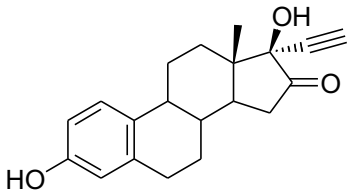
Certificate of Analysis



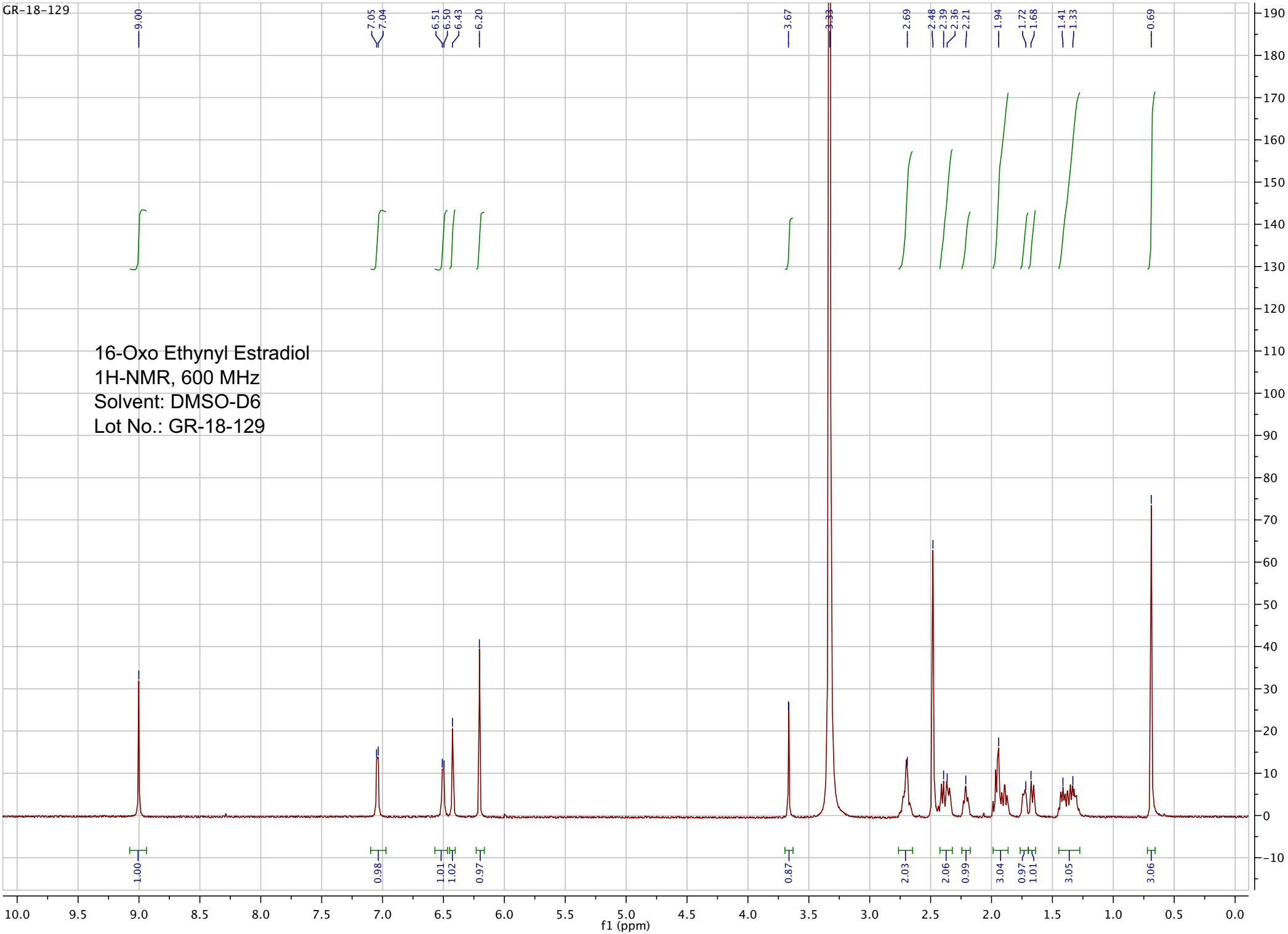
Name:	**16-Oxo Ethynyl Estradiol**
Lot#:	GR-18-129
Test Date:	05/23/2023 (re-test date: 05/23/2028)
CAS No.:	1350468-76-6
MF:	$C_{20}H_{22}O_3$
MW:	310.39
Appearance:	White solid
Purity:	98.8% by HPLC (average of two sample preparations)
^{1}H-NMR:	Conforms
MS-ESI (+)	Conforms (shows peaks at m/z = 293.2 $[M-H_2O+H]^+$, 311.2 $[M+H]^+$ and 328.2 $[M+NH_4]^+$)
Storage	Store at 0-5°C in a dry place away from direct sunlight

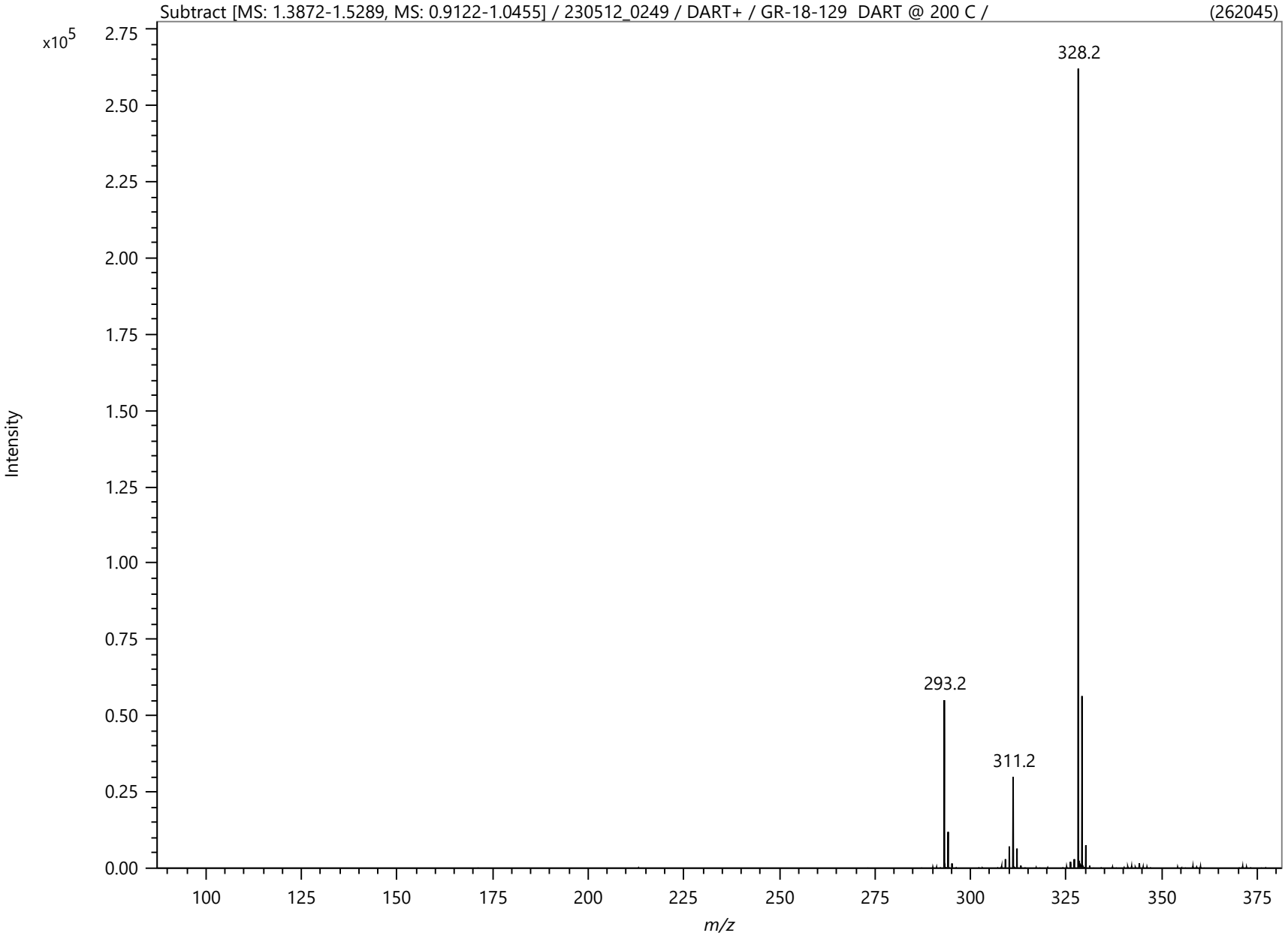
Approved by:

Date: 05/30/2023

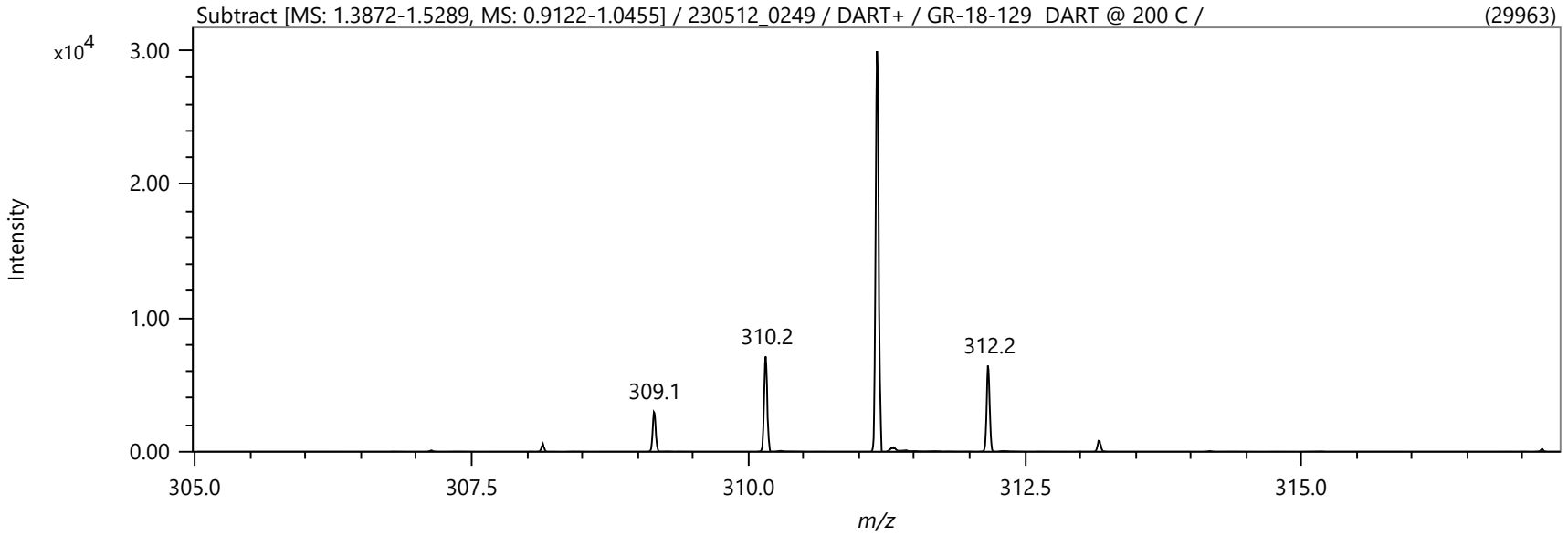
Viorica Rusu, QC/QA Manager

700, Collip Circle, The Research Park, London, ON, N6G 4X8
Ph: (647)4079078, e-mail: grusu@esschemco.com, www.esschemco.com


GR-18-129
9.00
7.05
7.04
6.51
6.50
6.43
6.20
3.67
3.33
2.69
2.48
2.39
2.36
2.21
1.94
1.72
1.68
1.41
1.33
0.69
16-Oxo Ethynyl Estradiol
1H-NMR, 600 MHz
Solvent: DMSO-D6
Lot No.: GR-18-129
1.00
0.98
1.01
1.02
0.97
0.87
2.03
2.06
0.99
3.04
0.97
1.01
3.05
3.06
f1 (ppm)


Subtract [MS: 1.3872-1.5289, MS: 0.9122-1.0455] / 230512_0249 / DART+ / GR-18-129 DART @ 200 C / (262045)
x10^5
Intensity
328.2
293.2
311.2
m/z

Spectrum



Elemental Composition

Parameters		Elements Set 1:				
Tolerance:	±10.00 mDa	Symbol	C	H	O	N
Electron:	Even	Min	0	0	0	0
Charge:	+1	Max	100	200	20	10
DBE:	-1.5 - 100.0					

Results

Mass	Intensity	Formula	Calculated Mass	Mass Difference [mDa]	Mass Difference [ppm]	DBE
311.16452	29963.27	C20 H23 O3	311.16417	0.35	1.13	9.5
		C9 H23 N6 O6	311.16736	-2.84	-9.11	1.5
		C16 H19 N6 O	311.16149	3.04	9.76	10.5
		C10 H19 N10 O2	311.16870	-4.17	-13.41	6.5
		C15 H23 N2 O5	311.16015	4.38	14.06	5.5
		C13 H27 O8	311.17004	-5.52	-17.74	0.5

Mass	Intensity	Formula	Calculated Mass	Mass Difference [mDa]	Mass Difference [ppm]	DBE
		C14 H23 N4 O4	311.17138	-6.86	-22.04	5.5
		C11 H19 N8 O3	311.15746	7.06	22.69	6.5
		C15 H19 N8	311.17272	-8.20	-26.34	10.5
		C10 H23 N4 O7	311.15613	8.40	26.99	1.5

Data File C:\CHEM32\1\DATA\VR011823\SIG11222.D
Sample Name: GR-18-129

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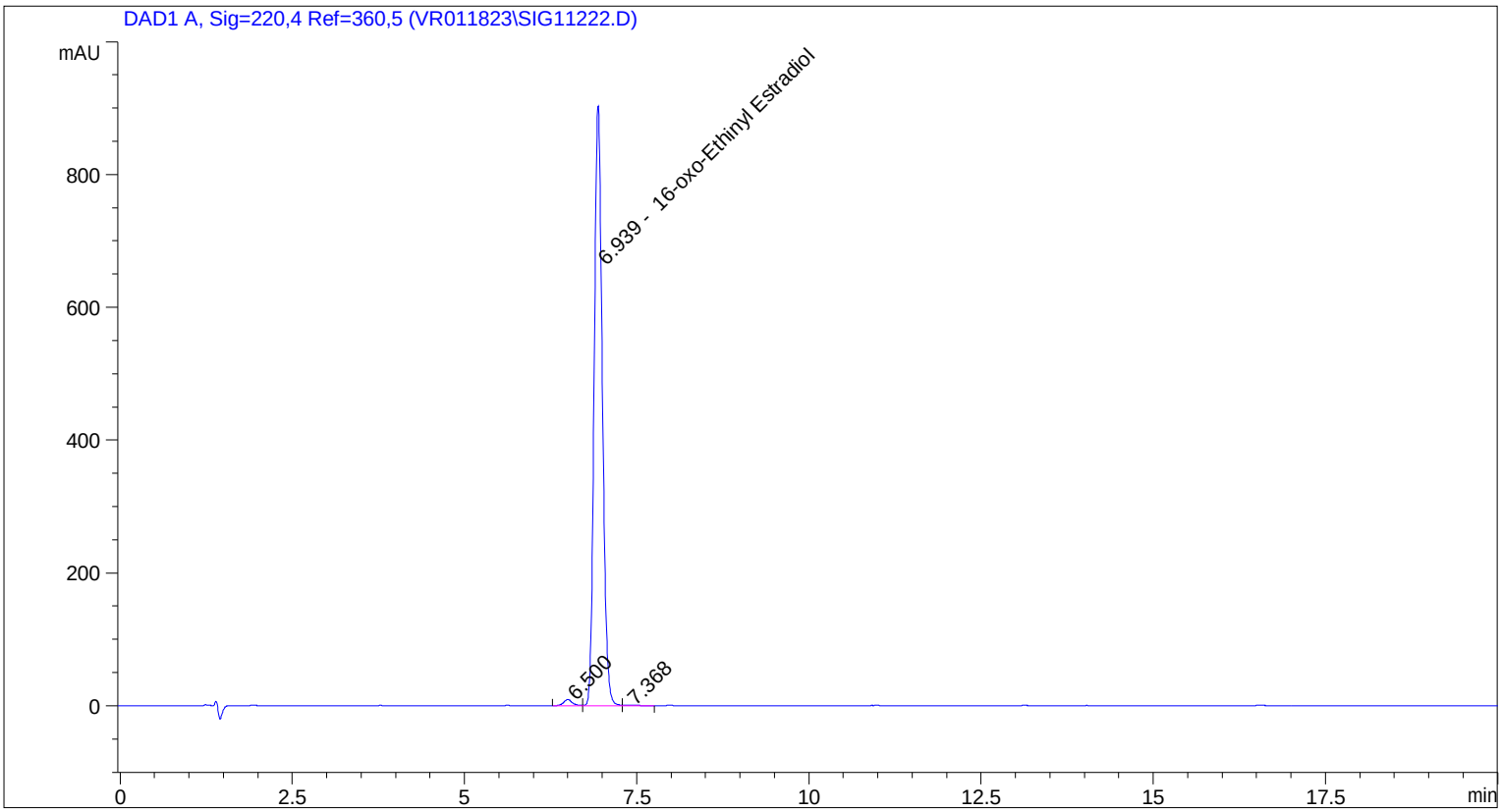
Acq. Operator : vrusu
Acq. Instrument : Instrument 1 Location : Vial 70
Injection Date : 5/23/2023 11:01:51 AM
Inj Volume : 5.0 µl
Acq. Method : C:\CHEM32\1\METHODS\VR052323_129.M
Last changed : 5/23/2023 11:00:44 AM by vrusu
Analysis Method : C:\CHEM32\1\METHODS\VR052323_129PM.M
Last changed : 5/23/2023 1:13:16 PM by vrusu



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Area Percent Report

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Sorted By : Signal
Calib. Data Modified : 5/23/2023 1:12:04 PM
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=220,4 Ref=360,5

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Area %	Name
1	6.500	BV	0.1325	83.49490	1.1050	?
2	6.939	VV	0.1283	7457.22021	98.6922	16-oxo-Ethinyl Estradiol
3	7.368	VB	0.1858	15.32069	0.2028	?

Totals : 7556.03581

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Data File C:\CHEM32\1\DATA\VR011823\SIG11223.D
Sample Name: GR-18-129 spl-2

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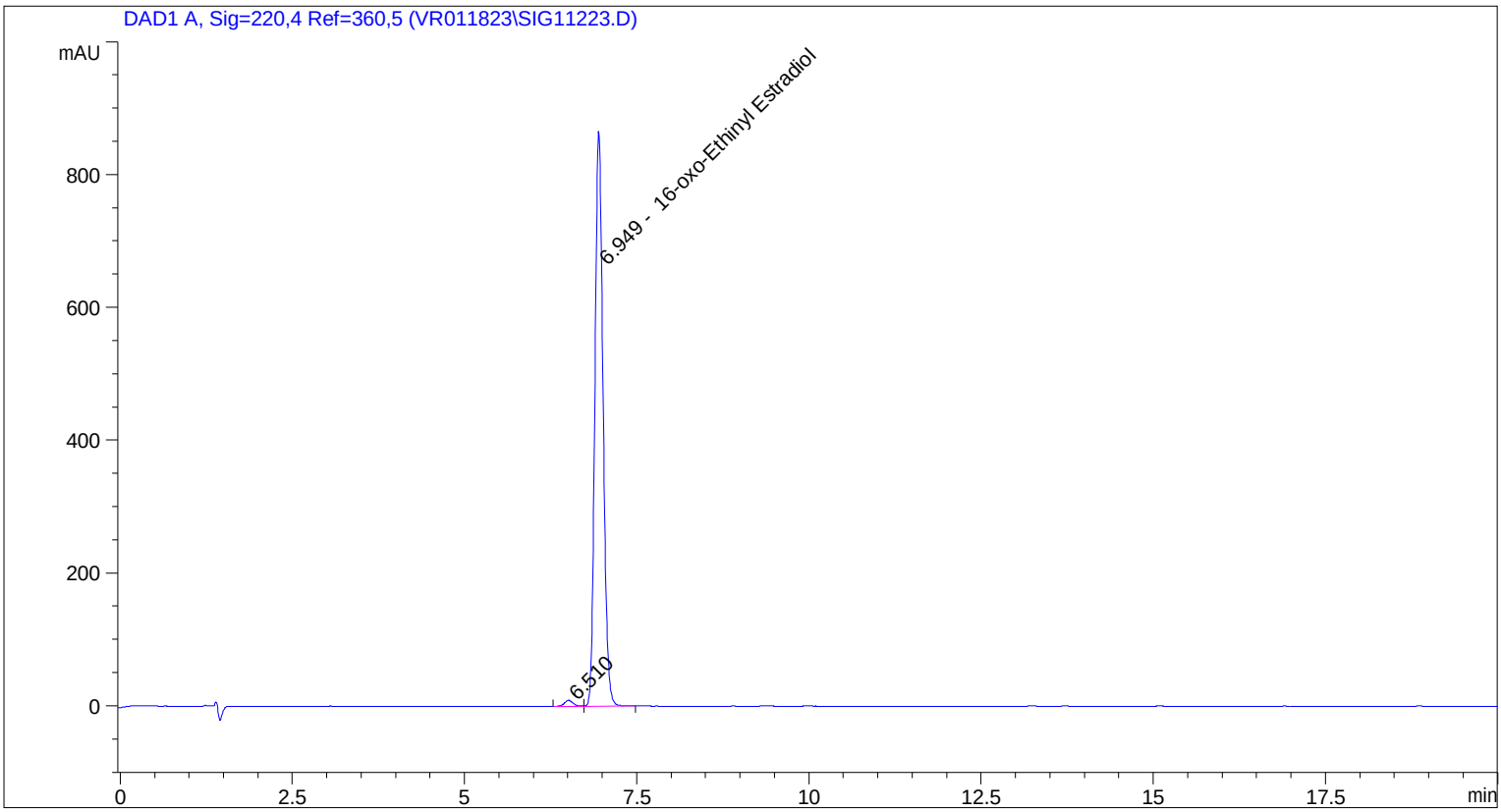
Acq. Operator : vrusu
Acq. Instrument : Instrument 1 Location : Vial 71
Injection Date : 5/23/2023 12:41:57 PM
Inj Volume : 5.0 µl
Acq. Method : C:\CHEM32\1\METHODS\VR052323_129.M
Last changed : 5/23/2023 12:40:52 PM by vrusu
Analysis Method : C:\CHEM32\1\METHODS\VR052323_129PM.M
Last changed : 5/23/2023 1:13:16 PM by vrusu



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Area Percent Report

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Sorted By : Signal
Calib. Data Modified : 5/23/2023 1:12:04 PM
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=220,4 Ref=360,5

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Area %	Name
1	6.510	BV	0.1340	82.21354	1.1392	?
2	6.949	VB	0.1281	7134.48291	98.8608	16-oxo-Ethinyl Estradiol

Totals : 7216.69645

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*** End of Report ***