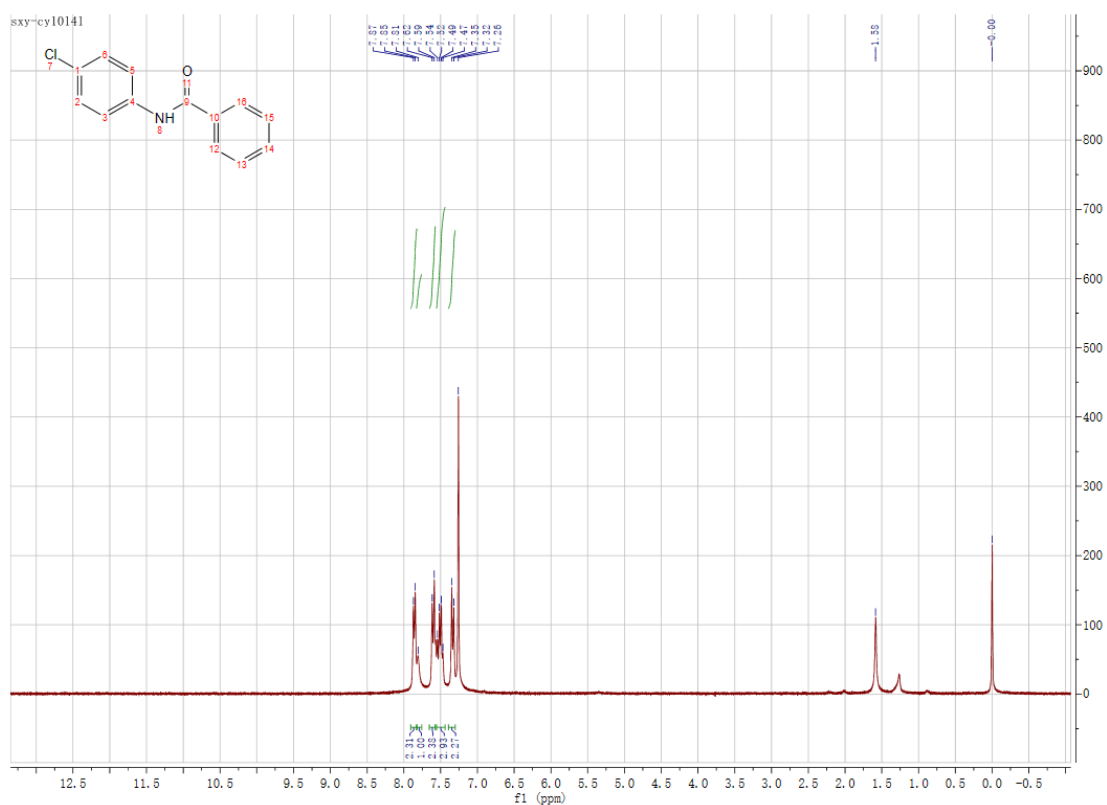
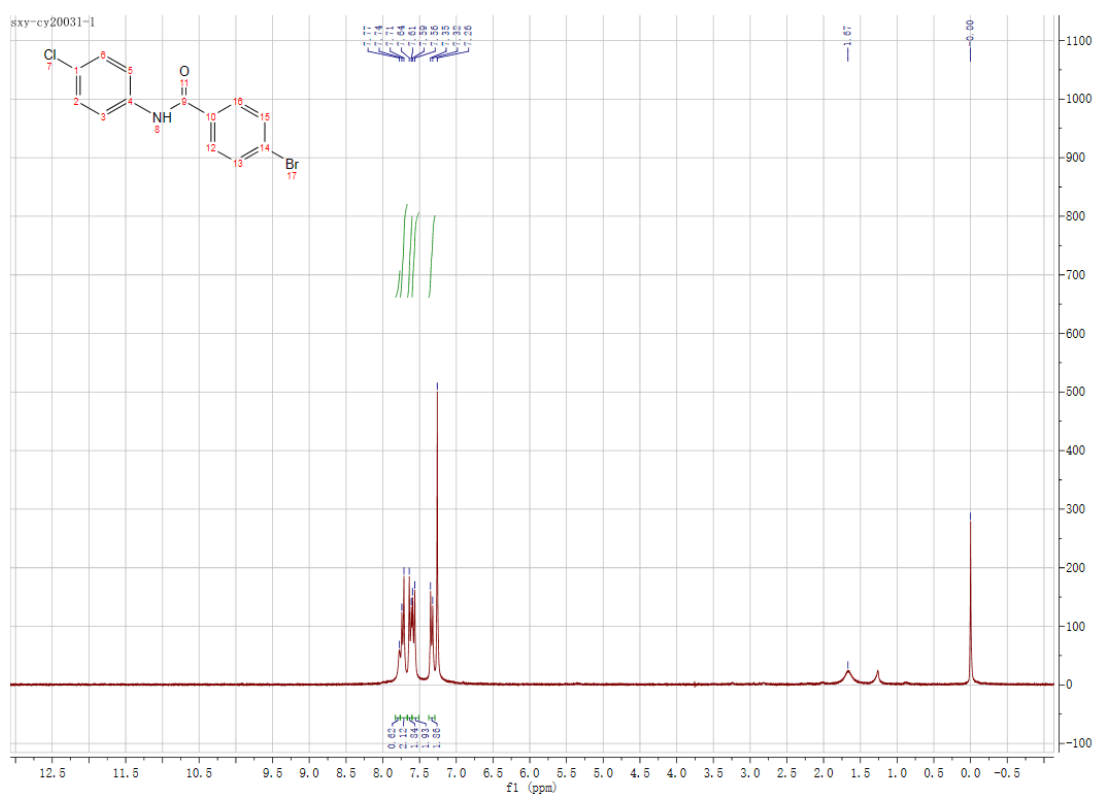
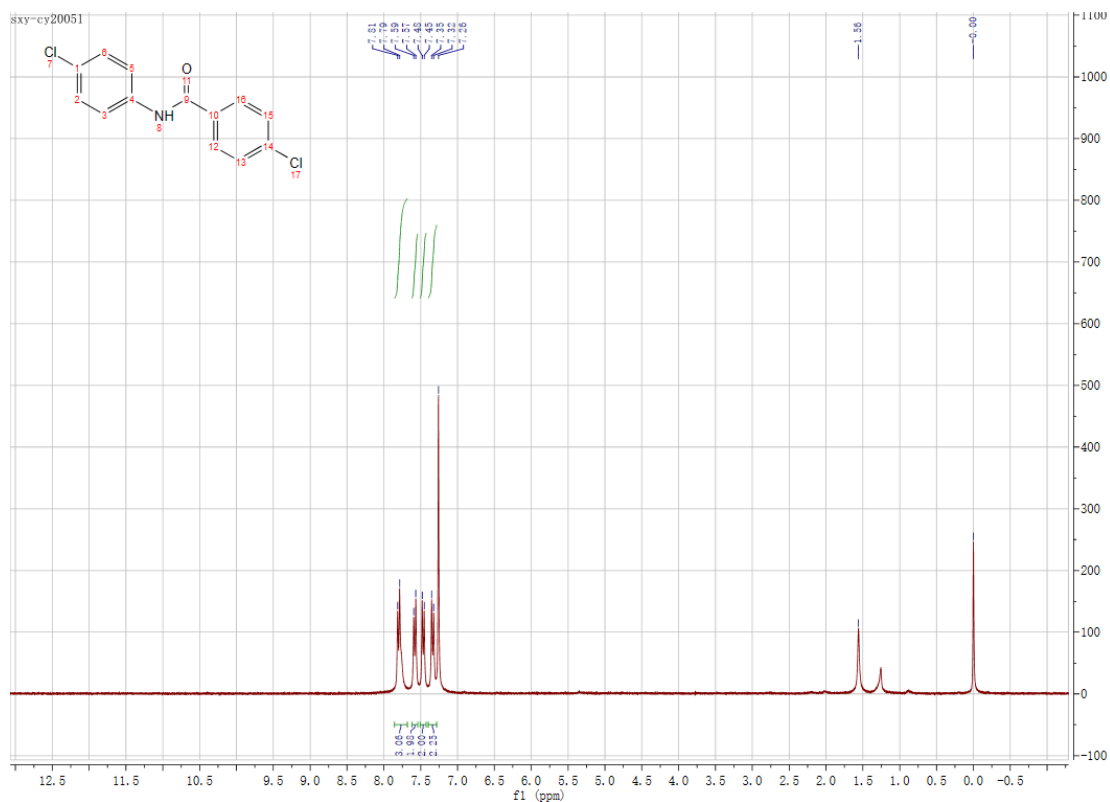


**Synthesis, Activity Evaluation, and Apoptosis Induction of Novel 1,2,4-triazol-3-amine
Derivatives as Potent Anti-lung Cancer Agents**

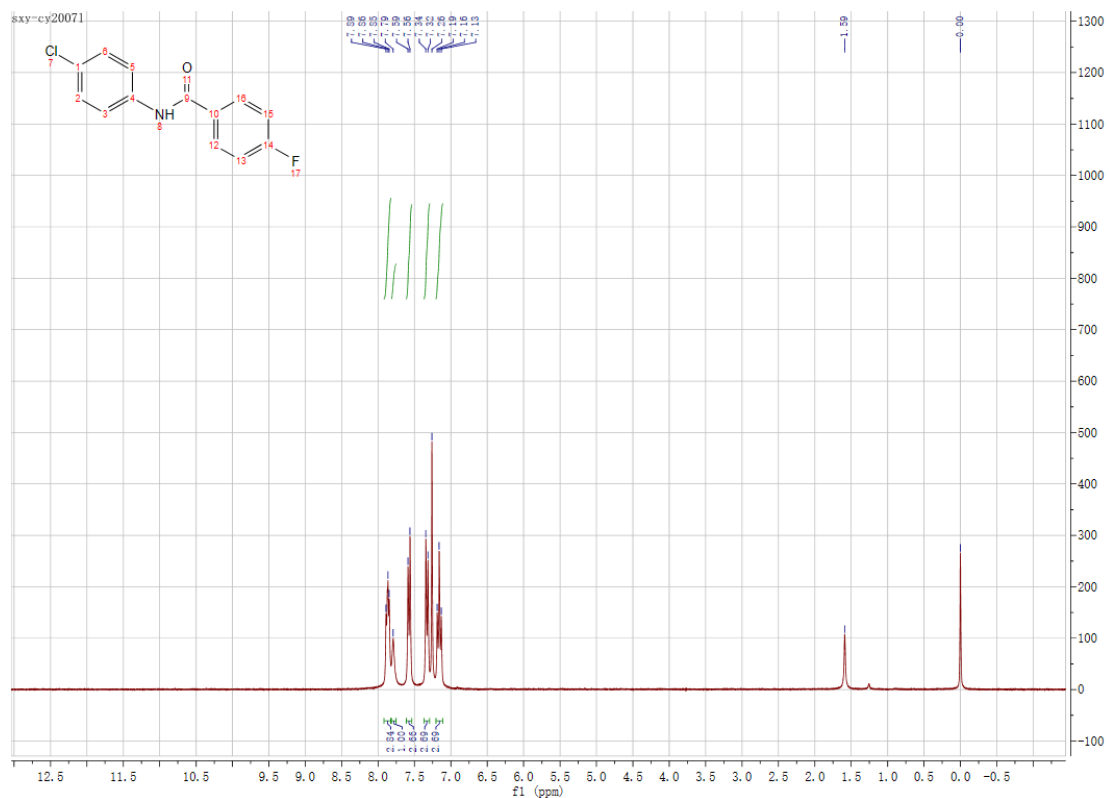
Xian-yu Sun^{1,*}, Chun-yan Zhong¹, Qing-qing Qiu¹, Zhen-wang Li¹, Mei-yu Liu¹, Xin Wang¹,
Cheng-hao Jin^{2,*}

*College of Animal Science and Technique, Heilongjiang Bayi Agriculture University, Daqing
163319, Heilongjiang, PR China*

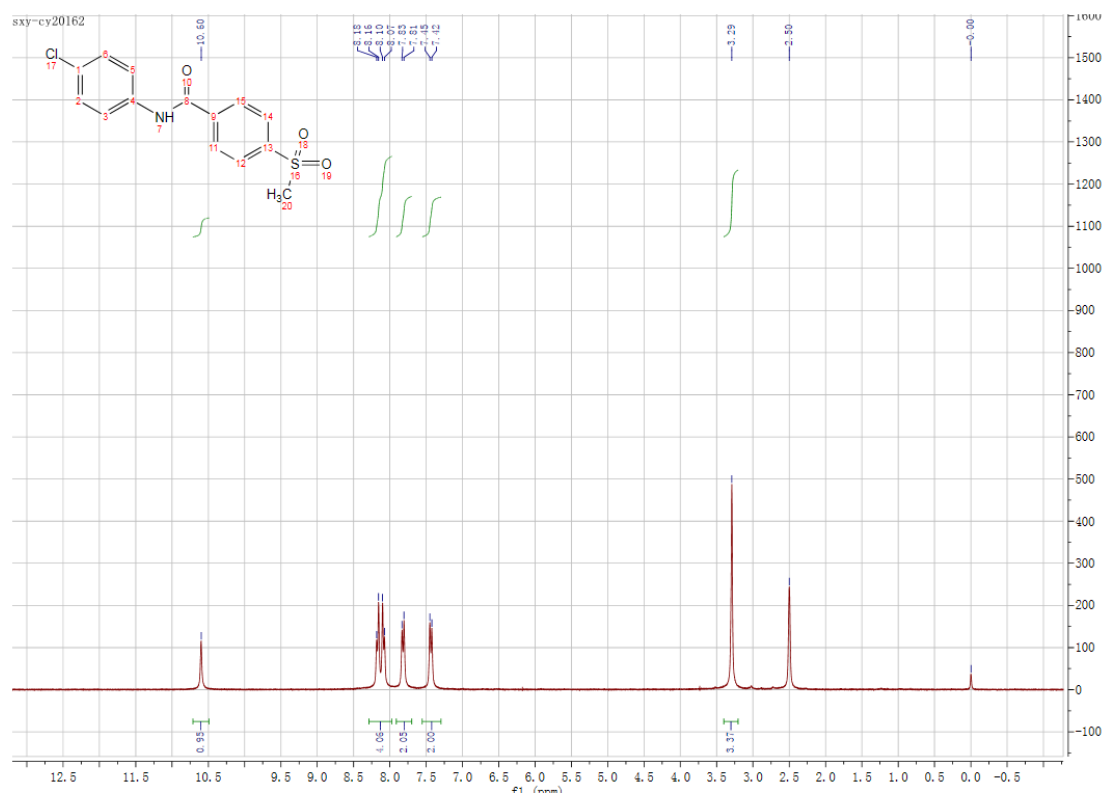
¹H-NMR of *N*-(4-chlorophenyl)benzamide (**1a**)¹H-NMR of 4-bromo-*N*-(4-chlorophenyl)benzamide (**1b**)



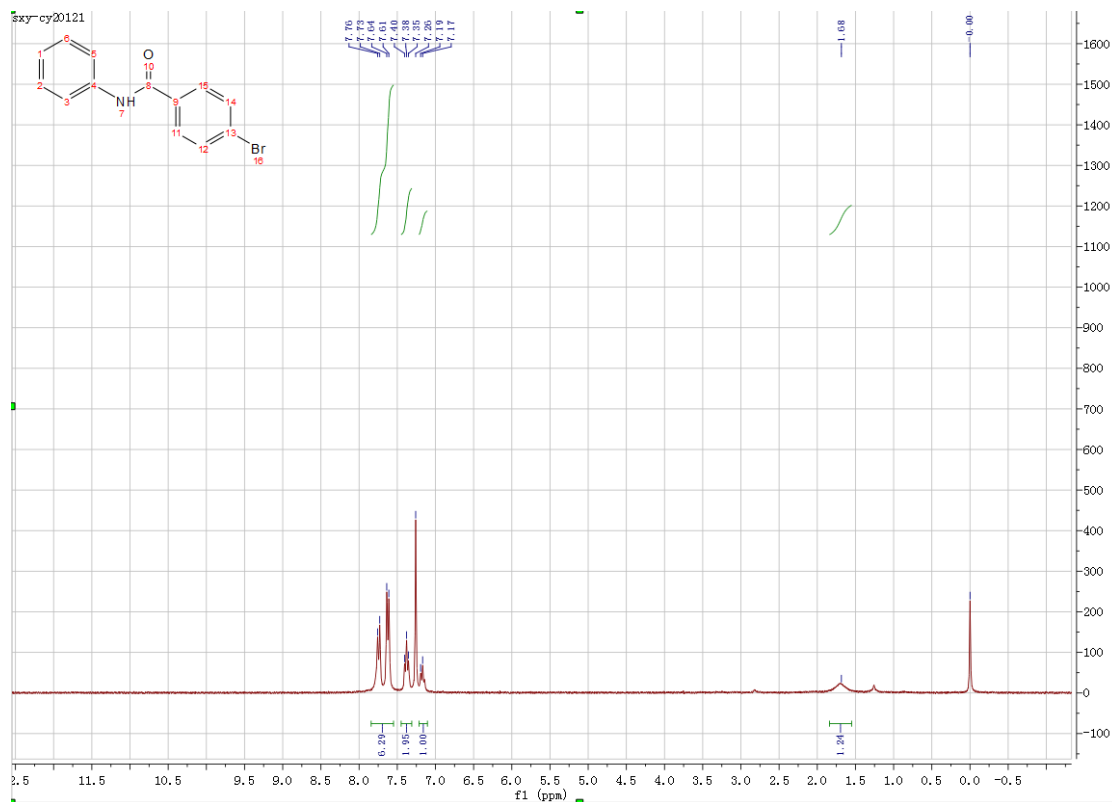
¹H-NMR of 4-chloro-*N*-(4-chlorophenyl)benzamide (**1c**)



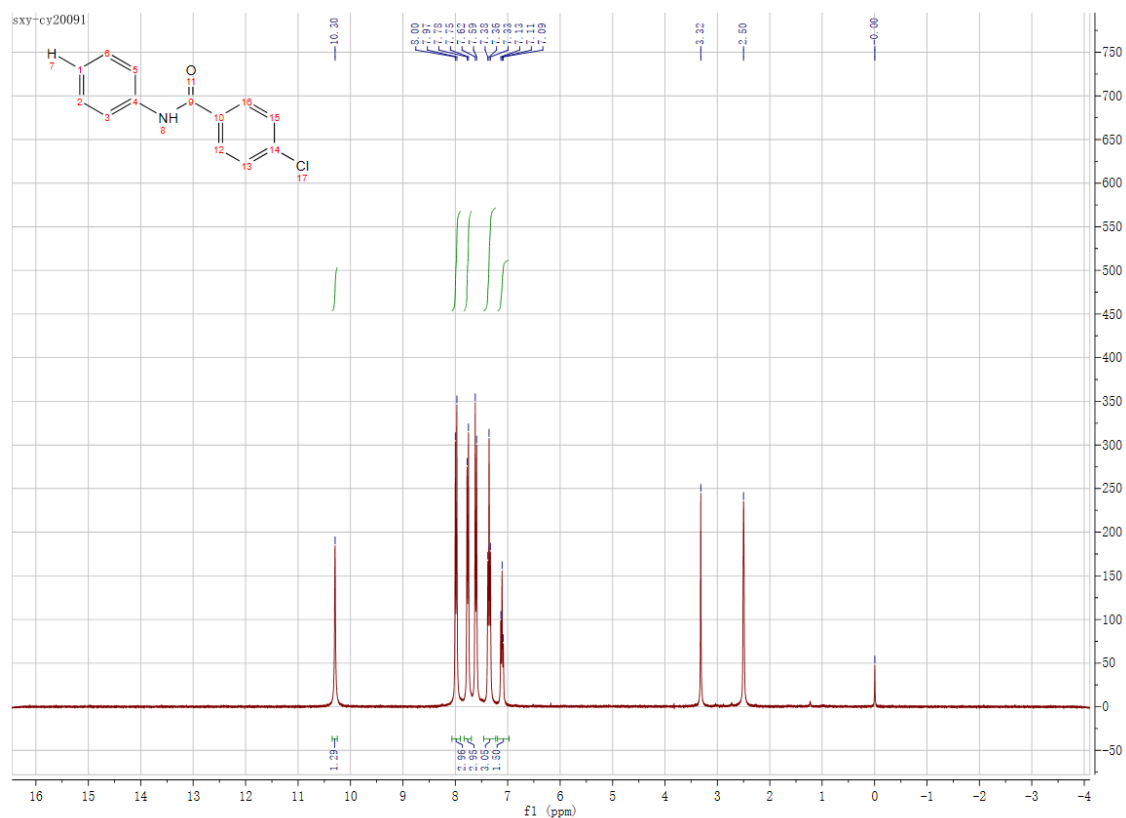
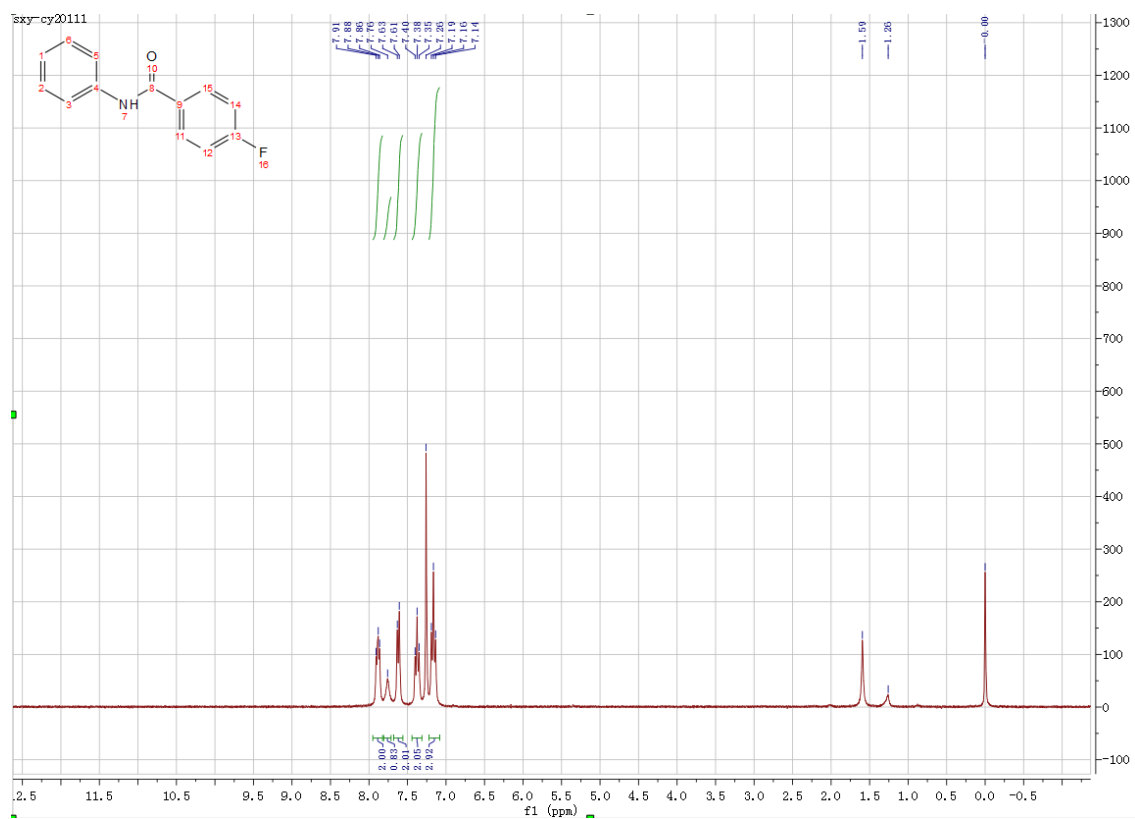
¹H-NMR of *N*-(4-chlorophenyl)-4-fluorobenzamide (**1d**)

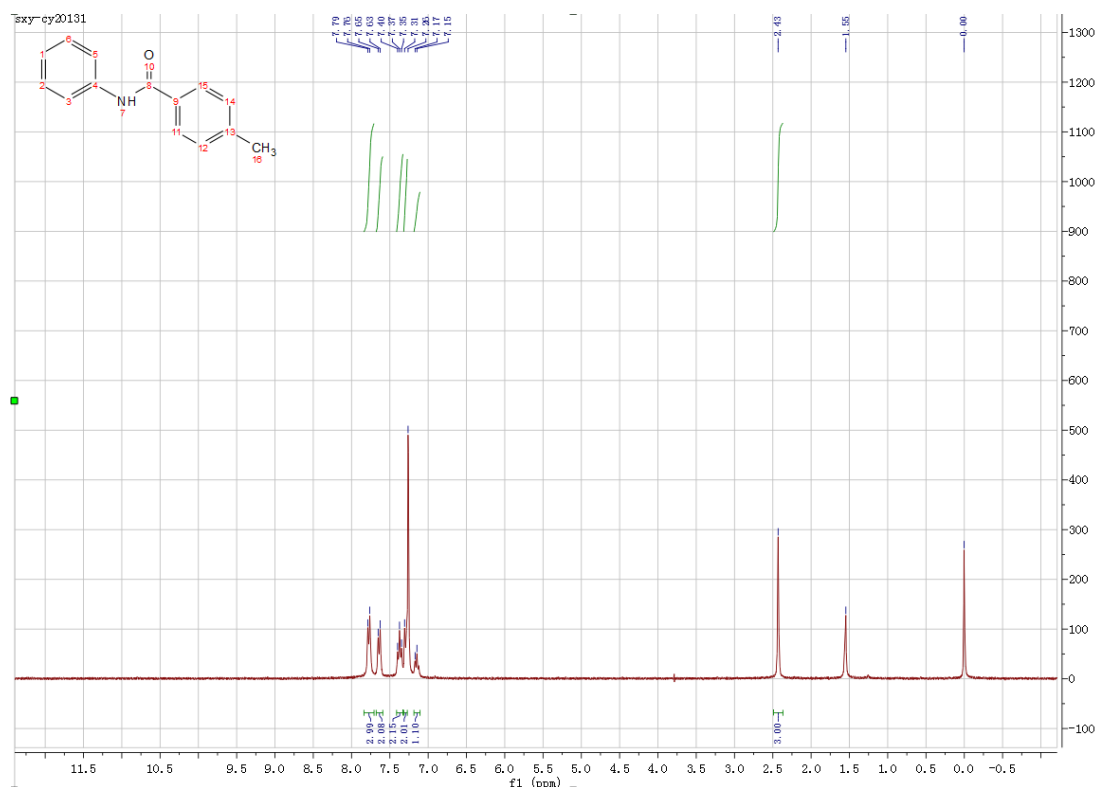


$^1\text{H-NMR}$ of *N*-(4-chlorophenyl)-4-(methylsulfonyl)benzamide (**1e**)

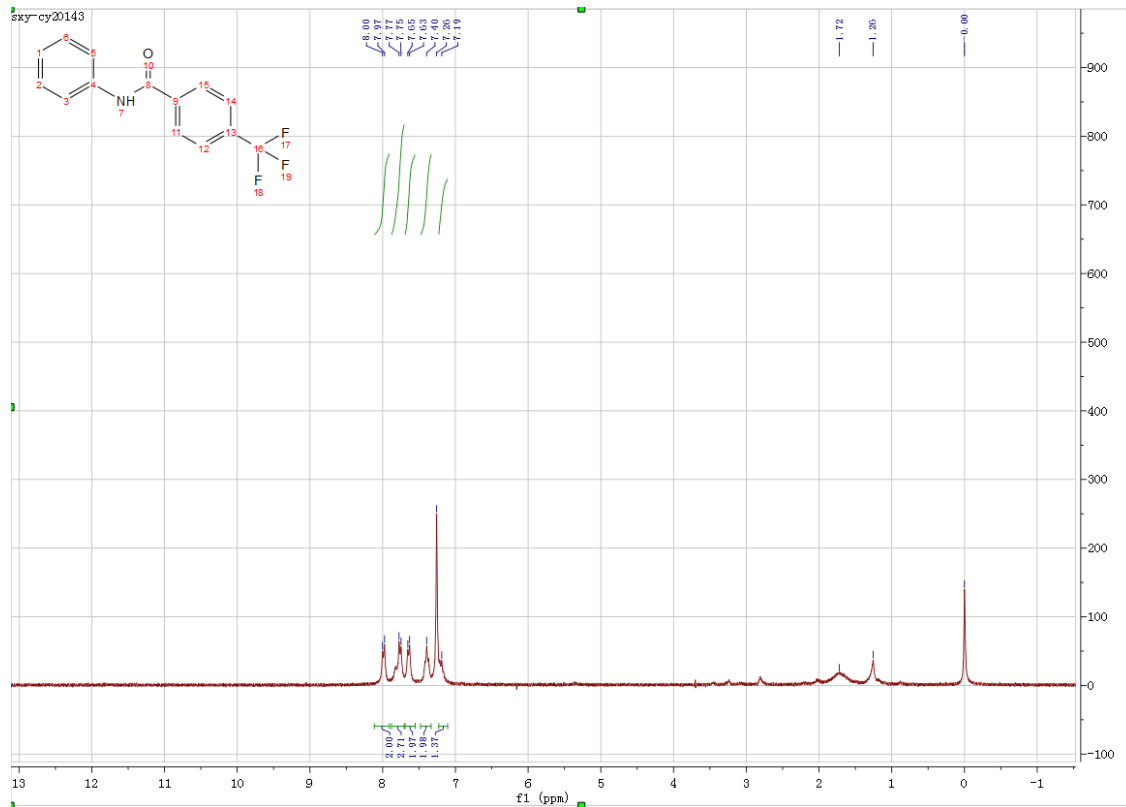


$^1\text{H-NMR}$ of 4-bromo-*N*-phenylbenzamide (**1f**)

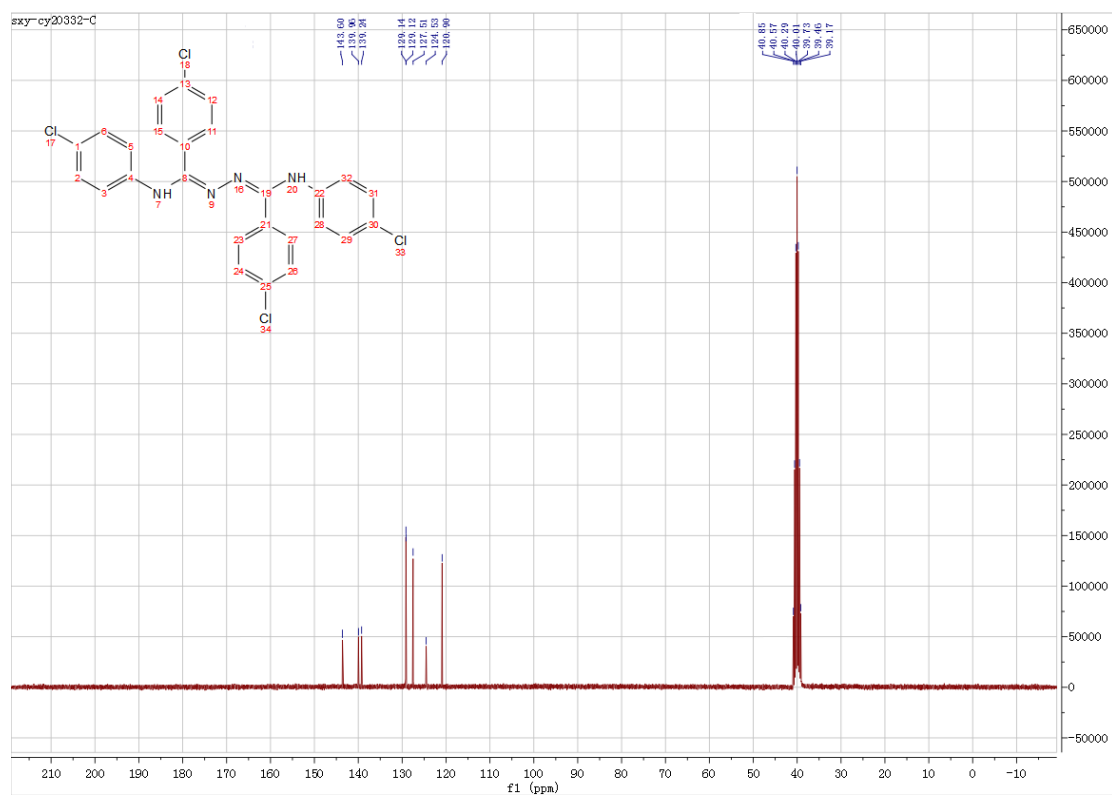
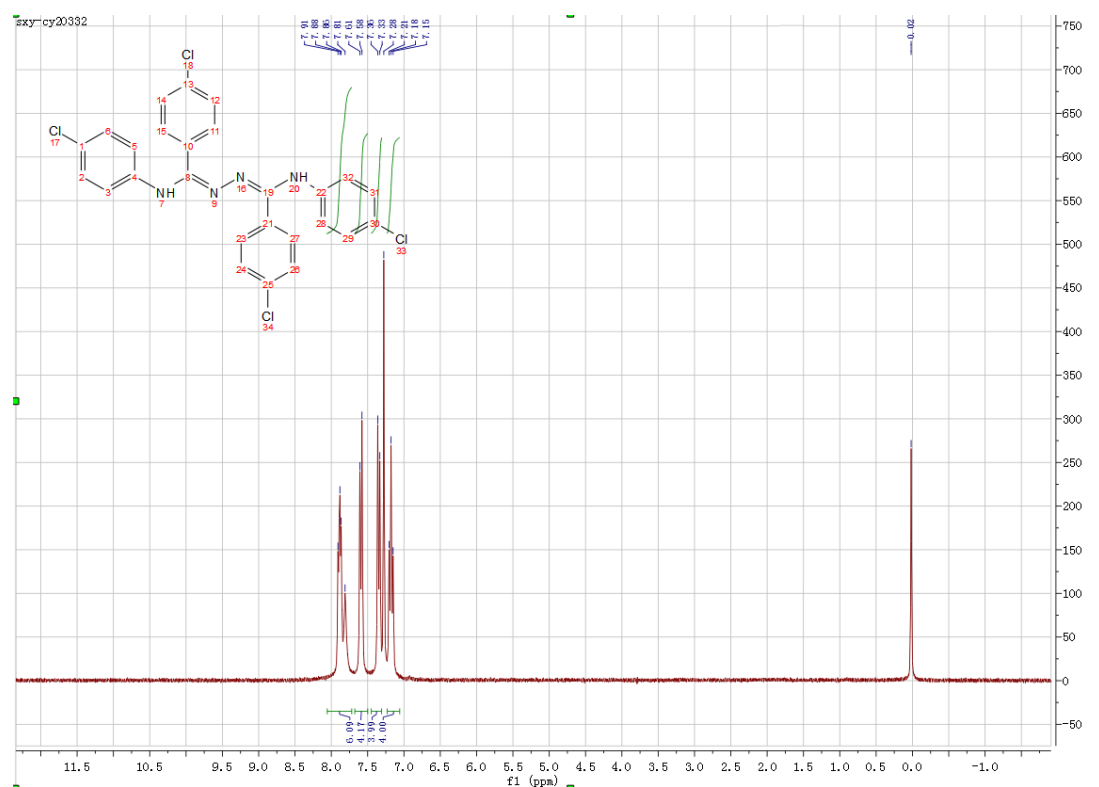
¹H-NMR of 4-chloro-*N*-phenylbenzamide (**1g**)¹H-NMR of 4-fluoro-*N*-phenylbenzamide (**1h**)

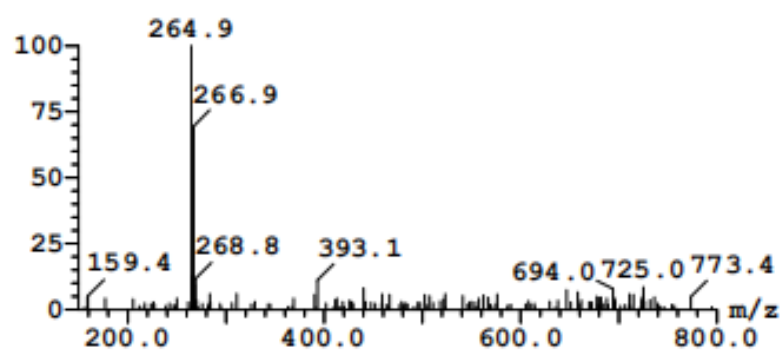


¹H-NMR of 4-methyl-*N*-phenylbenzamide (**1i**)

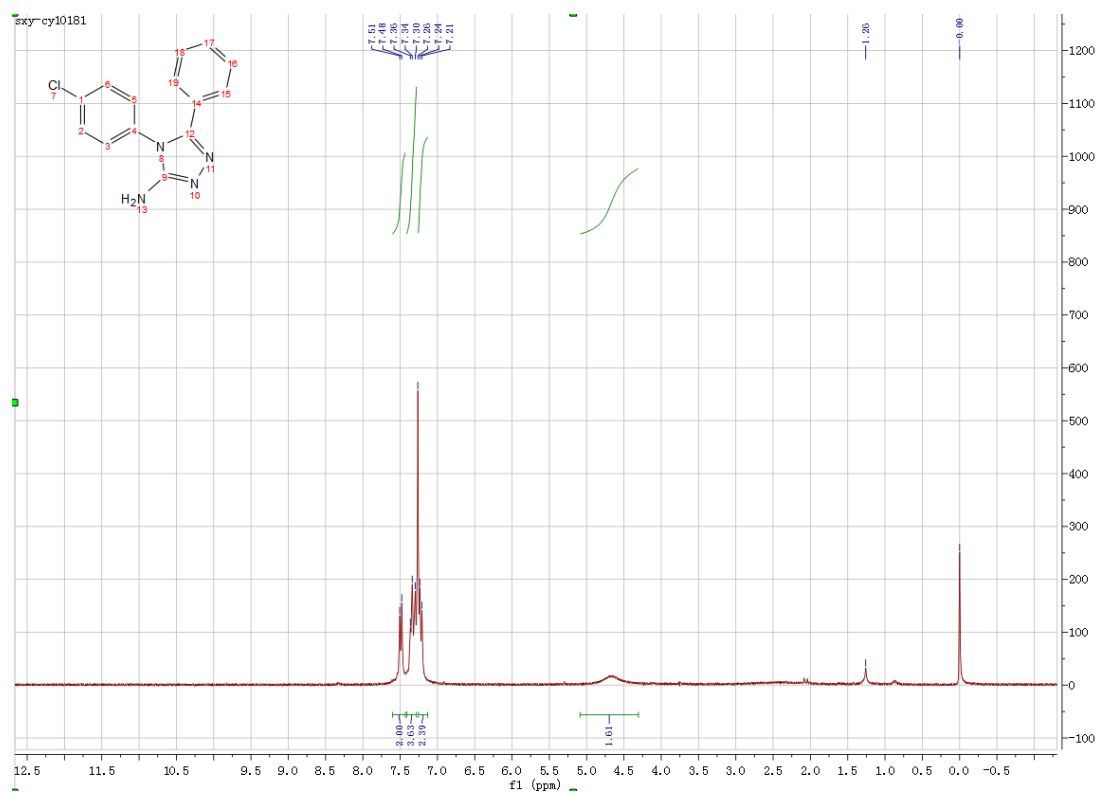


¹H-NMR of 4-(trifluoromethyl)-*N*-phenylbenzamide (**1j**)

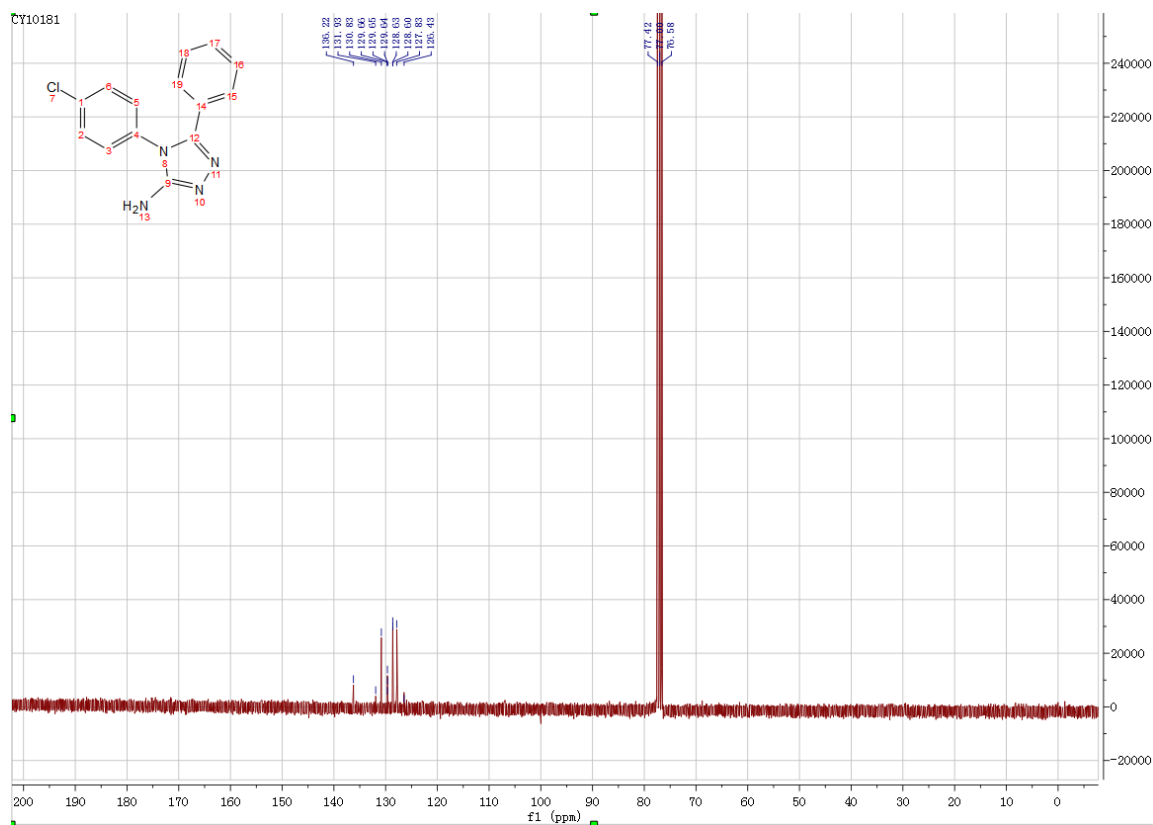




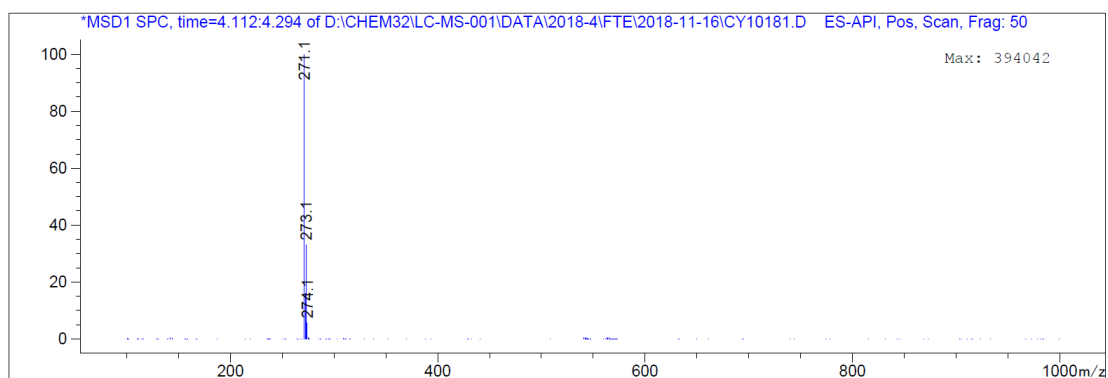
ESI-MS of dimerization



¹H-NMR of 4-(4-chlorophenyl)-5-phenyl-4H-1,2,4-triazol-3-amine (**4a**)

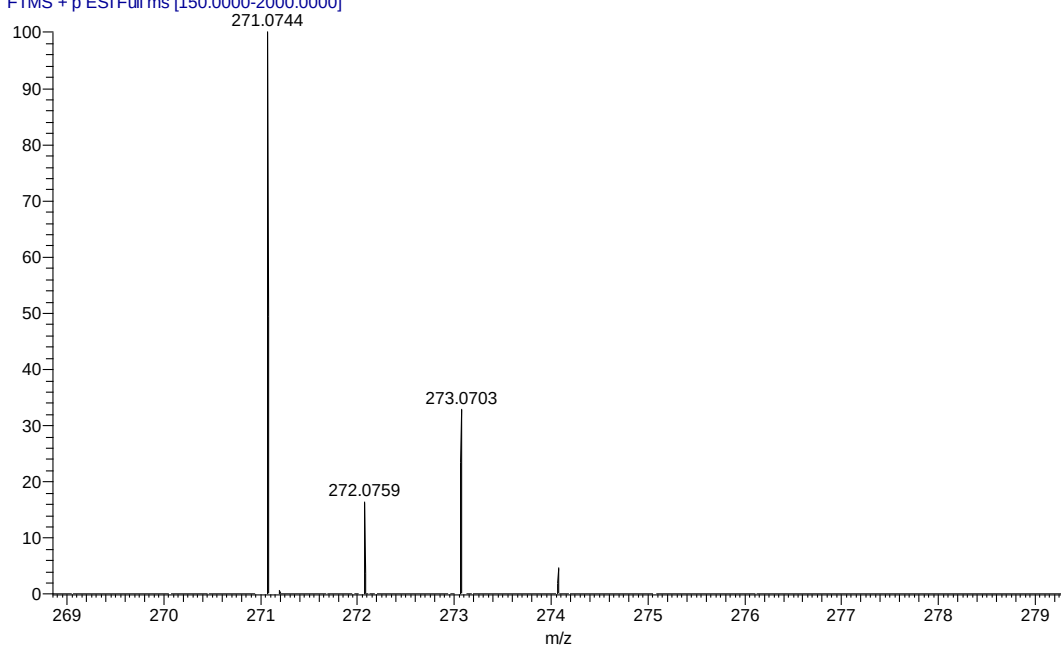


¹³C-NMR of 4-(4-chlorophenyl)-5-phenyl-4H-1,2,4-triazol-3-amine (**4a**)

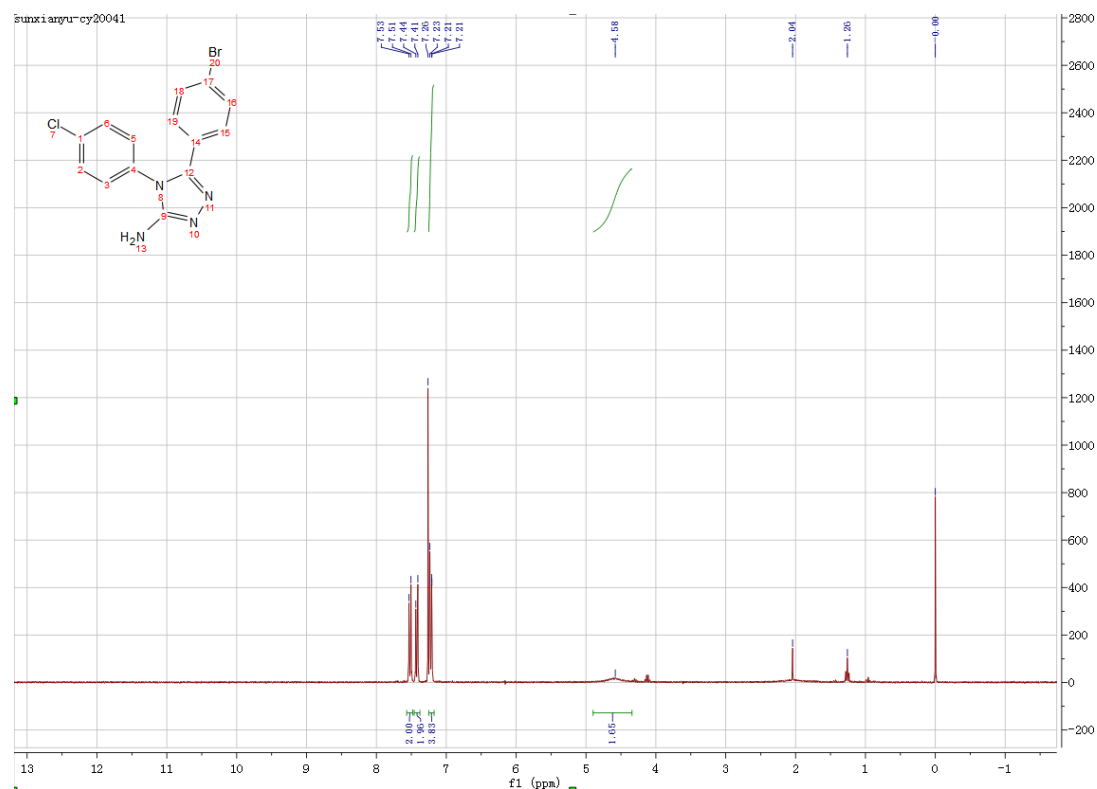


MS of 4-(4-chlorophenyl)-5-phenyl-4*H*-1,2,4-triazol-3-amine (**4a**)

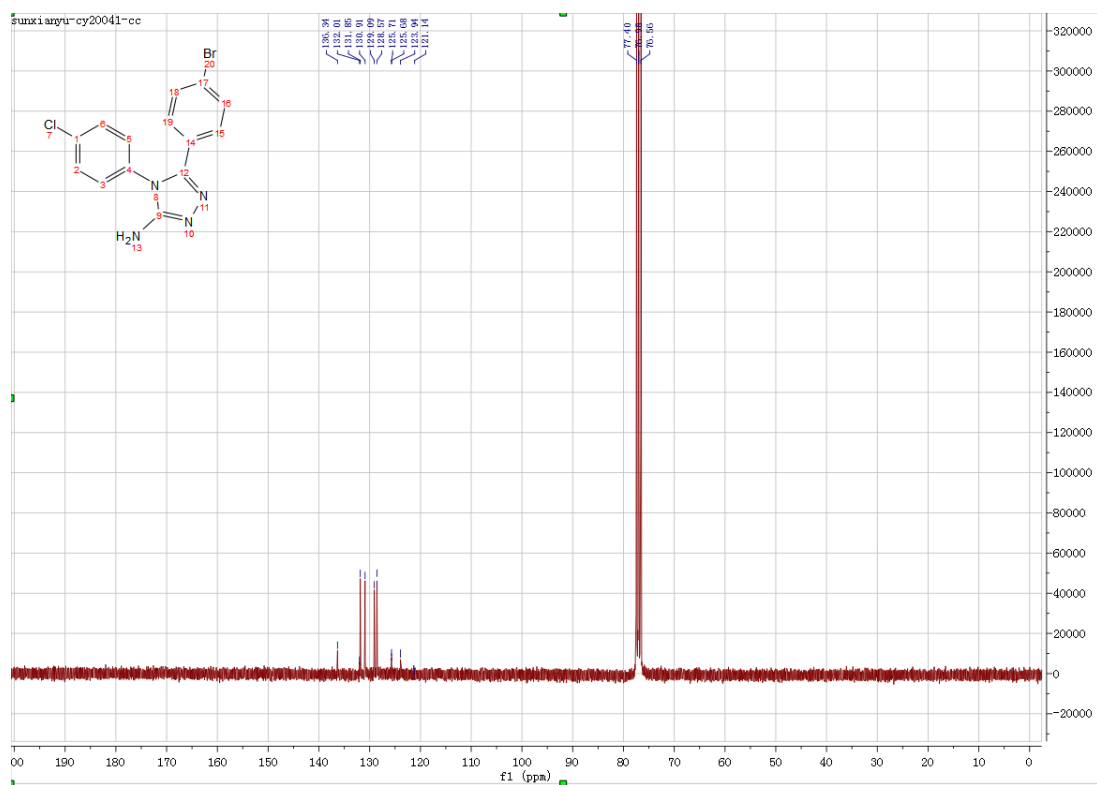
CY-10181 #281 RT: 2.72 AV: 1 NL: 1.82E10
T: FTMS + p ESI Full ms [150.0000-2000.0000]



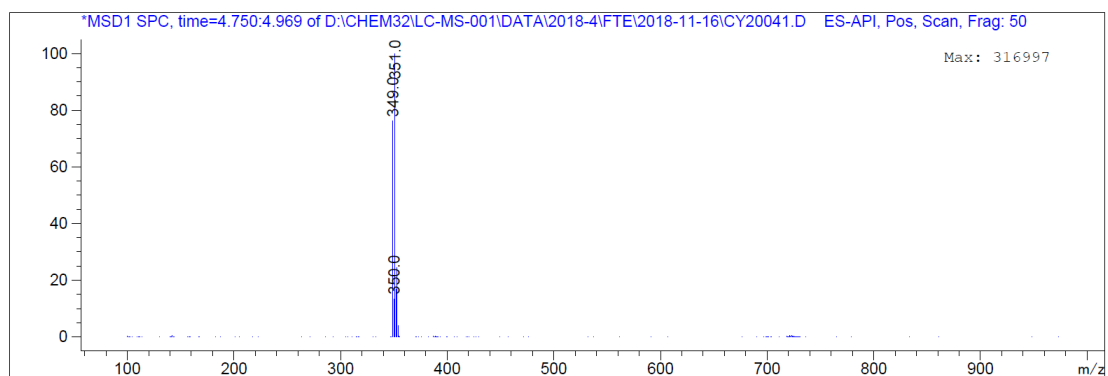
HRMS of 4-(4-chlorophenyl)-5-phenyl-4*H*-1,2,4-triazol-3-amine (**4a**)



¹H-NMR of 5-(4-bromophenyl)-4-(4-chlorophenyl)-4H-1,2,4-triazol-3-amine (**4b**)

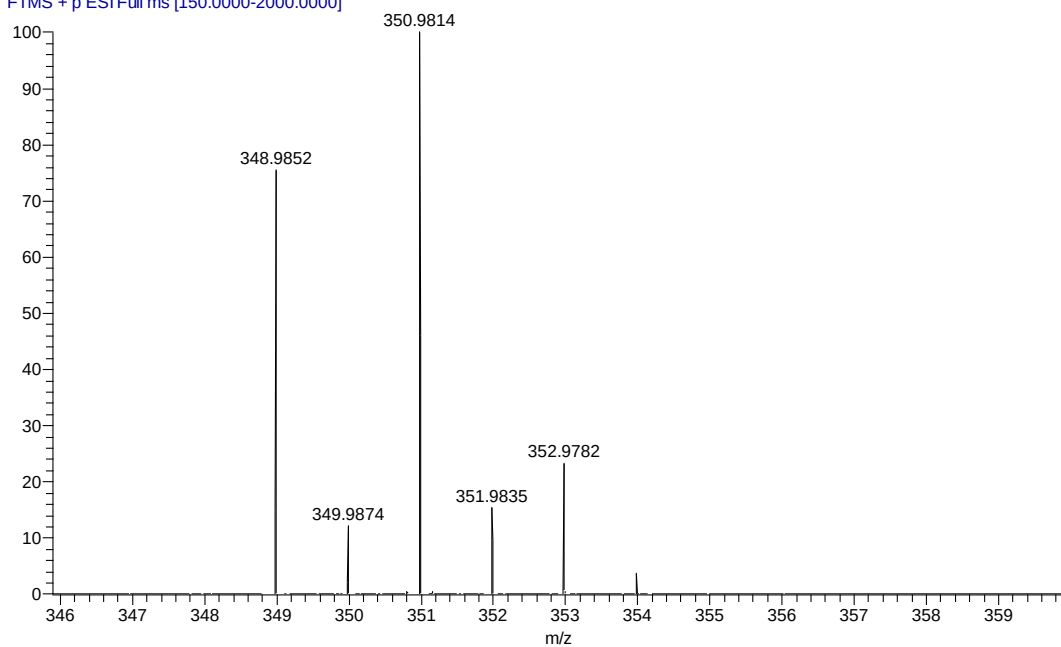


¹³C-NMR of 5-(4-bromophenyl)-4-(4-chlorophenyl)-4H-1,2,4-triazol-3-amine (**4b**)

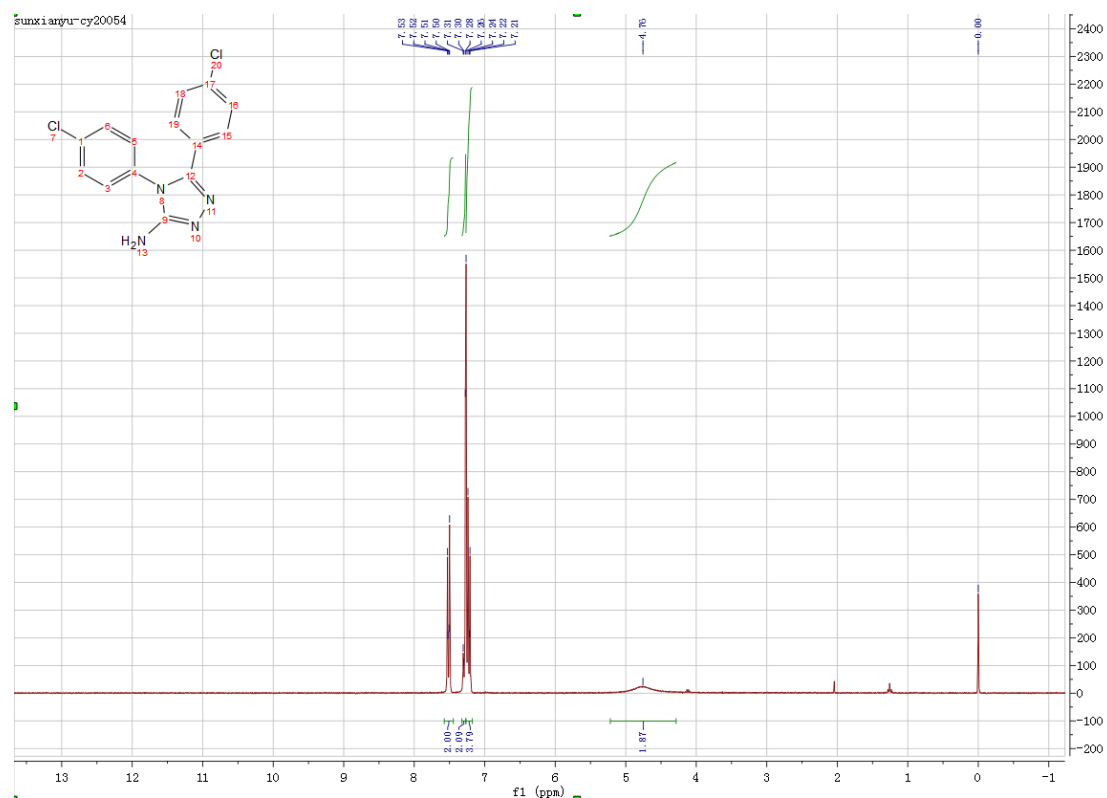


MS of 5-(4-bromophenyl)-4-(4-chlorophenyl)-4H-1,2,4-triazol-3-amine (**4b**)

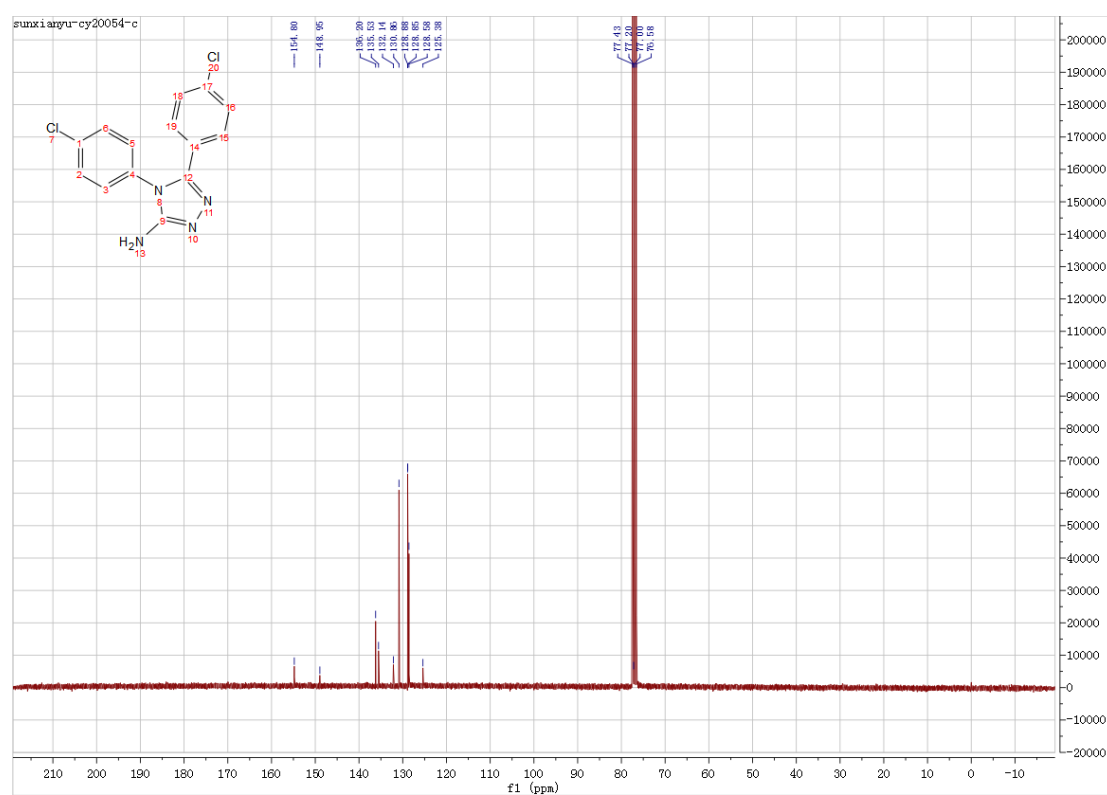
CYY-20041 #317 RT: 3.11 AV: 1 NL: 1.41E10
T: FTMS + p ESI Full ms [150.0000-2000.0000]



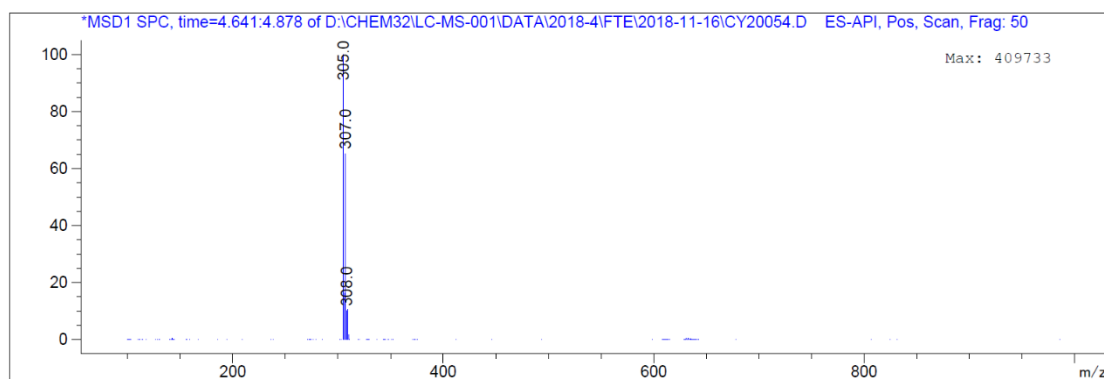
HRMS of 5-(4-bromophenyl)-4-(4-chlorophenyl)-4H-1,2,4-triazol-3-amine (**4b**)



^1H -NMR of 4,5-bis(4-chlorophenyl)-4H-1,2,4-triazol-3-amine (**4c**)

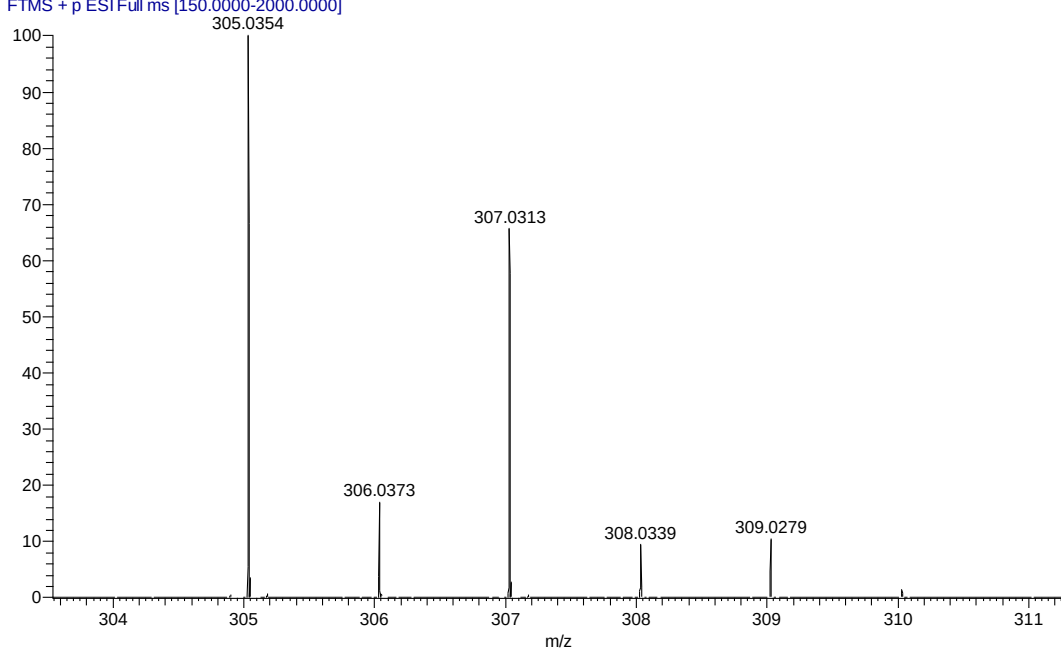


^{13}C -NMR of 4,5-bis(4-chlorophenyl)-4H-1,2,4-triazol-3-amine (**4c**)

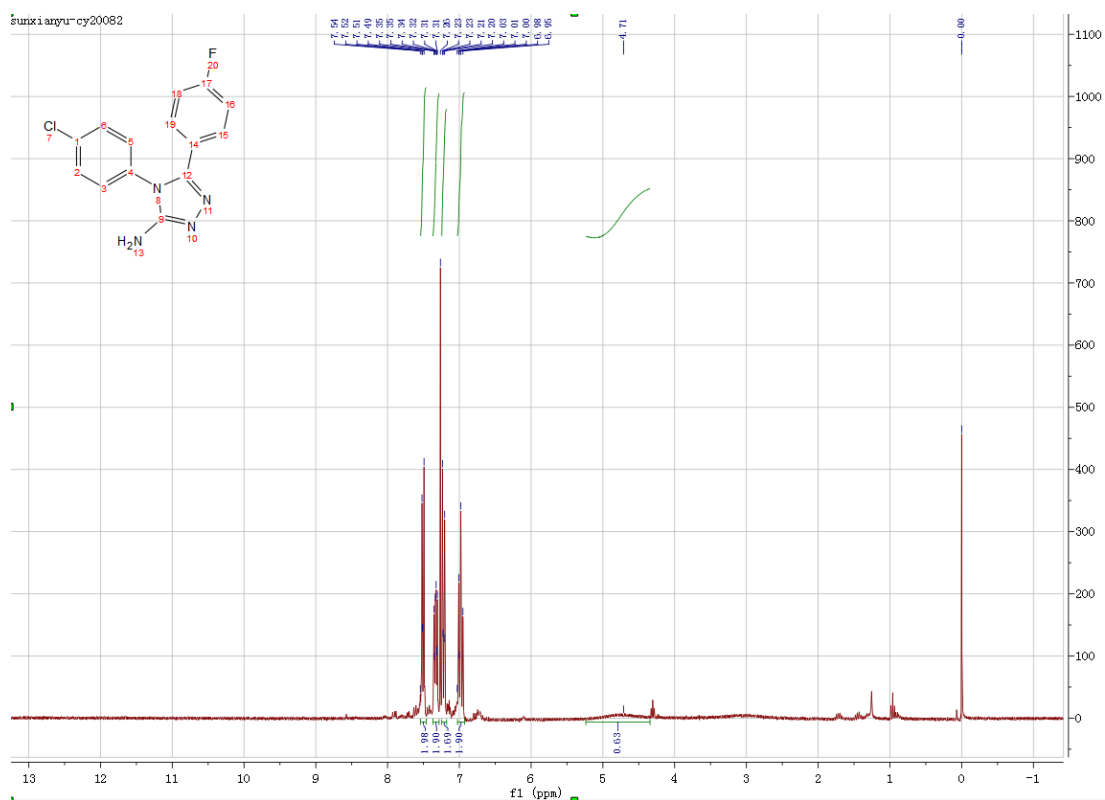


MS of 4,5-bis(4-chlorophenyl)-4H-1,2,4-triazol-3-amine (**4c**)

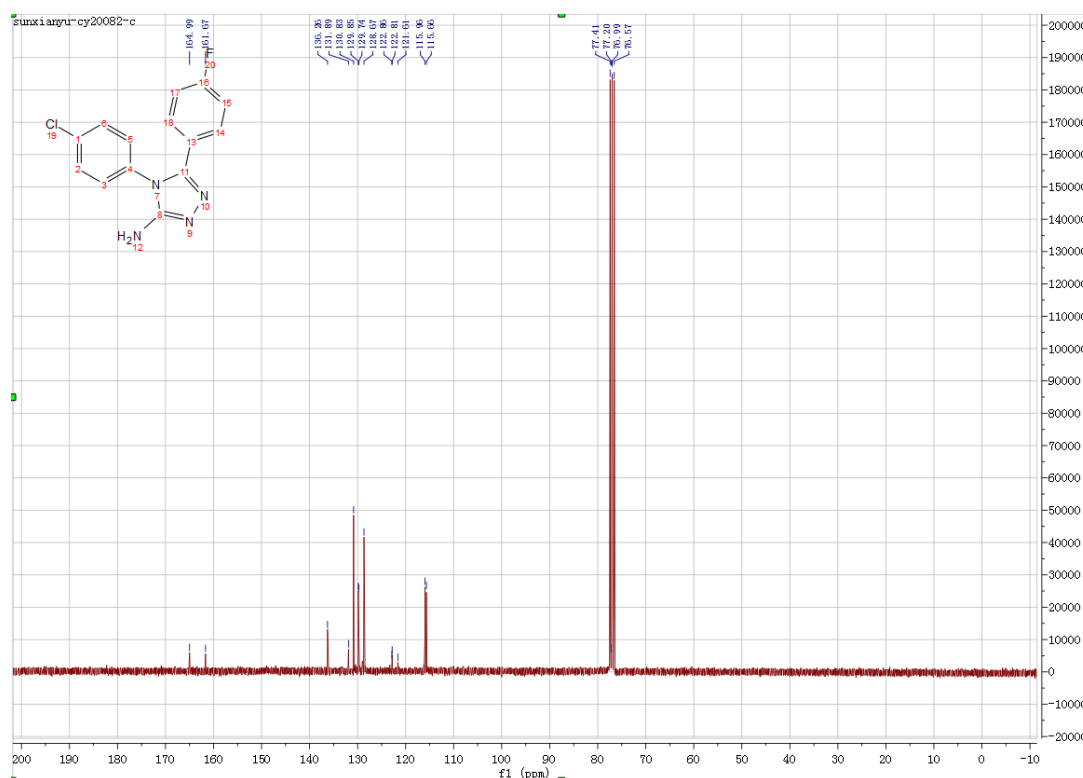
CYY-20054 #305 RT: 2.99 AV: 1 NL: 1.40E10
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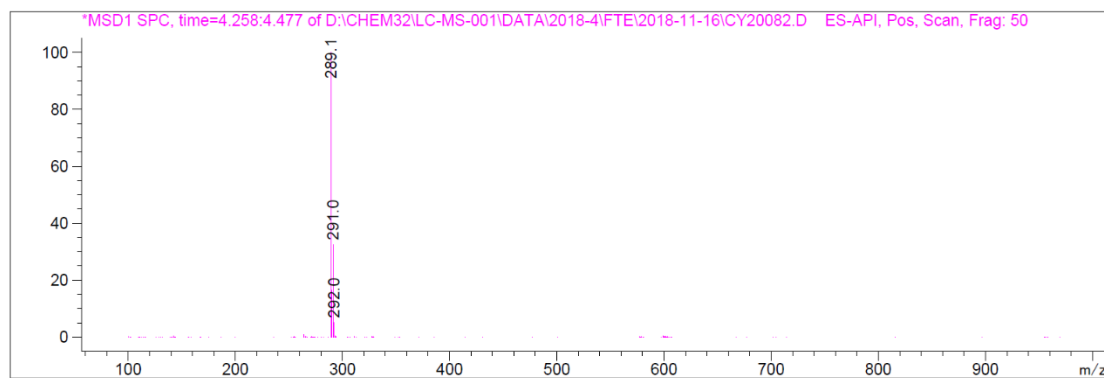
HRMS of 4,5-bis(4-chlorophenyl)-4H-1,2,4-triazol-3-amine (**4c**)



¹H-NMR of 4-(4-chlorophenyl)-5-(4-fluorophenyl)-4H-1,2,4-triazol-3-amine (**4d**)

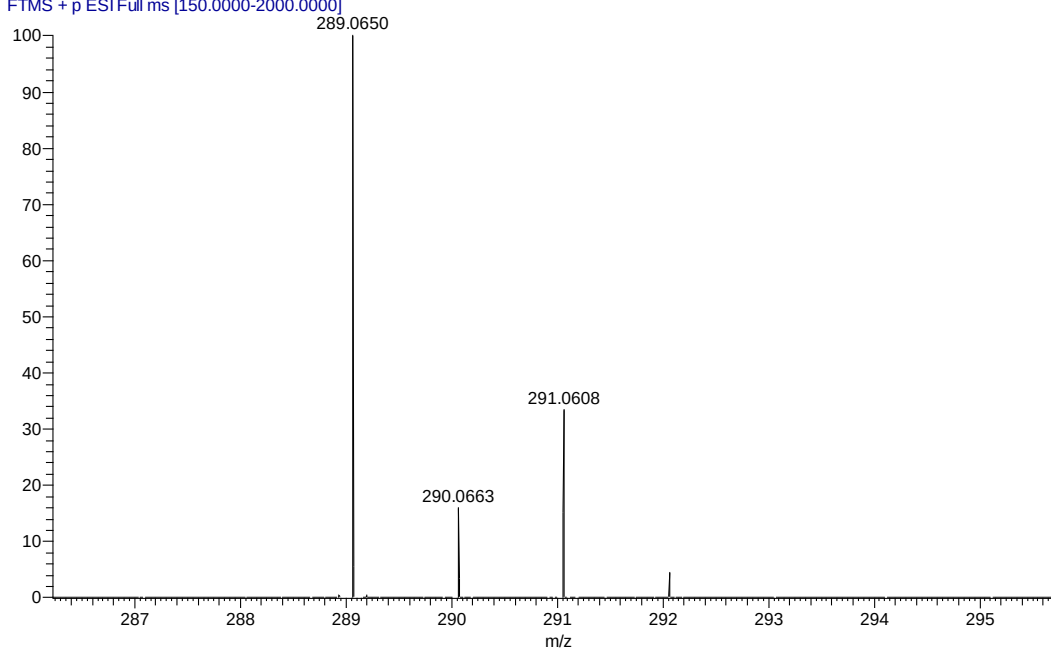


¹³C-NMR of 4-(4-chlorophenyl)-5-(4-fluorophenyl)-4H-1,2,4-triazol-3-amine (**4d**)

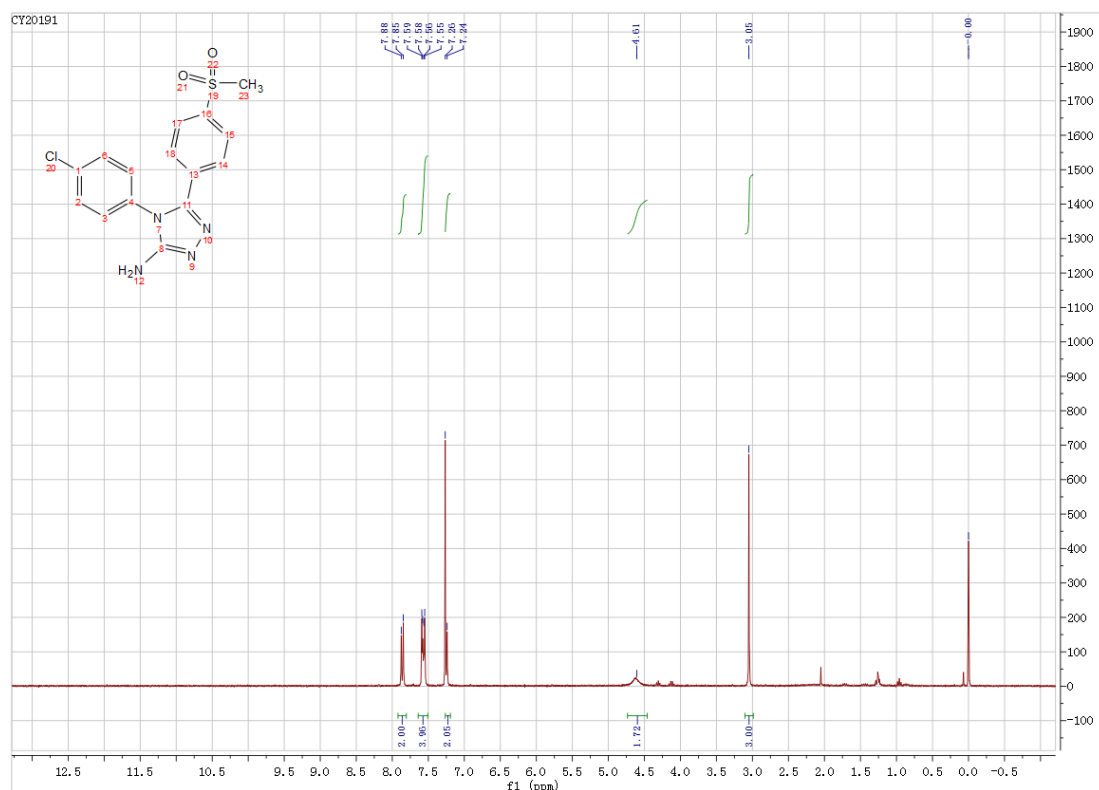


MS of 4-(4-chlorophenyl)-5-(4-fluorophenyl)-4*H*-1,2,4-triazol-3-amine (**4d**)

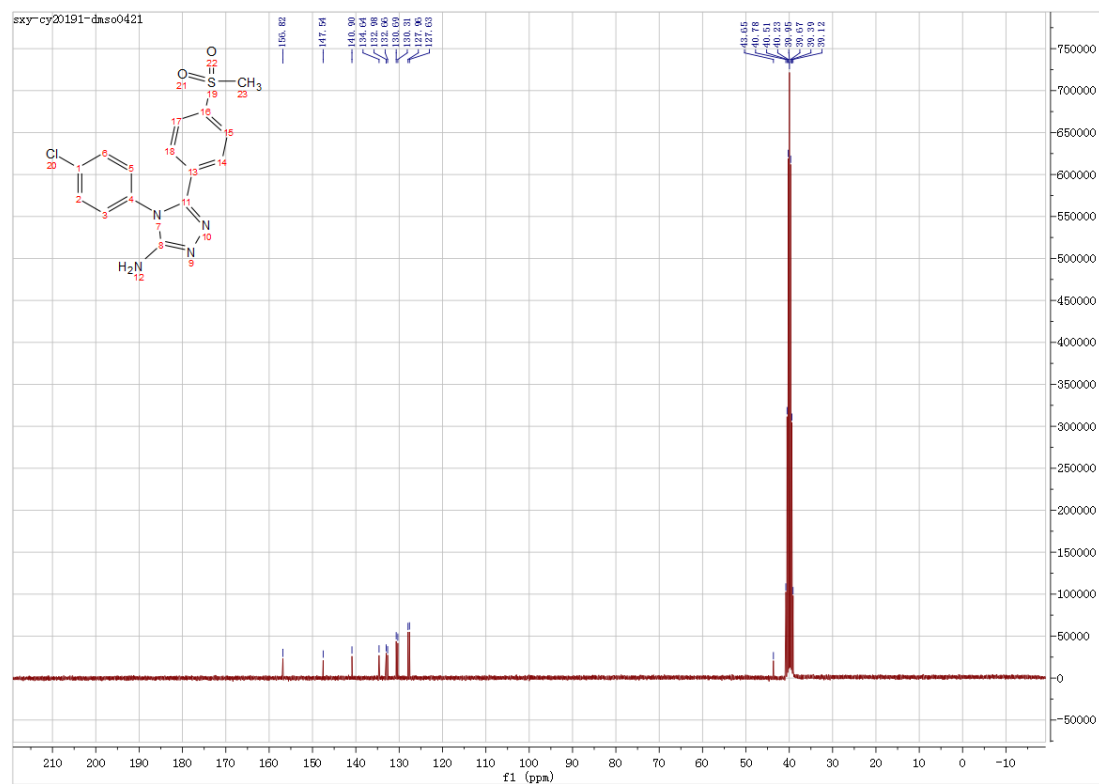
CY-20082 #293 RT: 2.86 AV: 1 NL: 2.07E10
T: FTMS + p ESI Full ms [150.0000-2000.0000]



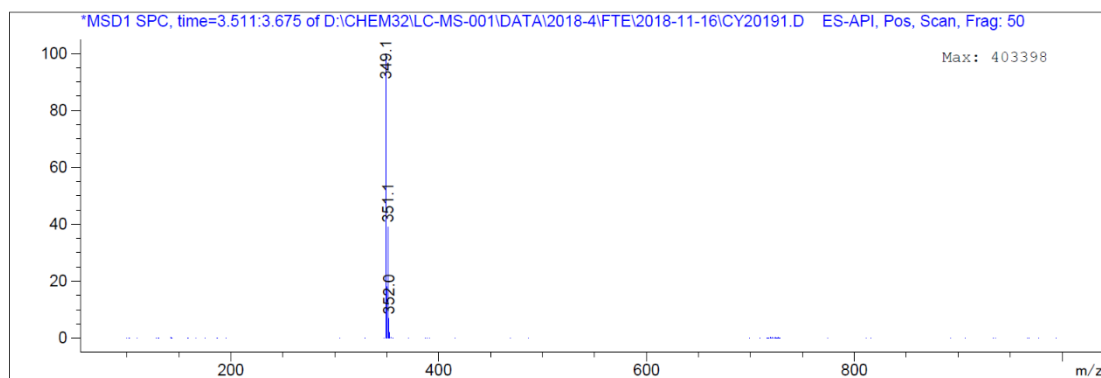
HRMS of 4-(4-chlorophenyl)-5-(4-fluorophenyl)-4*H*-1,2,4-triazol-3-amine (**4d**)



¹H-NMR of 4-(4-chlorophenyl)-5-[4-(methylsulfonyl)phenyl]-4H-1,2,4-triazol-3-amine (**4e**)

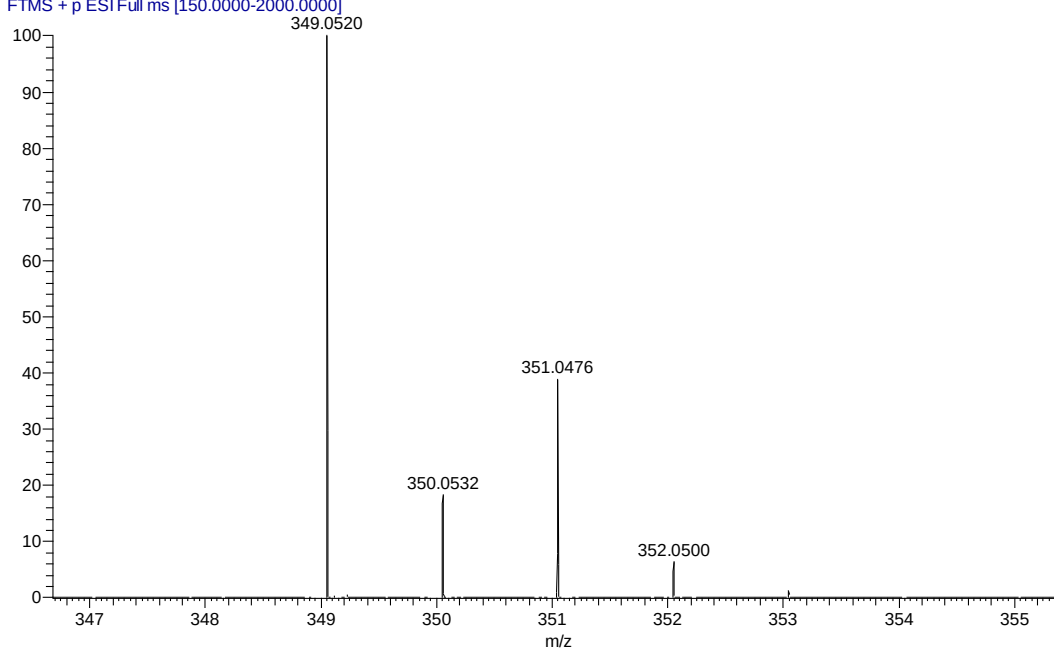


¹³C-NMR of 4-(4-chlorophenyl)-5-[4-(methylsulfonyl)phenyl]-4H-1,2,4-triazol-3-amine (**4e**)

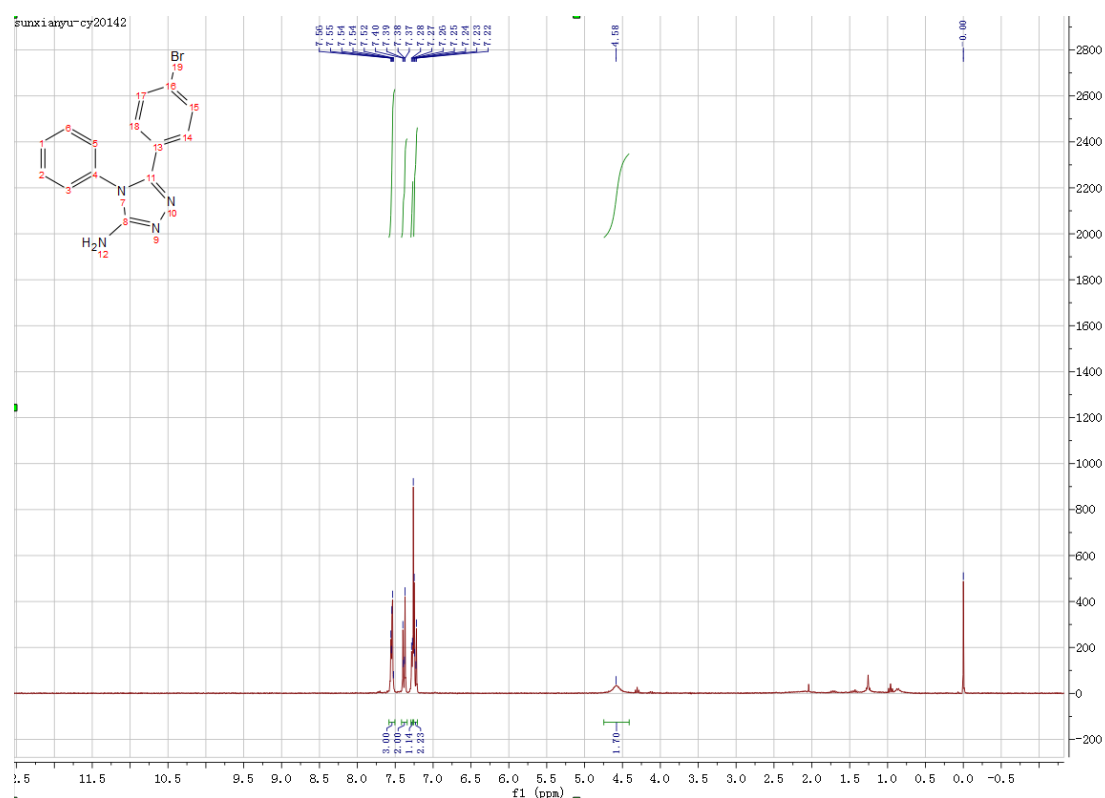


MS of 4-(4-chlorophenyl)-5-[4-(methylsulfonyl)phenyl]-4*H*-1,2,4-triazol-3-amine (**4e**)

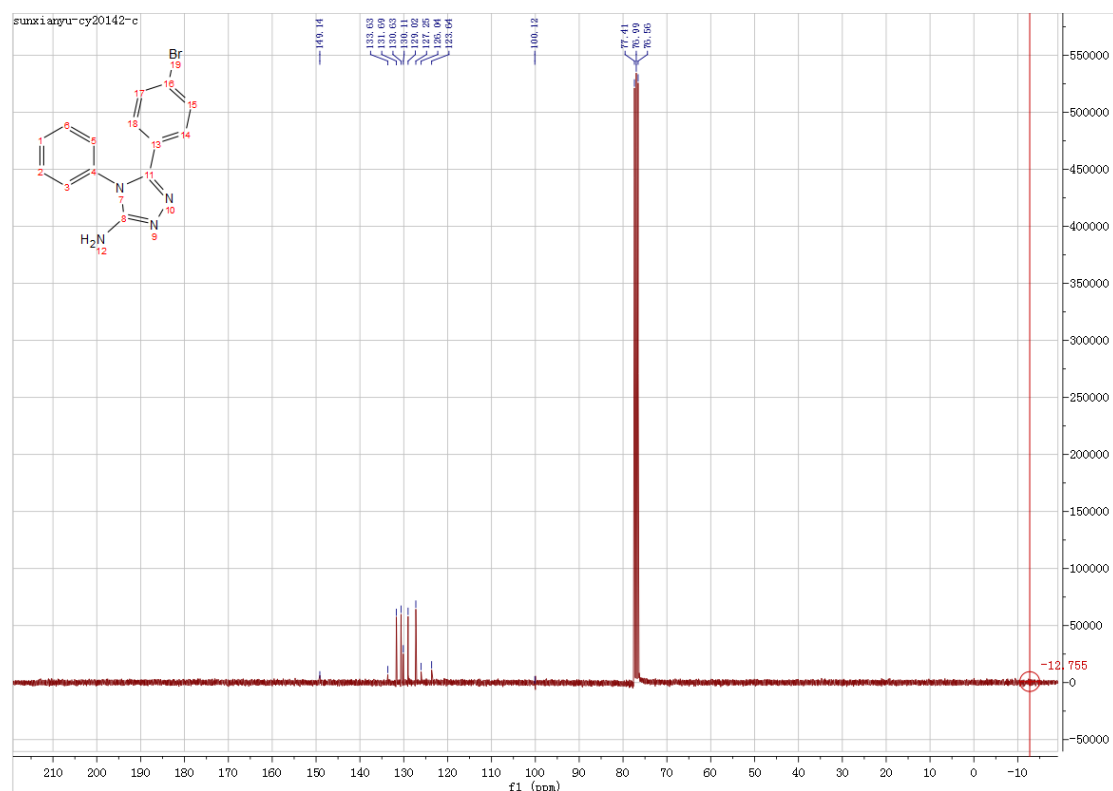
CY-20191 #273 RT: 2.65 AV: 1 NL: 1.73E10
T: FTMS + p ESI Full ms [150.0000-2000.0000]



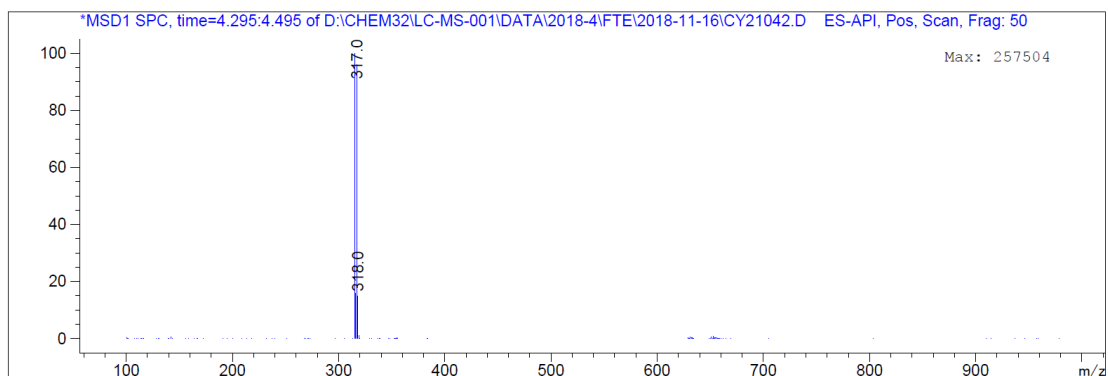
HRMS of 4-(4-chlorophenyl)-5-[4-(methylsulfonyl)phenyl]-4*H*-1,2,4-triazol-3-amine (**4e**)



^1H -NMR of 5-(4-bromophenyl)-4-phenyl-4H-1,2,4-triazol-3-amine (4f)

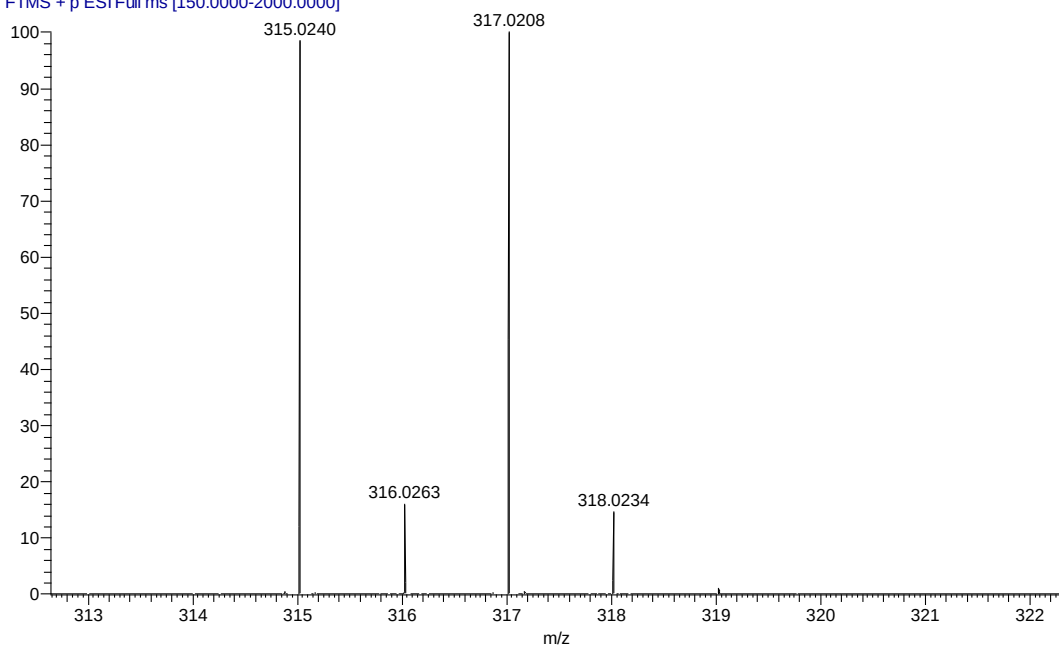


^{13}C -NMR of 5-(4-bromophenyl)-4-phenyl-4H-1,2,4-triazol-3-amine (4f)

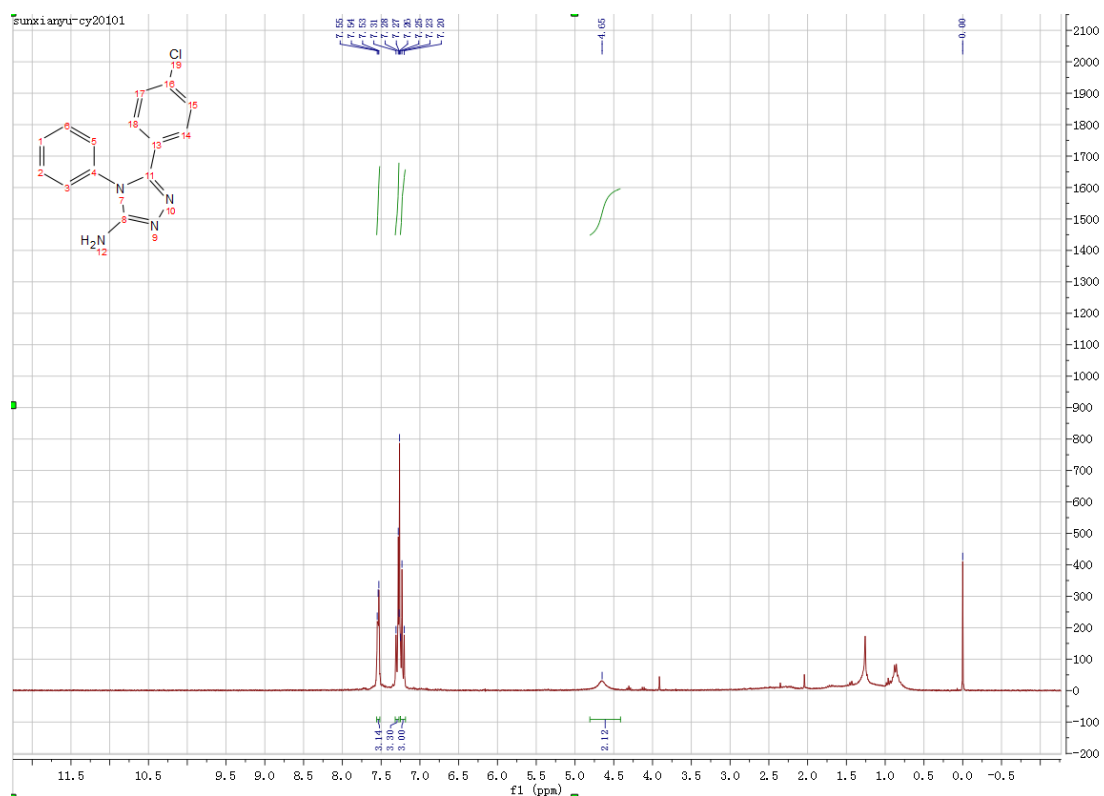


MS of 5-(4-bromophenyl)-4-phenyl-4H-1,2,4-triazol-3-amine (**4f**)

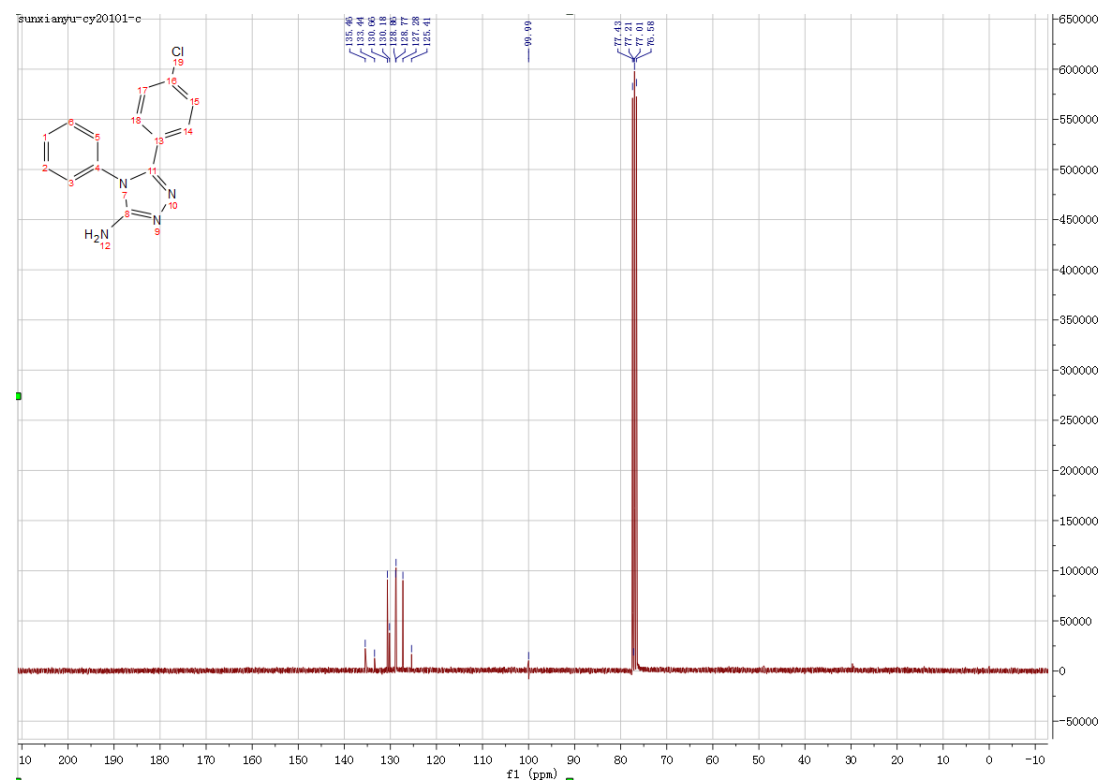
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T: FTMS + p ESI Full ms [150.0000-2000.0000]



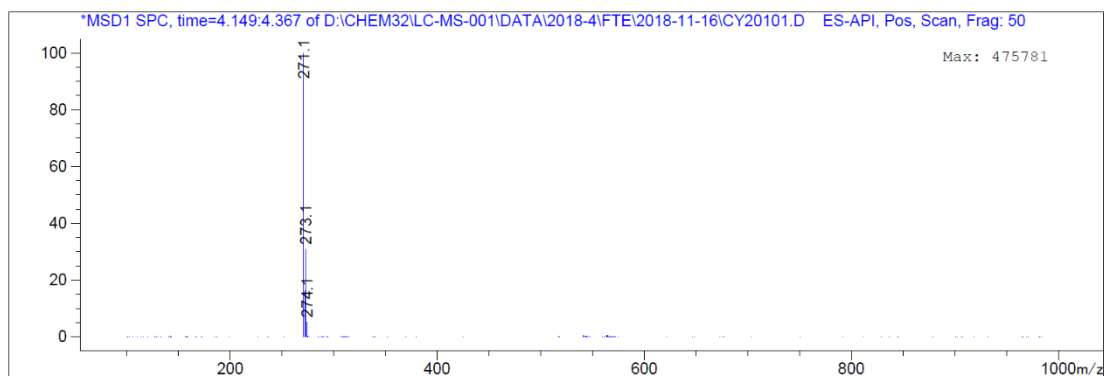
HRMS of 5-(4-bromophenyl)-4-phenyl-4H-1,2,4-triazol-3-amine (**4f**)



¹H-NMR of 5-(4-chlorophenyl)-4-phenyl-4H-1,2,4-triazol-3-amine (**4g**)

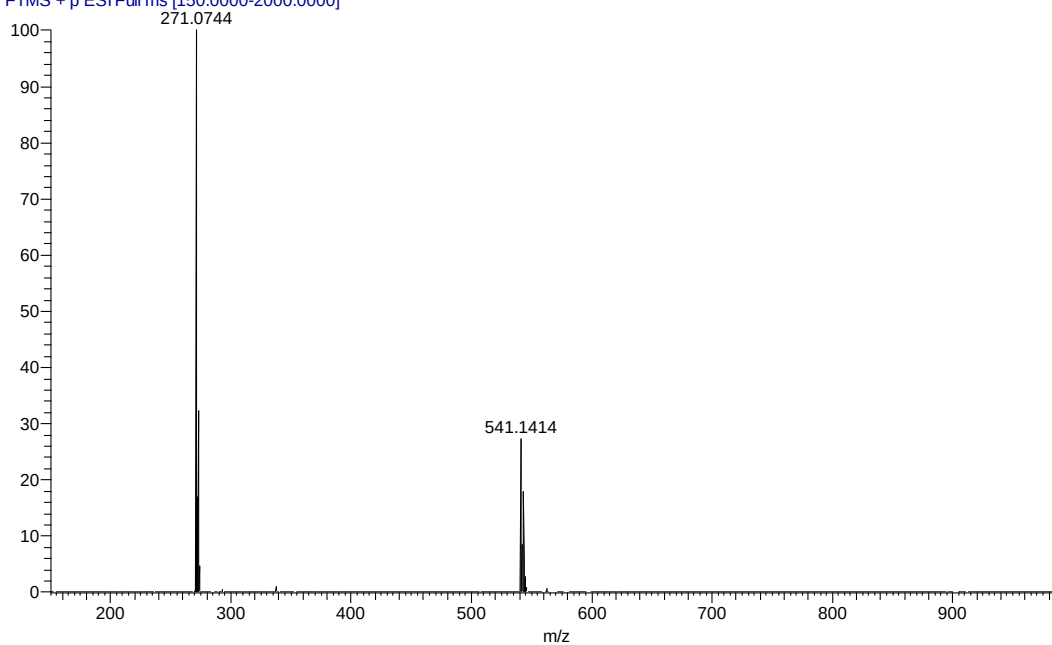


¹³C-NMR of 5-(4-chlorophenyl)-4-phenyl-4H-1,2,4-triazol-3-amine (**4g**)

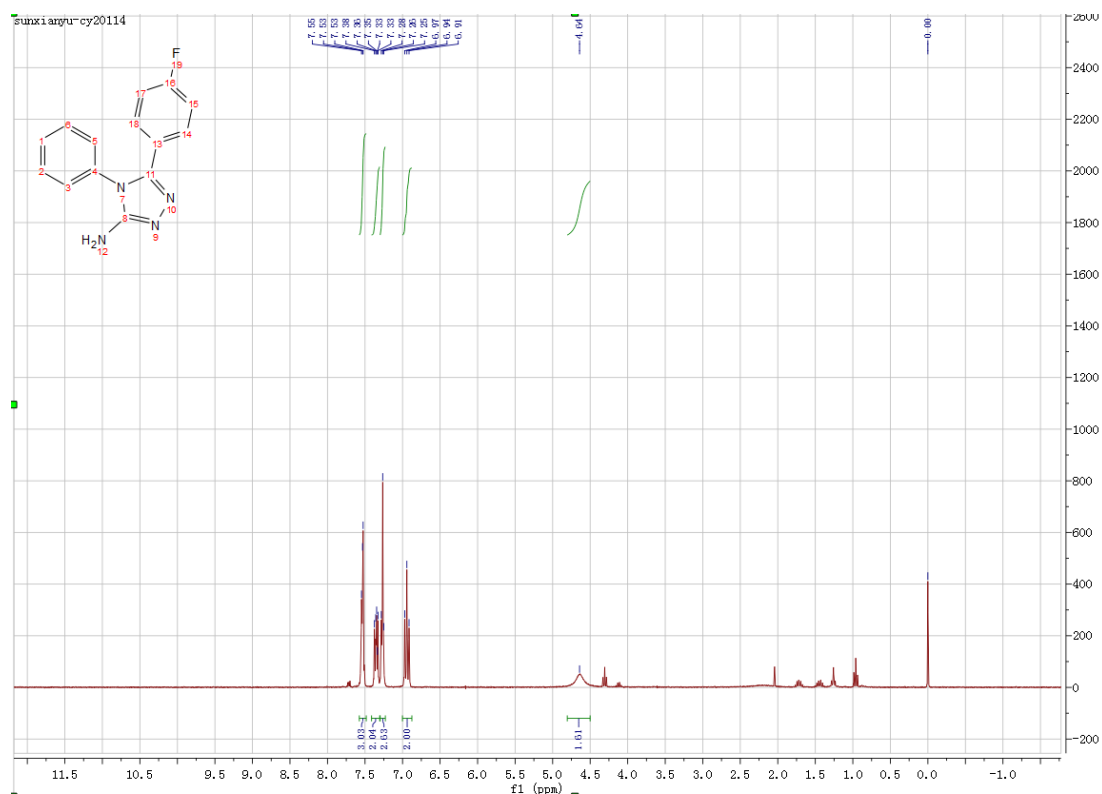
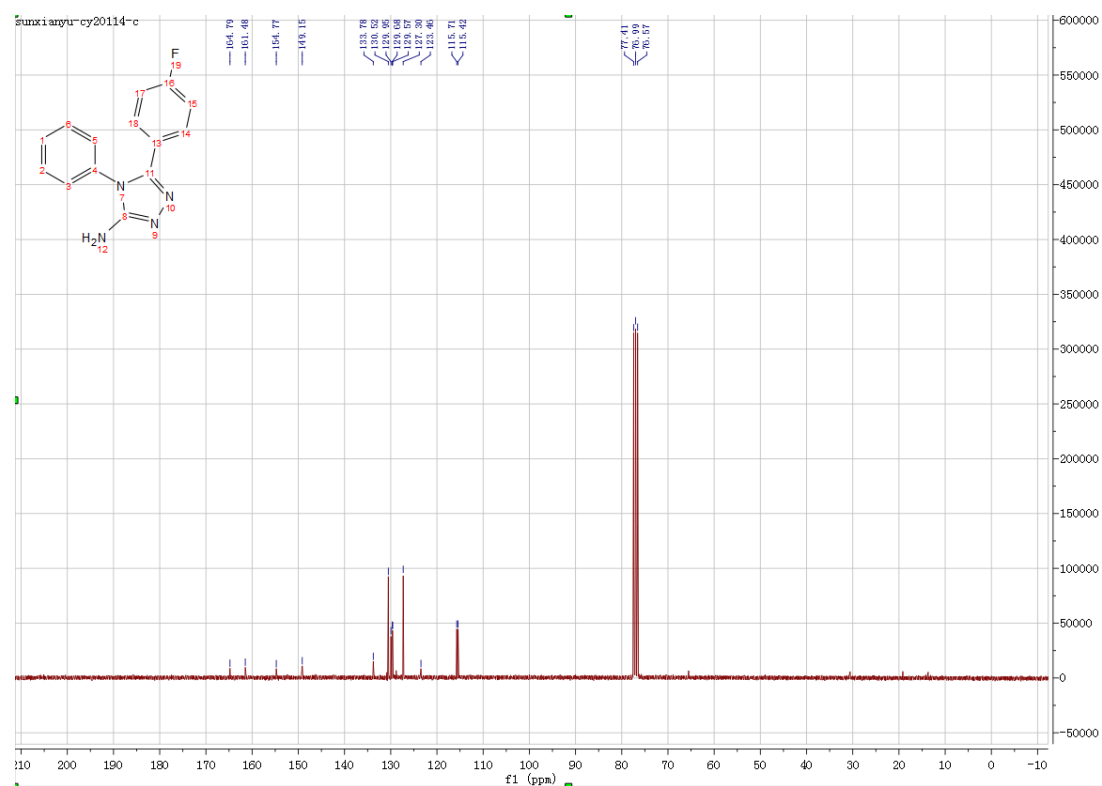


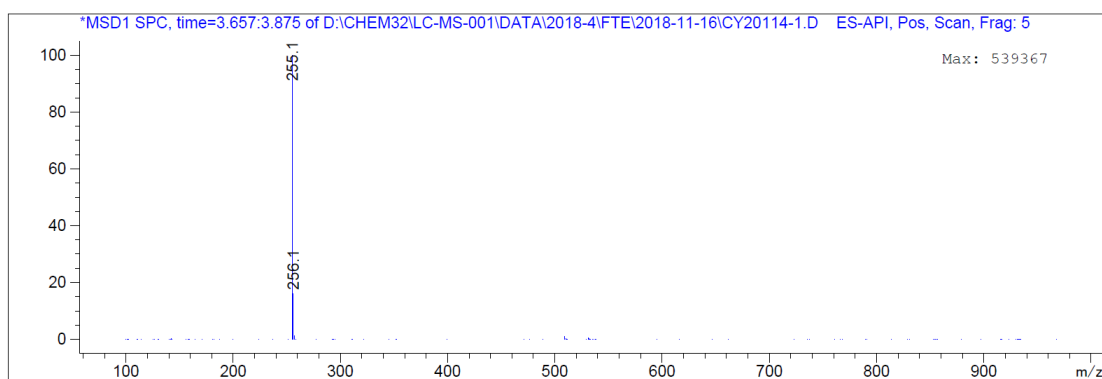
MS of 5-(4-chlorophenyl)-4-phenyl-4*H*-1,2,4-triazol-3-amine (**4g**)

CY-20101 #279 RT: 2.73 AV: 1 NL: 1.78E10
T: FTMS + p ESI Full ms [150.0000-2000.0000]



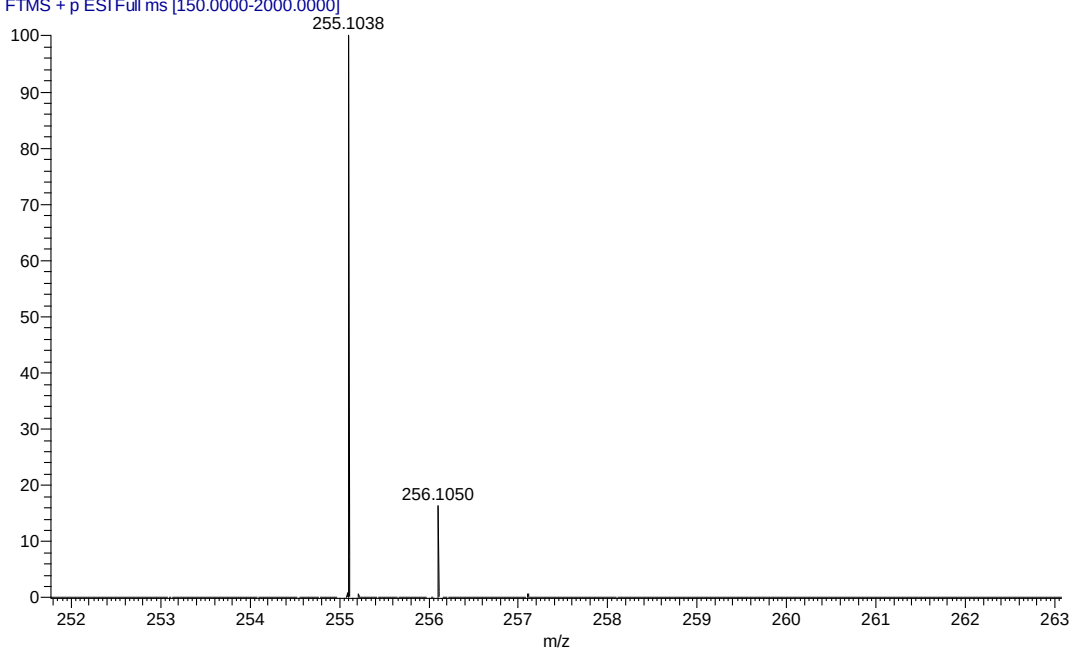
HRMS of 5-(4-chlorophenyl)-4-phenyl-4*H*-1,2,4-triazol-3-amine (**4g**)

¹H-NMR of 5-(4-fluorophenyl)-4-phenyl-4*H*-1,2,4-triazol-3-amine (**4h**)

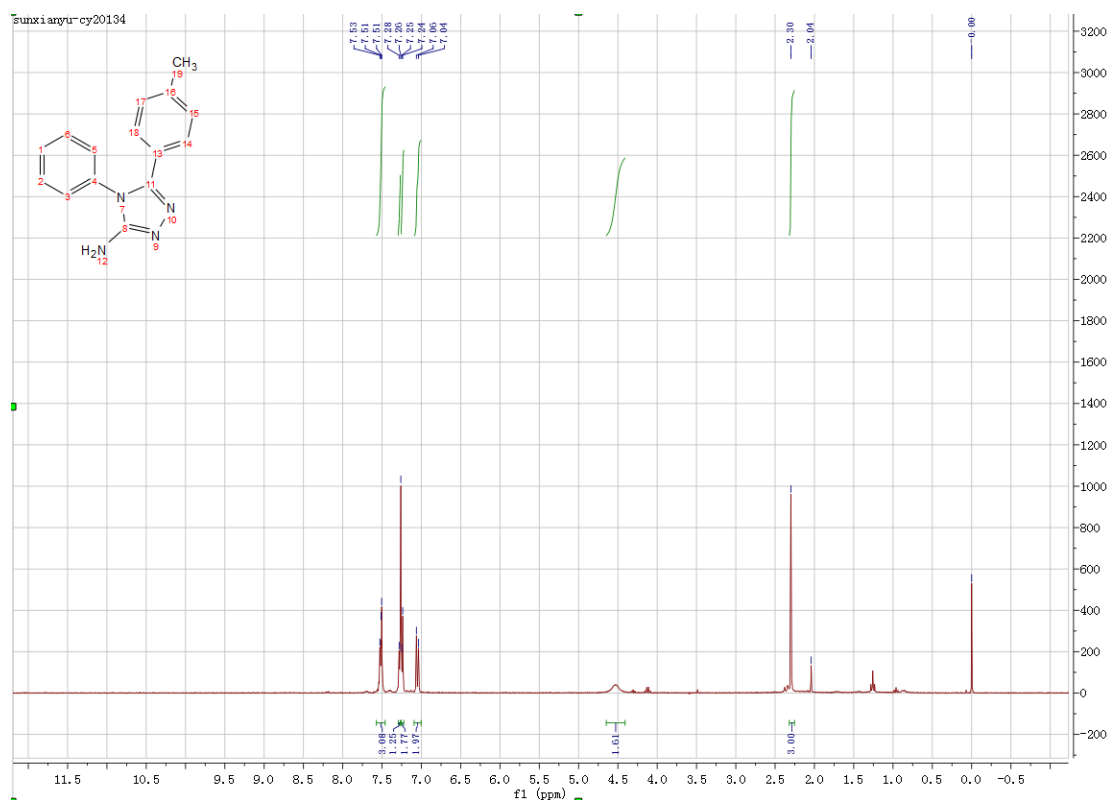


MS of 5-(4-fluorophenyl)-4-phenyl-4H-1,2,4-triazol-3-amine (**4h**)

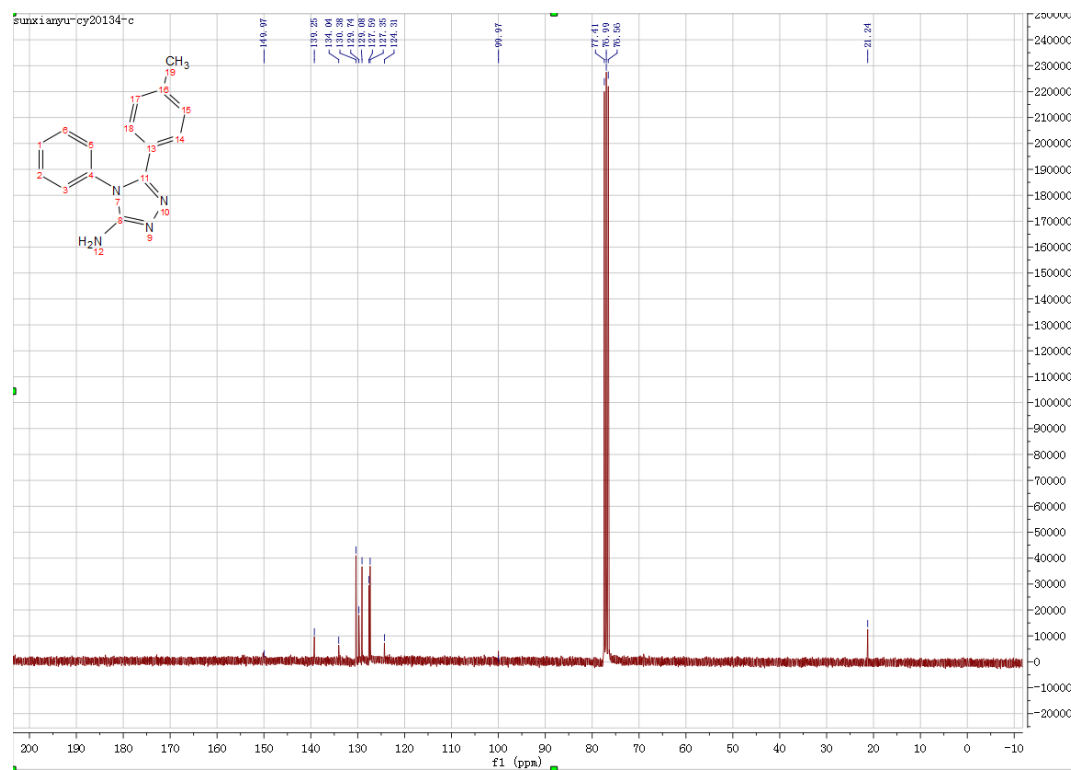
CY-20114 #279 RT: 2.72 AV: 1 NL: 1.61E10
T: FTMS + p ESI Full ms [150.0000-2000.0000]



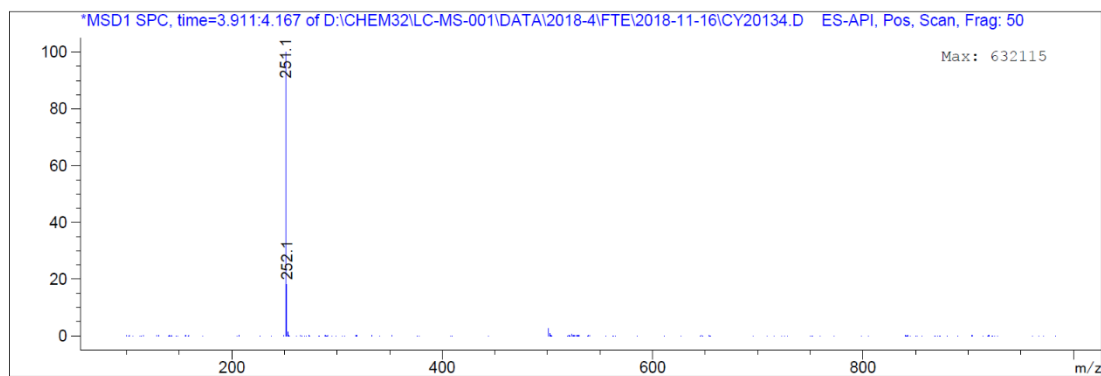
HRMS of 5-(4-fluorophenyl)-4-phenyl-4H-1,2,4-triazol-3-amine (**4h**)



$^1\text{H-NMR}$ of 4-phenyl-5-p-tolyl-4H-1,2,4-triazol-3-amine (**4i**)

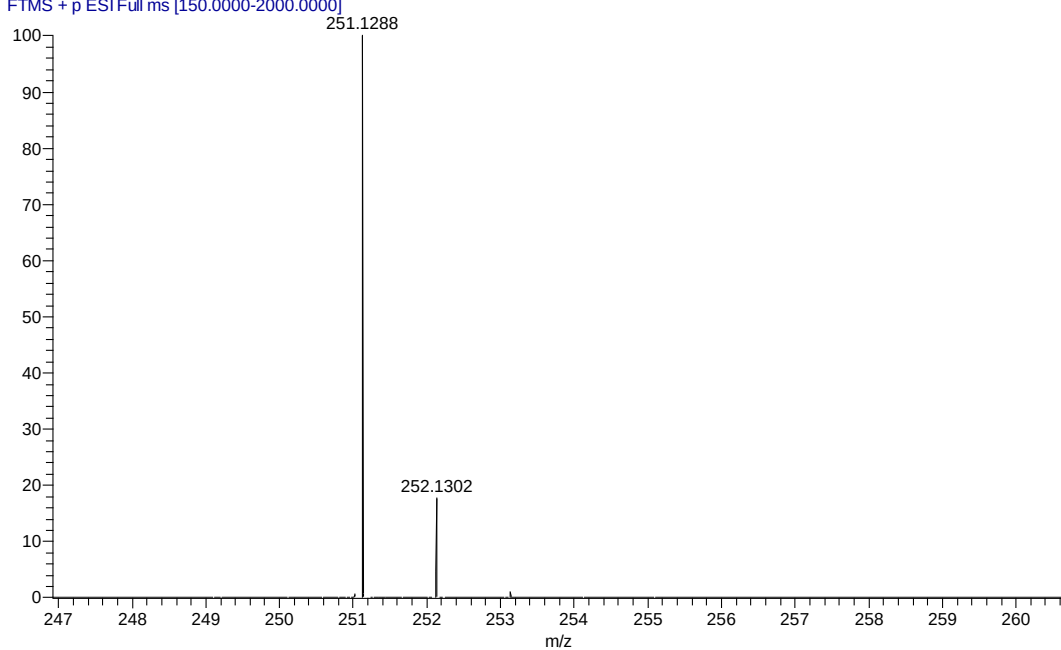


$^{13}\text{C-NMR}$ of 4-phenyl-5-p-tolyl-4H-1,2,4-triazol-3-amine (**4i**)

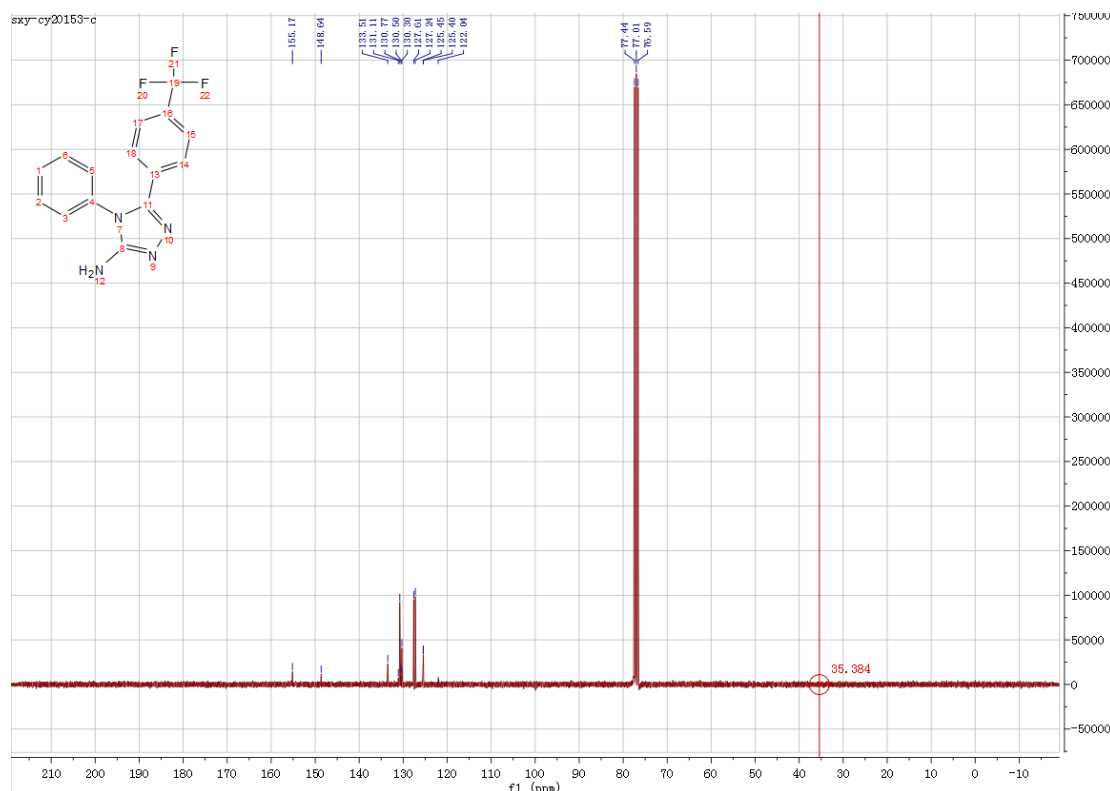
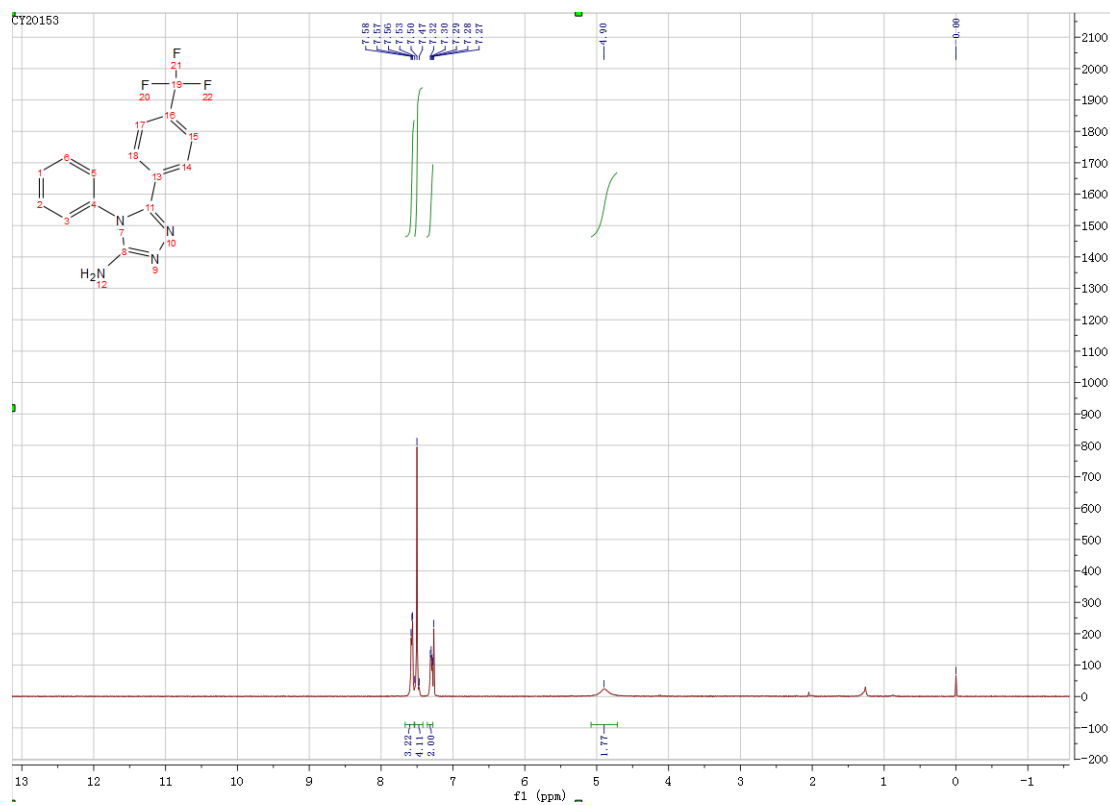


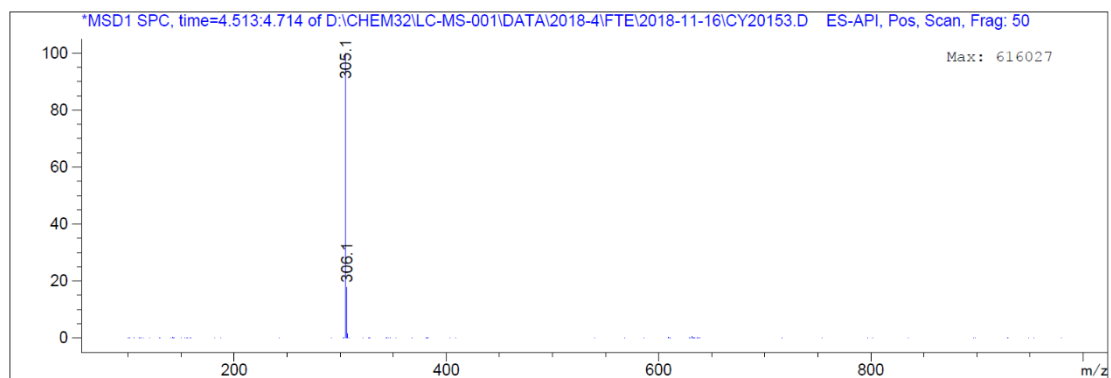
MS of 4-phenyl-5-p-tolyl-4*H*-1,2,4-triazol-3-amine (**4i**)

CY-20134 #271 RT: 2.64 AV: 1 NL: 2.32E10
T: FTMS + p ESI Full ms [150.0000-2000.0000]



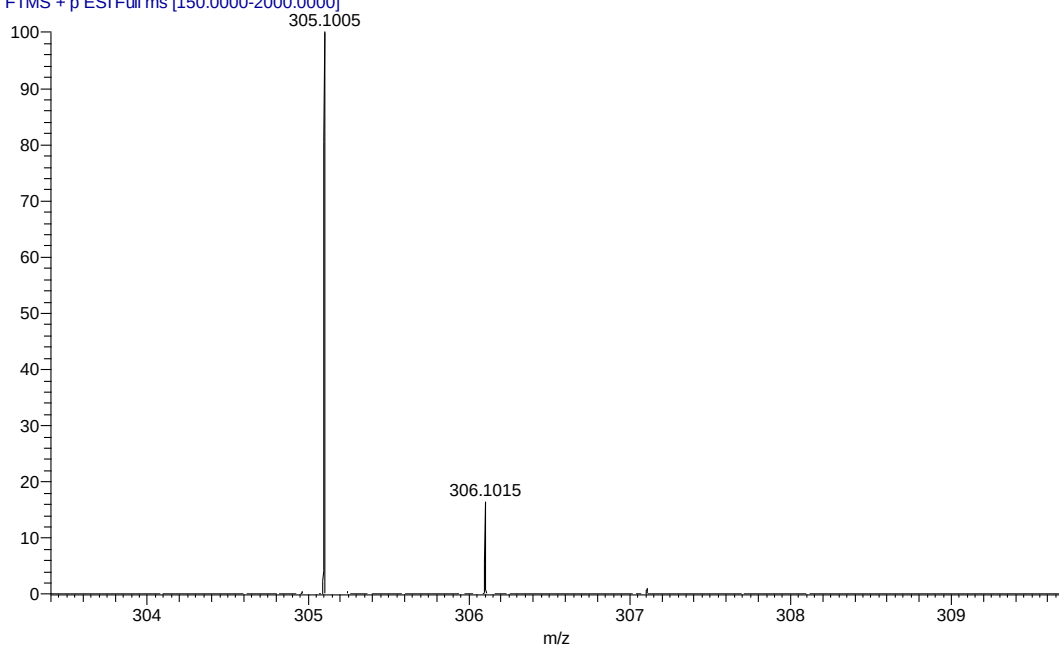
HRMS of 4-phenyl-5-p-tolyl-4*H*-1,2,4-triazol-3-amine (**4i**)





MS of 5-(4-(trifluoromethyl)phenyl)-4-phenyl-4*H*-1,2,4-triazol-3-amine (**4i**)

CY-20153 #317 RT: 3.07 AV: 1 NL: 1.33E10
T: FTMS + p ESI Full ms [150.0000-2000.0000]



HRMS of 5-(4-(trifluoromethyl)phenyl)-4-phenyl-4*H*-1,2,4-triazol-3-amine (**4i**)