



Frontier BioPharm

LLC

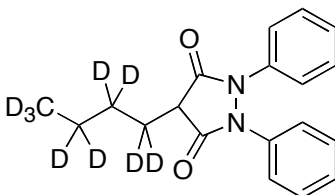
6013 Atwood Drive, Suite 300 • Richmond, KY 40475 • phone 859.623.0409 | fax 888.315.8599 • www.frontierbiopharm.com
mailing/billing address | P.O.Box 614 • Richmond, Ky 40476-0614

CERTIFICATE OF ANALYSIS

Phenylbutazone-D₉

Sample Product Number:	PD-0010
Lot Number:	10210130
Chemical Name:	4-Butyl-d ₉ -1,2-diphenyl-3,5-Pyrazolidinedione
Storage Condition:	2-8°C
Identity:	¹ H-NMR, ¹³ C-NMR, GCMS, IR
Empirical Formula:	C ₁₉ H ₁₁ D ₉ N ₂ O ₂
Formula weight:	317.43
Chemical Purity:	>99% by GCMS
Residual solvents:	Water <0.5% (by DSC)
Isotopic purity:	>99 atom% D (GCMS)
Melting point:	104-104.5°C
Date of Analysis:	October 15, 2012
Expiration Date:	October 15, 2017

Structure



Approved: _____

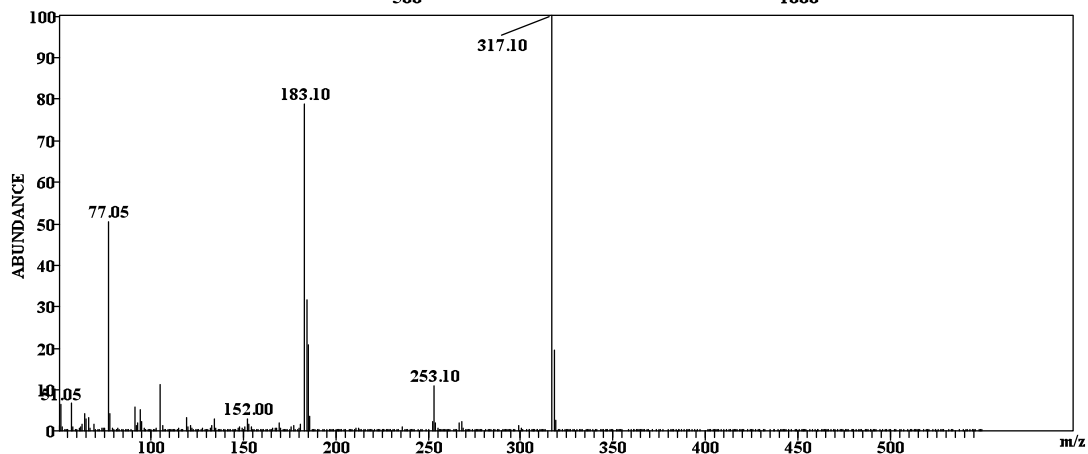
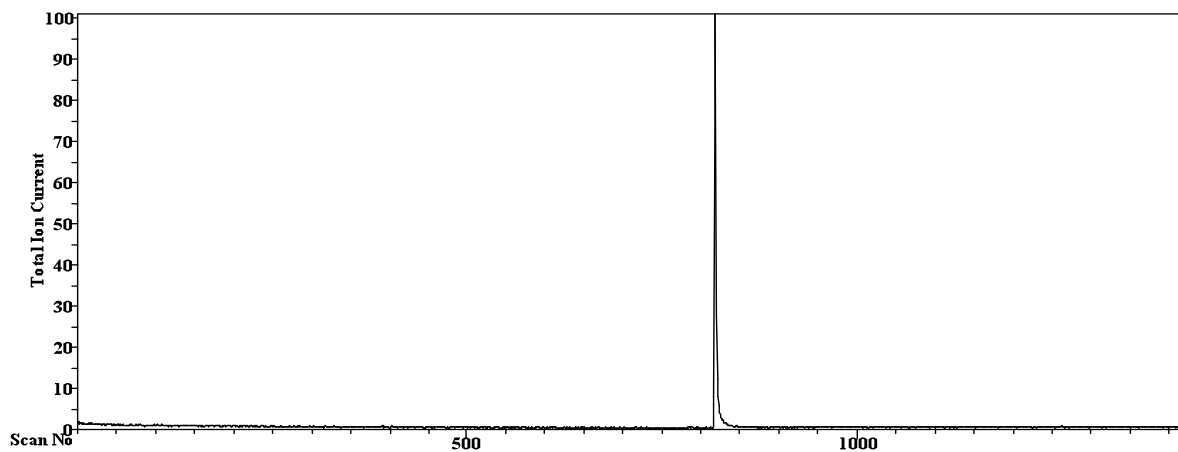
R. L. Eisenberg

Rodney L. Eisenberg, Ph.D.
Director

10-15-2013

Date

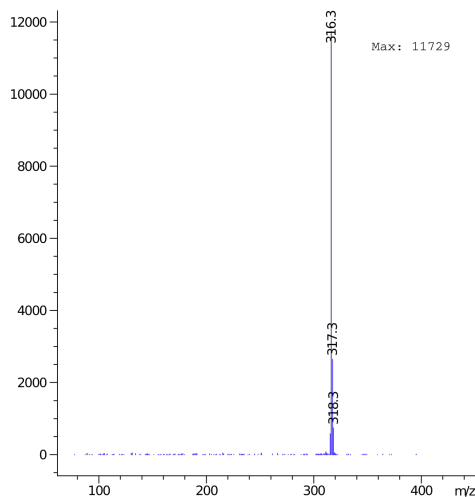
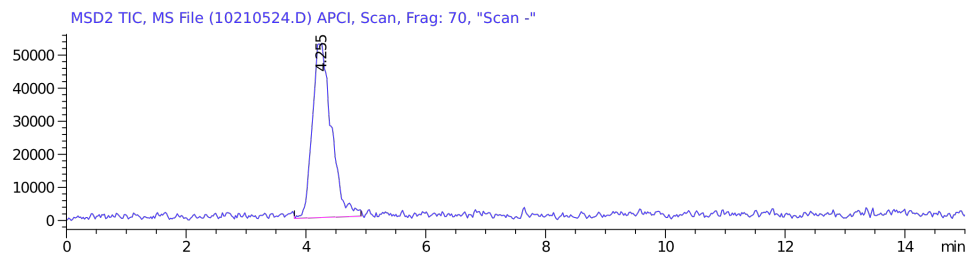
GCMS Analysis



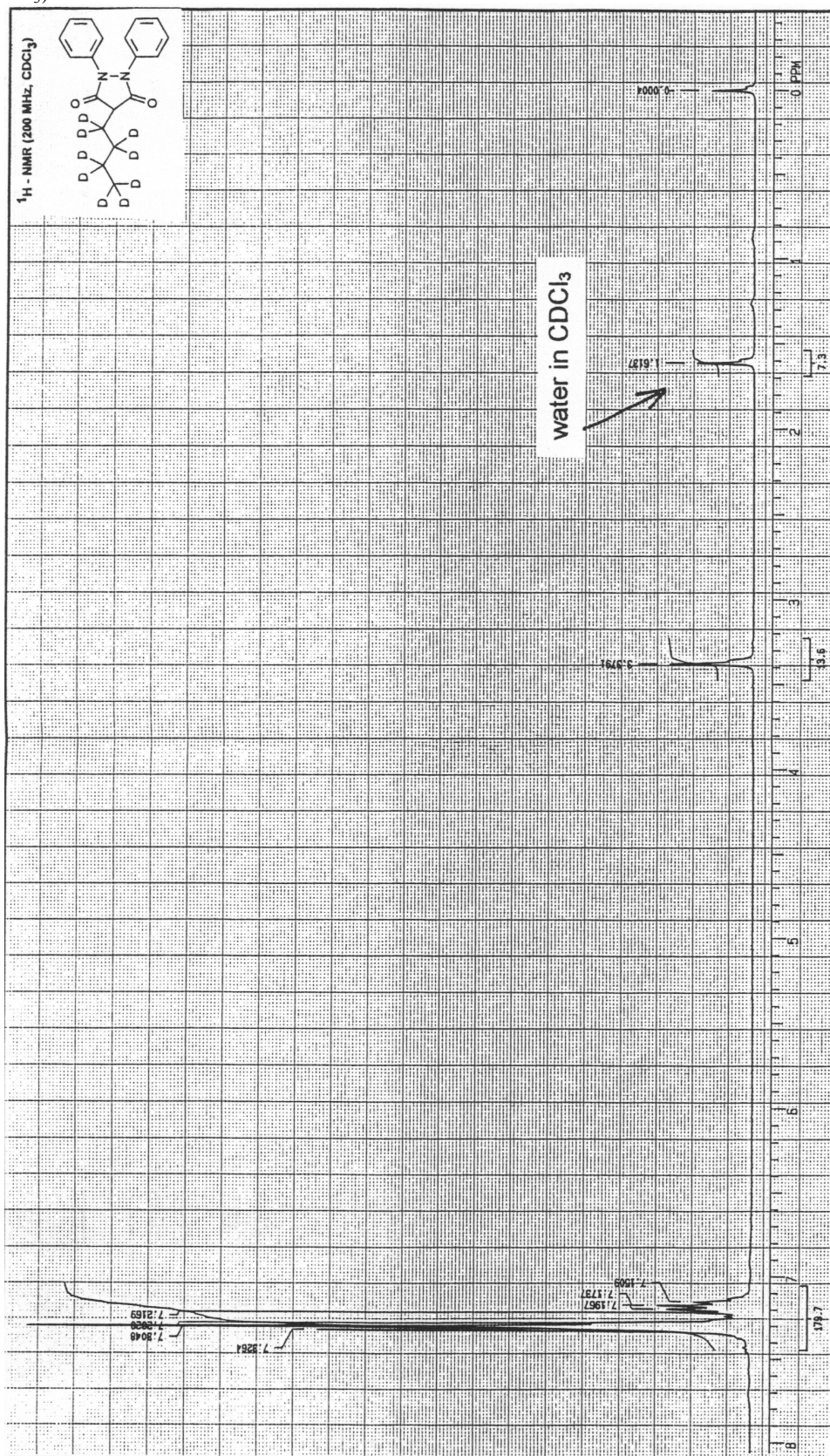
Mass Relative
Intensities

LCMS (negative ion Mode, APCI, M-1)

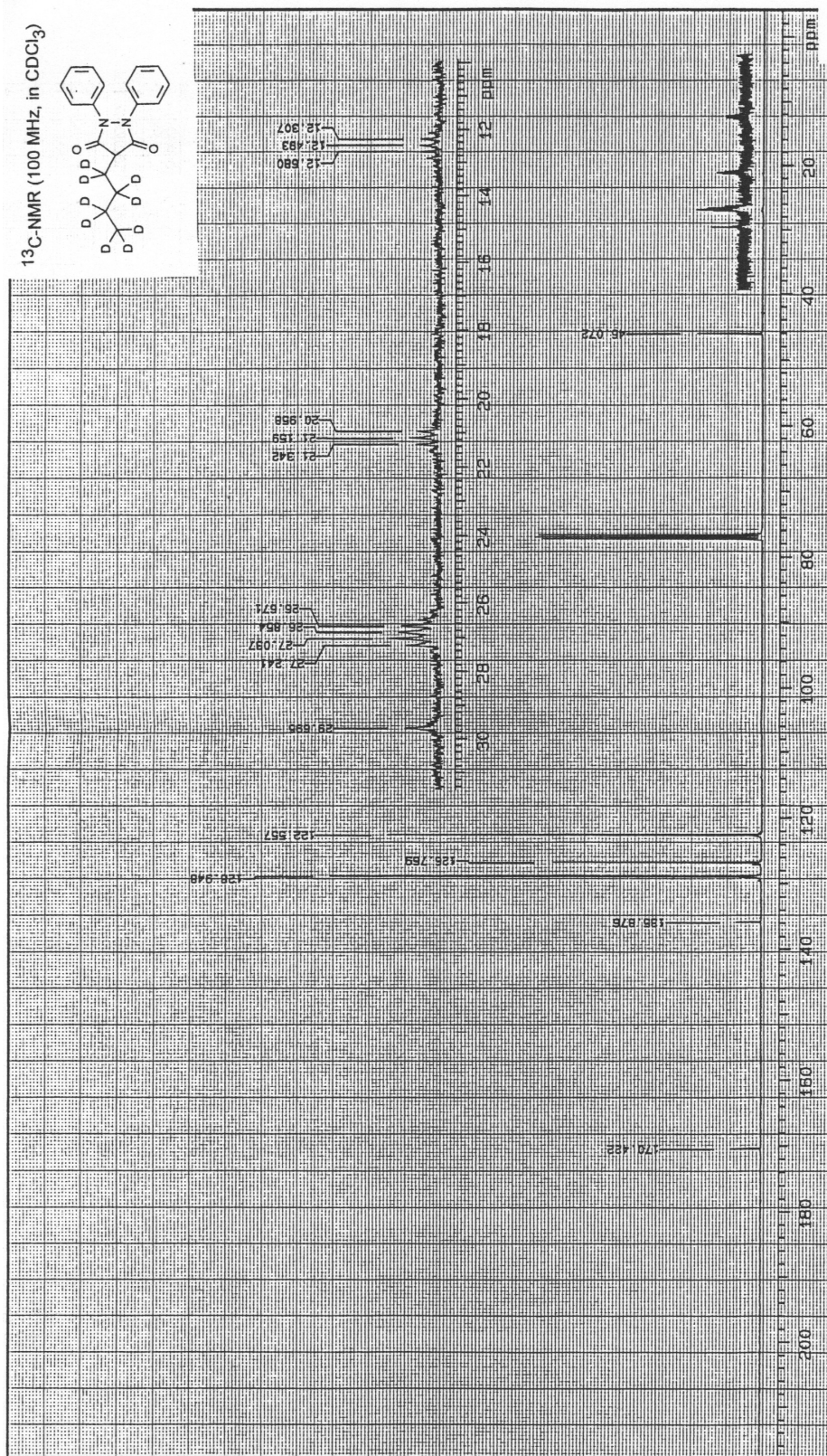
311.14999	0.023
312.54999	0.026
313.45001	0.060
317.10001	100.000
318.20001	19.289
319.10001	2.546
320.20001	0.195
321.00000	0.053
322.79999	0.015
323.70001	0.013



$^1\text{H-NMR}$ (CDCl_3) 200 MHz



^{13}C -NMR (CDCl_3) 100 MHz



COA version History.
Original. 10-15-2012
Version 1.1. Add Expiration date: 10-15-2013