



BDG SYNTHESIS

Certificate of Analysis

This material is a research-grade material prepared by custom synthesis. The quantity available is limited, 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 research-grade materials. Research 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.

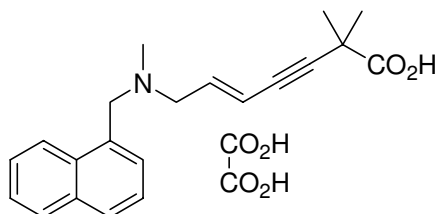
BDG Synthesis certifies that this reference material meets or exceeds the specifications stated in this data sheet.

Barry Dent

Barry R. Dent, PhD, Director
29 September 2003

Name: Carboxyterbinafine oxalate
CAS Number: none (99473-14-0 free base)

Structure:



Molecular Weight: $C_{21}H_{23}NO_2 \cdot C_2H_2O_4 = 411.45$
Lot Number: BDG 3663.5
Appearance: Off-white, crystalline solid
Corrected Purity: 98.6 % (HPLC) – 0.1 % acetone = 98.5 %
Expiry Date: 29 September 2004

Because of the small amount of material available it is not possible to perform formal storage stability studies. This expiry date is assigned from experience gained with the material in the laboratory and/or on storage.

Storage and Handling:

Temperature: ambient laboratory temperature; may be refrigerated.
Humidity: not believed to be hygroscopic; may be handled in normal laboratory atmosphere.
Light: protect from strong sunlight.
Caution: Only experienced laboratory personnel should handle the material.

Identity and Purity:

Source of Material

The material was made by an unambiguous synthetic route, using literature procedures where possible; starting materials were purchased from reputable sources and all intermediates were checked for identity by NMR.

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 acetone (0.1 % w/w) and a trace (under 0.1 %) of methanol is observed. Impurities: no significant impurities are evident in the spectrum.

Carbon-13 NMR Spectrum

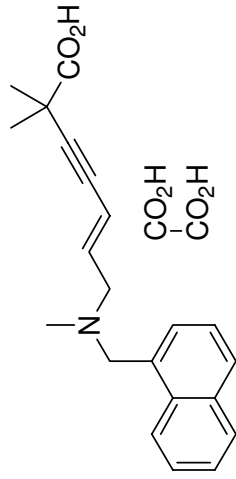
Identity: the signals are consistent with the proposed structure and in accord with literature where available.

High-resolution mass spectrum (FAB+): found m/z 322.1792. $C_{21}H_{24}NO_2$ $[M+H]^+$ requires m/z 322.1807. The deviation of 4.7 ppm is within normally accepted limits for the establishment of identity by HRMS.

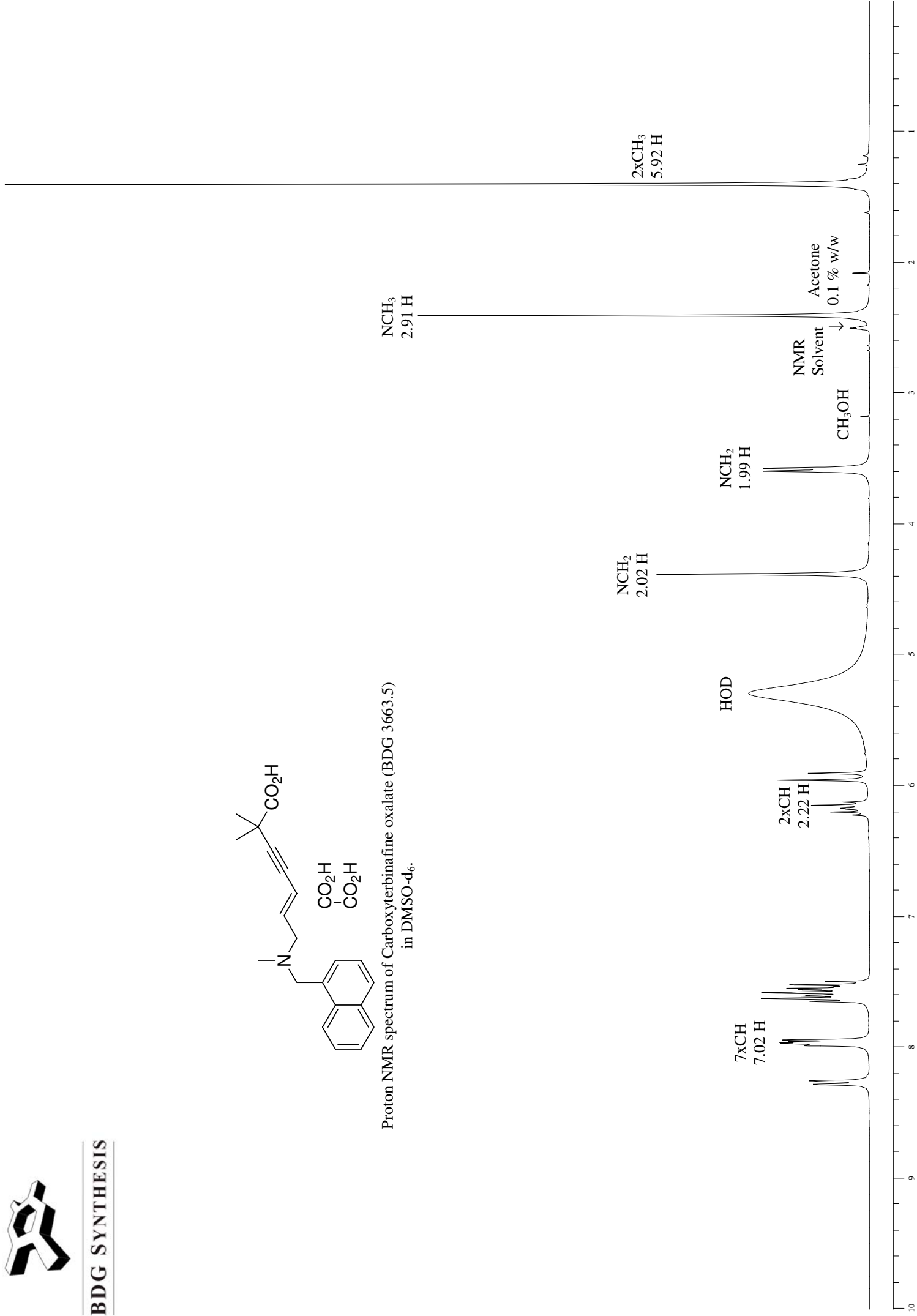
HPLC: A sharp, symmetrical peak is observed (98.6 area %). Note: in the absence of reference materials for preparing calibration curves, it is assumed that all peaks have the same detector response. Where possible, the conditions of analysis follow a pharmacopeial or literature method, or have been adapted from same.

Elemental Analysis: Found: C 66.85, H 6.01, N 3.43 %
 $C_{21}H_{23}NO_2 \cdot C_2H_2O_4$ requires: C 67.14, H 6.12, N 3.40 %

The elemental analyses fall within generally accepted limits for establishing the molecular formula given. The results may also be taken to imply the absence of significant quantities of water or inorganic salts (which have not been elsewhere tested for because of sample size limitations).

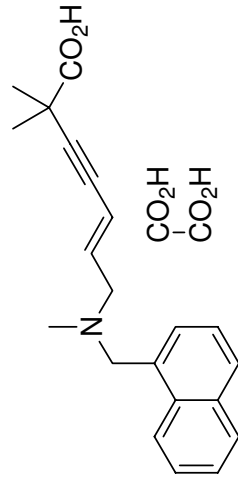


Proton NMR spectrum of Carboxyterbinafine oxalate (BDG 3663.5) in DMSO-d₆.





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Carbon-13 NMR spectrum of Carboxyterbinafine oxalate (BDG 3663.5) in DMSO-d₆.

NMR
Solvent
+ NCH₃

2xCH₃

2xCO₂H

CO₂H

7xCH

3xC

CH

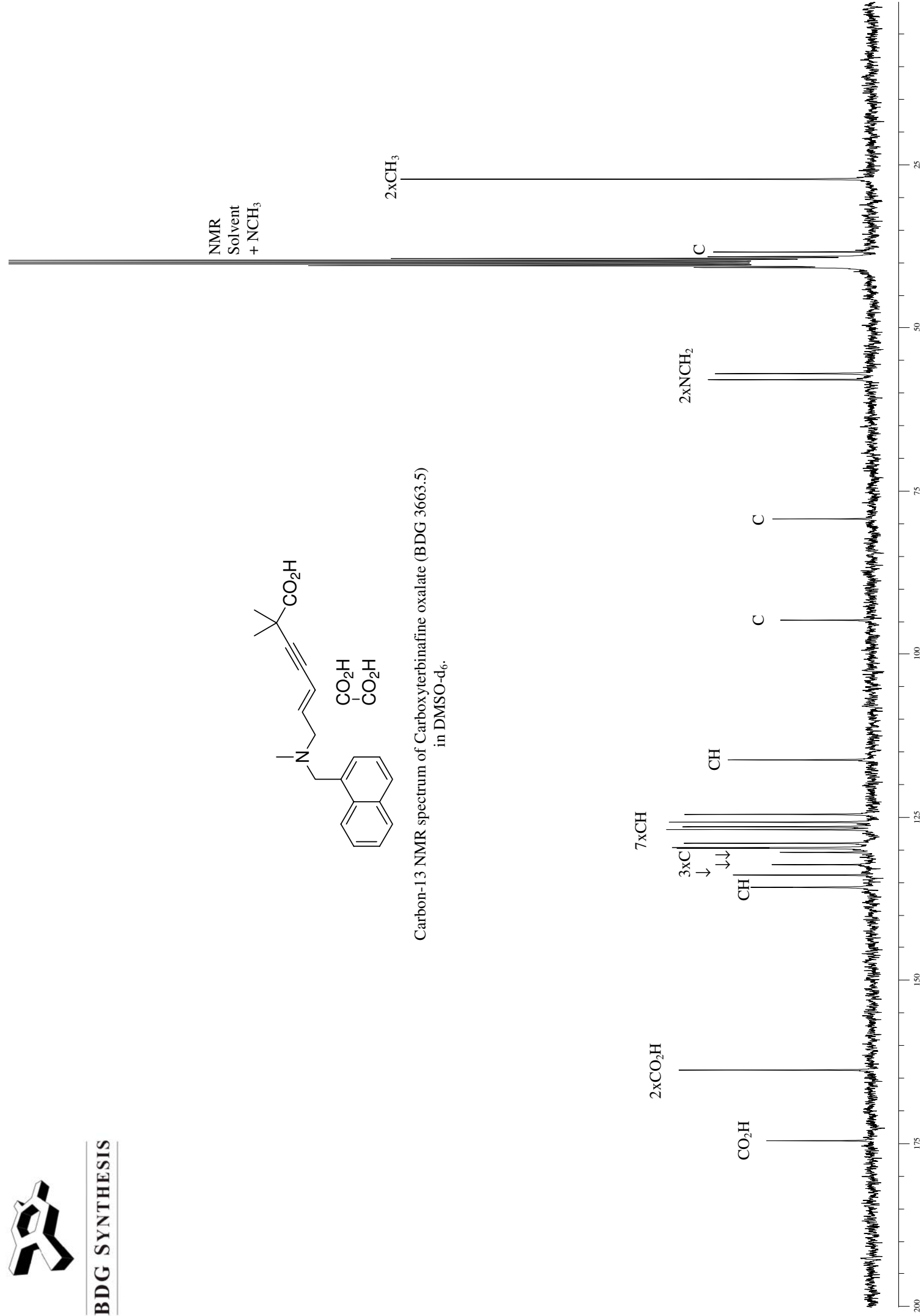
CH

2xNCH₂

C

C

C



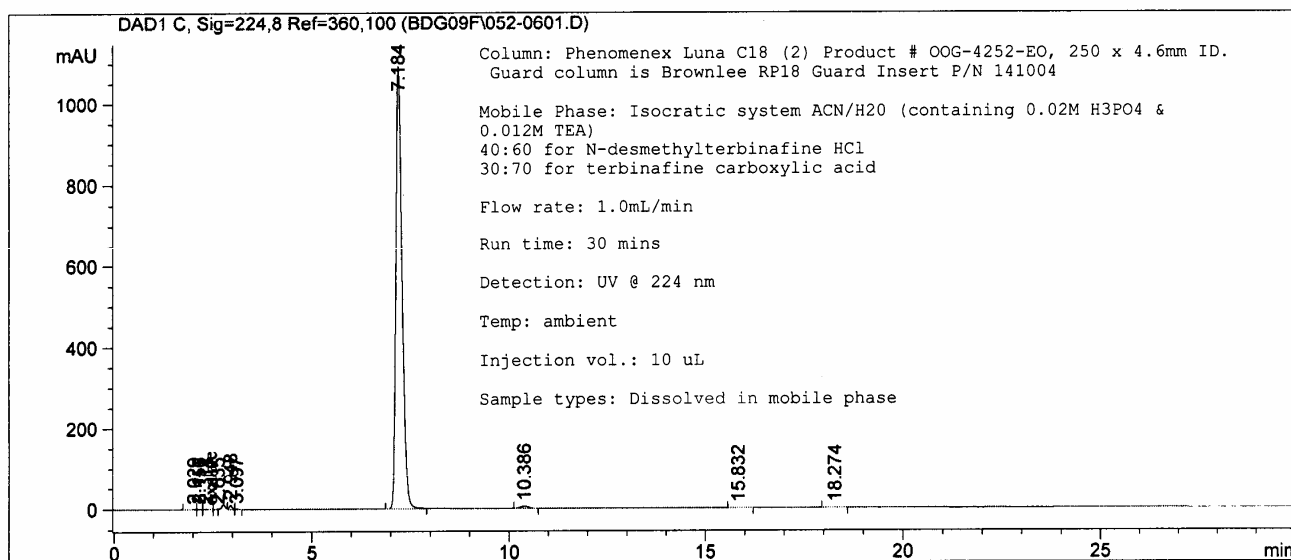
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Injection Date   : 9/25/03 12:12:33 PM      Seq. Line   :    6
Sample Name     : BDG 3663.5                Location    : Vial 52
Acq. Operator   : admin                     Inj         :    1
                                           Inj Volume  : 10 µl

Acq. Method     : N:\LC1100_2\1\METHODS\LC40080B.M
Last changed    : 9/25/03 12:11:17 PM by admin
                  (modified after loading)

Analysis Method : N:\LC1100_2\1\METHODS\LC40080B.M
Last changed    : 9/25/03 2:58:05 PM by admin
                  (modified after loading)
    
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Isocratic analysis of terbinafine derivatives on Luna C18(2) column with ACN/H2O (0.02M H3PO4 acid & 0.012M TEA) # LC40080



Area Percent Report

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Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
    
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Signal 1: DAD1 C, Sig=224,8 Ref=360,100

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	2.029	MF	0.1171	5.16505	7.35363e-1	0.0424
2	2.156	FM	0.1035	5.46476	8.79887e-1	0.0449
3	2.314	FM	0.1285	6.95370	9.01715e-1	0.0571
4	2.635	FM	0.0781	3.23516	6.90450e-1	0.0266
5	2.948	FM	0.0868	52.89723	10.16197	0.4345
6	3.097	FM	0.1035	7.03344	1.13290	0.0578
7	7.184	MF	0.1825	1.20061e4	1096.33569	98.6072
8	10.386	BB	0.2122	74.35505	5.41498	0.6107
9	15.832	MM	0.3320	7.87223	3.95216e-1	0.0647
10	18.274	MM	0.3524	6.60266	3.12247e-1	0.0542

Totals : 1.21757e4 1116.96042

Results obtained with enhanced integrator!

*** End of Report ***