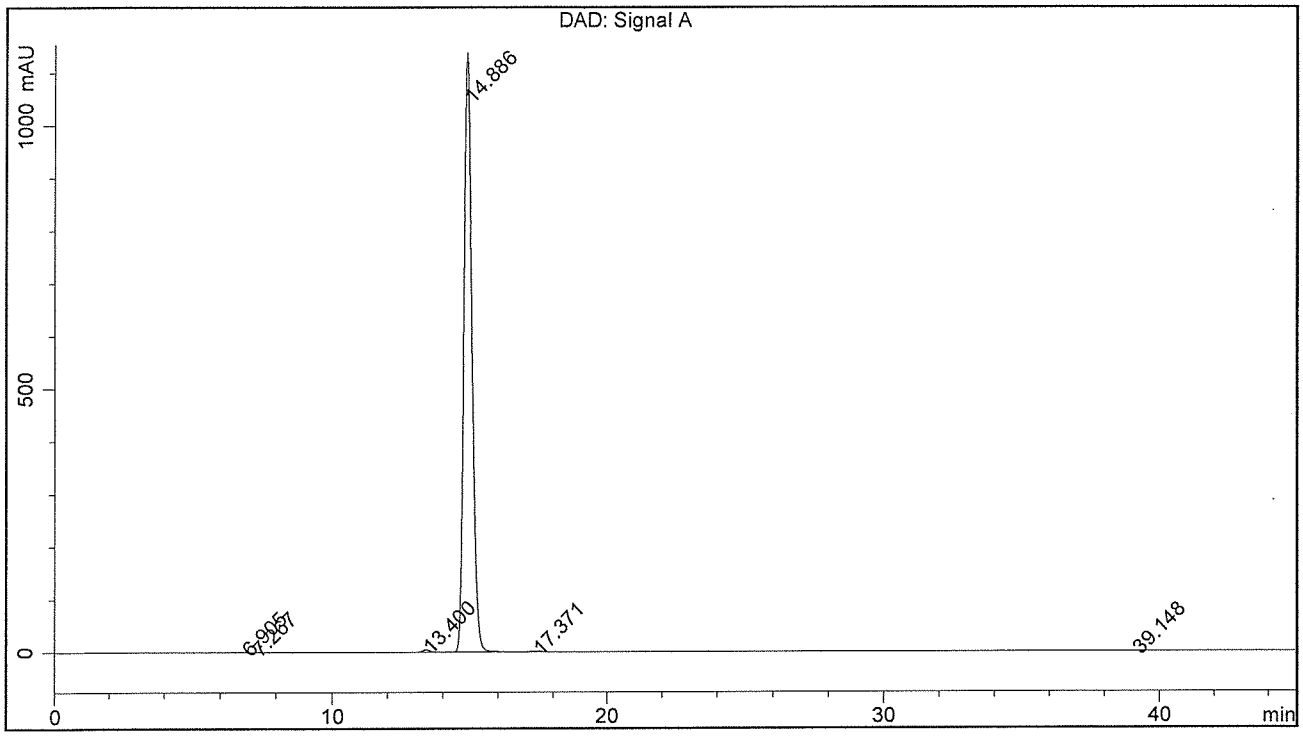
Lot Number: BDG 5710.1



BDG - Analysis of Cetirizine Dihydrochloride

Column : Phenomenex Luna C18(2) 5um 250 x 4.6 mm
Guard : Phenomenex Security Guard C18 RP 4 x 3 mm
Mobile Phase : 60:25:10:5 50 mM Potassium diHydrogen Phosphate : Acetonitrile : Methanol : Tetrahydrofuran
Flow Rate : 1.0 mL/min
Sample Solvent : Mobile Phase
Column Temperature : 20C
Injection Volume : 10 uL
Detection : UV at 230 nm

Sample Name	BDG 5710.1	**Instrument**	AnalyticalLC01
Acquisition	12/09/2009, 15:01:30	**Method (rev.)**	LC10220a (6)
Sequence	BDG_12Sep2009d - Reprocessed	**Vial Position**	1
Operator	solvation010\cerityadmin	**Injection**	1 of 1



Area Percent Report

Peak#	RT	Peak Height	Peak Area	Width	Area %
1	6.90 min	0.2232	4.2111	0.2401 min	0.018 %
2	7.27 min	0.2557	3.3390	0.1663 min	0.014 %
3	13.40 min	4.6204	83.9464	0.2800 min	0.354 %
4	14.89 min	1138.2671	23590.2432	0.3218 min	99.421 %
5	17.37 min	1.3204	32.9103	0.3608 min	0.139 %
6	39.15 min	0.2708	12.9132	0.5703 min	0.054 %