

# SH-29 and SK-119 Attenuates Air-Pollution Induced Damage by Activating Nrf2 in HaCaT Cells

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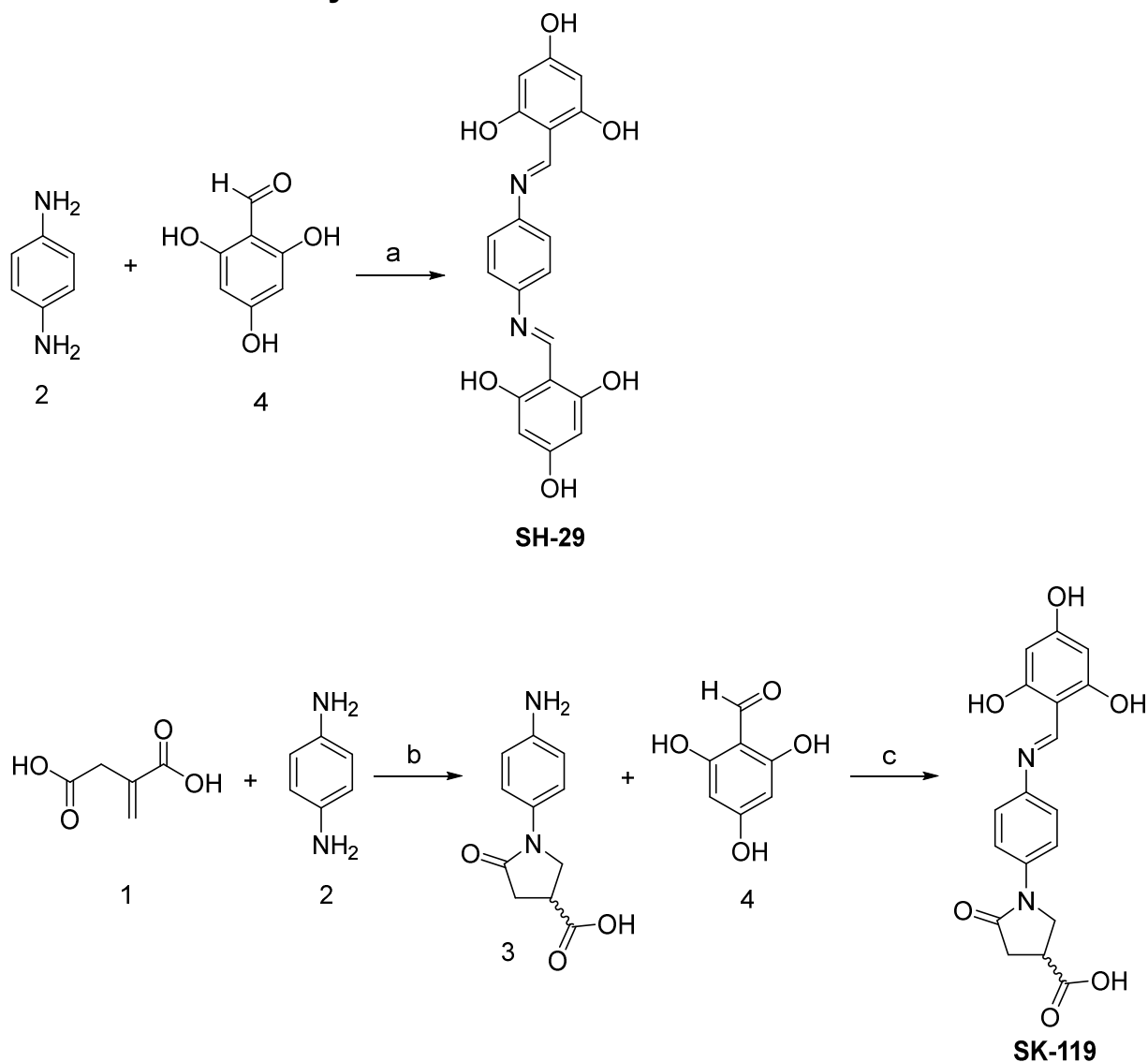
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## I. Scheme S1: Synthesis of SH-29 and SK-119

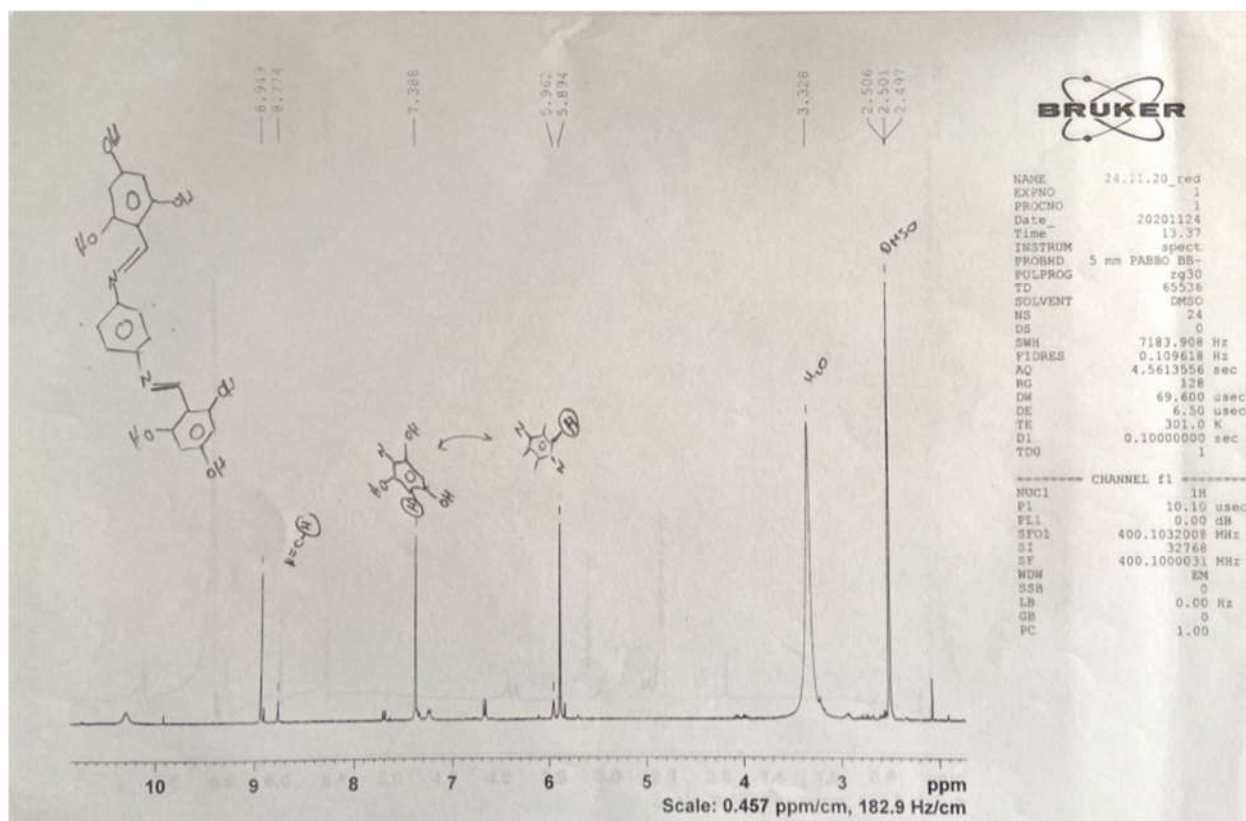
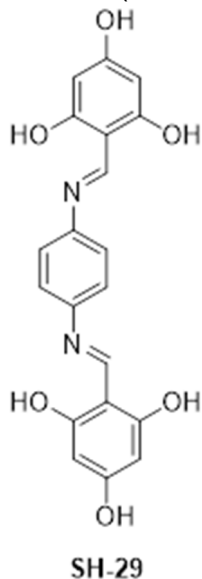


Synthetic procedure for the preparation of compounds SH-29 and SK-119. a) phenylenediamine (2), 2,4,6-trihydroxybenzaldehyde (4), EtOH, 5 h, r.t. b) itaconic acid (1), phenylenediamine (2), H<sub>2</sub>O, reflux 1 h. c) EtOH, compound 3, 2,4,6-trihydroxybenzaldehyde (4), RT overnight.

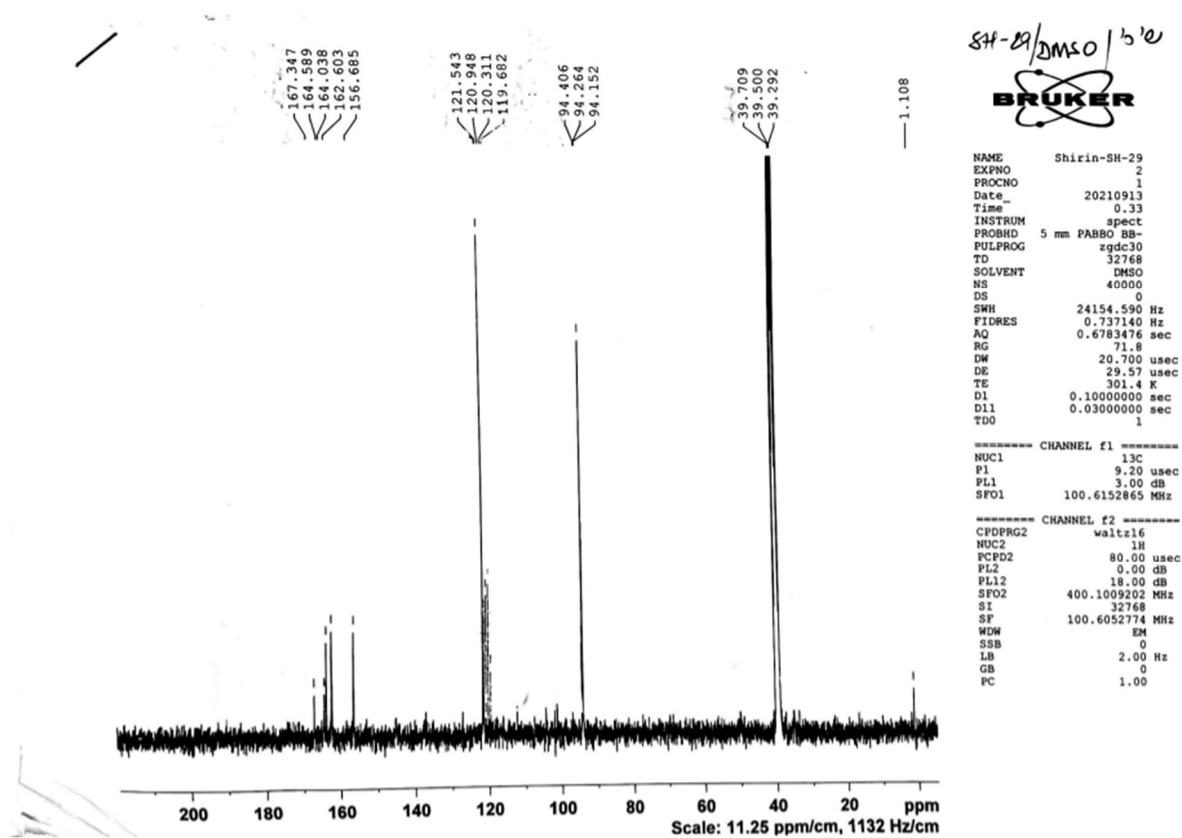
## II. NMR spectra

2,2'-((1E,1'E)-(1,4-phenylenebis(azaneylylidene)))bis(methaneylylidene))bis(benzene-1,3,5-triol), **SH-29**

### I. <sup>1</sup>H-NMR (400 MHz, DMSO)



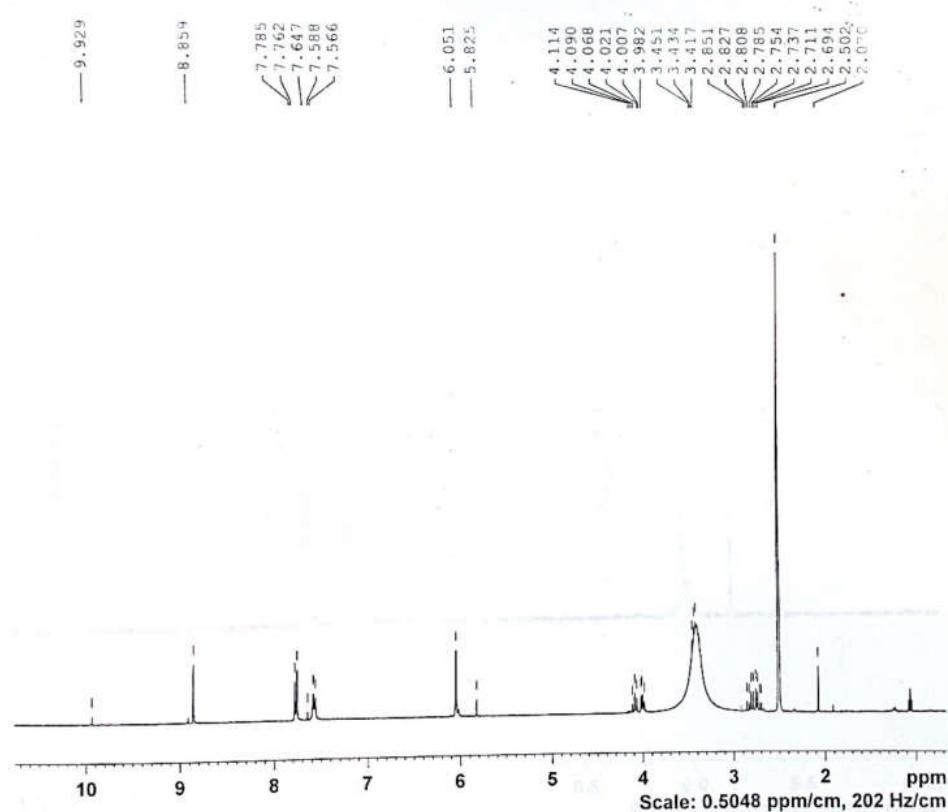
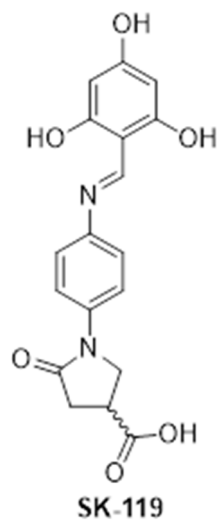
## II. $^{13}\text{C}$ -NMR(400 MHz, DMSO)



NMR assignment was previously reported [1]

5-oxo-1-(4-((2,4,6-trihydroxybenzylidene)amino)phenyl)pyrrolidine-3-carboxylic acid, **SK-119**

III.  $^1\text{H}$ -NMR (400 MHz, DMSO)



17m1  
Elz  
SK-119

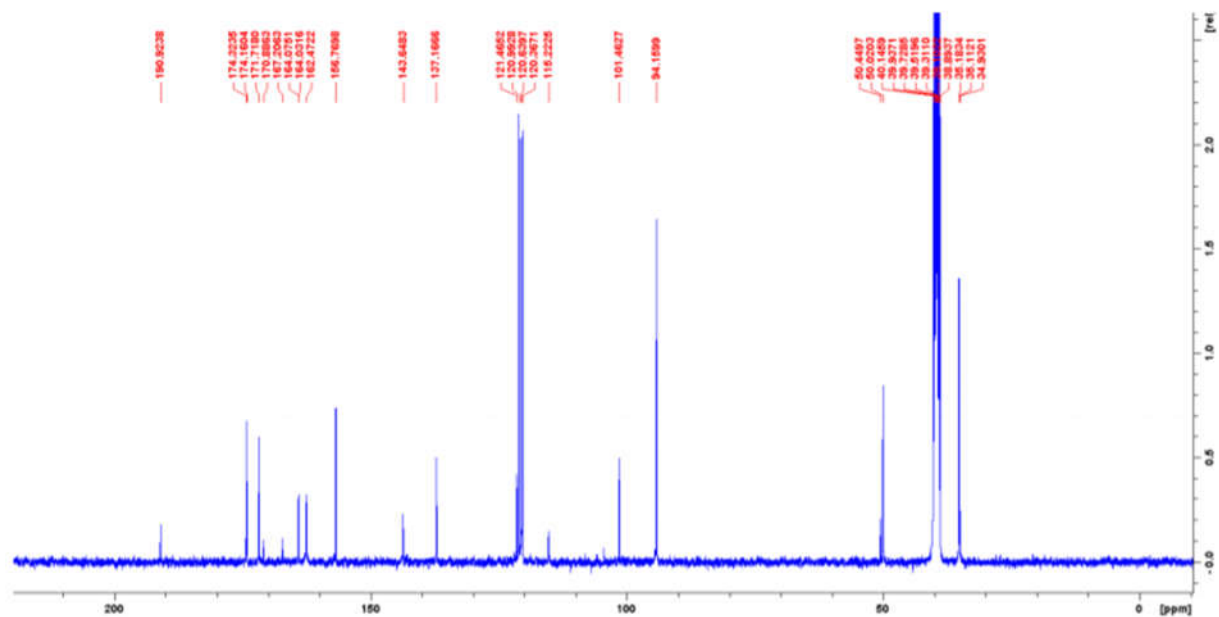
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Time      13.27
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PULPROG    zg30
TD         65536
SOLVENT    DMSO
NS          24
DS          0
SWH         7183.908 Hz
FIDRES      0.109618 Hz
AQ          4.5613556 sec
RG          128
DW          69.600 usec
DE          6.50 usec
TE          301.0 K
D1          0.10000000 sec
TD0         1
  
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===== CHANNEL f1 =====
NUC1       1H
P1         10.10 usec
PL1        0.00 dB
SFO1       400.1032008 MHz
SI         32768
SF         400.1000029 MHz
WDW        EM
SSB        0
LB         0.00 Hz
GB         0
PC         1.00
  
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IV.  $^{13}\text{C}$ -NMR(400 MHz, DMSO)



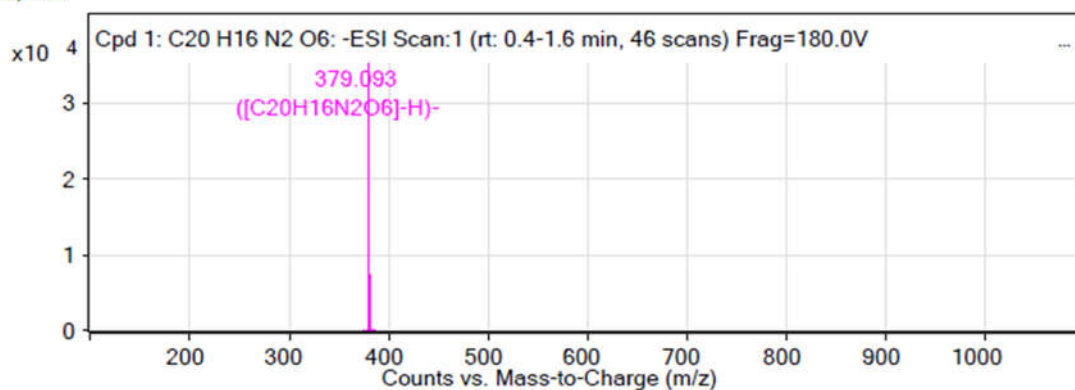
### III. Mass Spectrometry analytical data

2,2'-((1E,1'E)-(1,4-phenylenebis(azaneylylidene))bis(methaneylylidene))bis(benzene-1,3,5-triol),  
SH-29

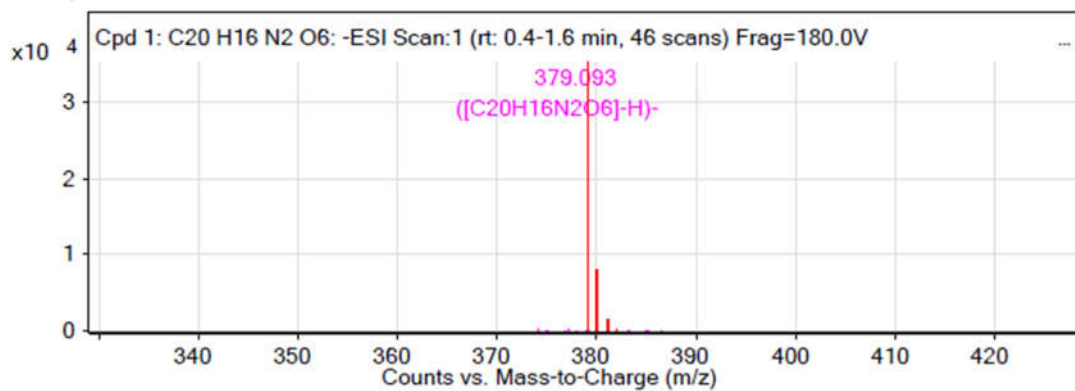
#### Qualitative Compound Report

Compound Label	m/z	RT	Algorithm	Mass
Cpd 1: C20 H16 N2 O6	379.093	0.6	Find By Formula	380.1007

MS Spectrum



MS Zoomed Spectrum



MS Spectrum Peak List

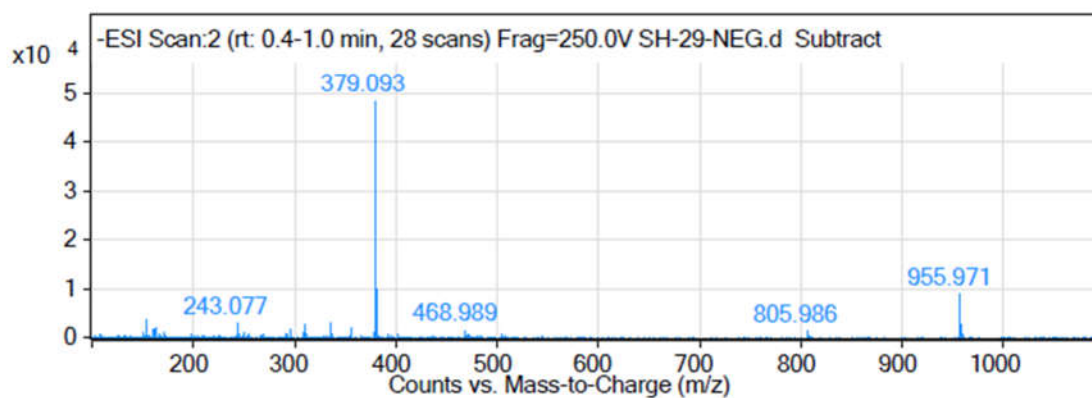
m/z	Calc m/z	Diff (ppm)	z	Abund	Formula	Ion
379.093	379.094	0.16	1	35212.06	C20H16N2O6	[M-H]-
380.099	380.097	0.77	1	7288.87	C20H16N2O6	[M-H]-
381.099	381.099	1.22	1	1100.89	C20H16N2O6	[M-H]-
382.102	382.102	-0.91	1	113.14	C20H16N2O6	[M-H]-

--- End Of Report ---

## Qualitative Analysis Report

### User Spectra

Spectrum Source	Fragmentor Voltage	Collision Energy	Ionization Mode
Peak (1) in "- TIC Scan"	250	0	ESI



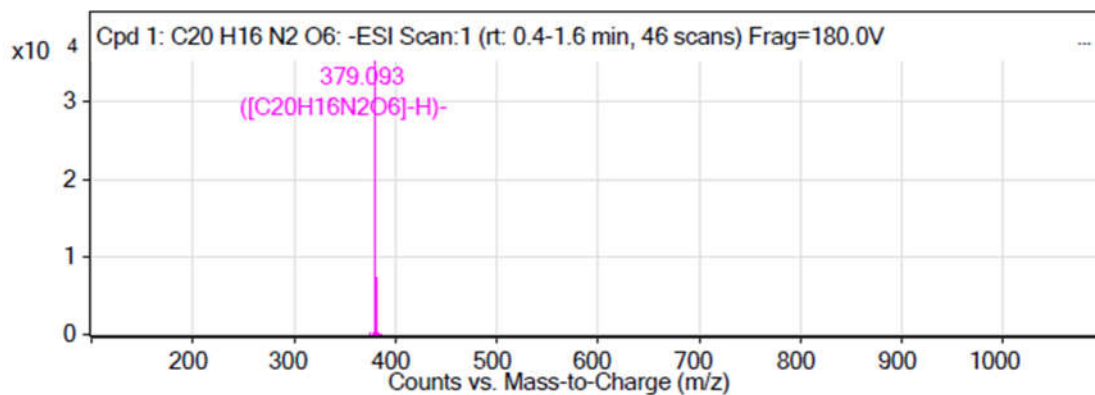
#### Peak List

m/z	z	Abund
92.928		1505.03
94.925		1277.5
108.045		726.11
151.004		788.85
153.019		3569.66
159.056		1416.09
160.842		1710.21
162.839		1740.31
164.836		667.46
170.944		868.28
199.087		759.8
243.077	1	3133.6
251.082		1016.61
255.077		764.34
295.072		1648.5
309.088		915.39
311.103	1	2854.08
335.103	1	3125.65
336.107	1	727.27
337.084		694.88
355.093		1781.02
377.075		1075.16
379.093	1	48275.35
380.096	1	9793.72
381.099	1	1617.79

468.989	1390.2
805.986	1208.88
955.971	9066.02
956.973	1638
957.968	2933.25



# Compounds

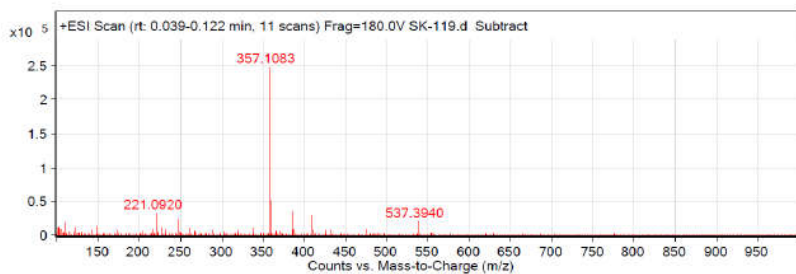


## Peak List

m/z	z	Abund	Formula	Ion
379.093	1	35212.06	C <sub>20</sub> H <sub>16</sub> N <sub>2</sub> O <sub>6</sub>	(M-H)-
380.096	1	7288.87	C <sub>20</sub> H <sub>16</sub> N <sub>2</sub> O <sub>6</sub>	(M-H)-
381.099	1	1100.89	C <sub>20</sub> H <sub>16</sub> N <sub>2</sub> O <sub>6</sub>	(M-H)-
382.102	1	113.14	C <sub>20</sub> H <sub>16</sub> N <sub>2</sub> O <sub>6</sub>	(M-H)-

--- End Of Report ---

5-oxo-1-(4-((2,4,6-trihydroxybenzylidene)amino)phenyl)pyrrolidine-3-carboxylic acid, **SK-119**



Peak List

m/z	z	Abund
54.9468		4160.51
55.9344		5869.46
56.9419		64186.87
72.937		12550.21
81.9371		48367.74
83.9404		5330.04
84.9463		5975.98
85.9415		6384.69
87.0441		14745.55
89.0595		3620.91
95.9525		5388.94
95.9731		4318.41
97.9684		72220.02
98.9614		27334.29
99.9687		9020.65
100.9566		11021.09
102.1276		12685.8
103.9555		8771.66
105.0697		9720.54
108.0673		3966.32
109.9432		19460.7
114.0913		4514.68
121.0741		3867.01
122.9639		12534.44
126.9672		3780.38
130.1588		4546.47
141.9585		7713.45
149.023		13540.89
172.8616		7416.14
202.8722		6104.05
217.1054		8517.03
221.092	1	32481.44
222.096	1	4056.02
227.1256		11458.43

230.8896		8376.76
246.8622		23633.44
248.8626	4	4188.94
261.1093		10435.04
261.1282		6657.95
267.1219		5732.12
288.2892		7180.11
301.1414		4964.74
318.7921		7068.65
337.1051		10102.43
357.1083	1	248457.59
358.1112	1	51375.8
359.1137	1	7545.01
365.1356		6329.38
371.0997		5591.6
385.1391		6876.68
387.1803	1	35066.03
388.1838	1	8342.91
409.1619	1	29193.48
410.1653	1	6899.88
425.1358		7783.54
432.2377	1	7886.26
475.113	1	9510.22
537.394	1	20491.01
538.3974	1	6725.91
553.3789		3628.97

Reference:

1. Kahremany, S.; Babaev, I.; Gvirtz, R.; Ogen-Stern, N.; Azoulay-Ginsburg, S.; Senderowitz, H.; Cohen, G.; Gruzman, A. Nrf2 Activation by SK-119 Attenuates Oxidative Stress, UVB, and LPS-Induced Damage. *Skin Pharmacol Physiol* **2019**, *32*, 173-181, doi:10.1159/000499432.