

Supporting Information for

**Design, Synthesis and Evaluation of Novel 1,4-Disubstituted
Piperazine-2,5-dione Derivatives as Antioxidants against H₂O₂-
Induced Oxidative Injury via the IL-6/Nrf2 Loop Pathway**

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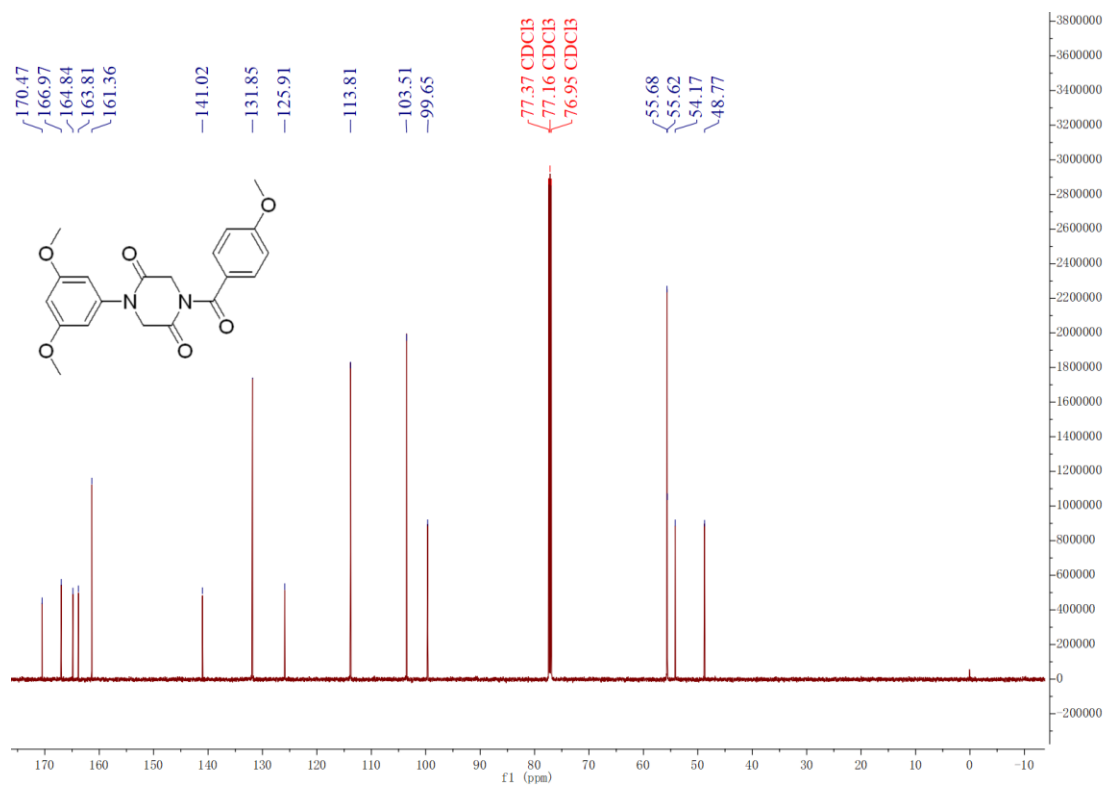
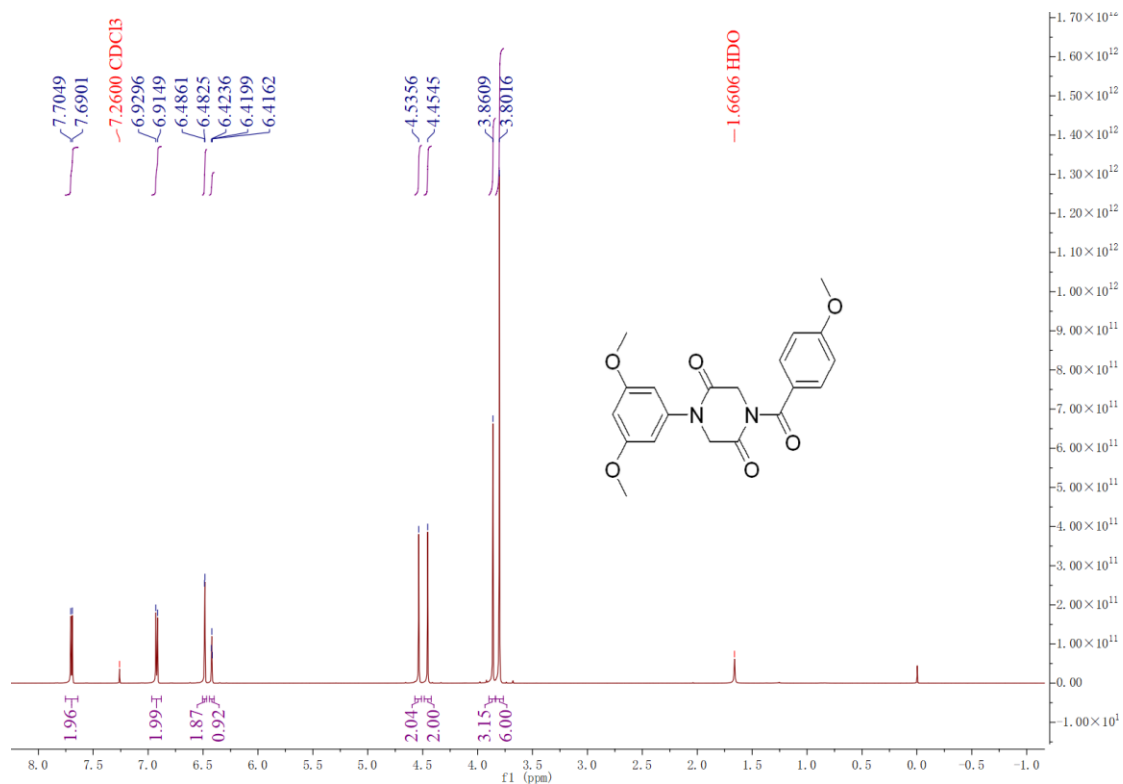
† These authors contributed equally to this work.

Table S1

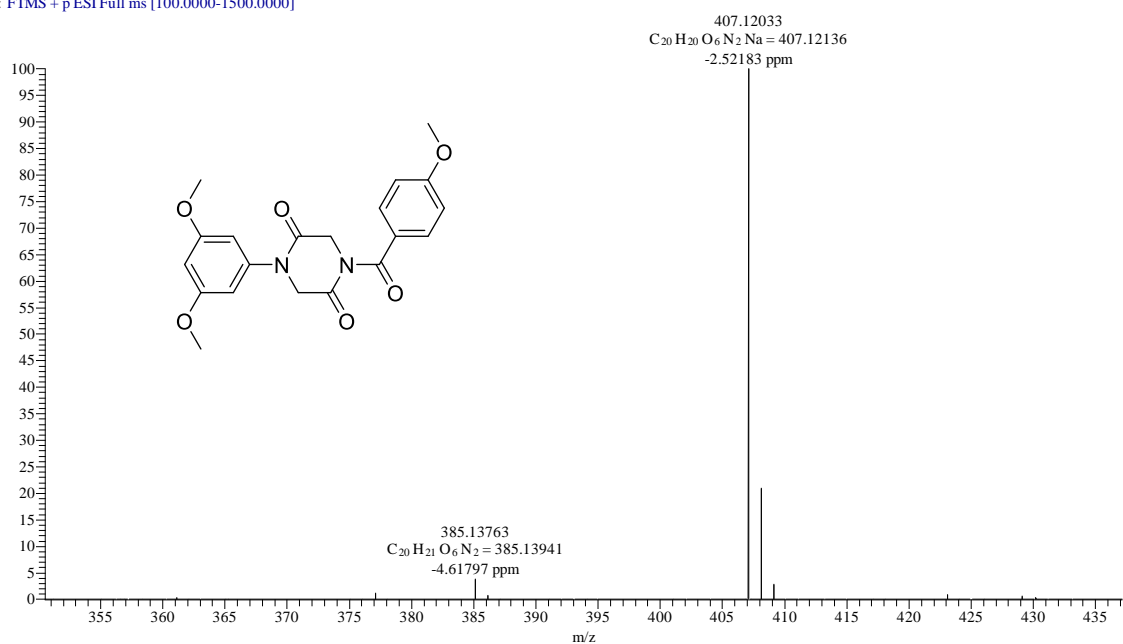
The impact of synthetic compounds on SH-SY5Y cytotoxicity

Compd.	Viabilities of SH-SY5Y Cells		
	80(μ M)	20(μ M)	5(μ M)
9a	109.1 \pm 5.61	104.6 \pm 4.71	93.05 \pm 8.58
9b	84.20 \pm 5.85	109.7 \pm 2.65	113.2 \pm 3.52
9c	111.6 \pm 8.11	130.7 \pm 19.42	85.87 \pm 10.59
9d	109.8 \pm 6.67	115.7 \pm 3.96	106.8 \pm 5.66
9e	120.4 \pm 4.13	108.3 \pm 2.33	114.5 \pm 2.77
9f	91.23 \pm 3.47	120.3 \pm 5.16	92.88 \pm 3.81
9g	101.1 \pm 0.94	97.02 \pm 0.68	107.6 \pm 2.64
9h	95.36 \pm 0.64	106.5 \pm 1.23	115.2 \pm 1.18
9i	103.7 \pm 0.93	81.51 \pm 5.06	91.87 \pm 2.93
9j	100.3 \pm 1.47	107.9 \pm 1.08	109.7 \pm 1.05
9k	105.6 \pm 1.01	99.27 \pm 1.33	117.9 \pm 1.74
9l	112.5 \pm 1.52	114.3 \pm 1.03	93.57 \pm 6.01
9m	98.77 \pm 2.21	101.4 \pm 2.64	117.3 \pm 7.96
9n	113.1 \pm 6.19	107.7 \pm 8.49	98.65 \pm 1.11
9o	107.7 \pm 5.38	113.4 \pm 6.76	113.5 \pm 6.58
9p	117.9 \pm 4.23	112.6 \pm 3.85	114.3 \pm 5.58
9q	103.1 \pm 1.56	107.6 \pm 1.01	106.5 \pm 2.95
9r	114.1 \pm 7.61	119.3 \pm 8.86	95.25 \pm 4.85
9s	101.8 \pm 0.69	101.1 \pm 0.74	109.3 \pm 3.66

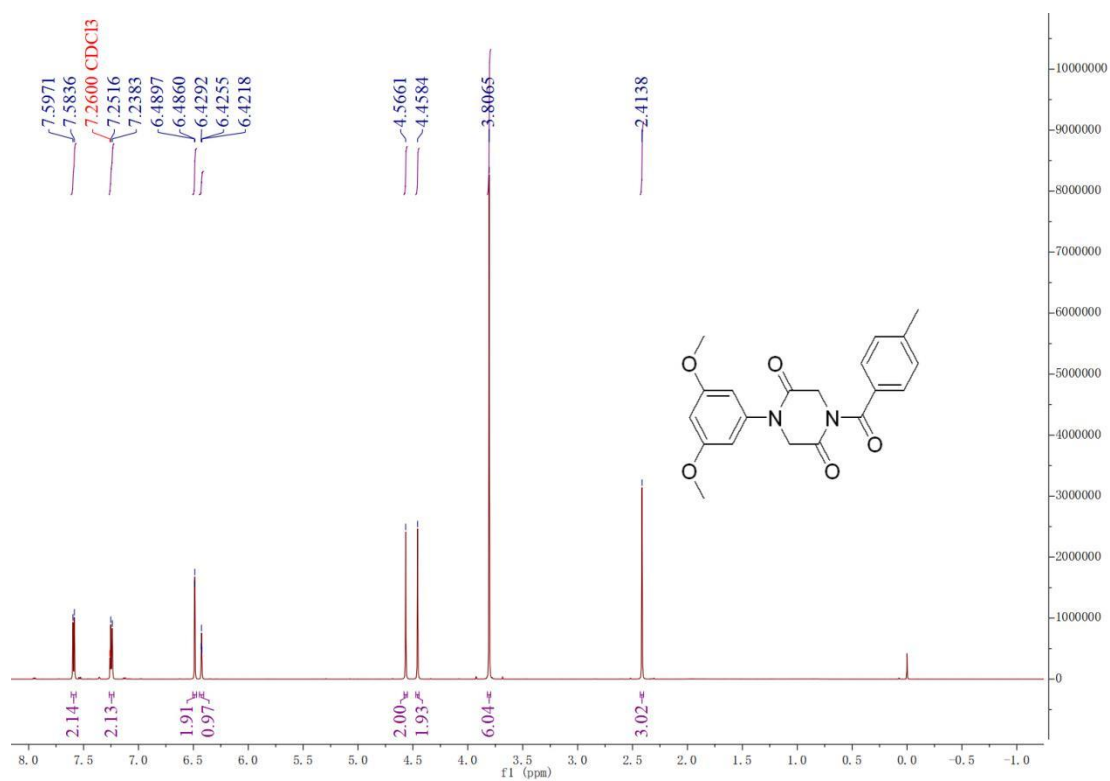
¹H, ¹³C, ¹⁹F NMR spectra and HR-MS (ESI) of compounds*1-(3,5-dimethoxyphenyl)-4-(4-methoxybenzoyl)piperazine-2,5-dione (9a)*

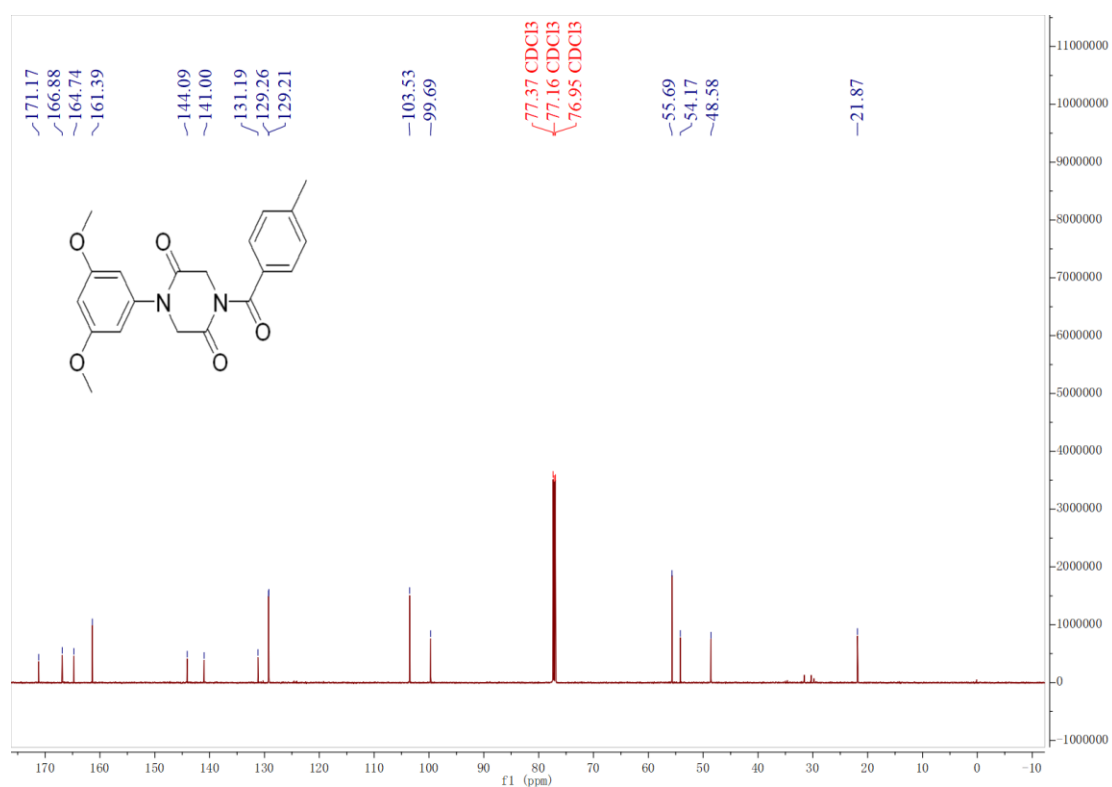


X1 #73 RT: 0.32 AV: 1 NL: 1.04E9
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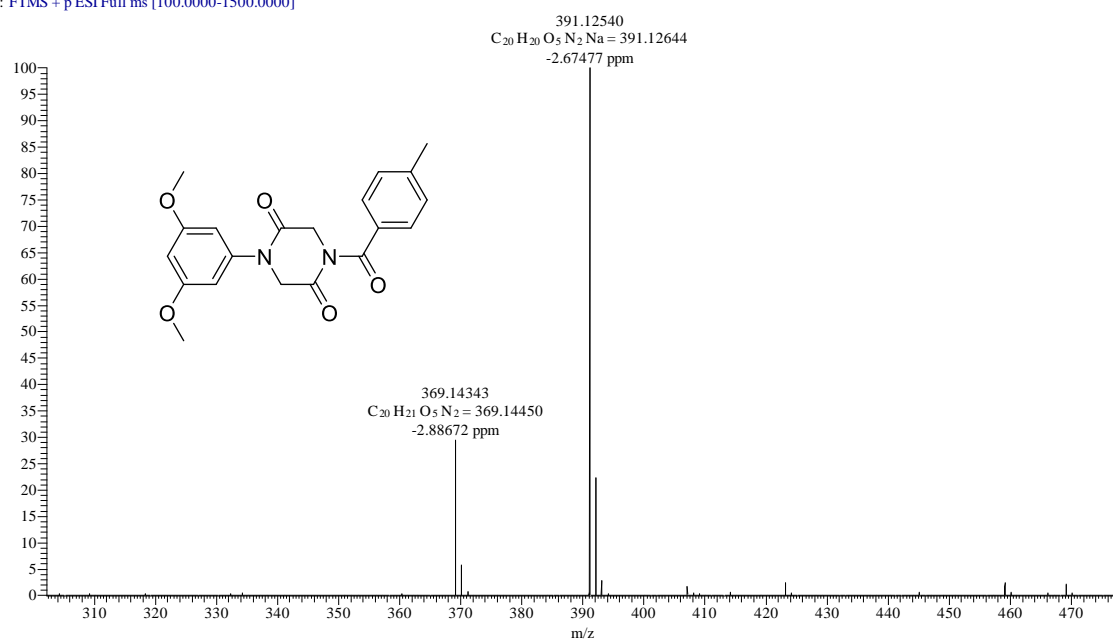


1-(3,5-dimethoxyphenyl)-4-(4-methylbenzoyl)piperazine-2,5-dione (**9b**)

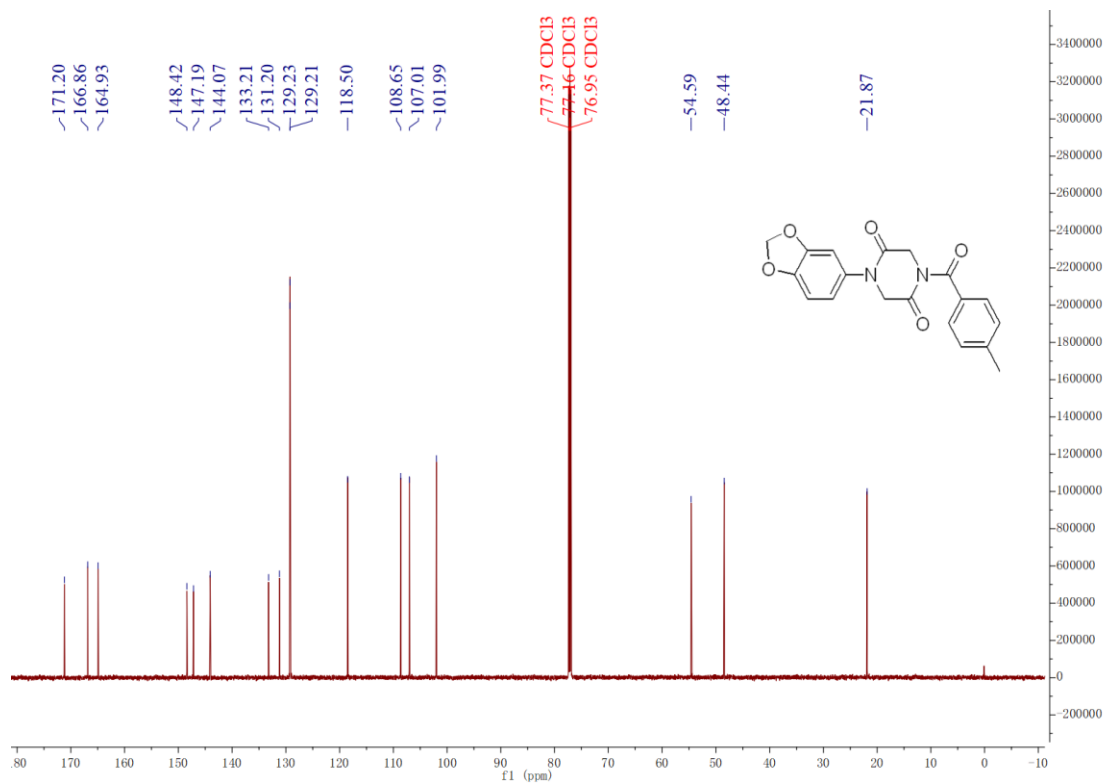
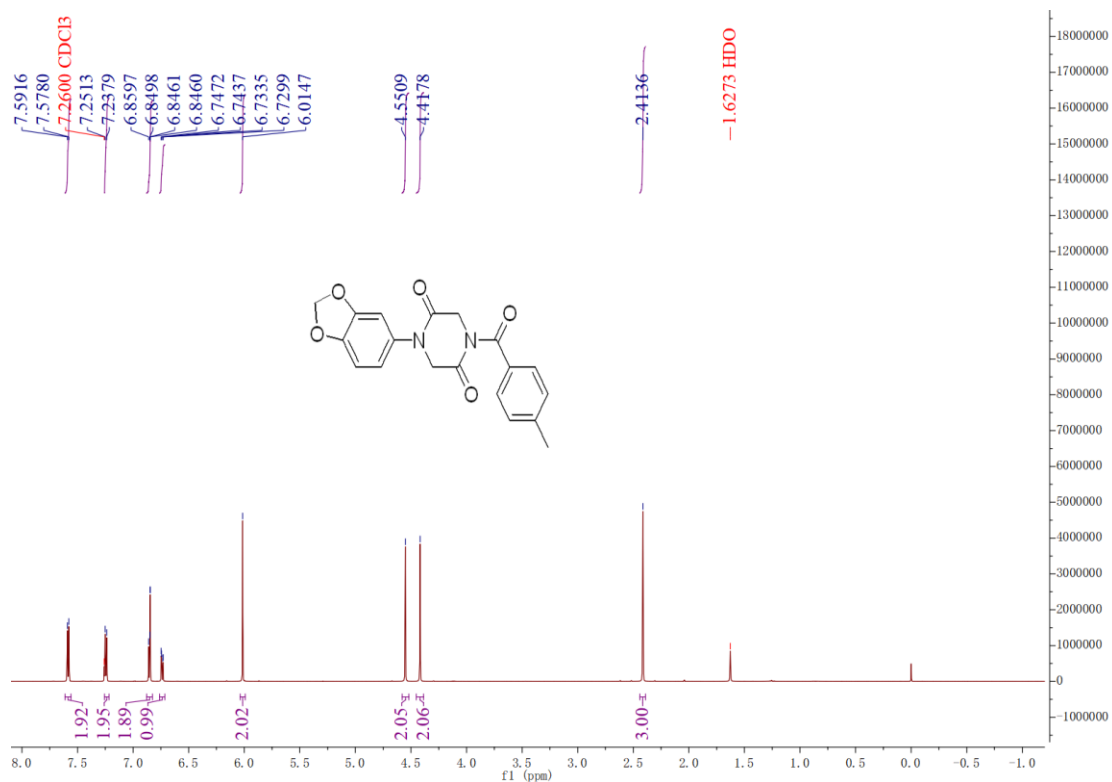




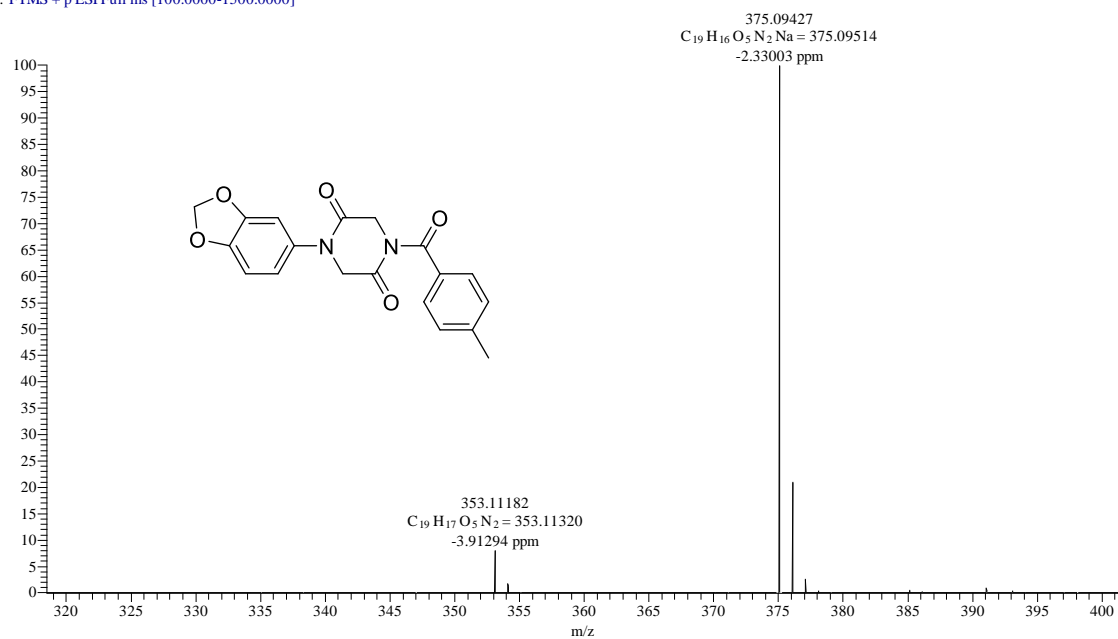
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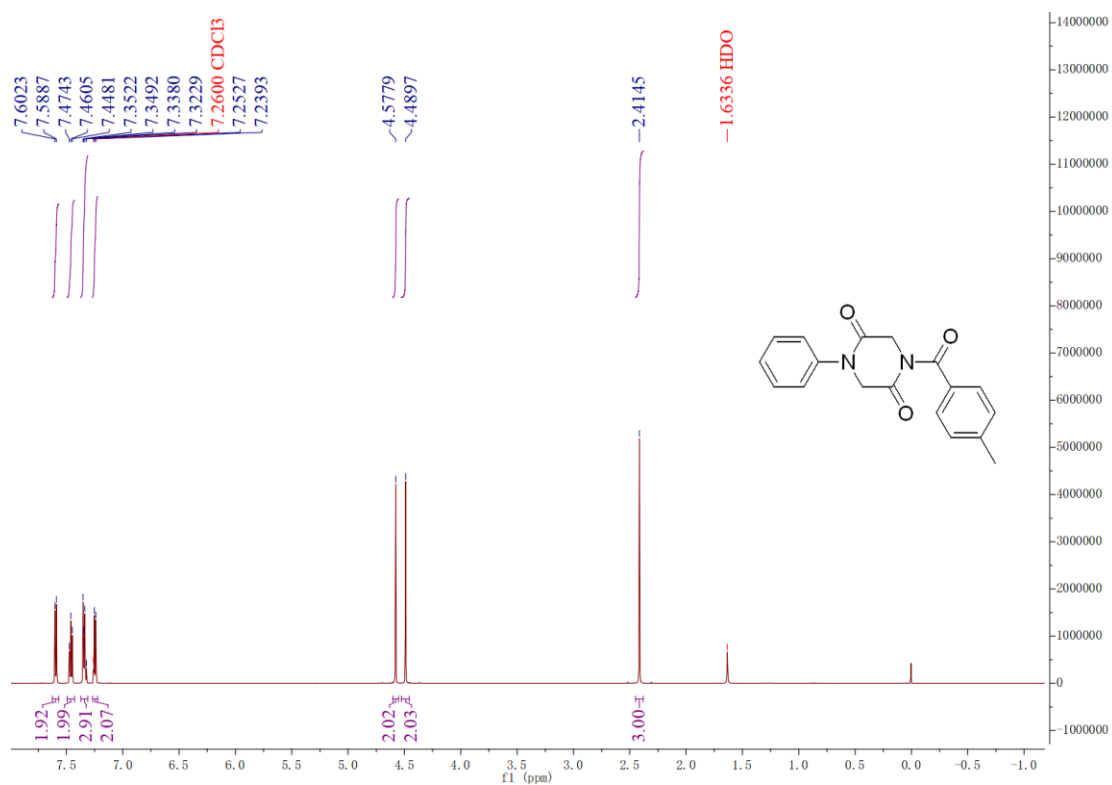
1-(4-methylbenzoyl)-4-(3,4-methylenedioxyphenyl)piperazine-2,5-dione (9c)

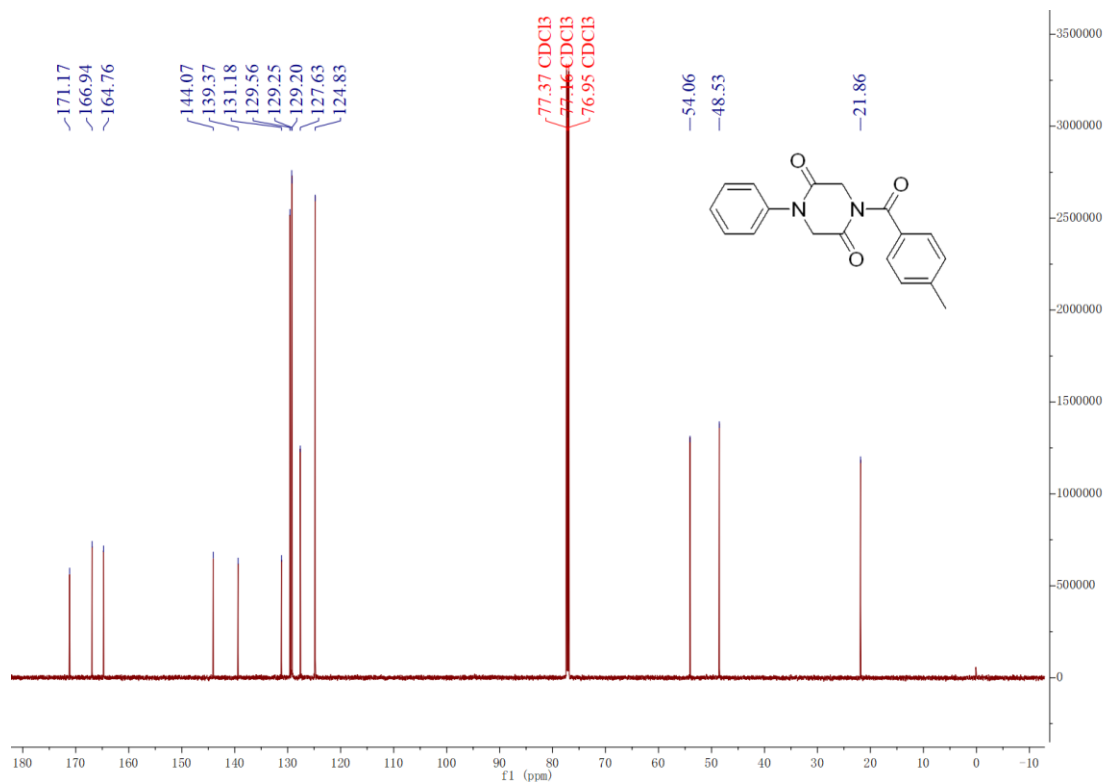


X21 #39 RT: 0.17 AV: 1 NL: 1.79E9
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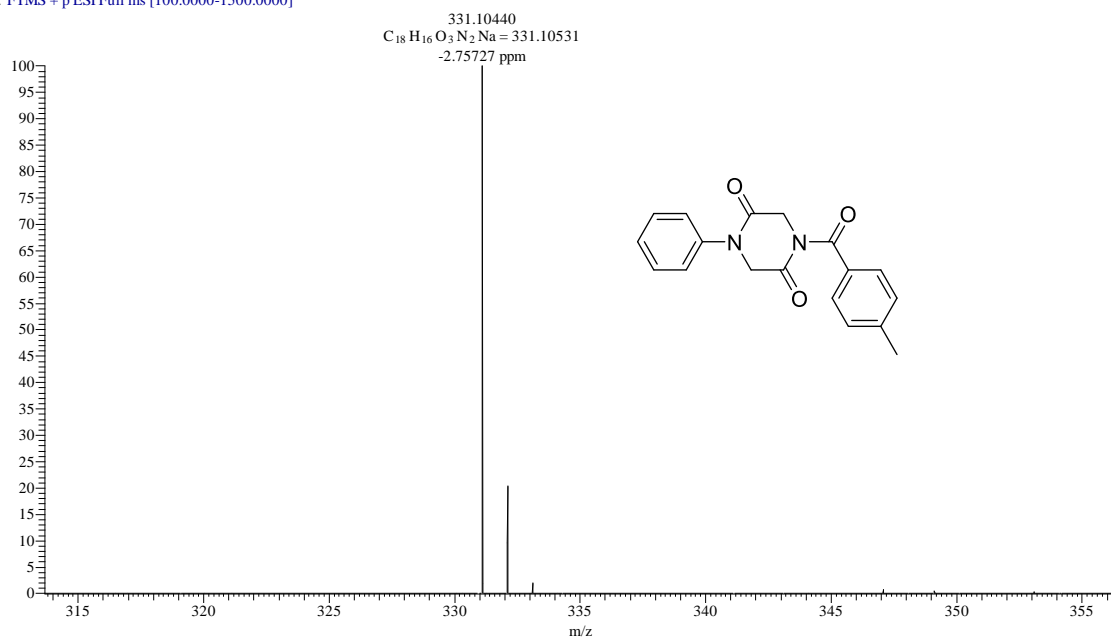


1-(4-methylbenzoyl)-4-phenylpiperazine-2,5-dione (**9d**)

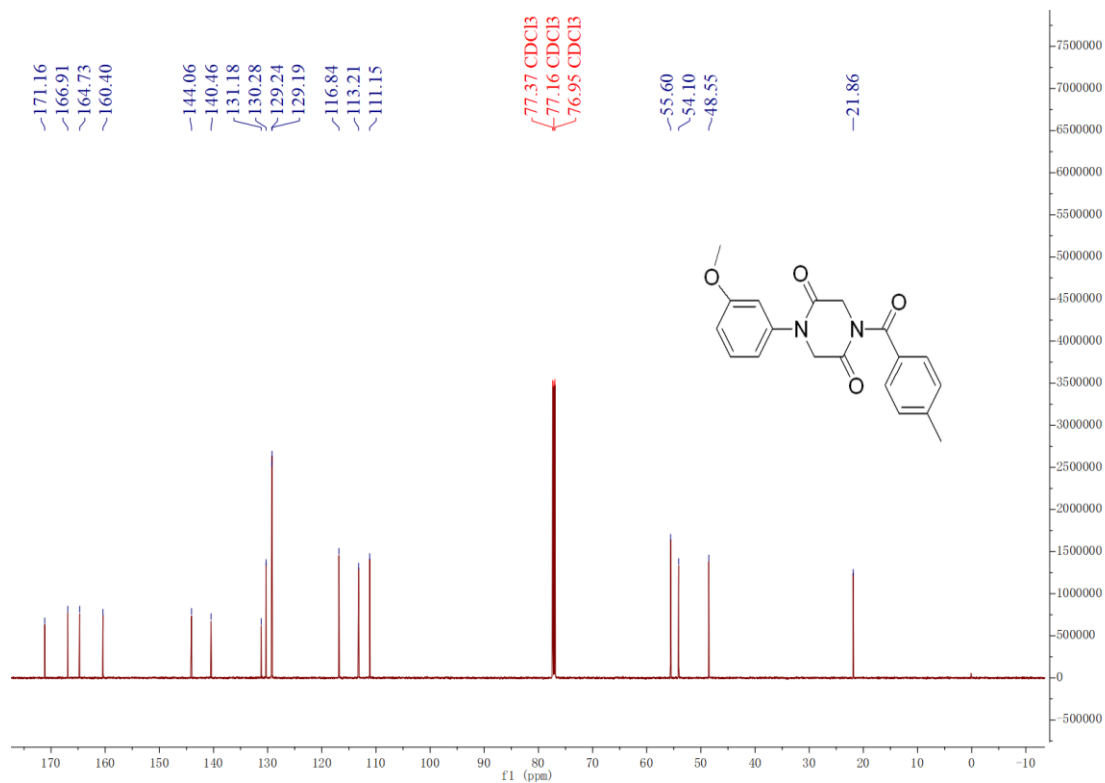
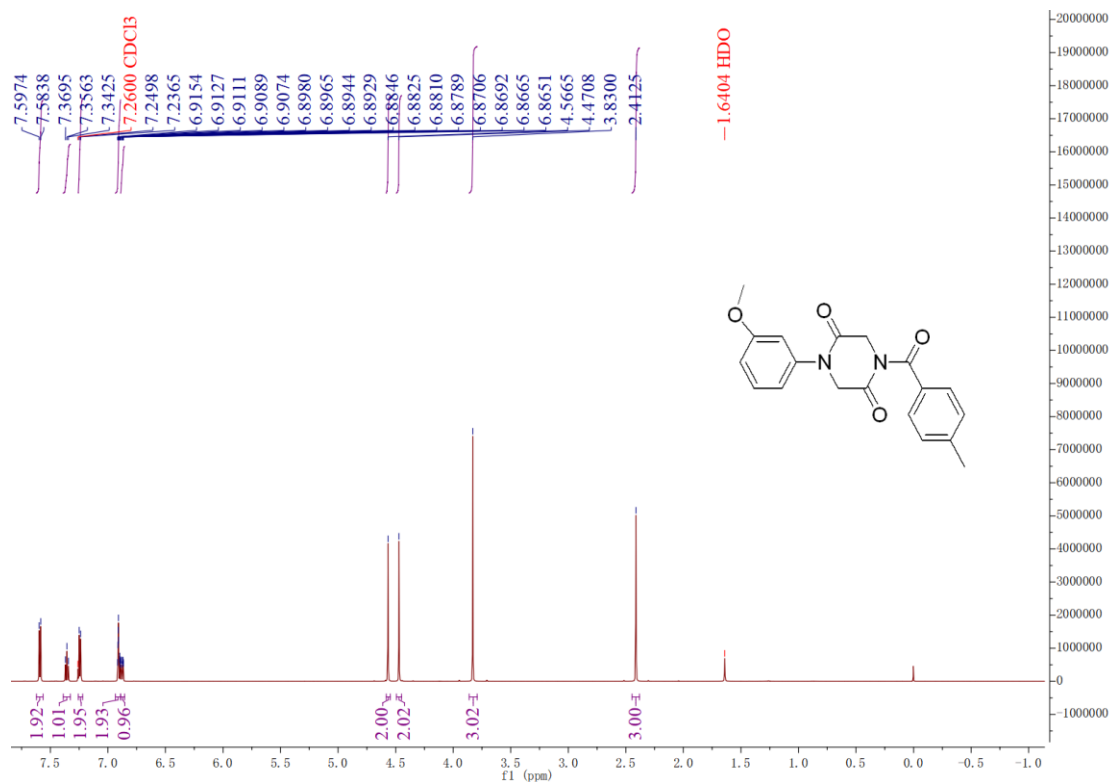




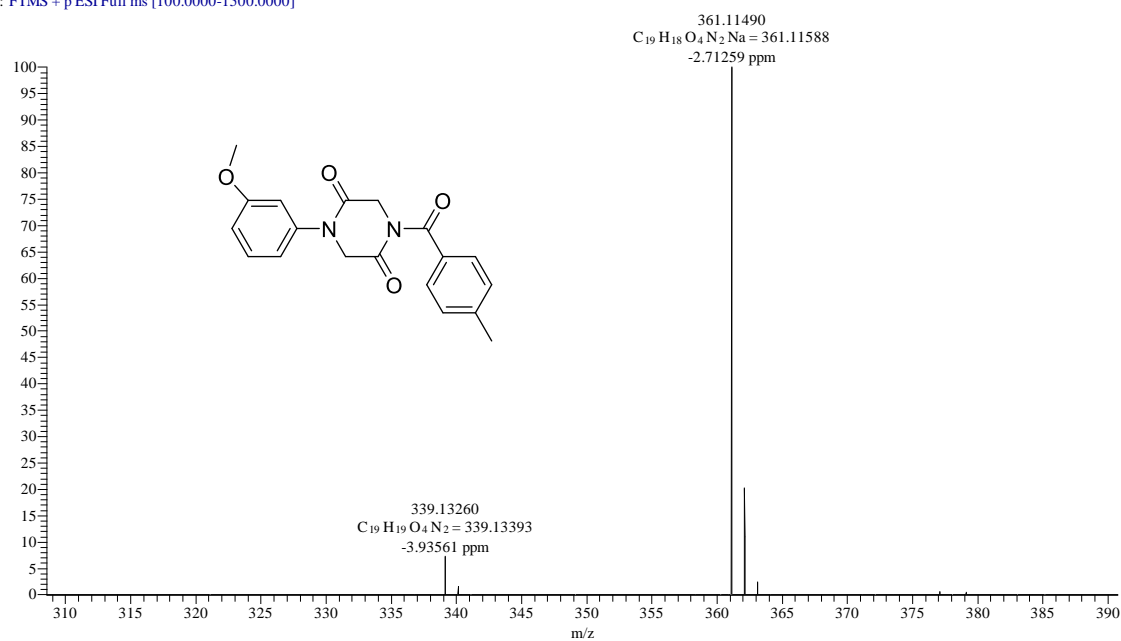
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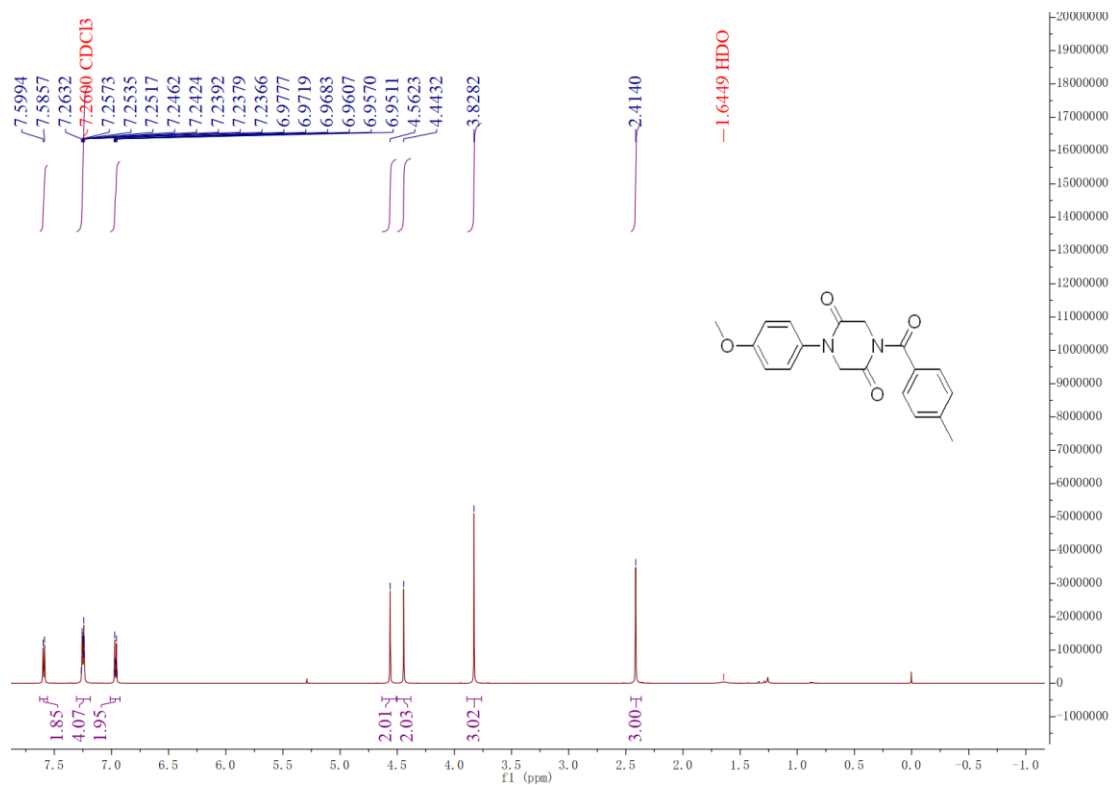
1-(3-methoxyphenyl)-4-(4-methylbenzoyl)piperazine-2,5-dione (9e)

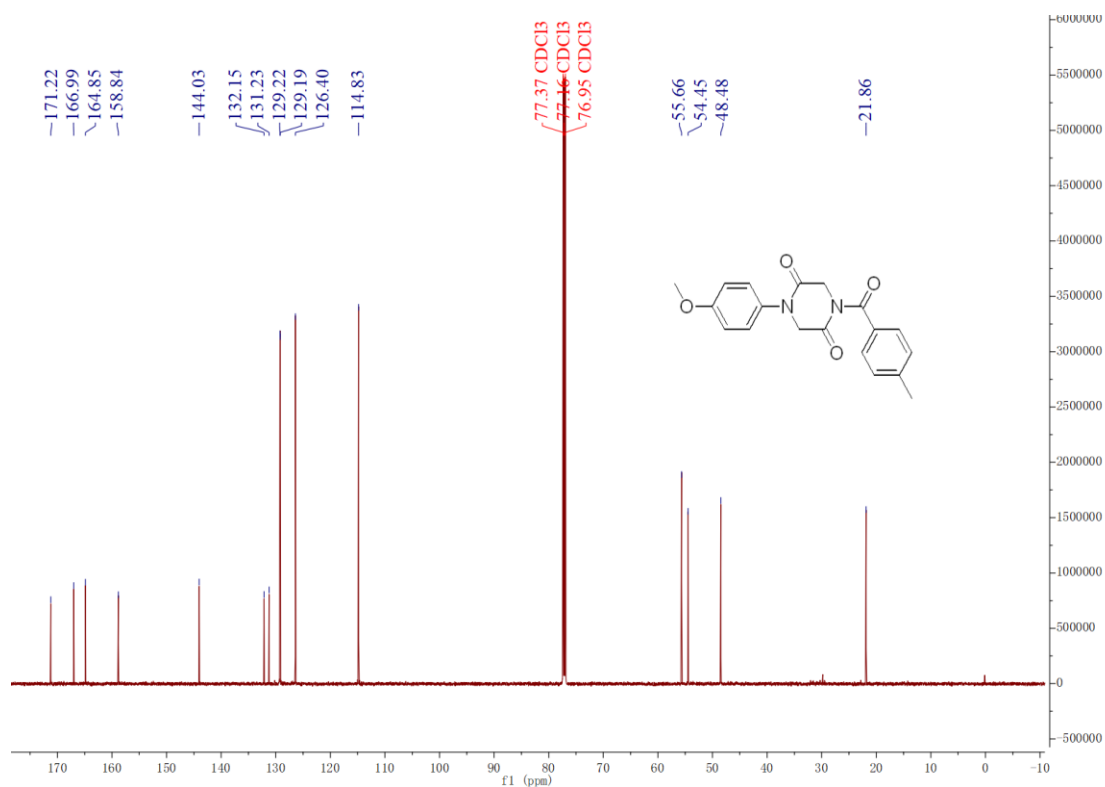


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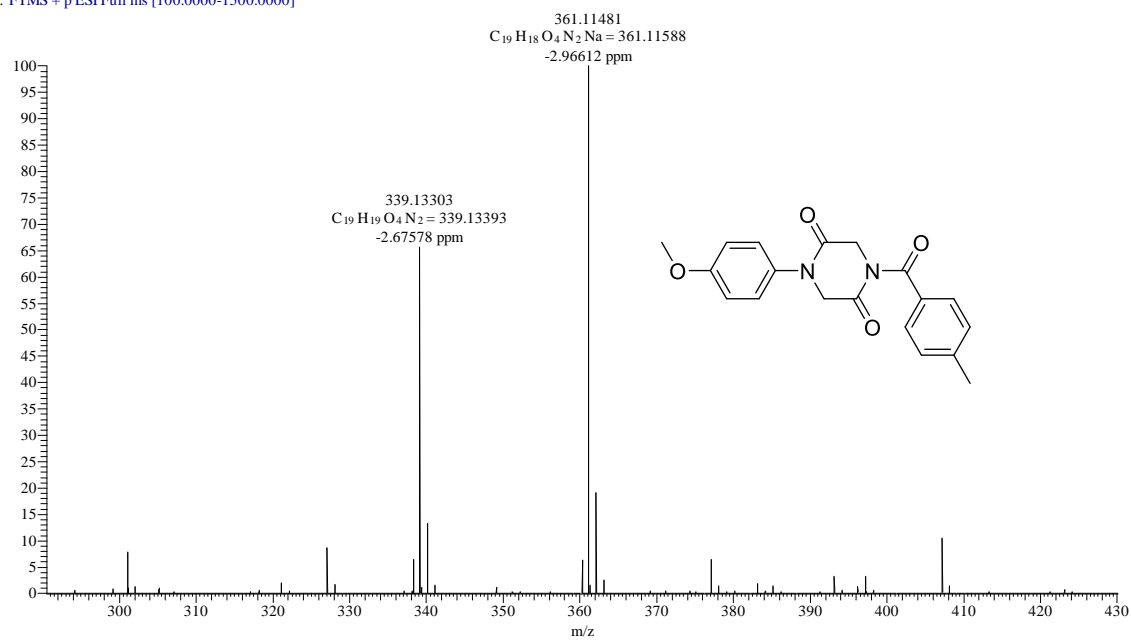


1-(4-methoxyphenyl)-4-(4-methylbenzoyl)piperazine-2,5-dione (9f)

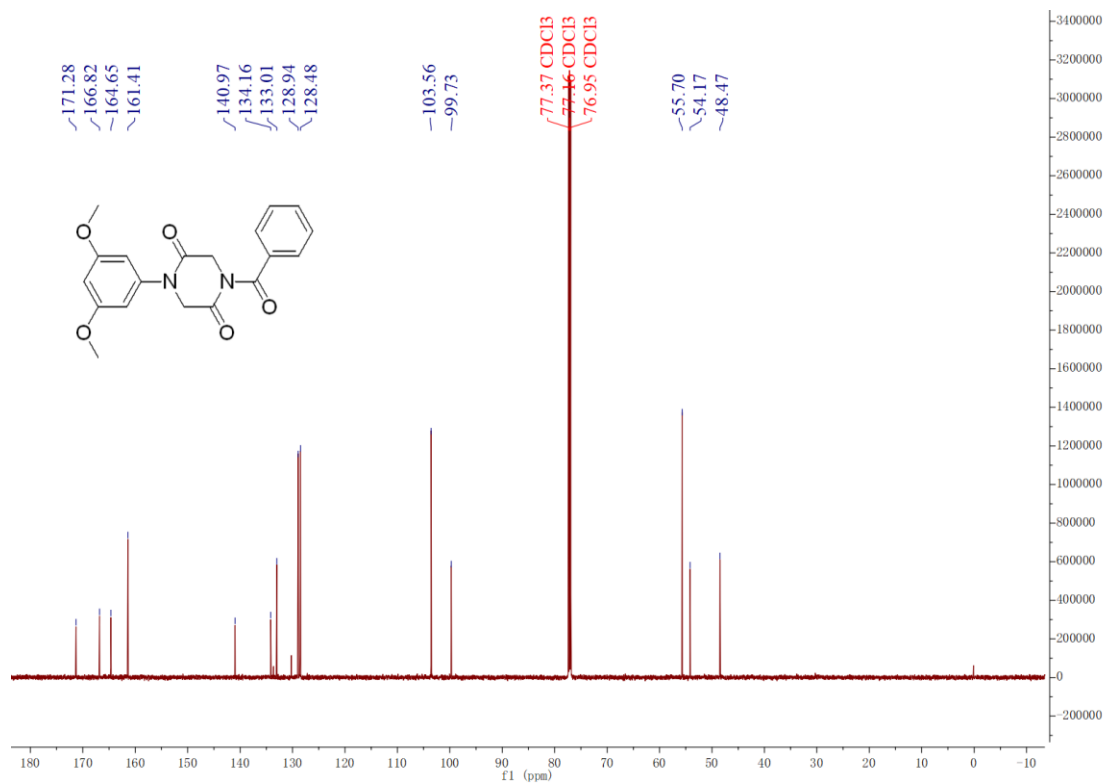
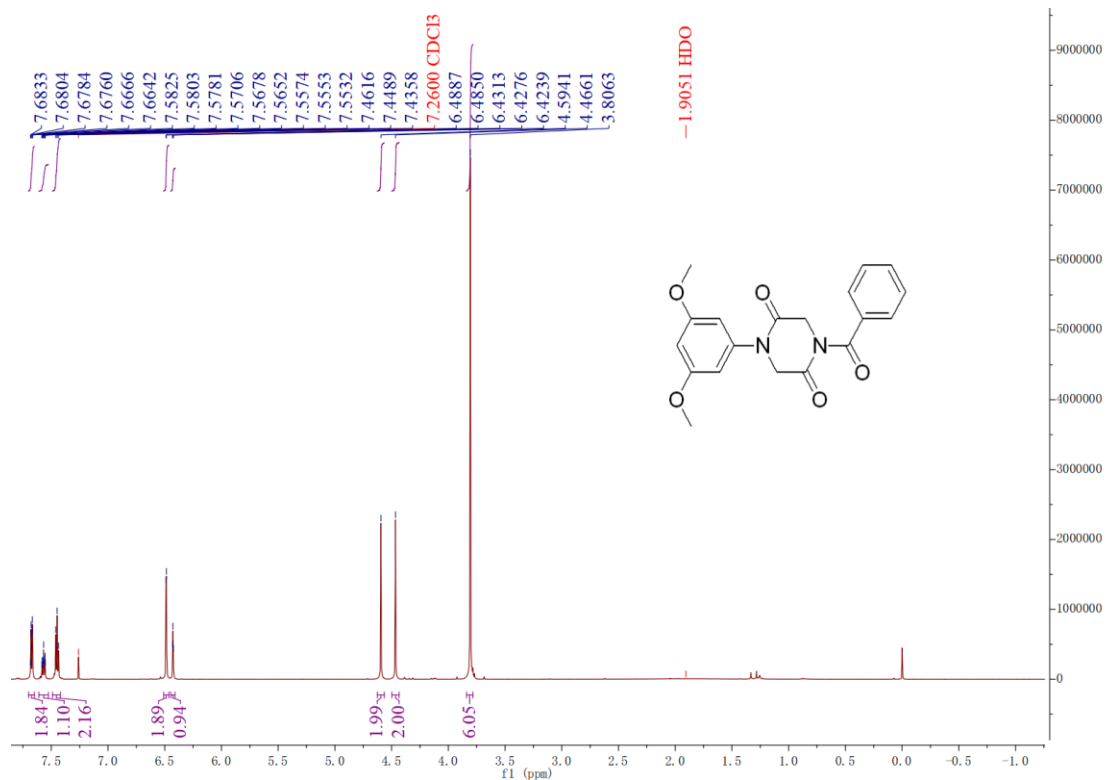




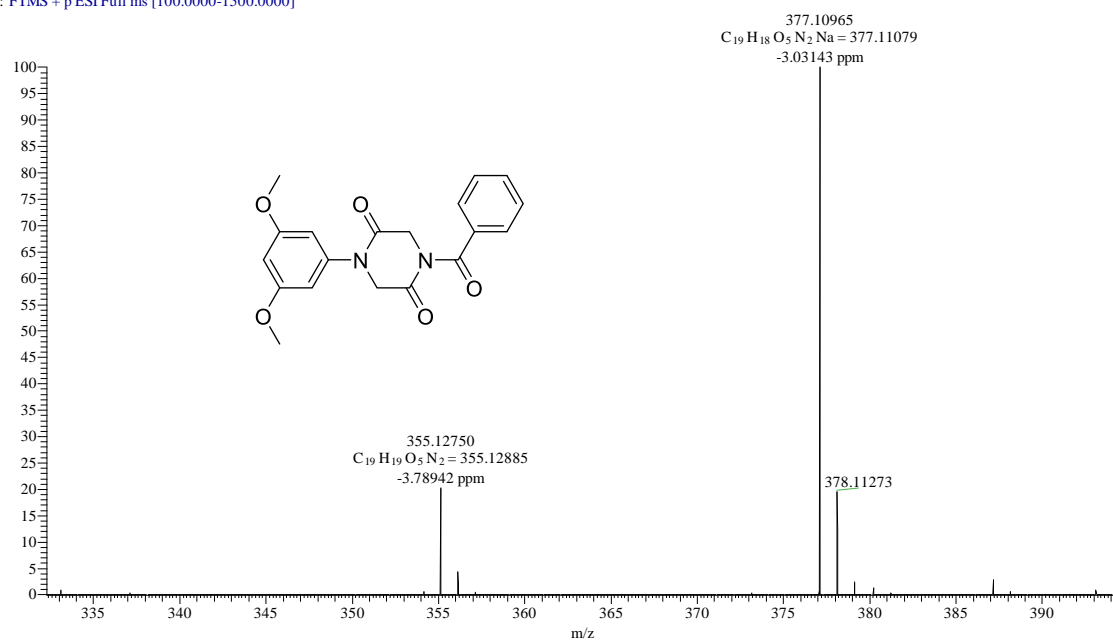
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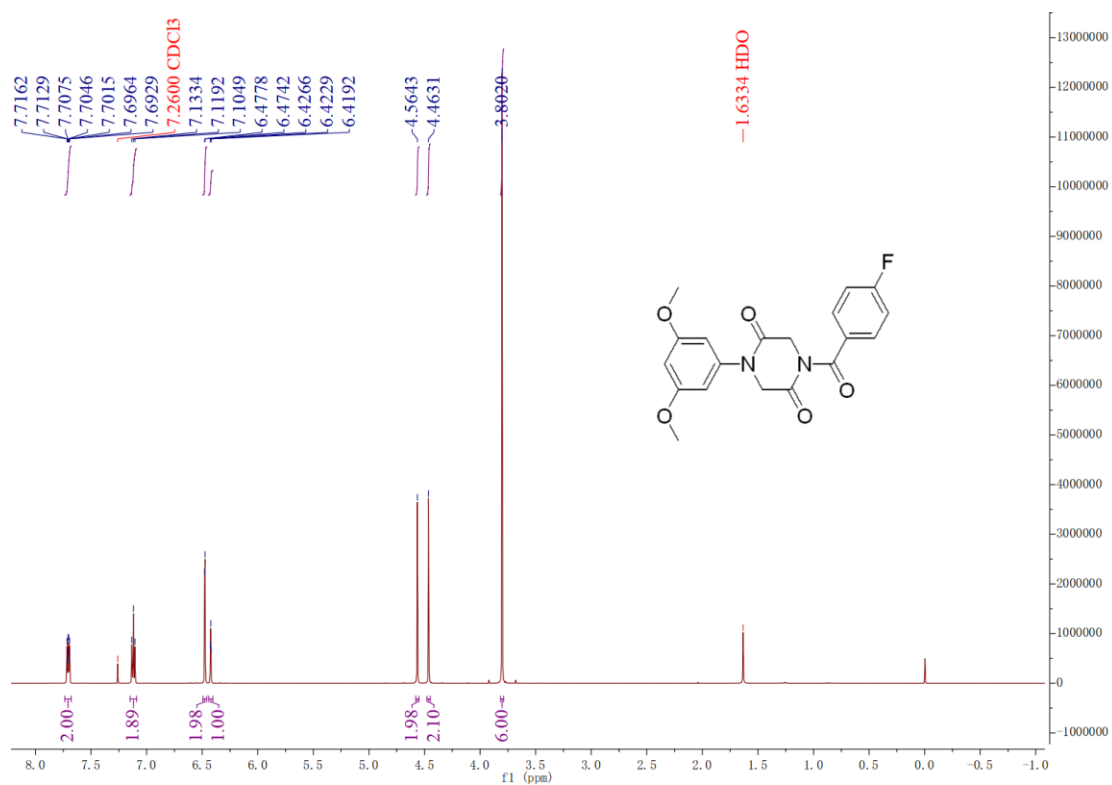
1-(3,5-dimethoxyphenyl)-4-benzoylpiperazine-2,5-dione (9g)

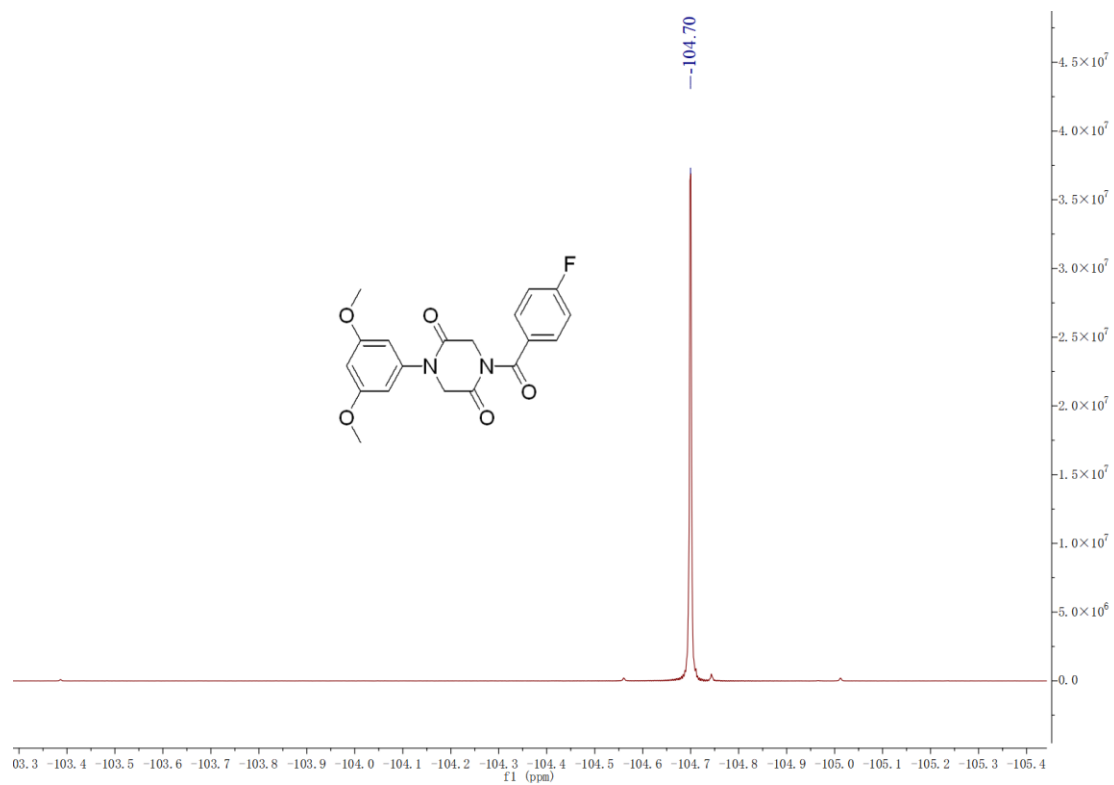
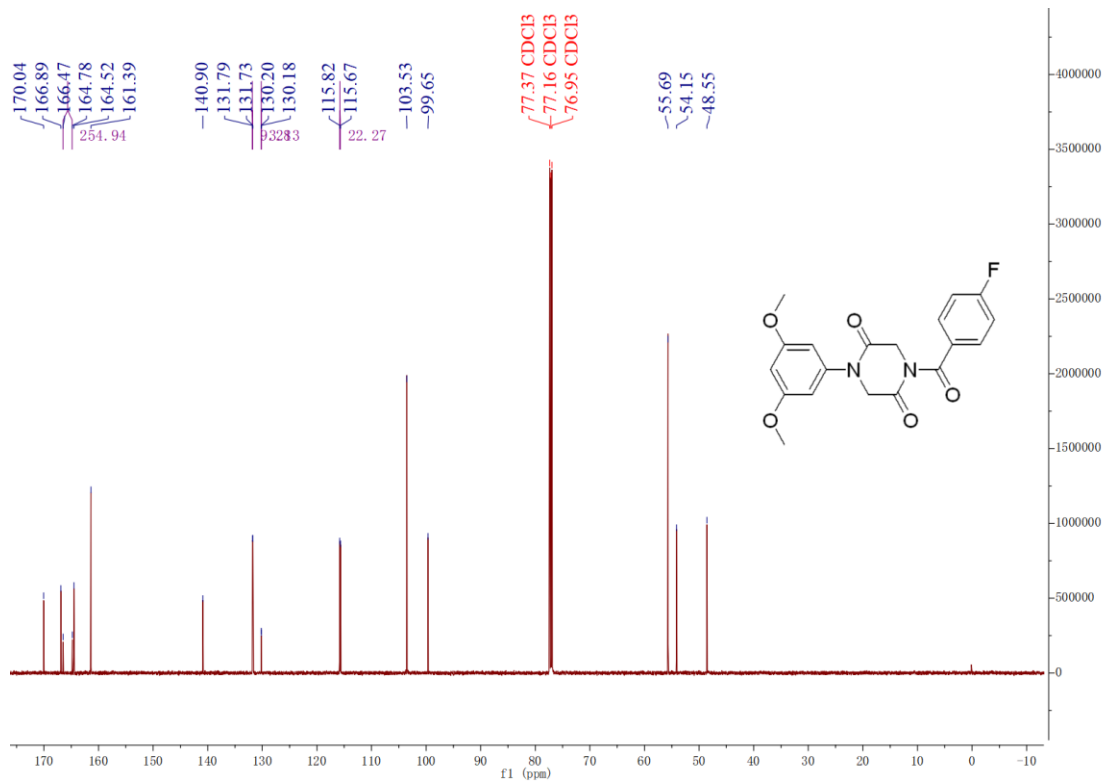


X3 #37 RT: 0.16 AV: 1 NL: 1.40E9
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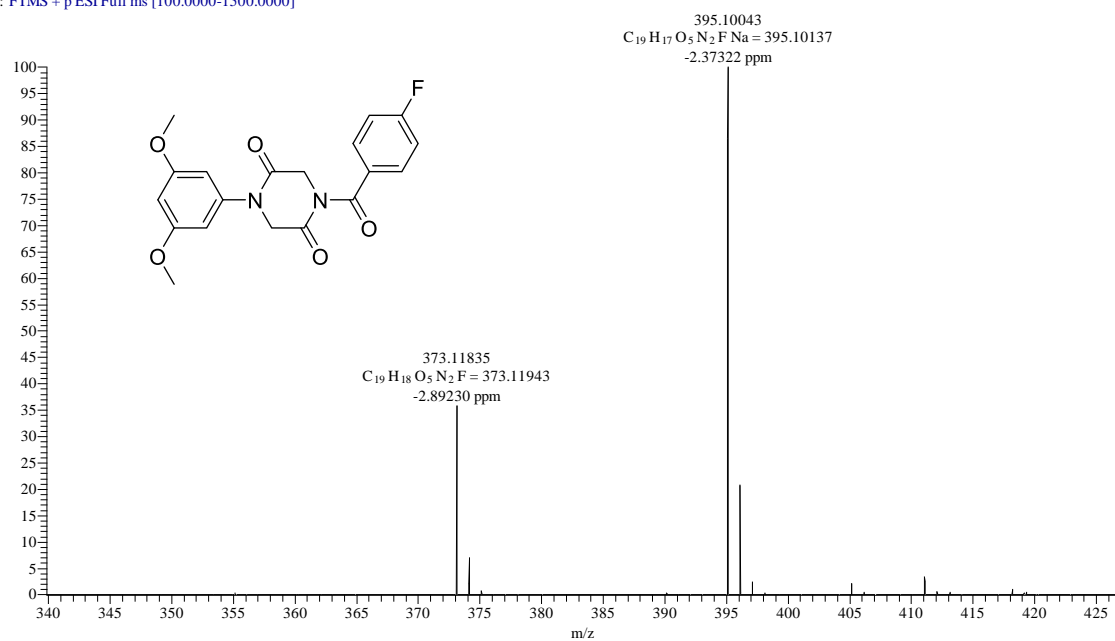


1-(3,5-dimethoxyphenyl)-4-(4-fluorobenzoyl)piperazine-2,5-dione (9h)

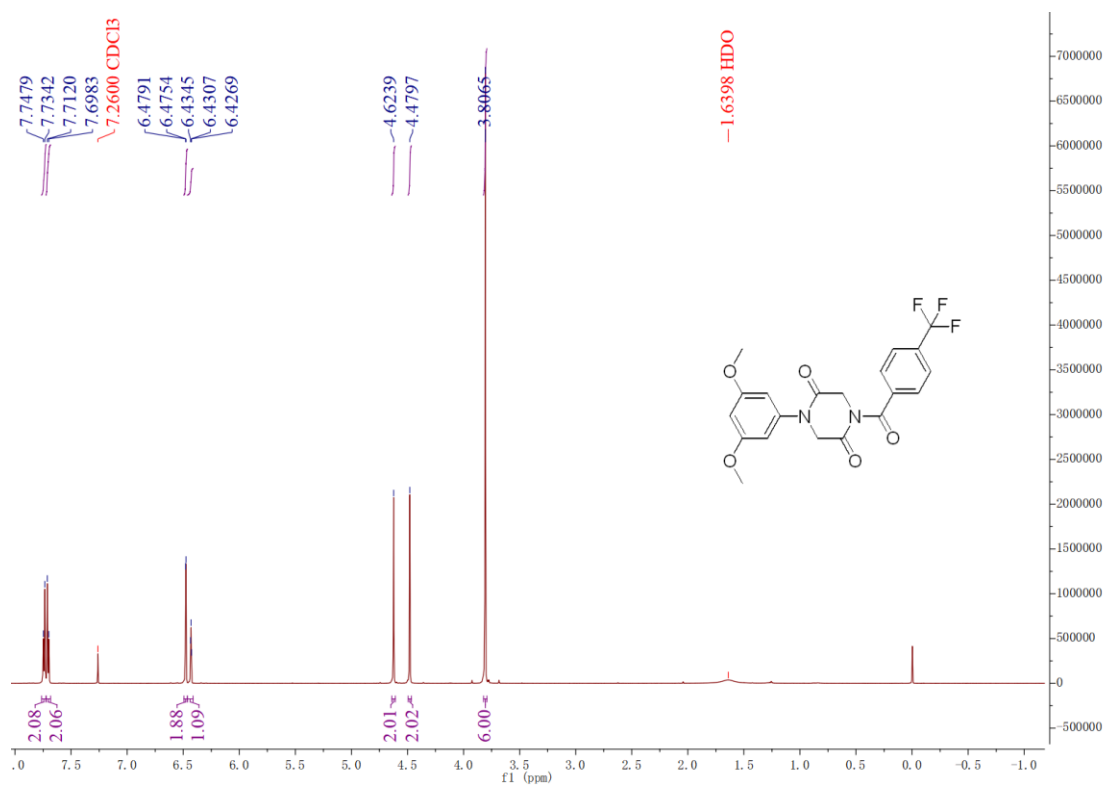


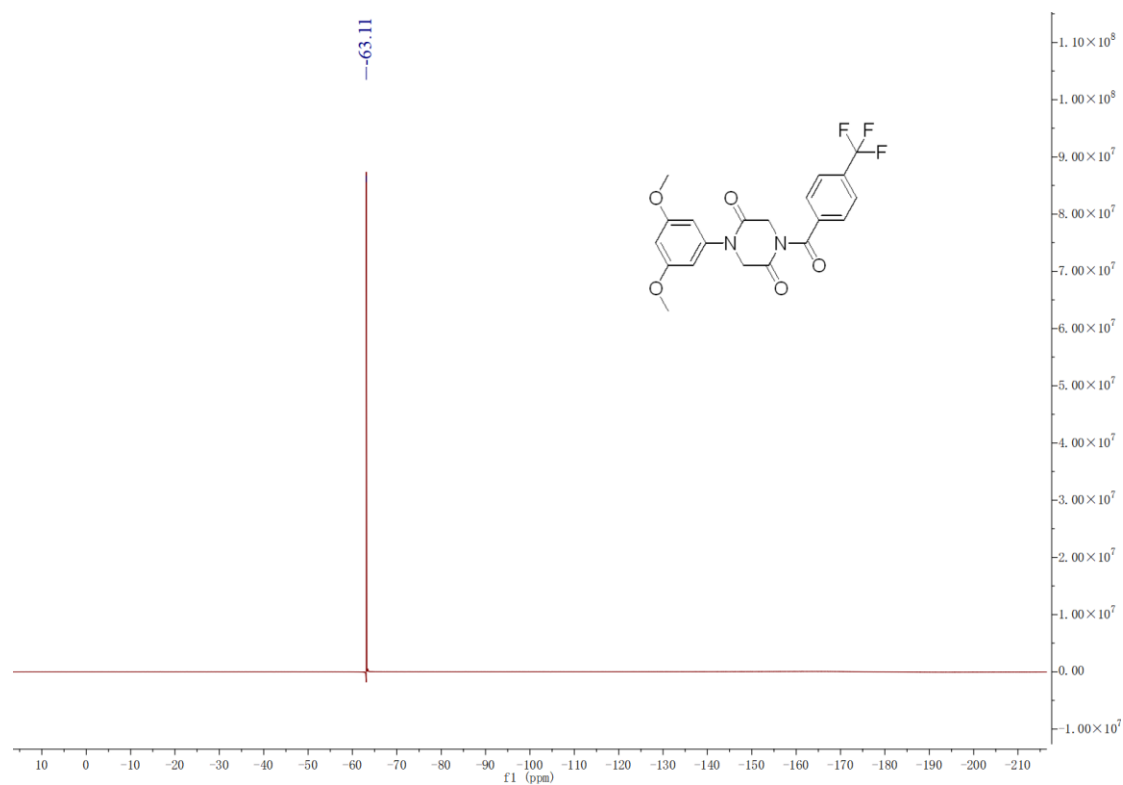
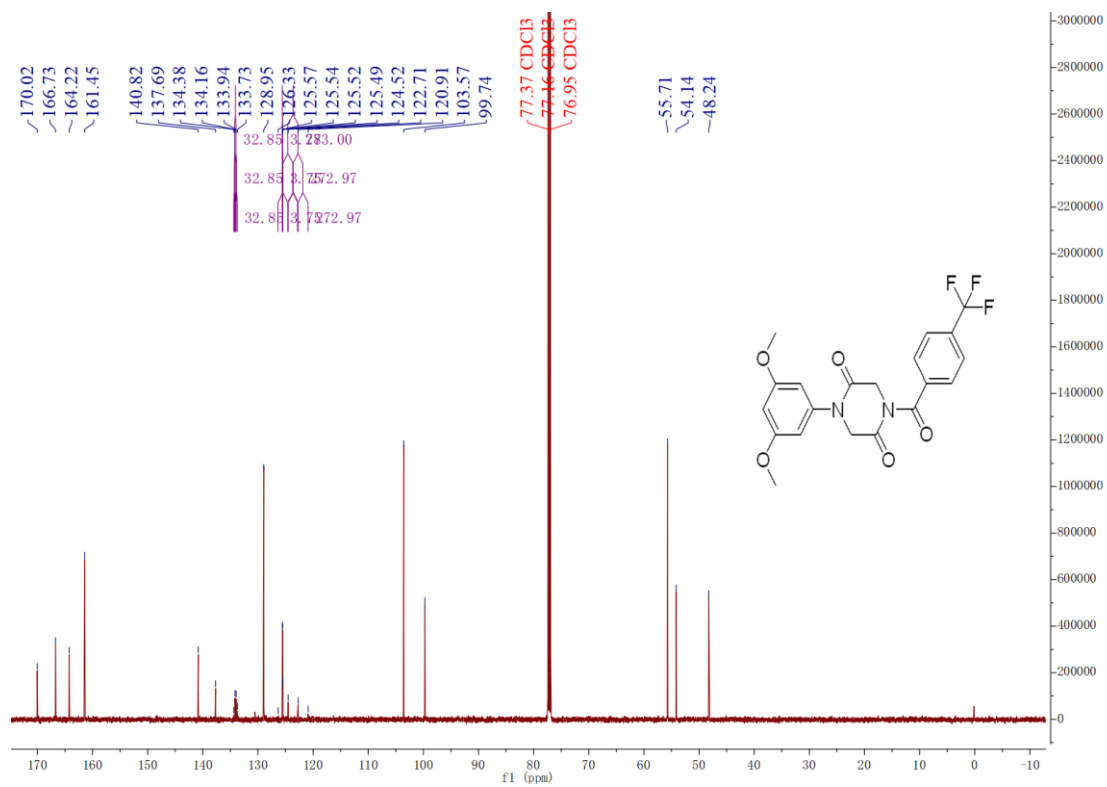


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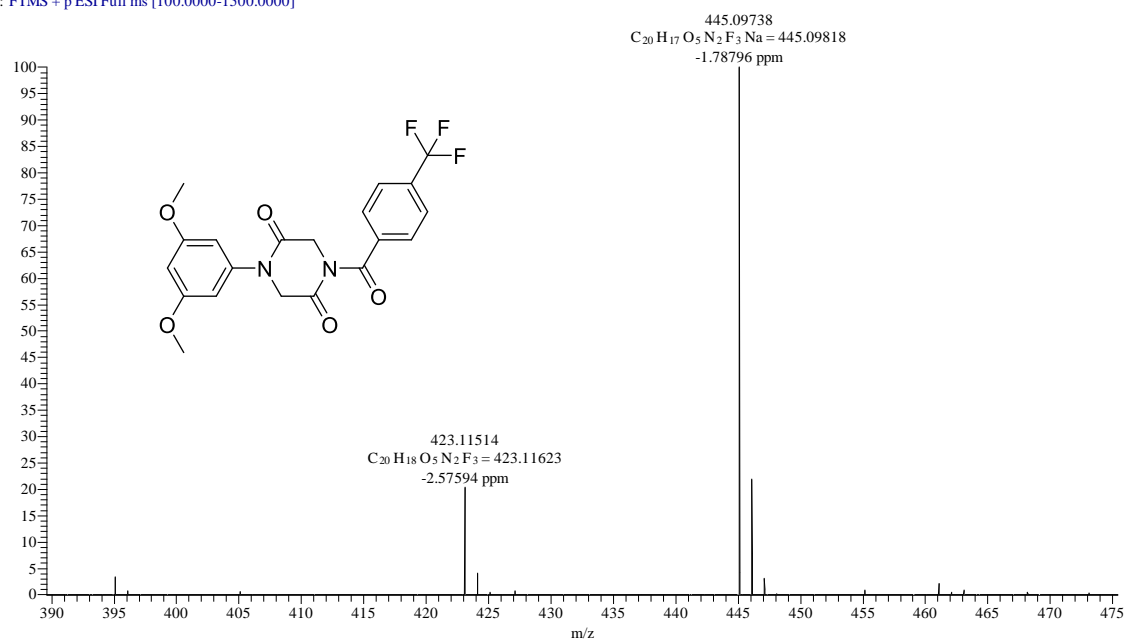


1-(3,5-dimethoxyphenyl)-4-(4-(trifluoromethyl)benzoyl)piperazine-2,5-dione (**9i**)

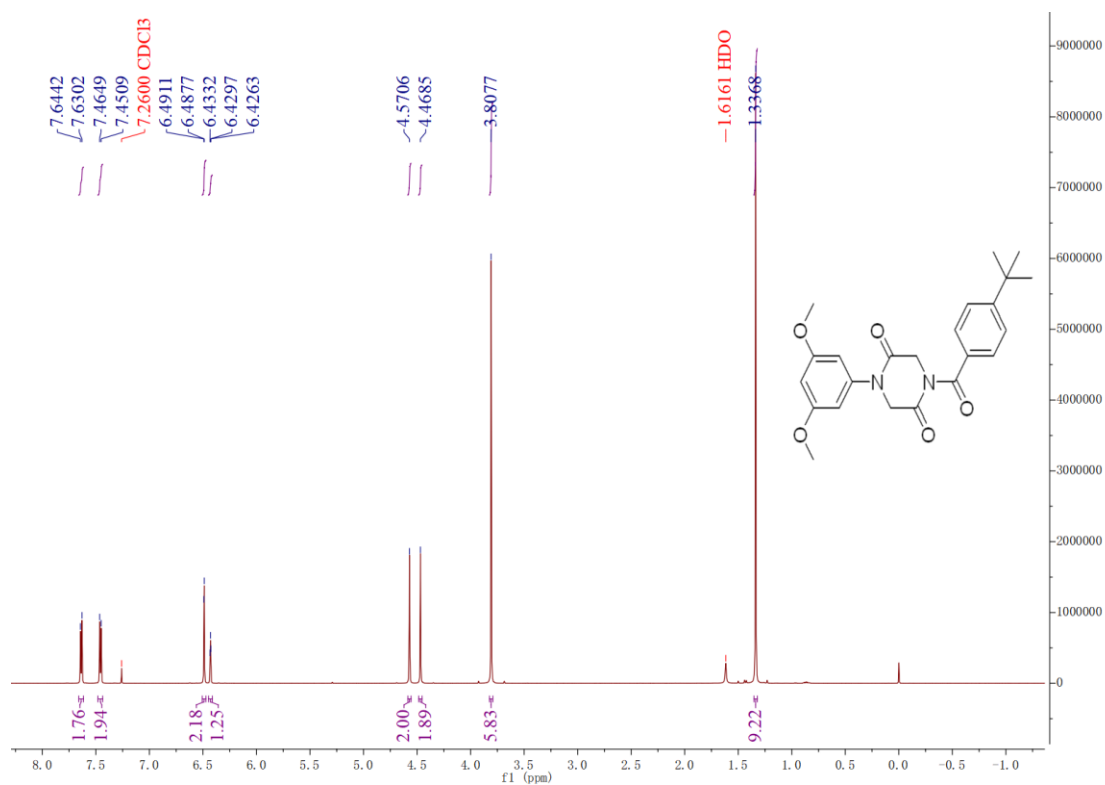


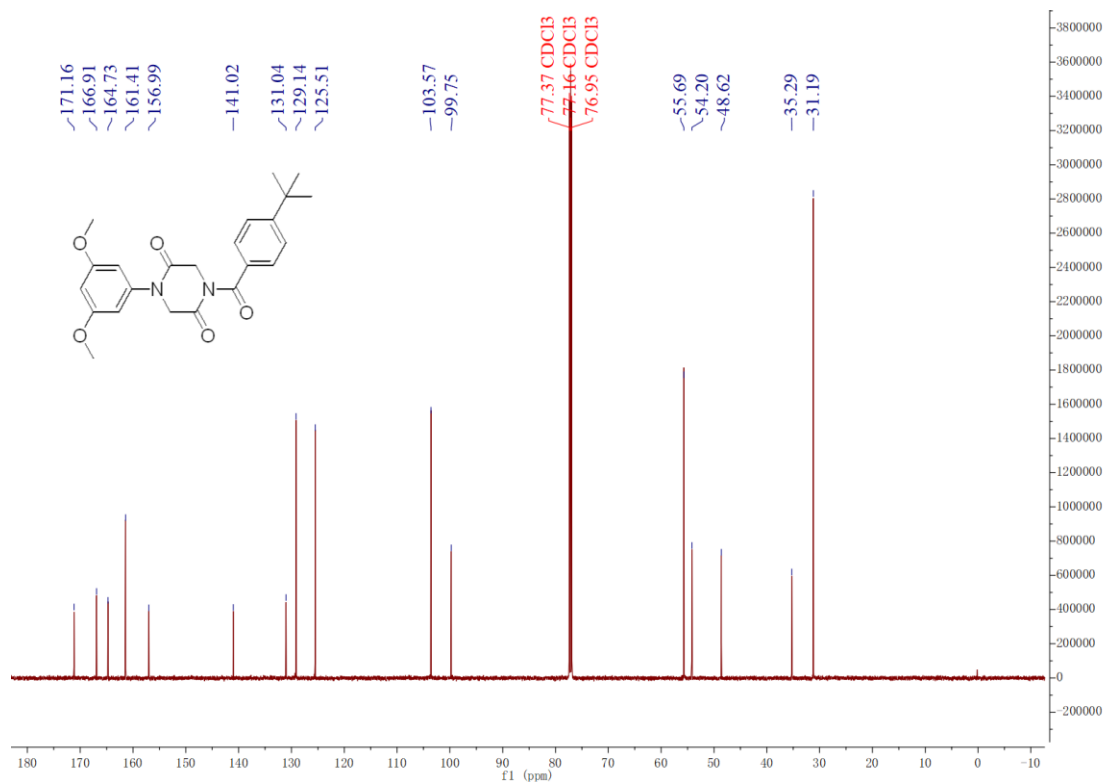


X5 #66 RT: 0.29 AV: 1 NL: 1.54E9
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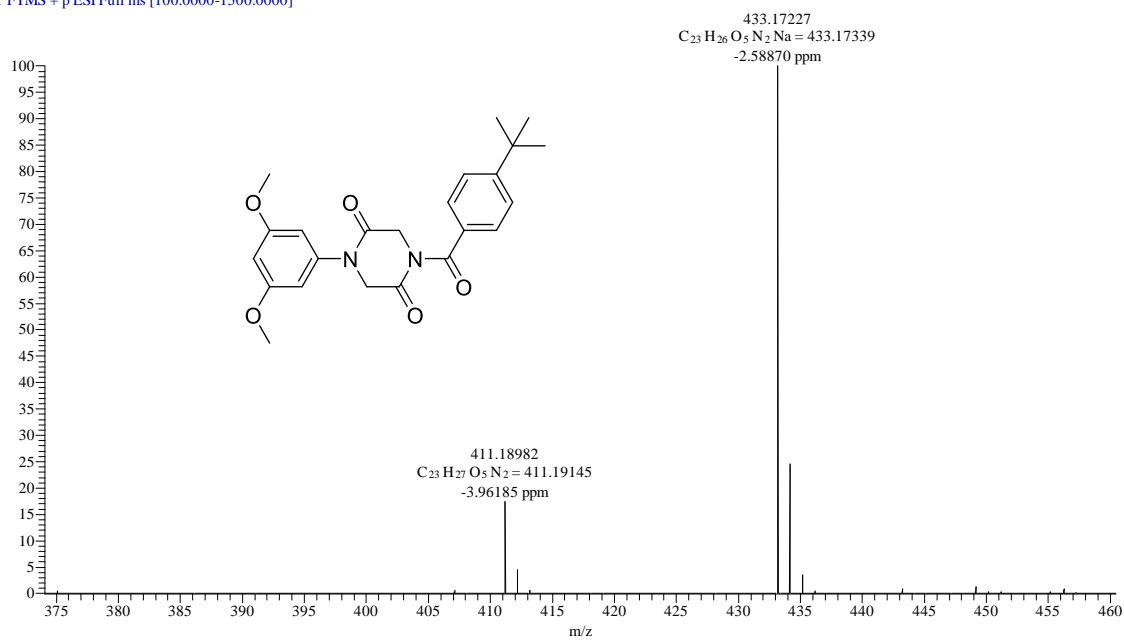


1-(3,5-dimethoxyphenyl)-4-(4-(tert-butyl)benzoyl)piperazine-2,5-dione (9j)

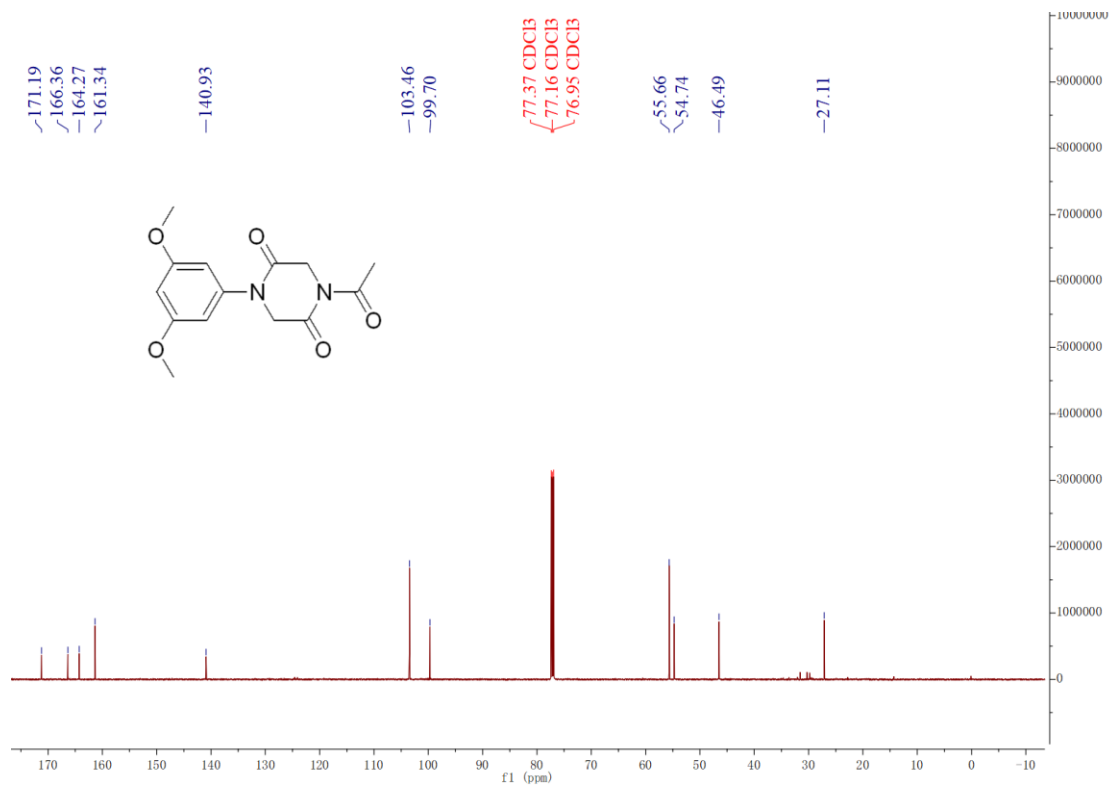
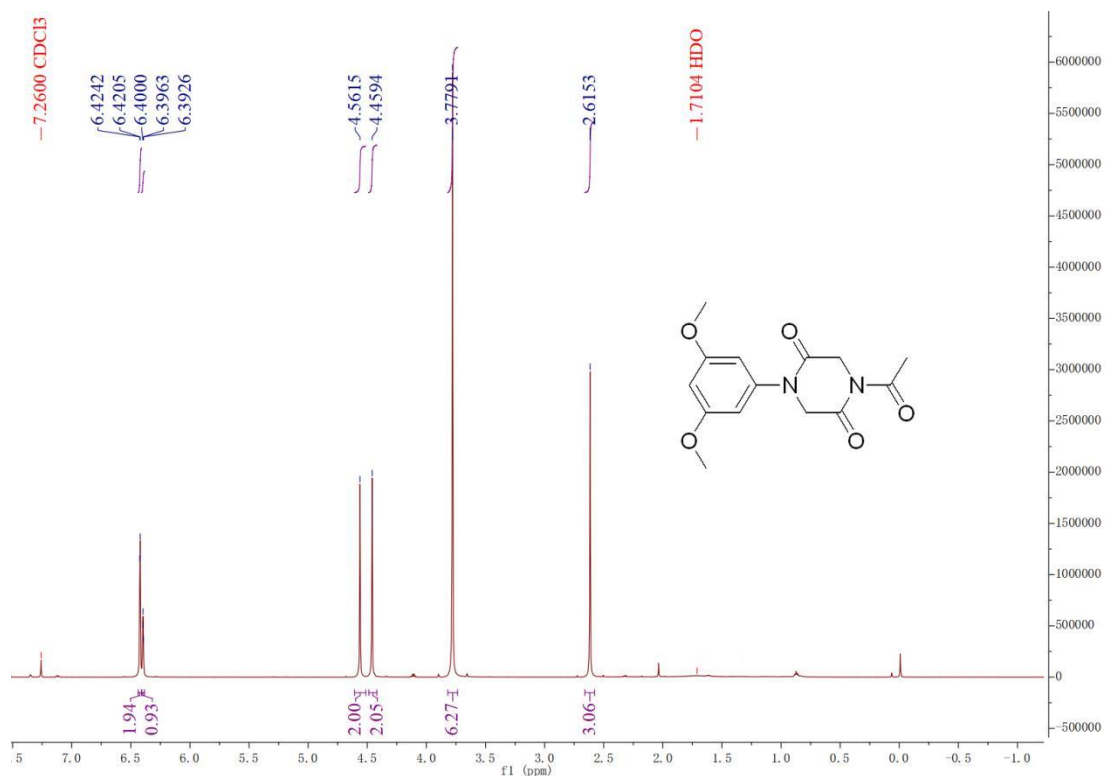




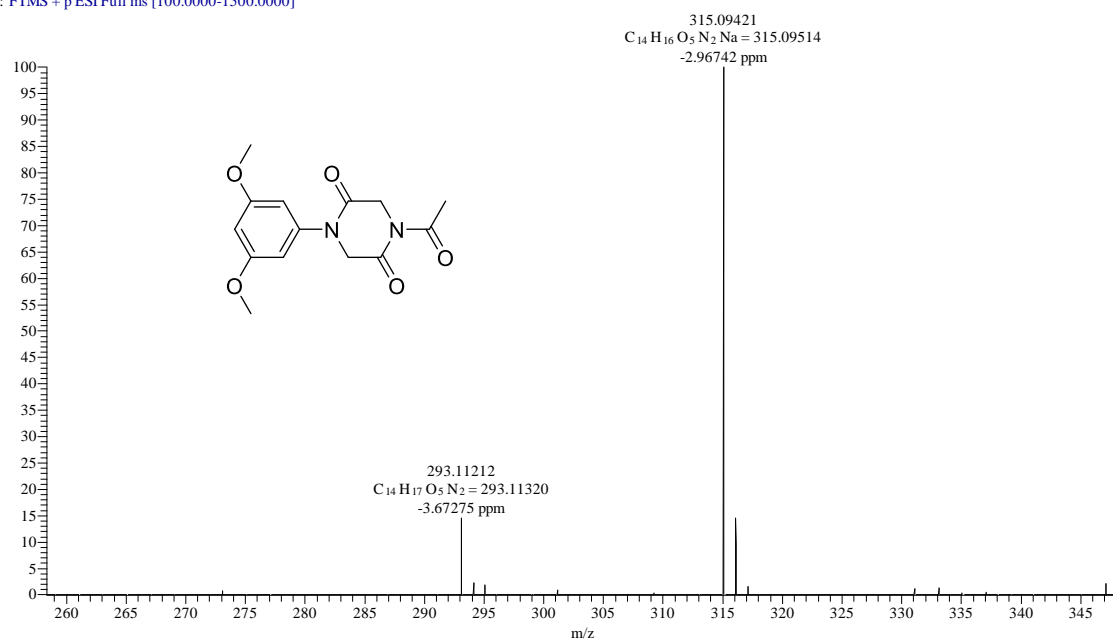
X6 #37 RT: 0.16 AV: 1 NL: 9.03E8
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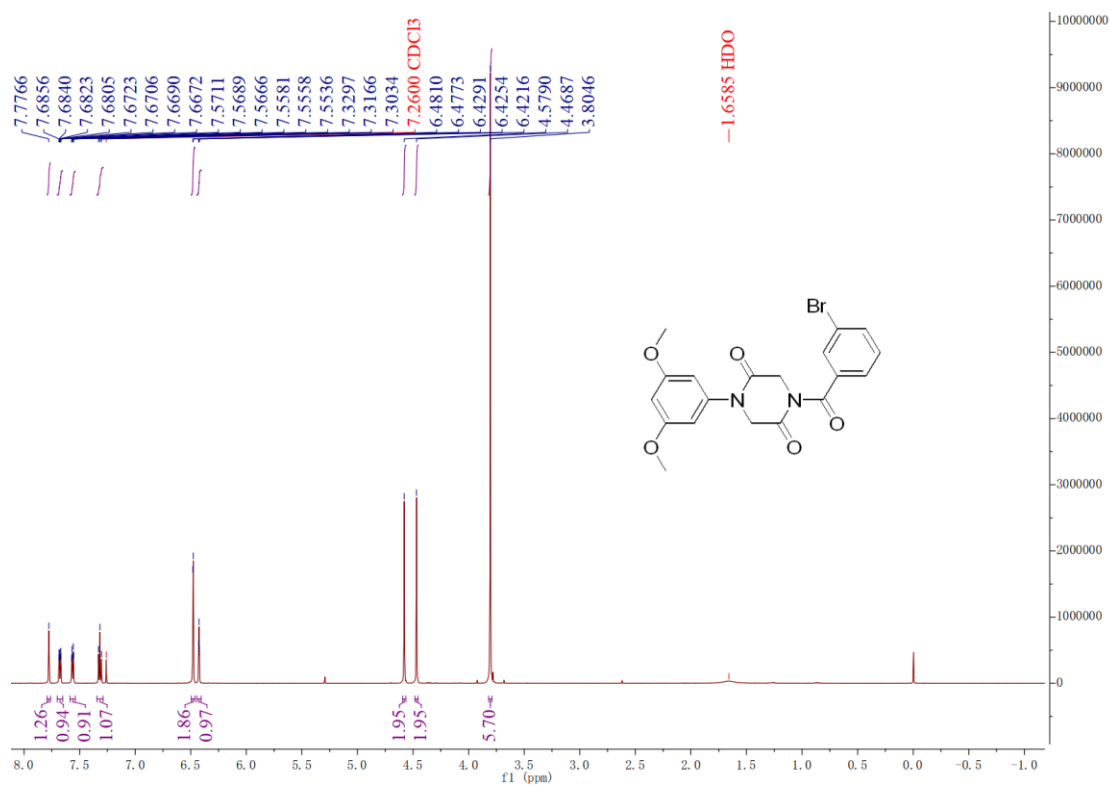
1-(3,5-dimethoxyphenyl)-4-acetylpiperazine-2,5-dione (**9k**)

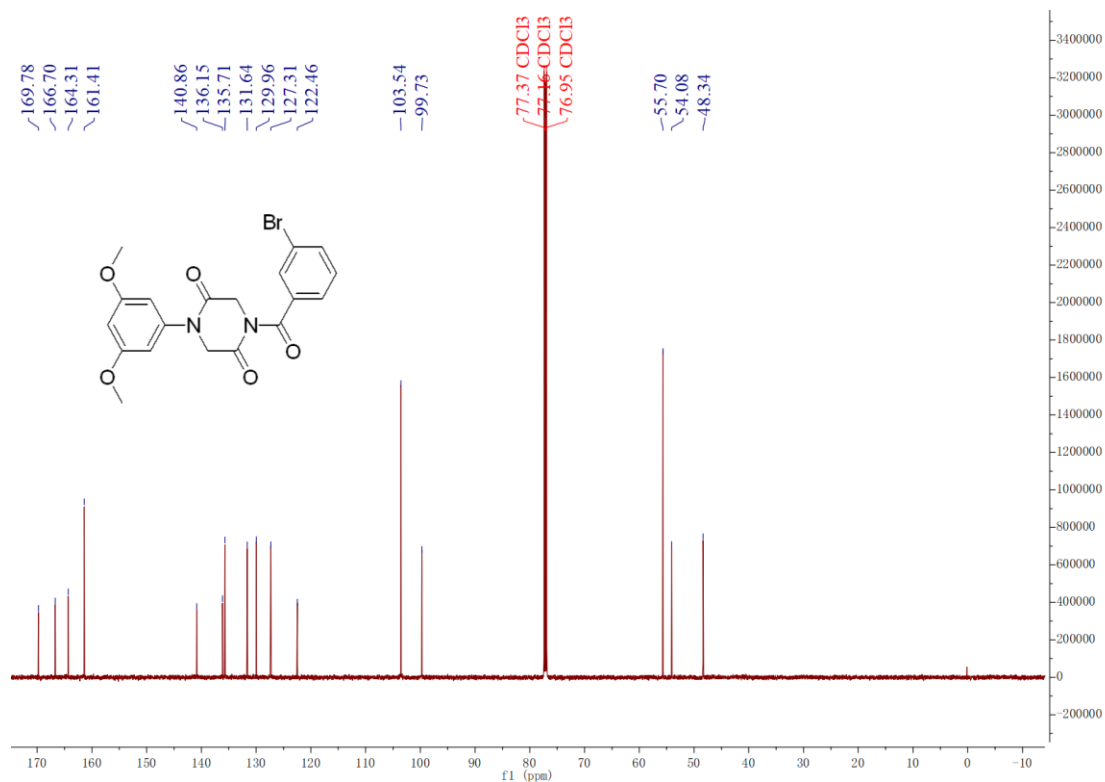


X7 #24 RT: 0.10 AV: 1 NL: 1.70E9
T: FTMS + p ESI Full ms [100.0000-1500.0000]

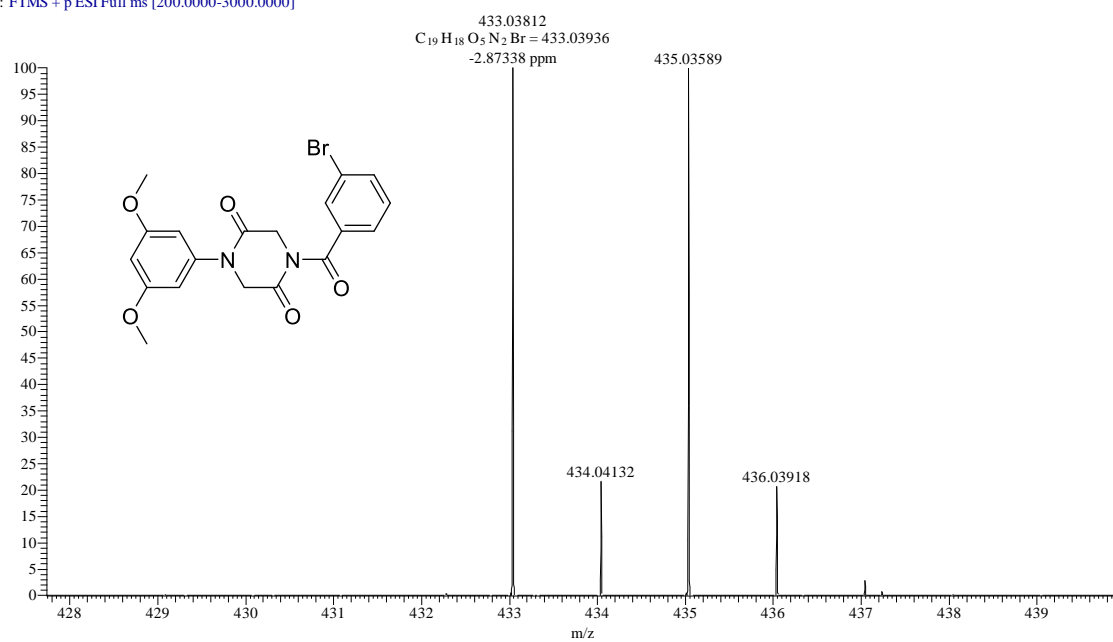


1-(3,5-dimethoxyphenyl)-4-(3-bromobenzoyl)piperazine-2,5-dione (9l)

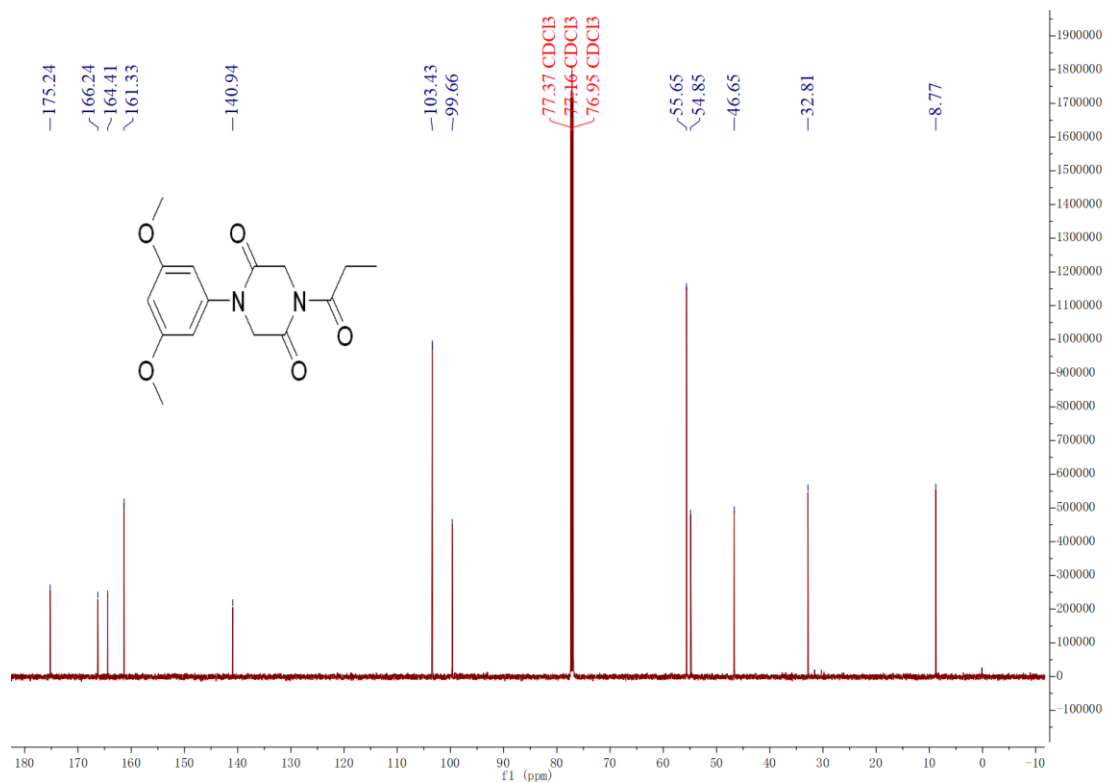
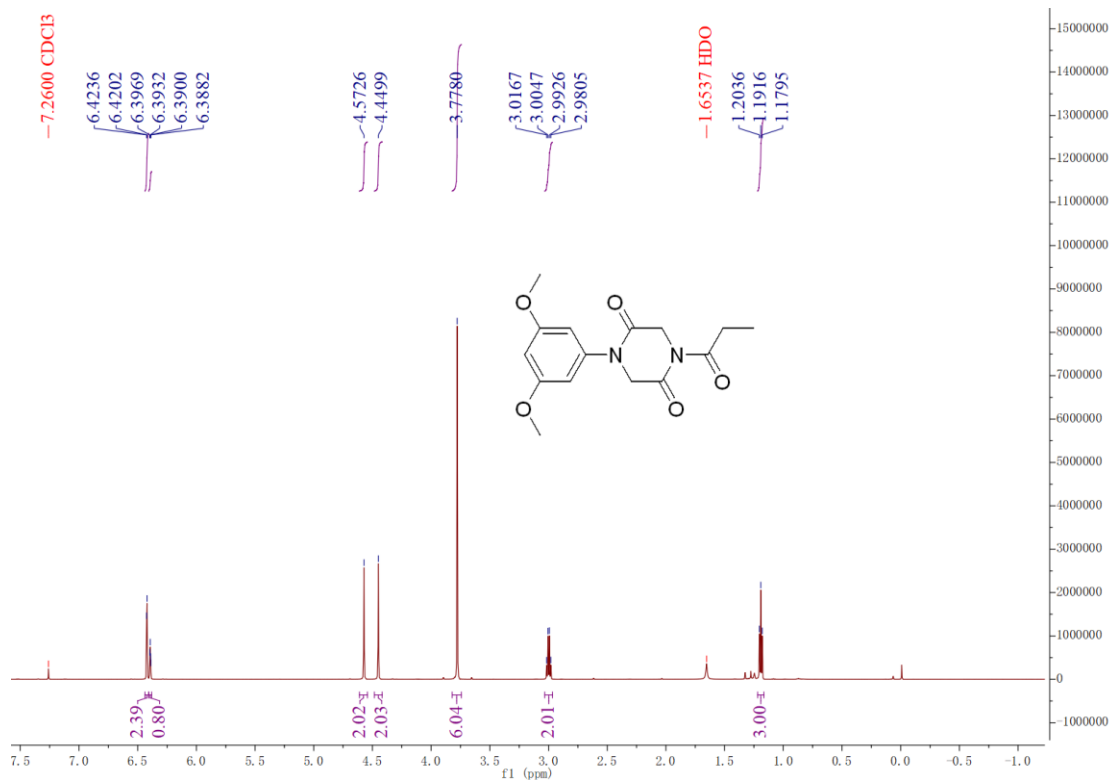




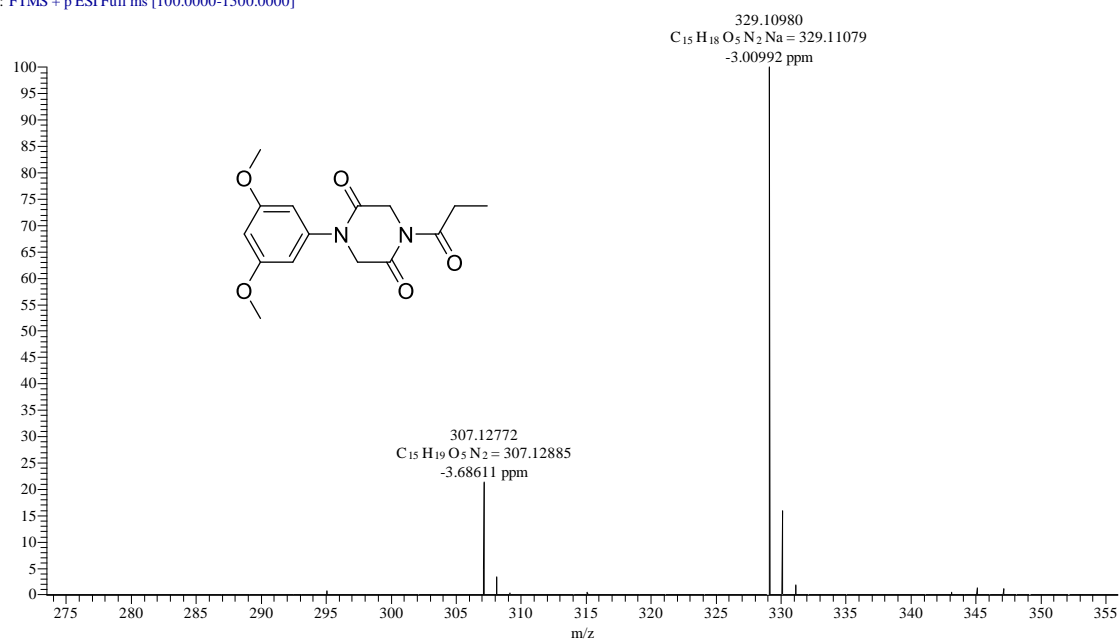
X8_210901112554 #6 RT: 0.03 AV: 1 NL: 2.25E8
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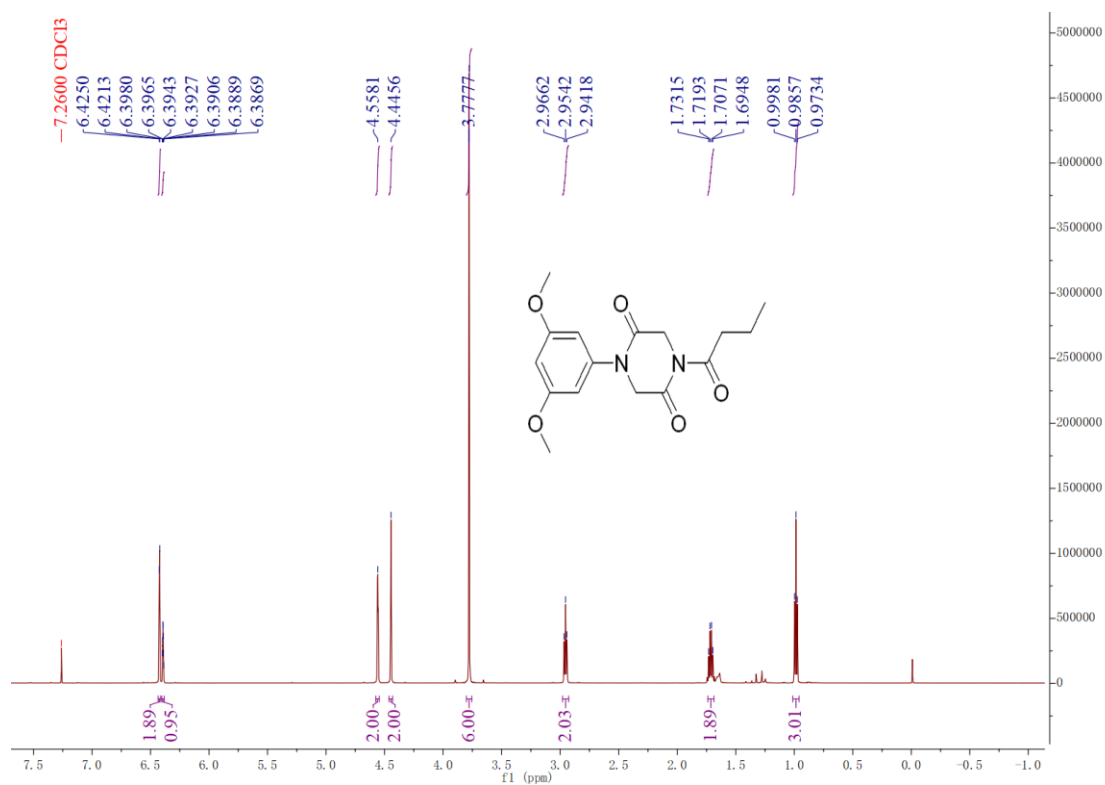
1-(3,5-dimethoxyphenyl)-4-propionylpiperazine-2,5-dione (9m)

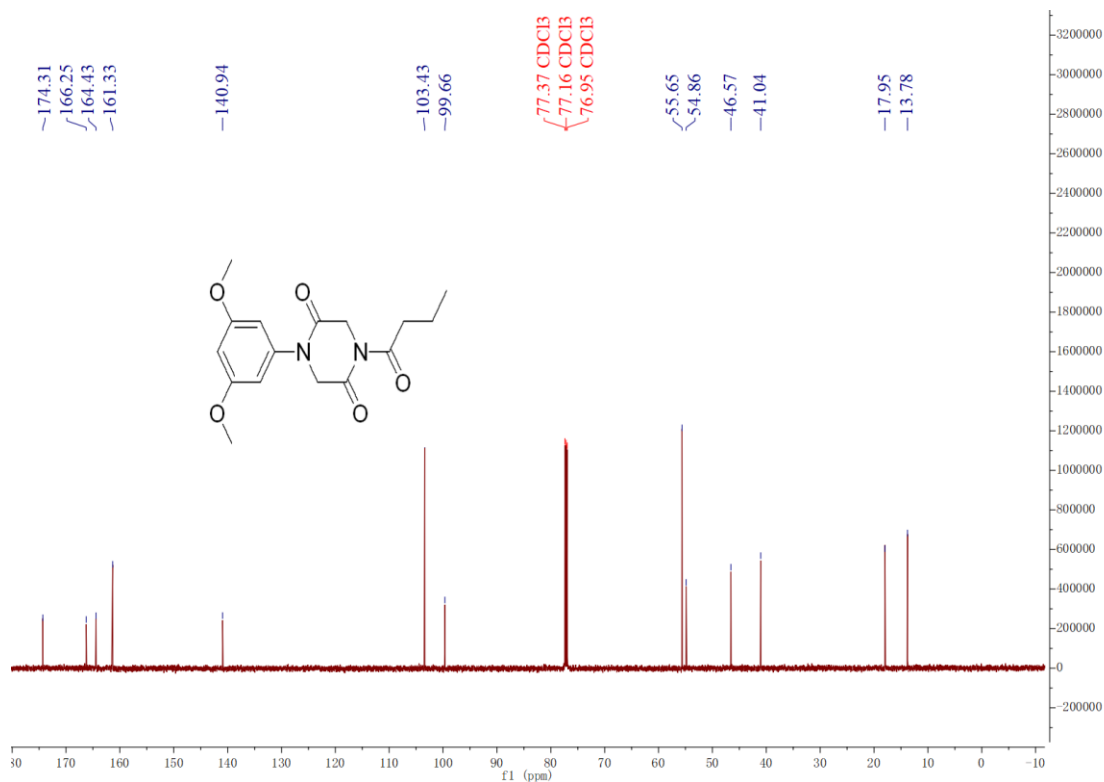


X9 #42 RT: 0.18 AV: 1 NL: 2.74E9
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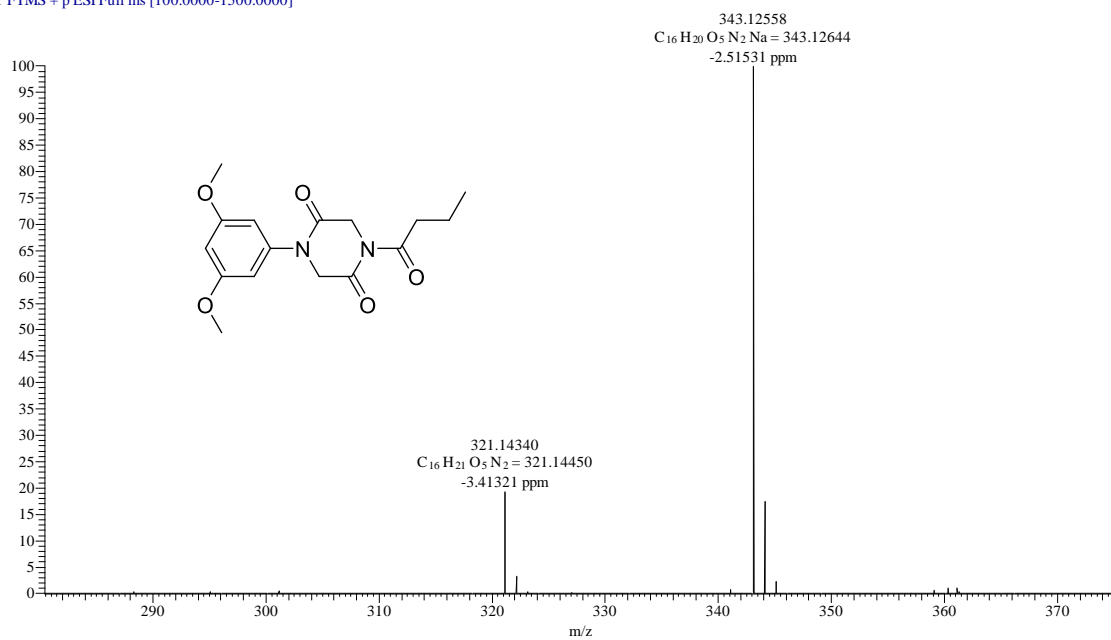


1-(3,5-dimethoxyphenyl)-4-butyrylpiperazine-2,5-dione (9n)

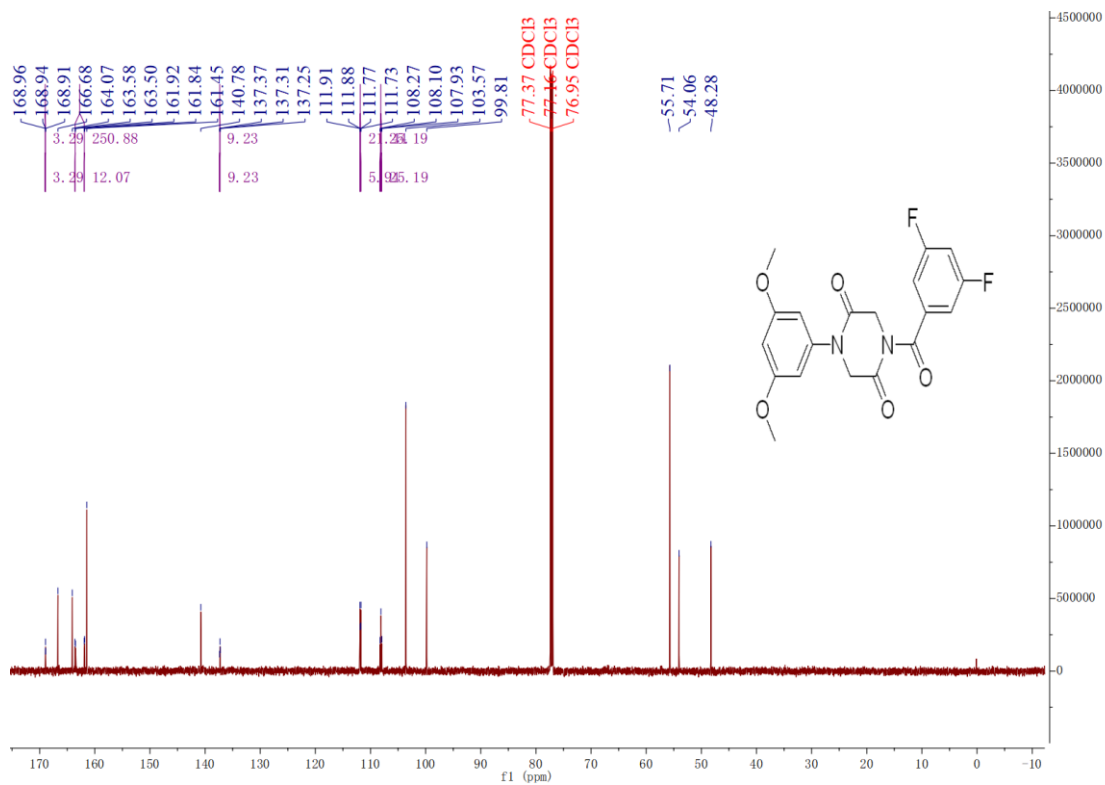
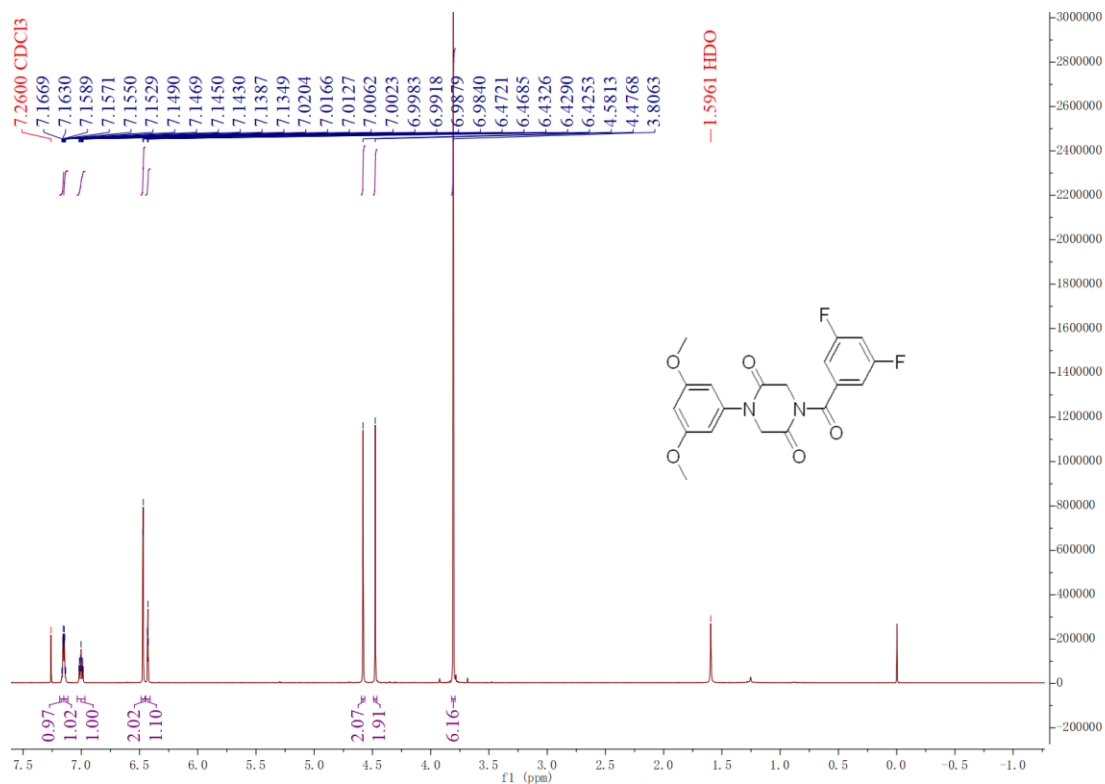


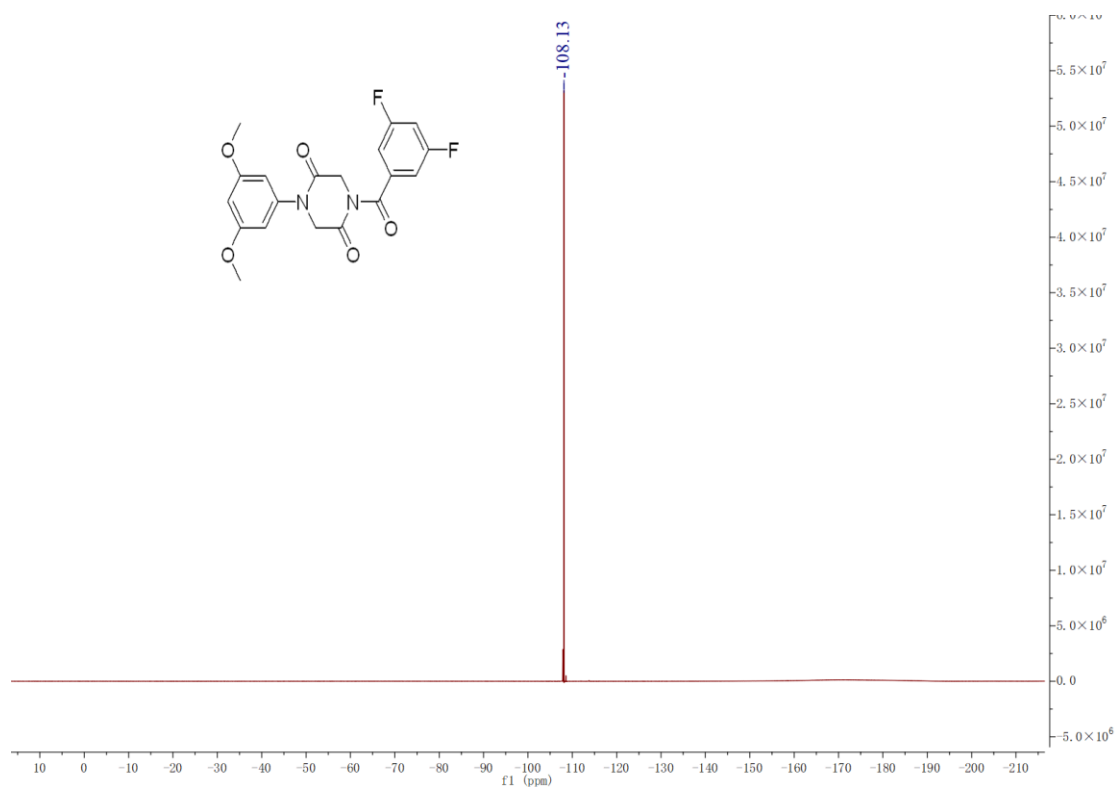


X10 #40 RT: 0.18 AV: 1 NL: 1.85E9
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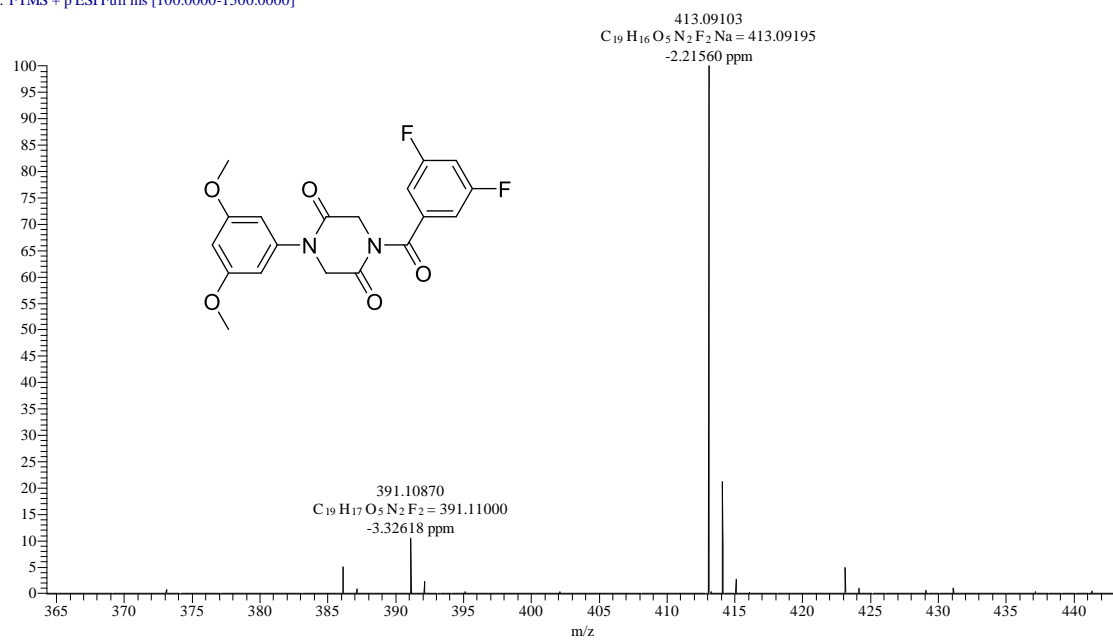


1-(3,5-difluorobenzoyl)-4-(3,5-dimethoxyphenyl)piperazine-2,5-dione (**9o**)

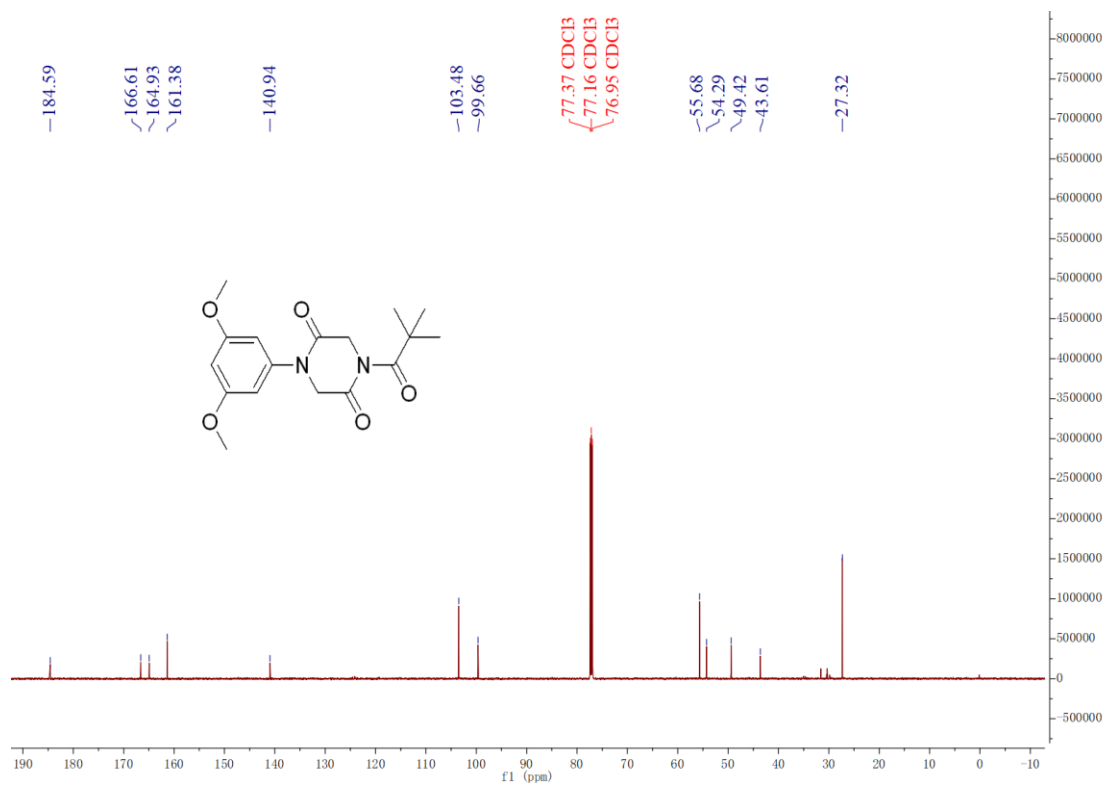
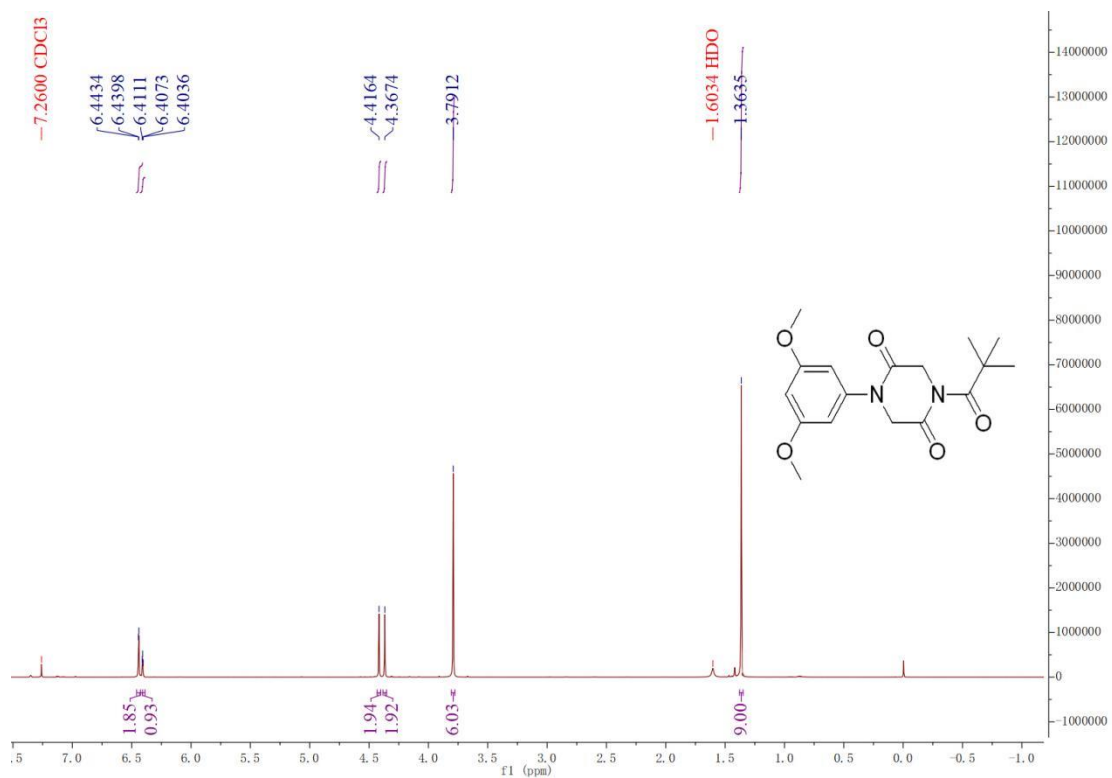




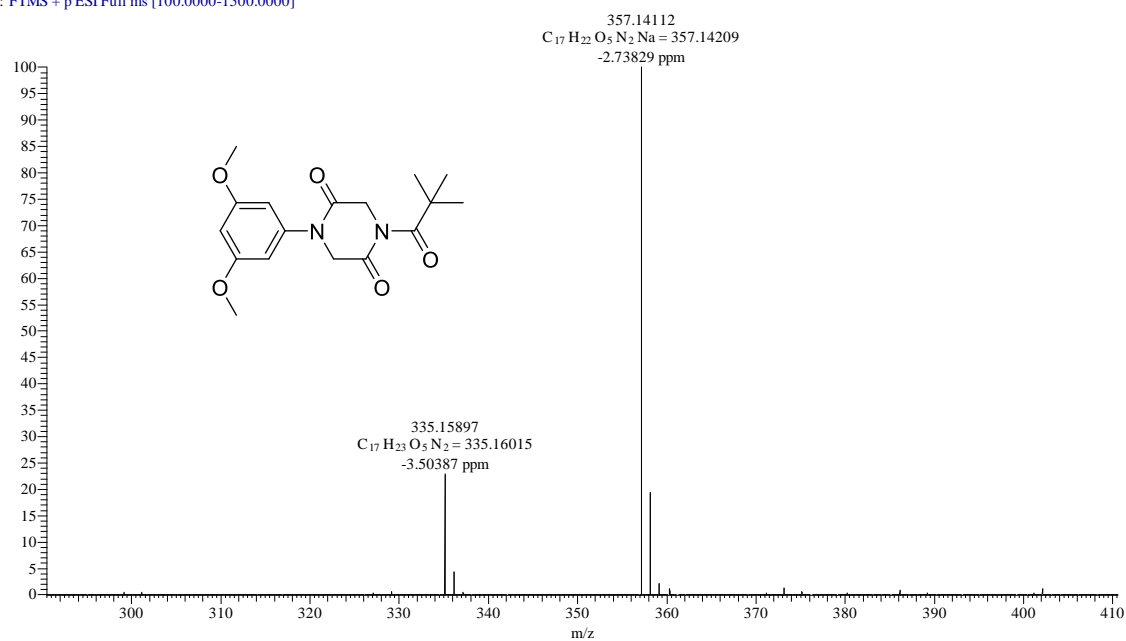
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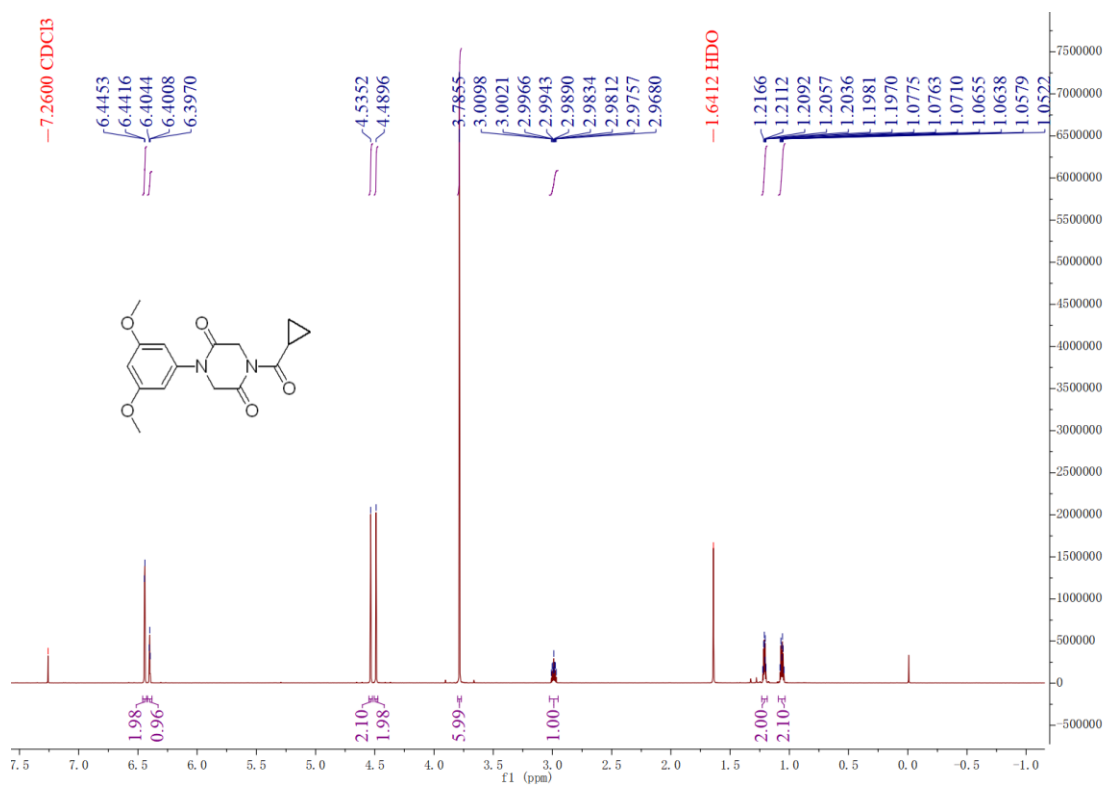
1-(3,5-dimethoxyphenyl)-4-pivaloylpiperazine-2,5-dione (9p)

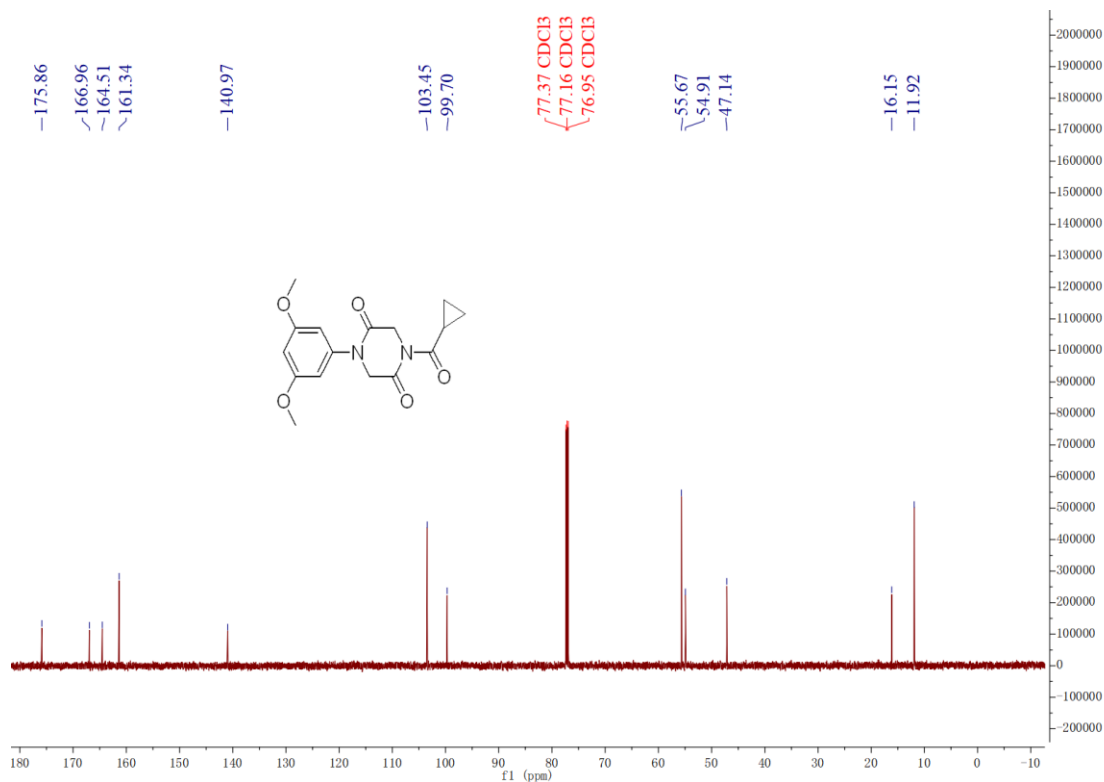


X15 #40-41 RT: 0.18-0.18 AV: 2 NL: 1.95E9
T: FTMS + p ESI Full ms [100.0000-1500.0000]

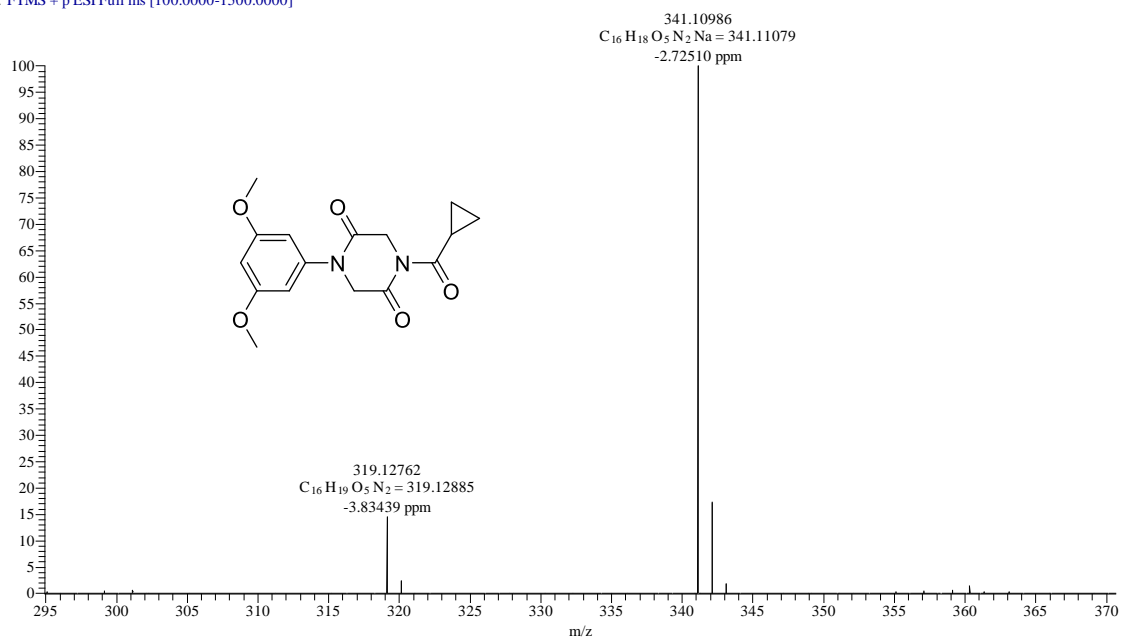


1-(3,5-dimethoxyphenyl)-4-(cyclopropanecarbonyl)piperazine-2,5-dione (9q)

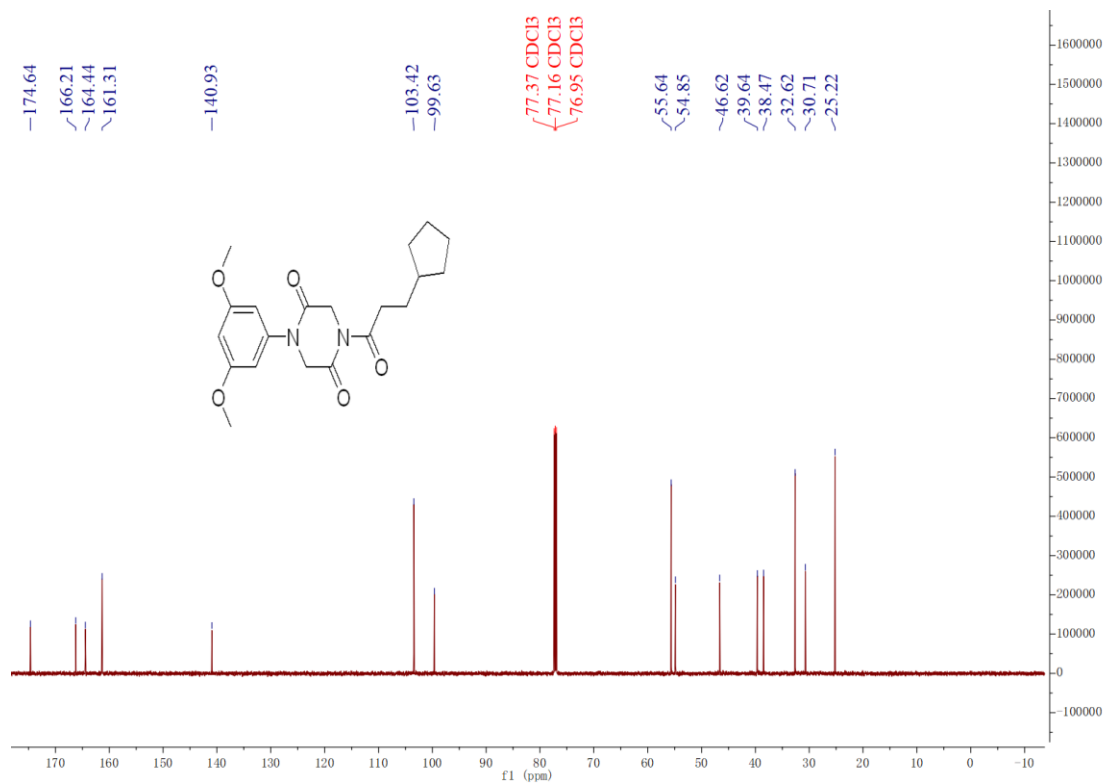
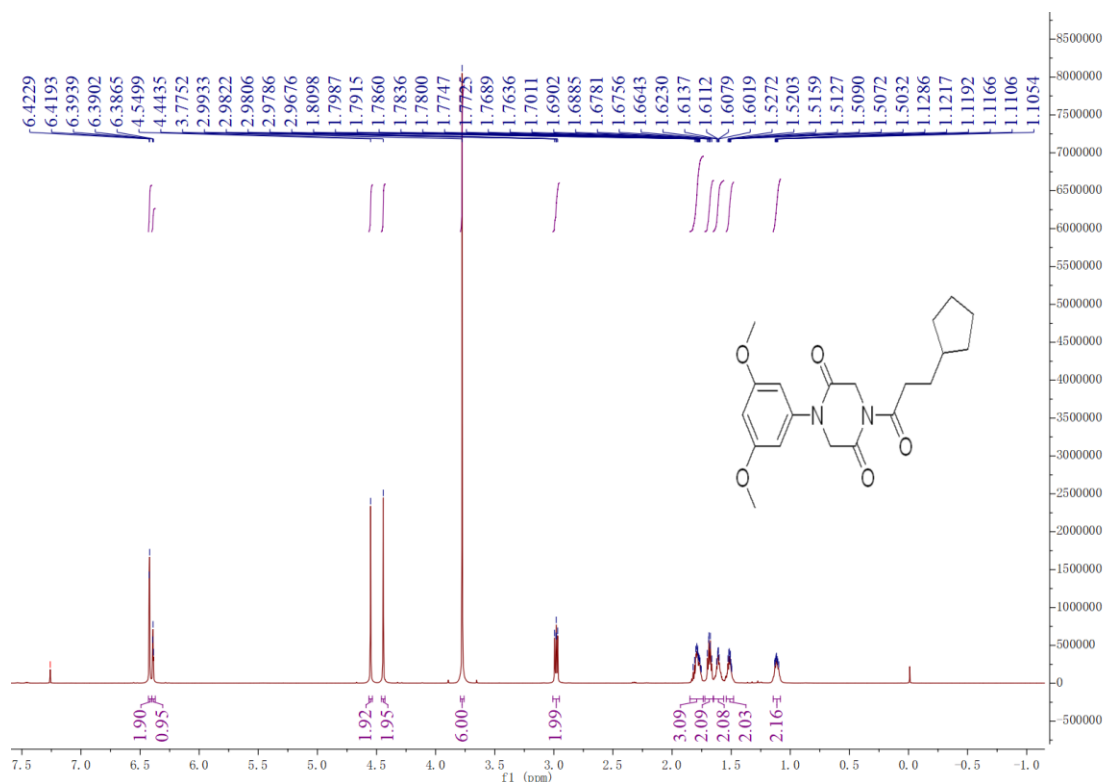




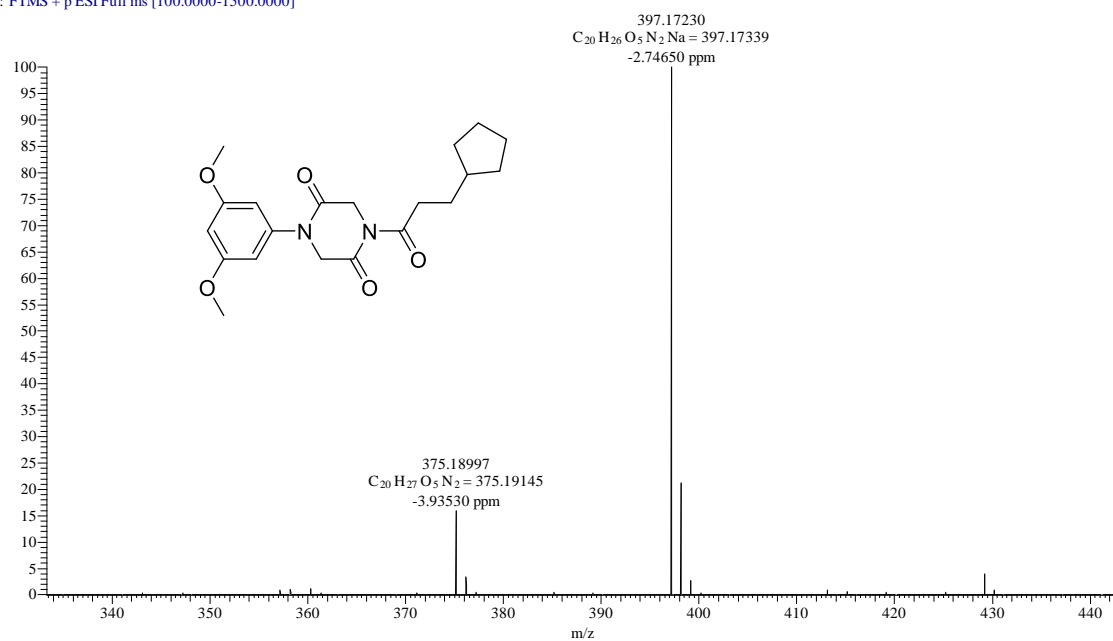
X16 #38 RT: 0.17 AV: 1 NL: 1.83E9
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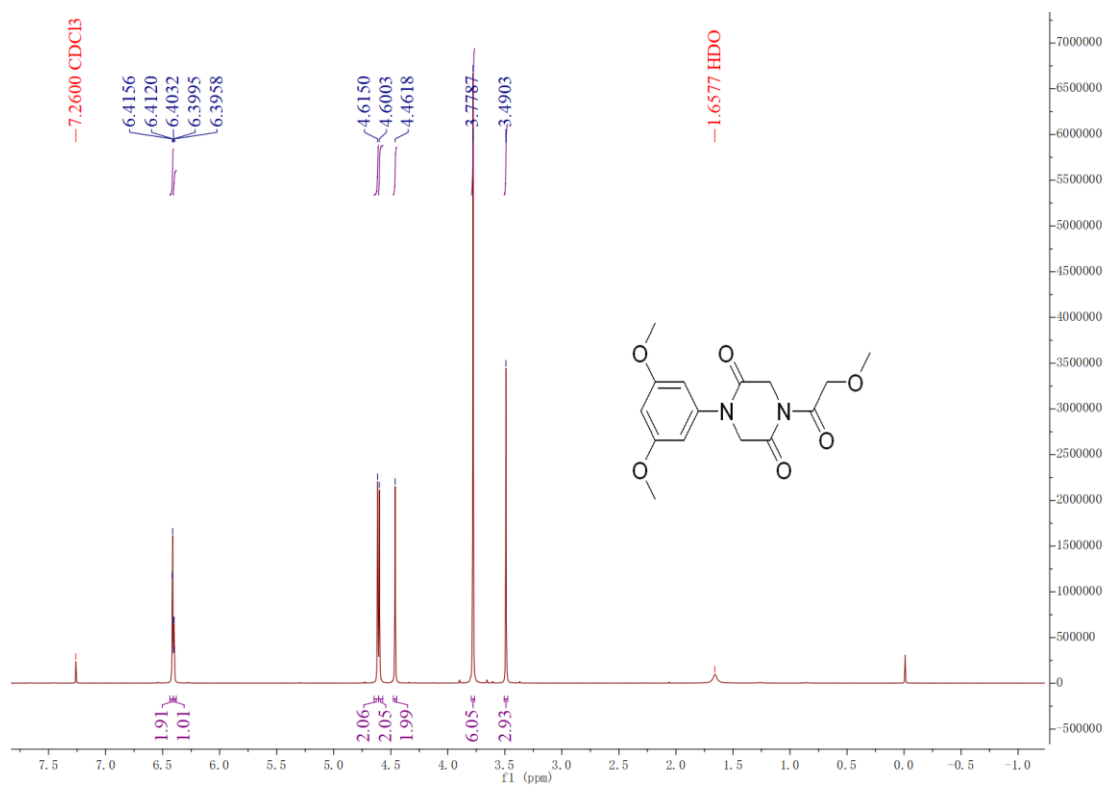
1-(3,5-dimethoxyphenyl)-4-(3-cyclopentylpropanoyl)piperazine-2,5-dione (9r)

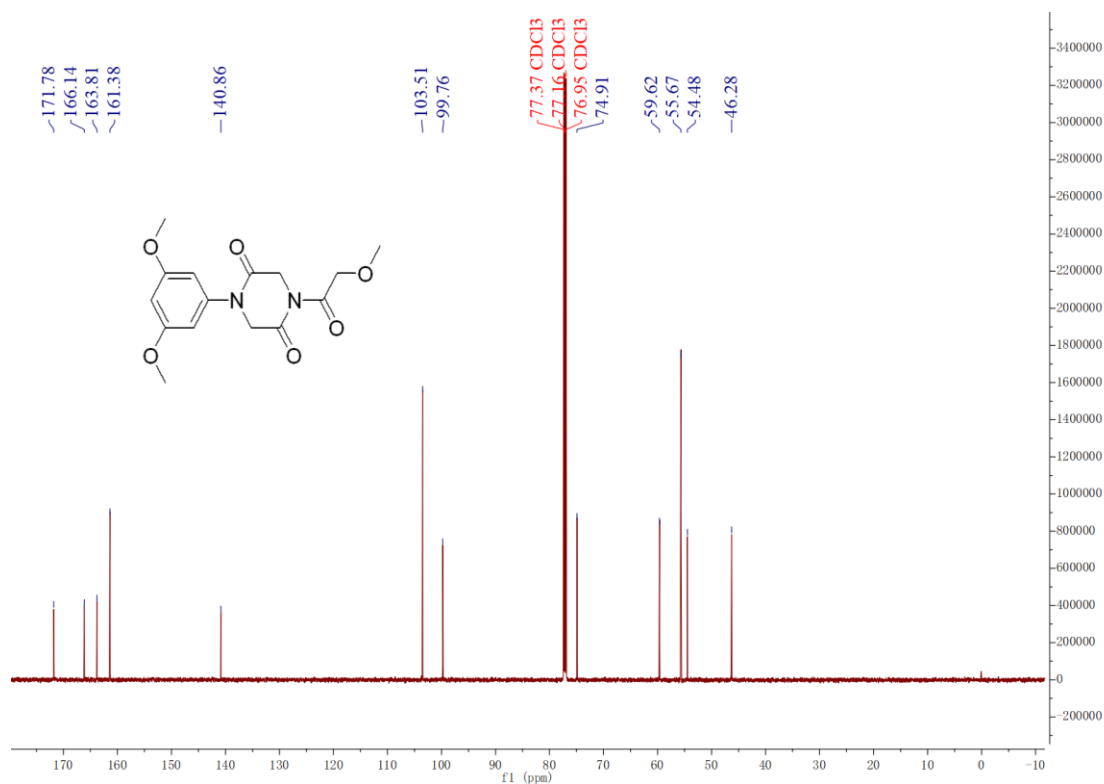


X18 #117 RT: 0.52 AV: 1 NL: 1.26E9
T: FTMS + p ESI Full ms [100.0000-1500.0000]



1-(3,5-dimethoxyphenyl)-4-(2-methoxyacetyl)piperazine-2,5-dione (9s)





X20 #46 RT: 0.20 AV: 1 NL: 1.92E9
T: FTMS + p ESI Full ms [100.0000-1500.0000]

