

Discovery of novel azoles derivatives with benzanilide-containing hydrophobic side chains for the treatment of drug-resistant fungal infections

Hao Jia ¹, Sha-sha Gong ¹, Yong-xin Zhang ¹, Ying-xia Xie ^{1,2*}, Naying Chu ^{1*}

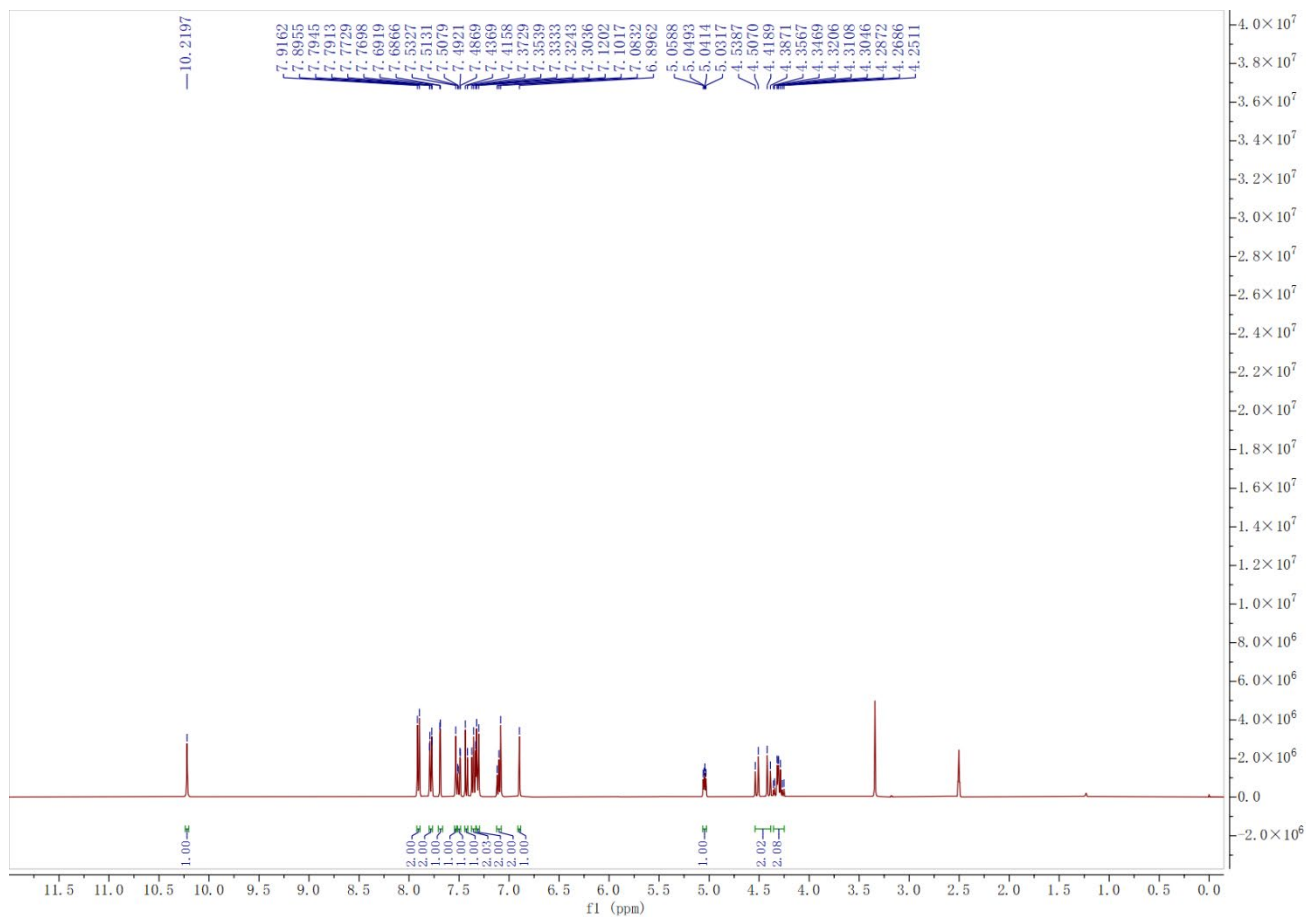
¹ *Department of Pharmacy, The First People's Hospital of Shangqiu, Suiyang District, 292 Kaixuan Road, Shangqiu 476000, China;*

² *School of Pharmaceutical Sciences and School of Pharmaceutical Science and Institute of Pharmaceutical Science, Zhengzhou University, Zhengzhou 450001, PR China;*

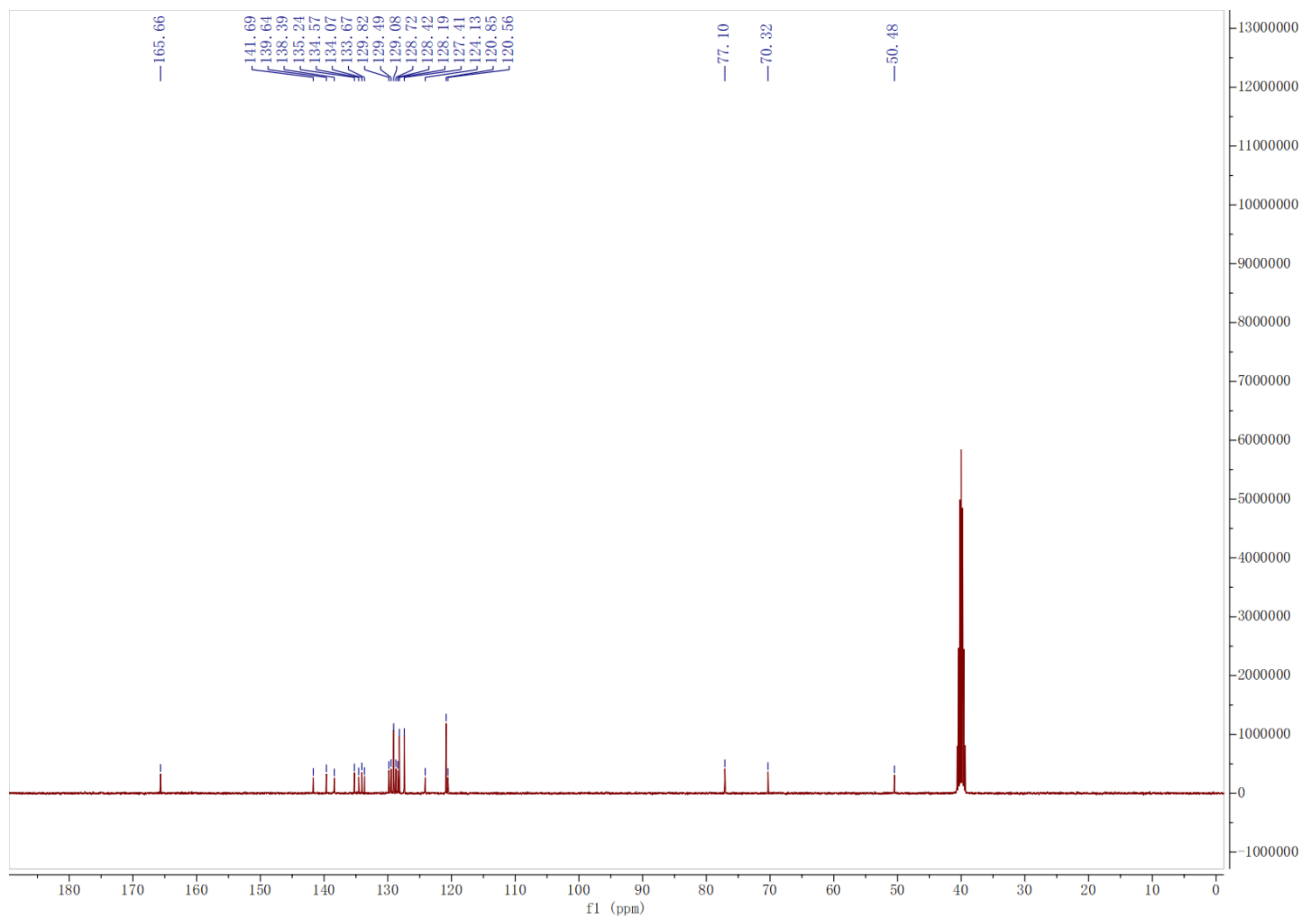
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The ¹H and ¹³C NMR spectra were recorded at 400 MHz and 100 MHz on a Bruker ARX 400 MHz spectrometer using (CD₃)₂SO as solvents with TMS as the internal standard. The NMR spectra were analyzed and interpreted using MestReNova. The solvent peaks were 2.5 ppm and 40 ppm in the ¹H and ¹³C NMR spectra, respectively.

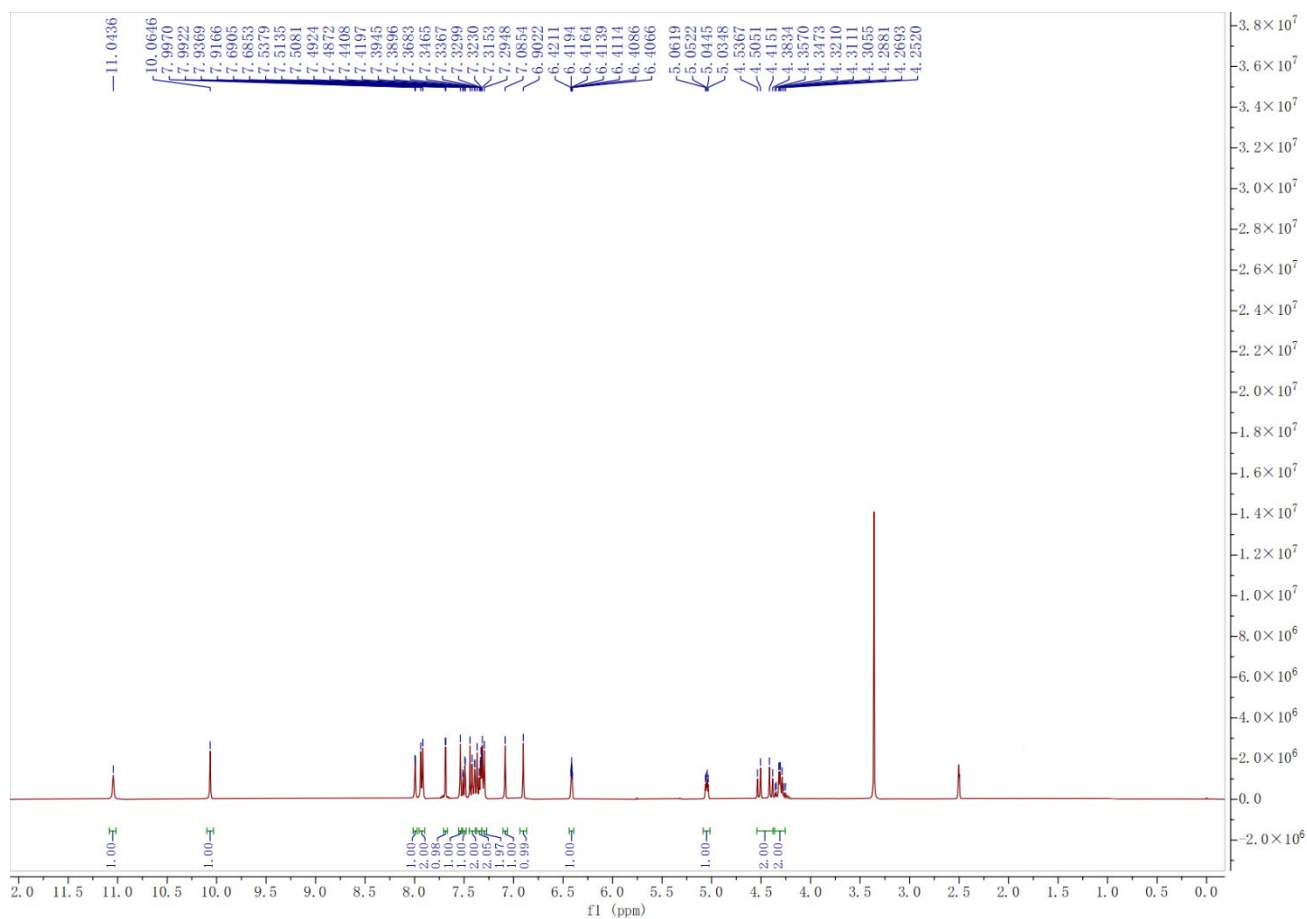
The ^1H -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-phenylbenzamide (**A01**)



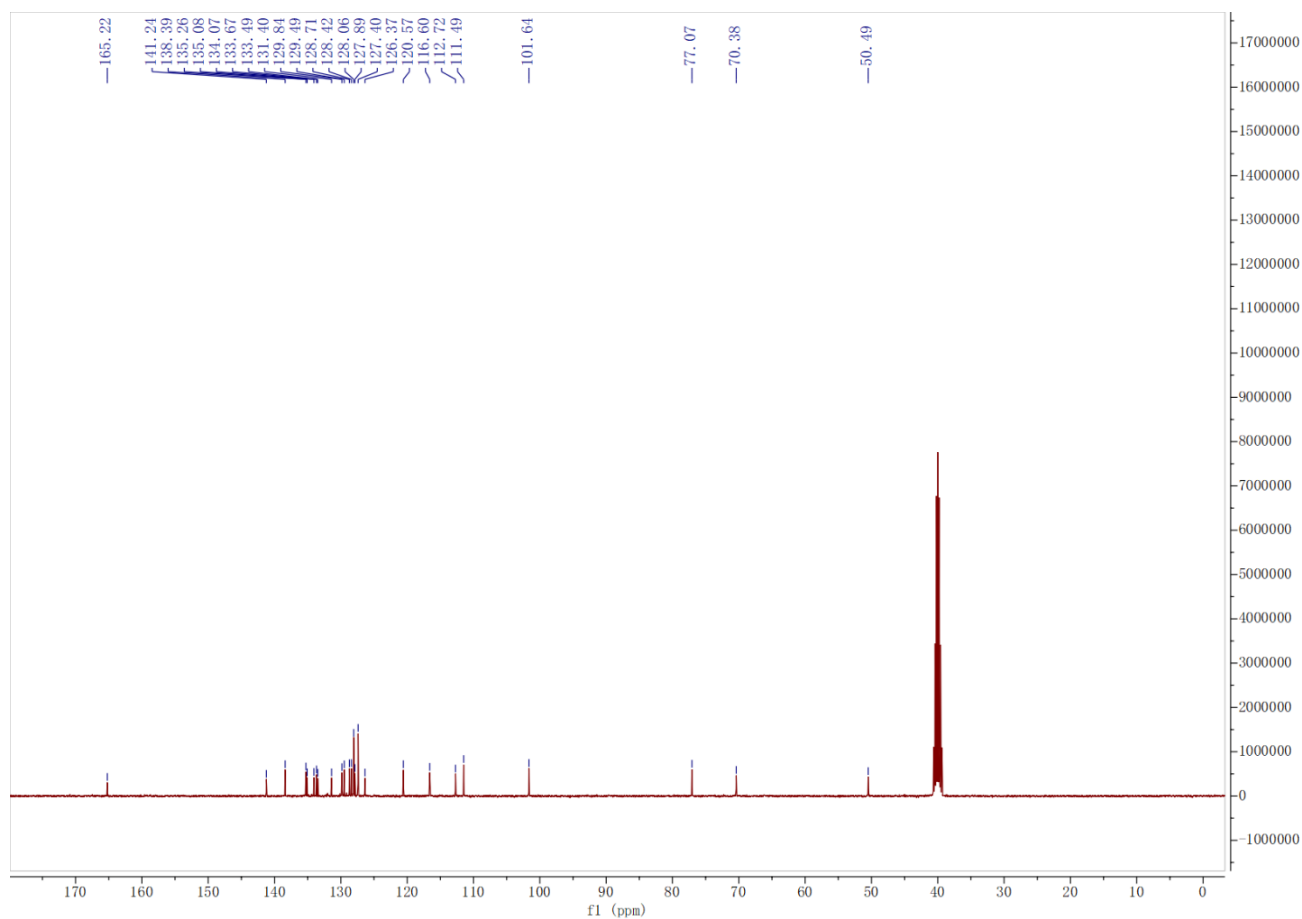
The ^{13}C -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-phenylbenzamide (**A01**)



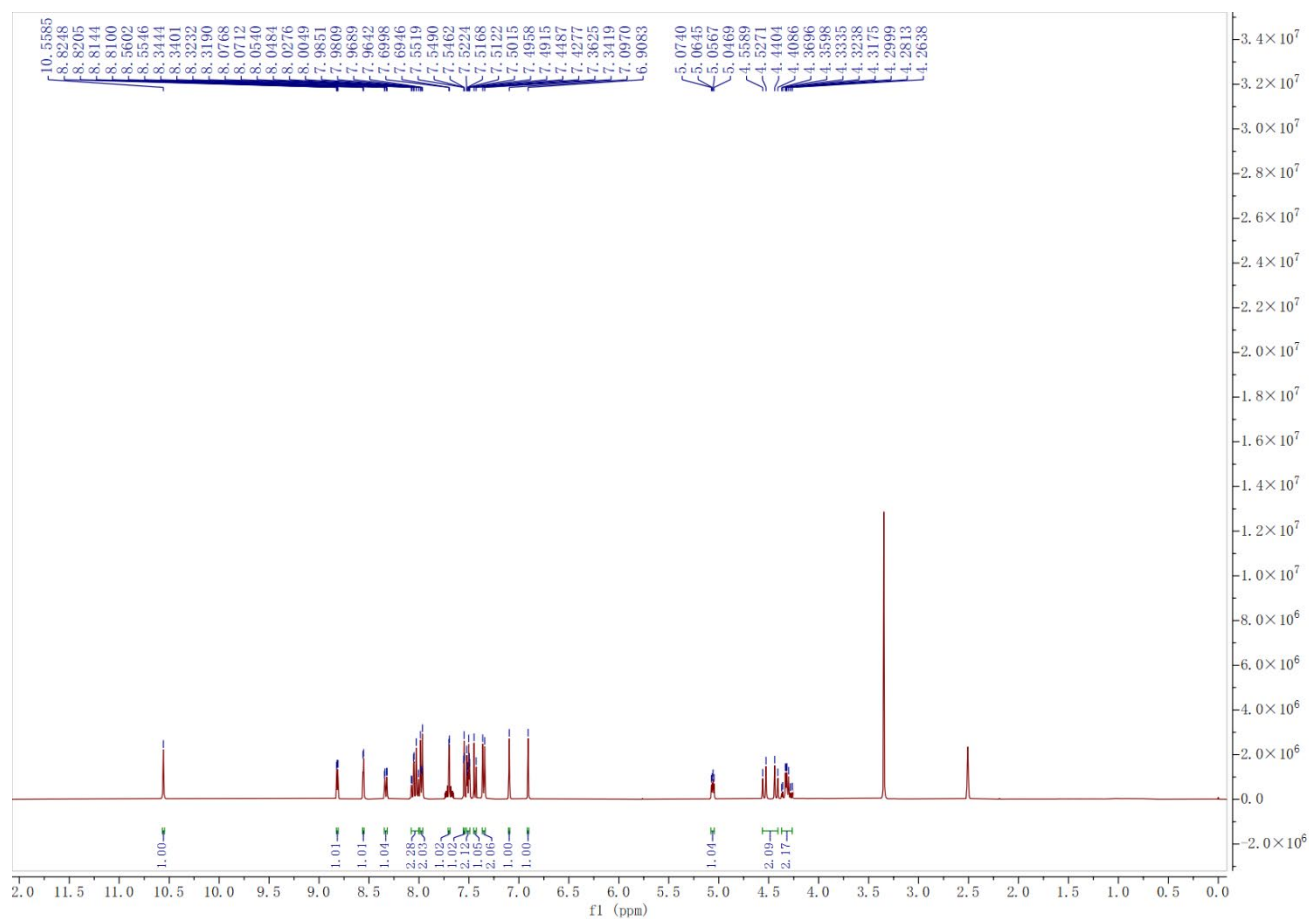
The ^1H -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(4-fluorophenyl)benzamide (**A02**)



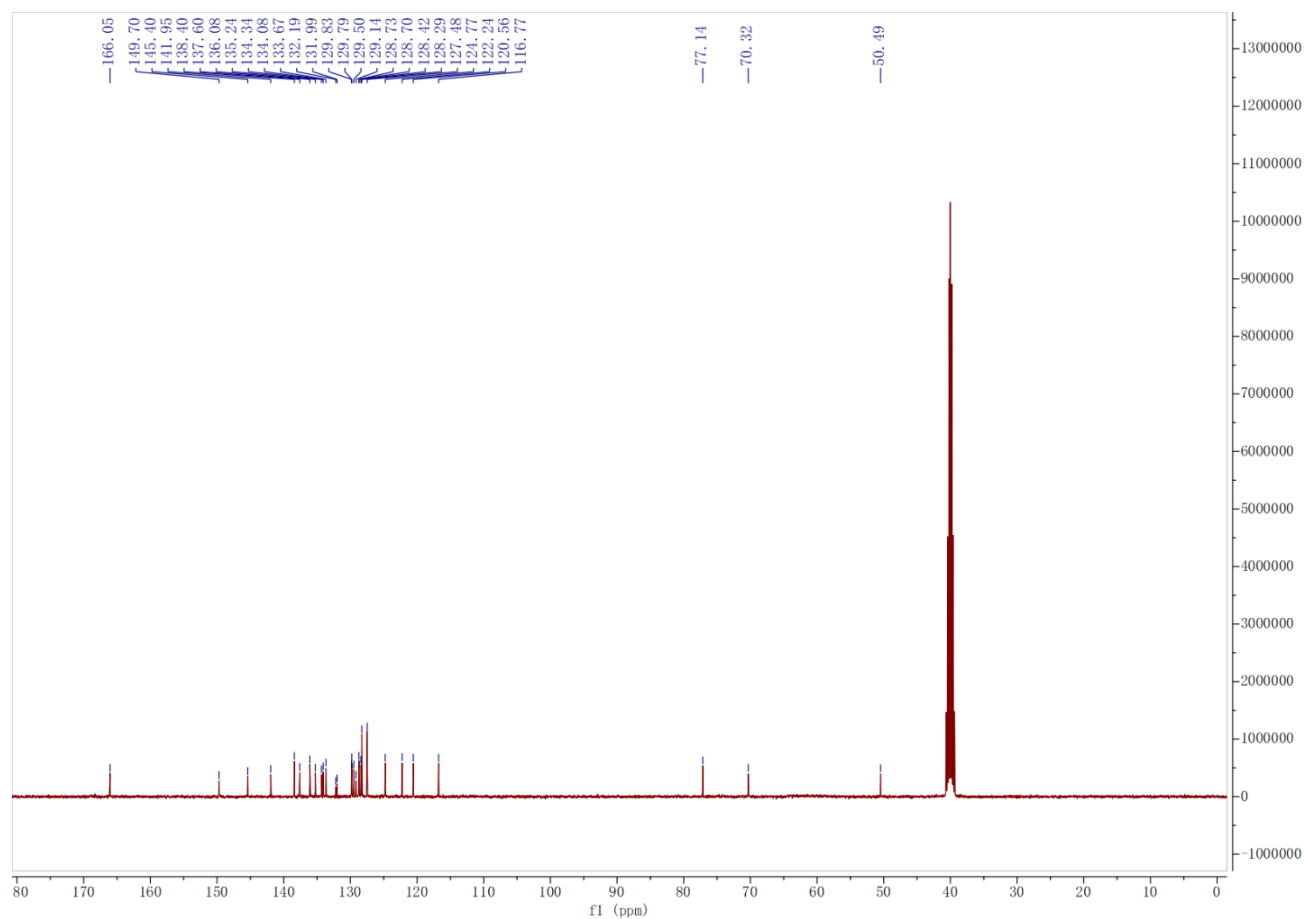
The ^{13}C -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(4-fluorophenyl)benzamide (**A02**)



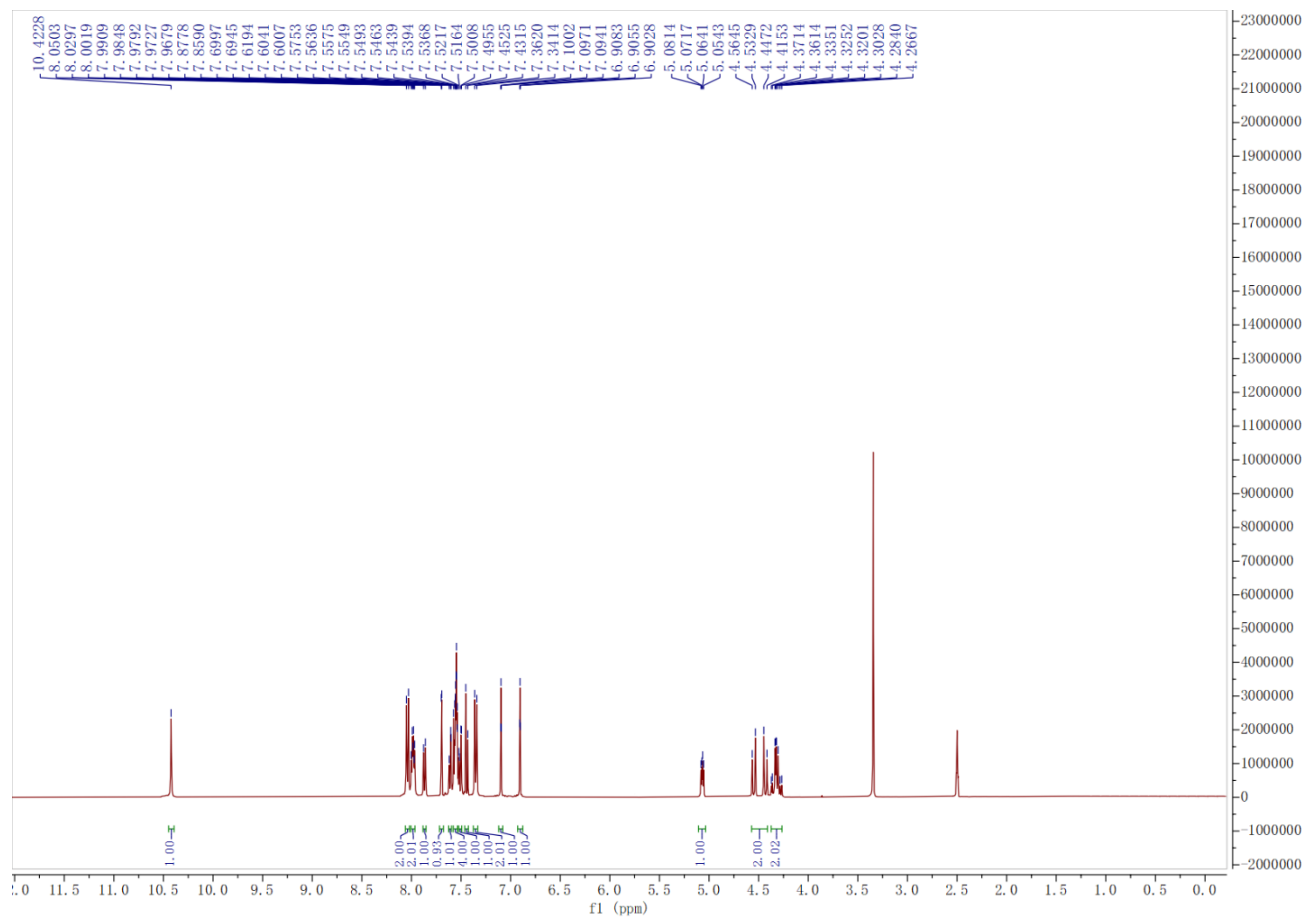
The ^1H -NMR spectrum of *N*-(4-chlorophenyl)-4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)benzamide (**A03**)



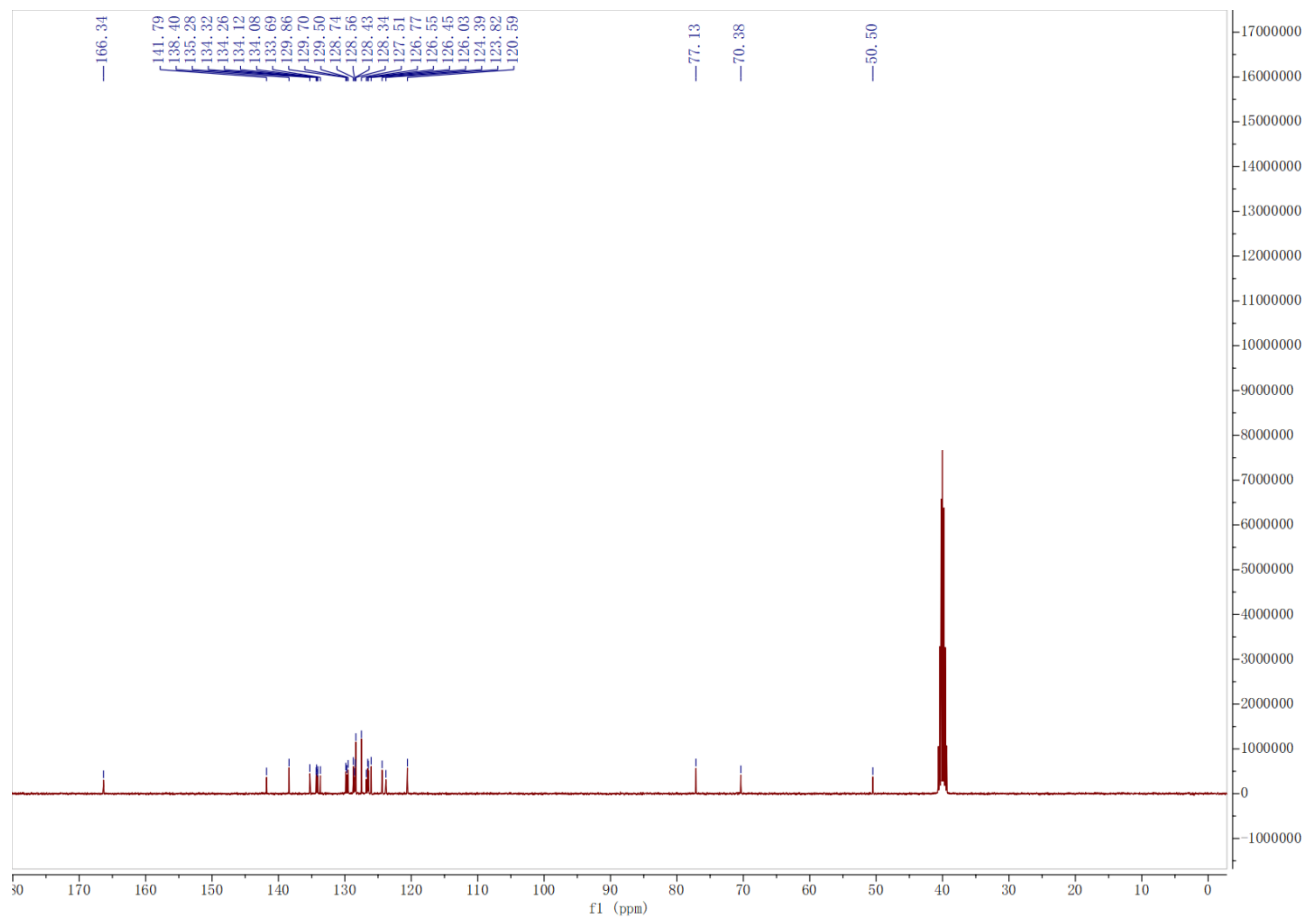
The ^{13}C -NMR spectrum of *N*-(4-chlorophenyl)-4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)benzamide (**A03**)



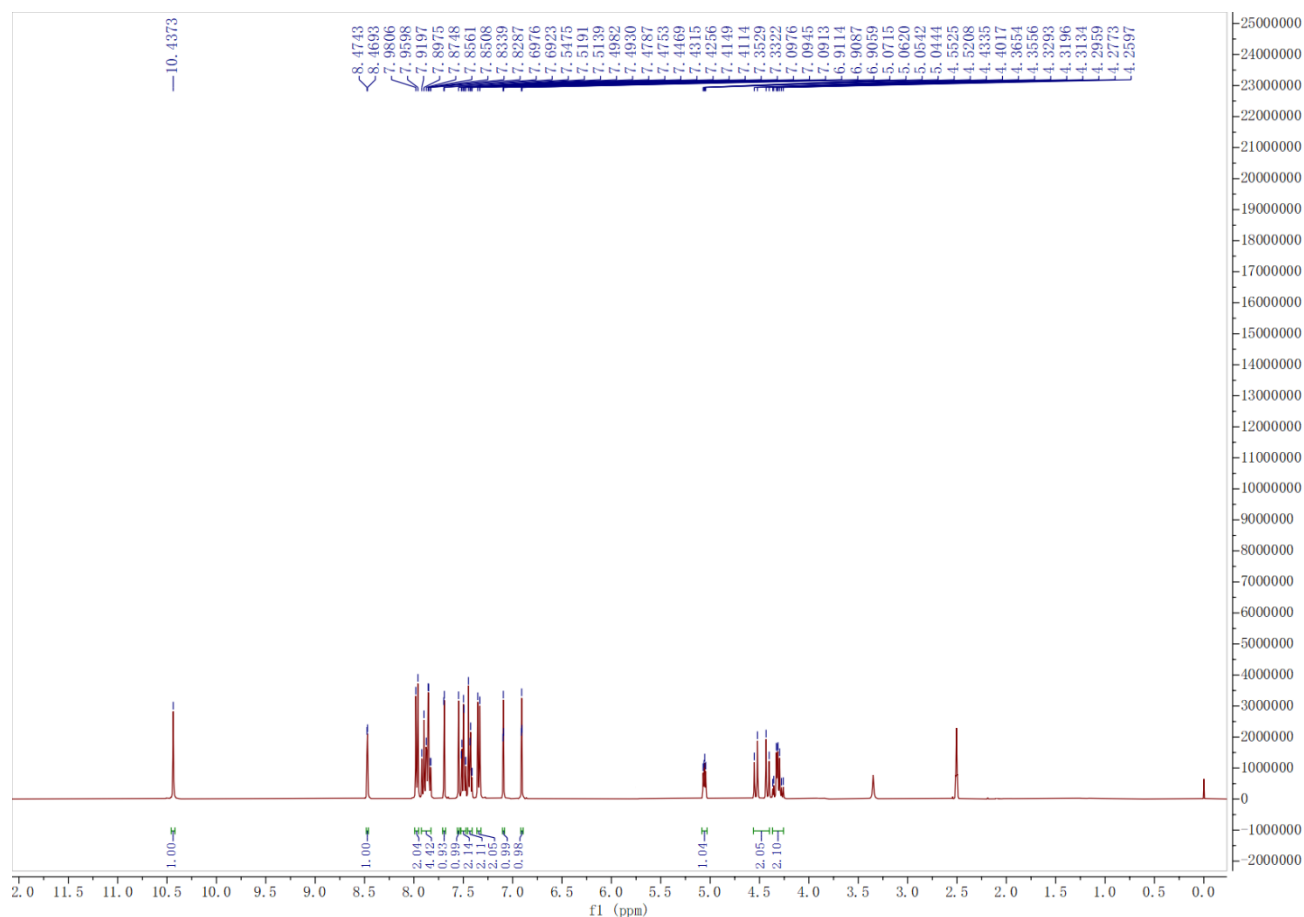
The ^1H -NMR spectrum of *N*-(4-bromophenyl)-4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)benzamide (**A04**)



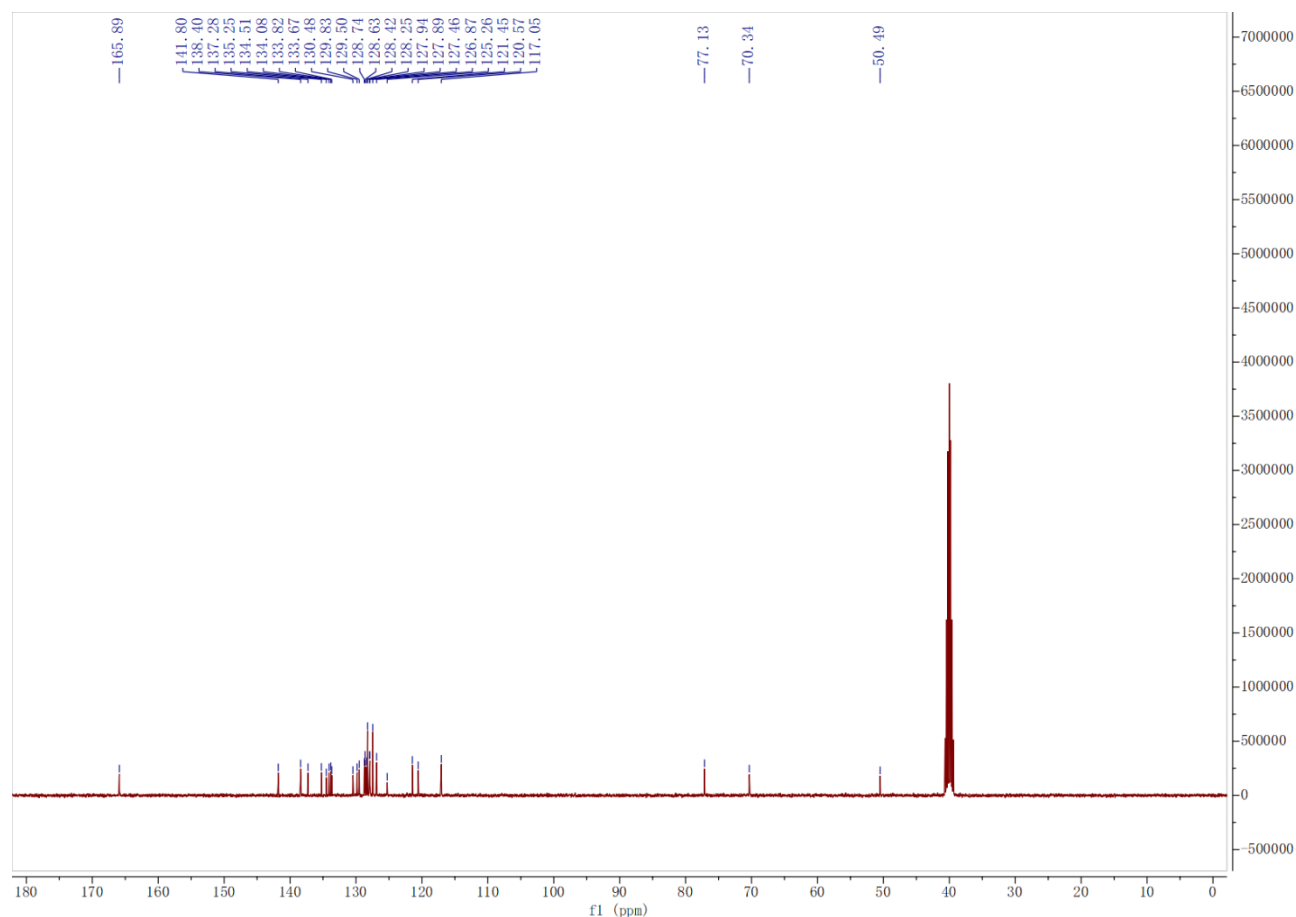
The ^{13}C -NMR spectrum of *N*-(4-bromophenyl)-4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)benzamide (**A04**)



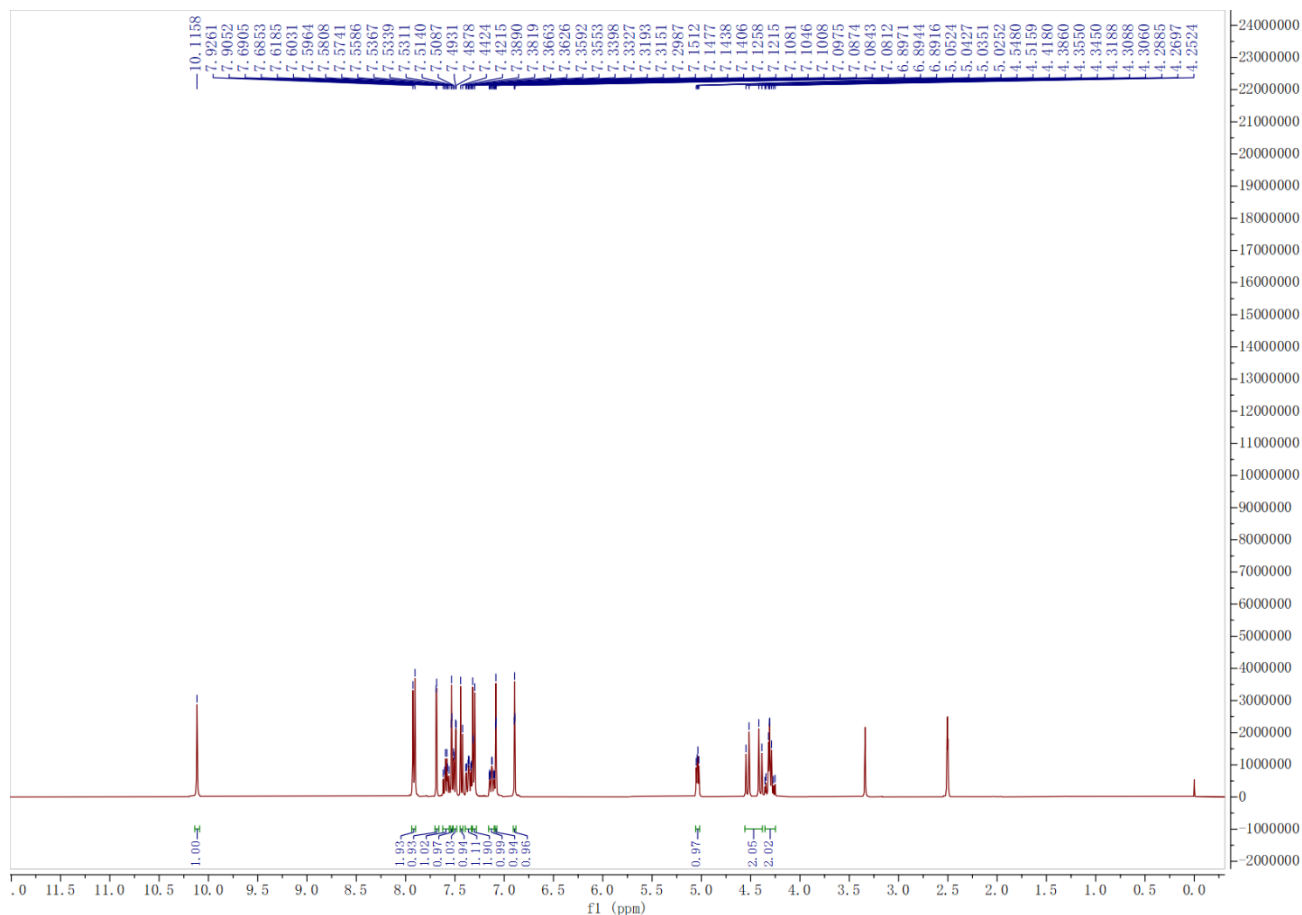
The ^1H -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(*p*-tolyl)benzamide (**A05**)



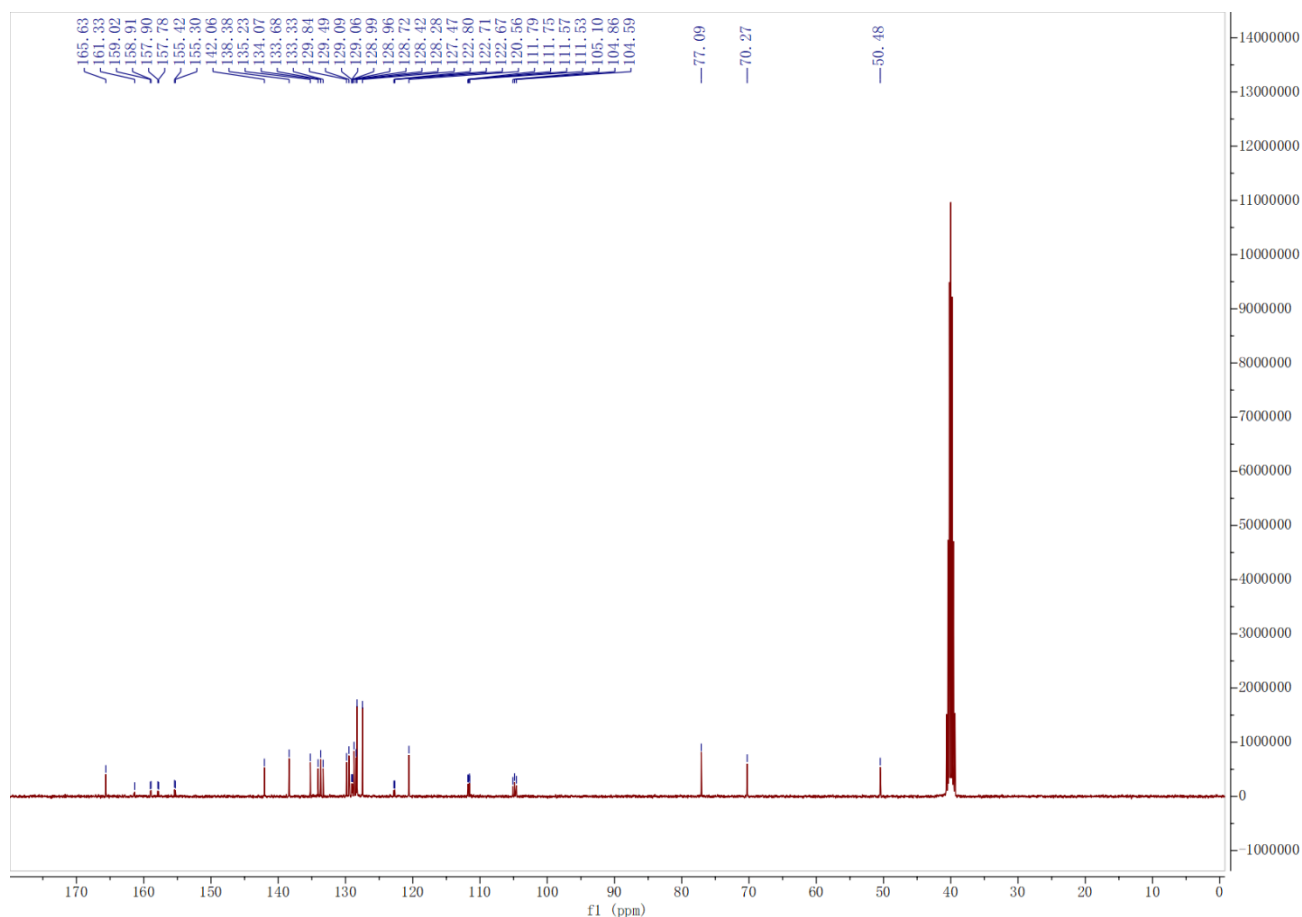
The ^{13}C -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(*p*-tolyl)benzamide (**A05**)



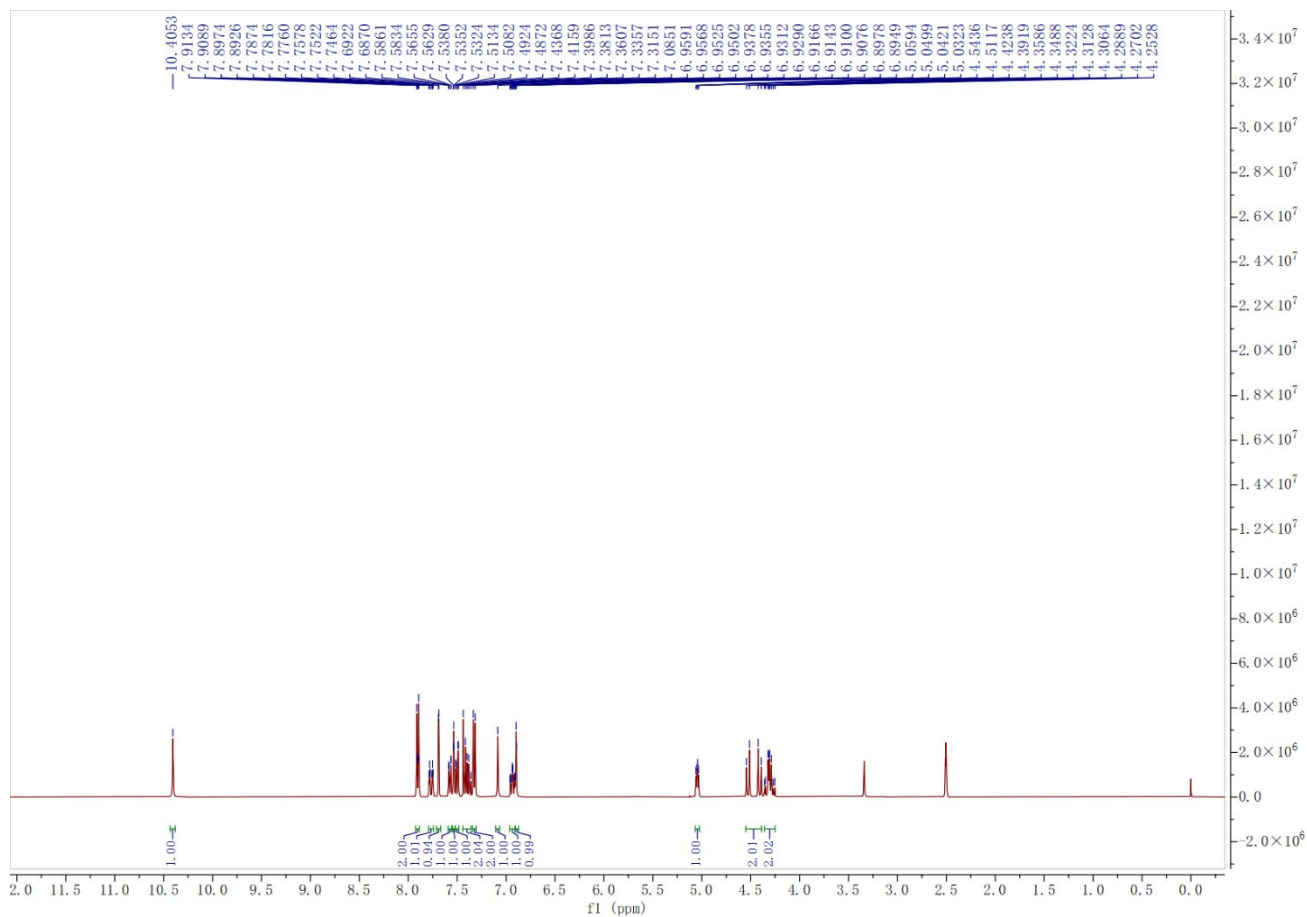
The ^1H -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(4-(trifluoromethyl)phenyl)benzamide (**A06**)



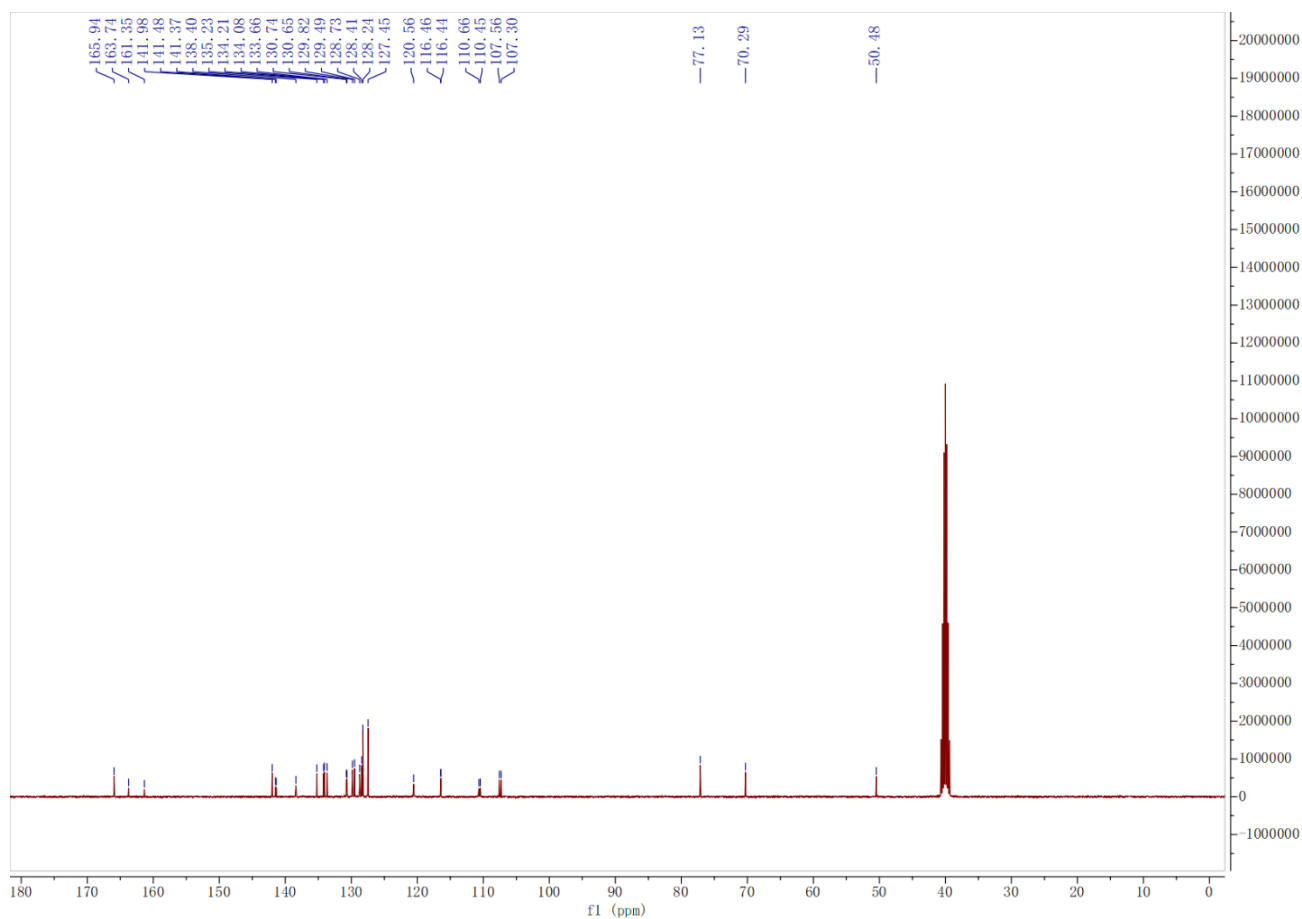
The ^{13}C -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(4-(trifluoromethyl)phenyl)benzamide (**A06**)



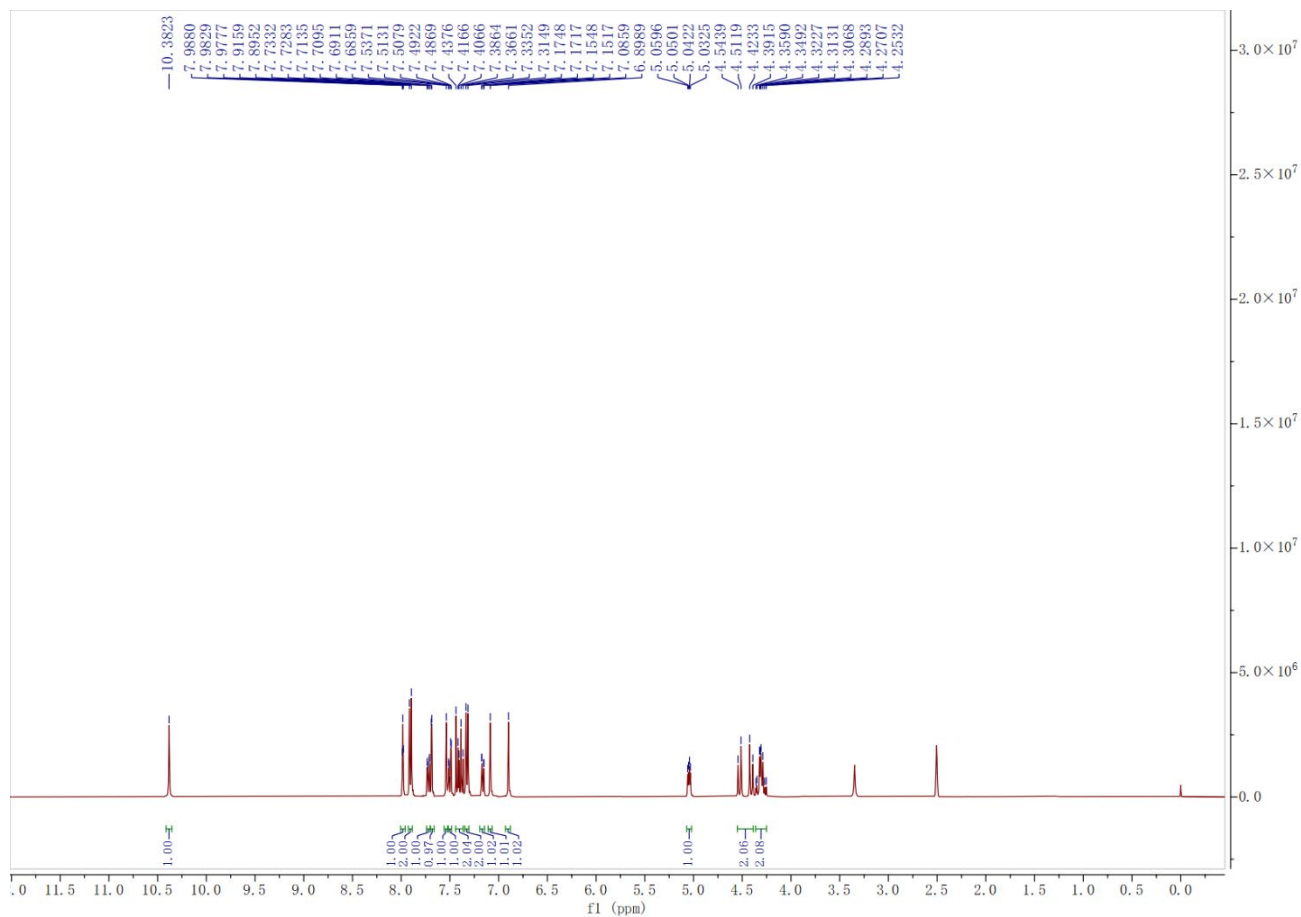
The ^1H -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(4-methoxyphenyl)benzamide (**A07**)



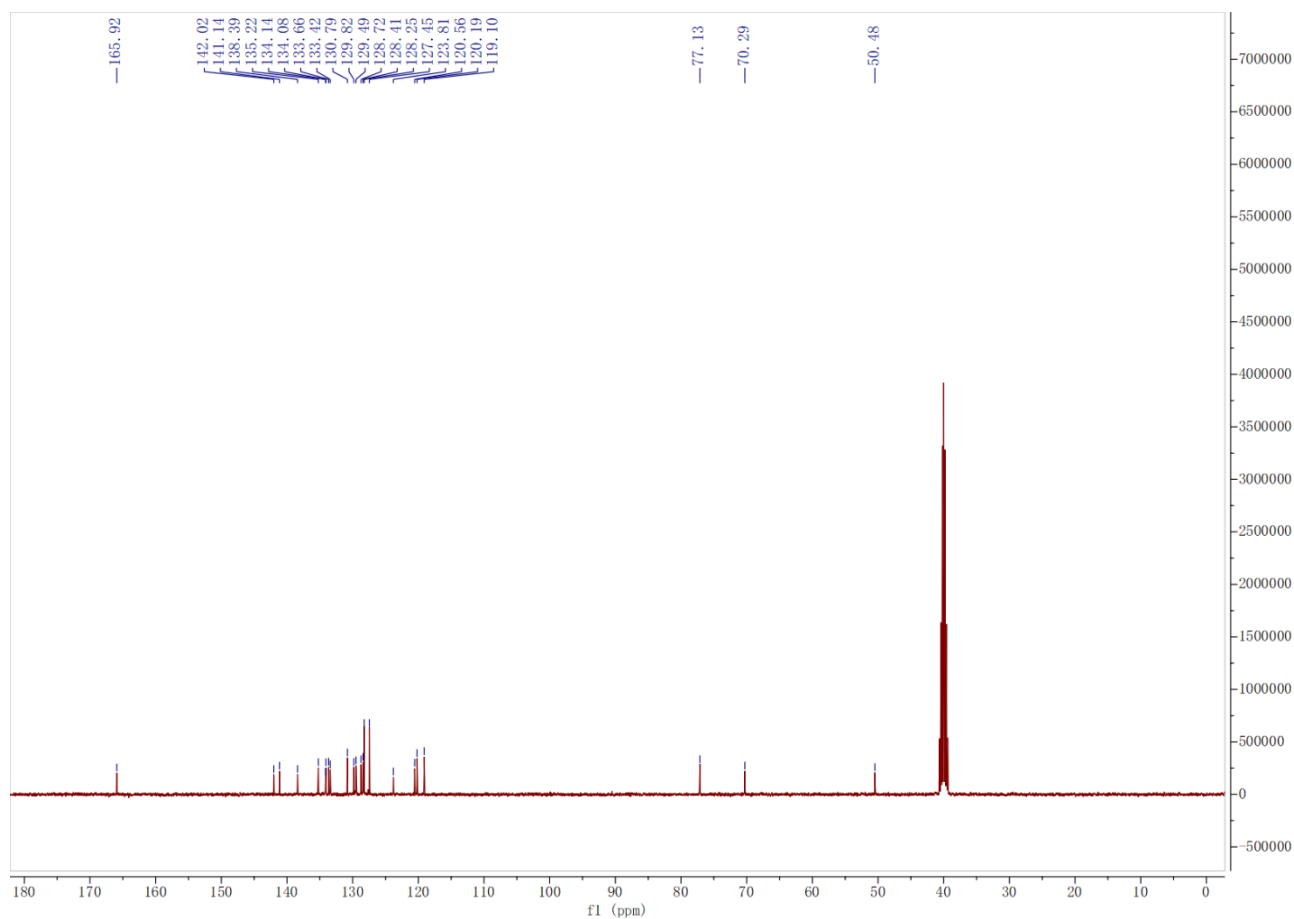
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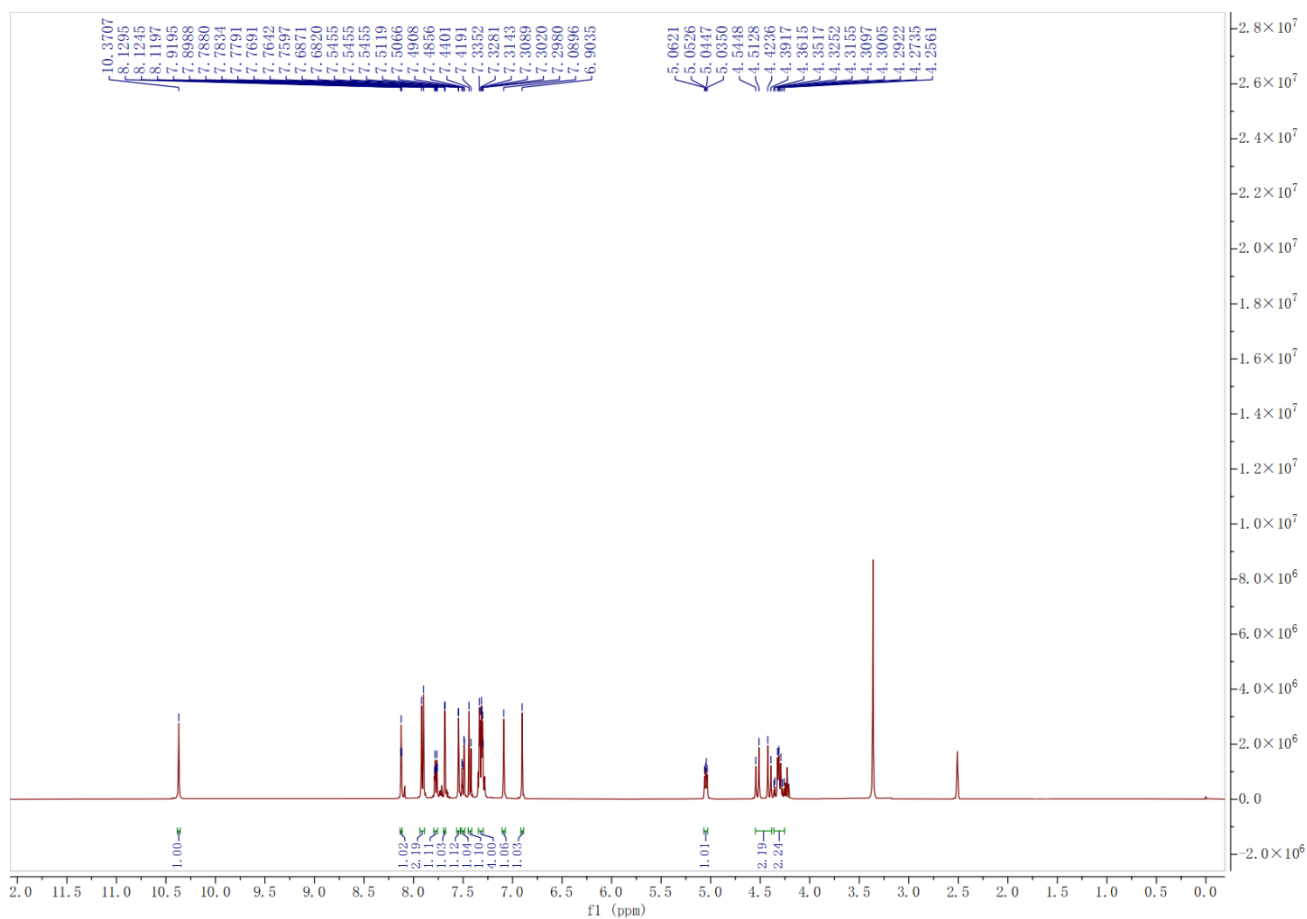
The ^1H -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(3-fluorophenyl)benzamide (**A08**)



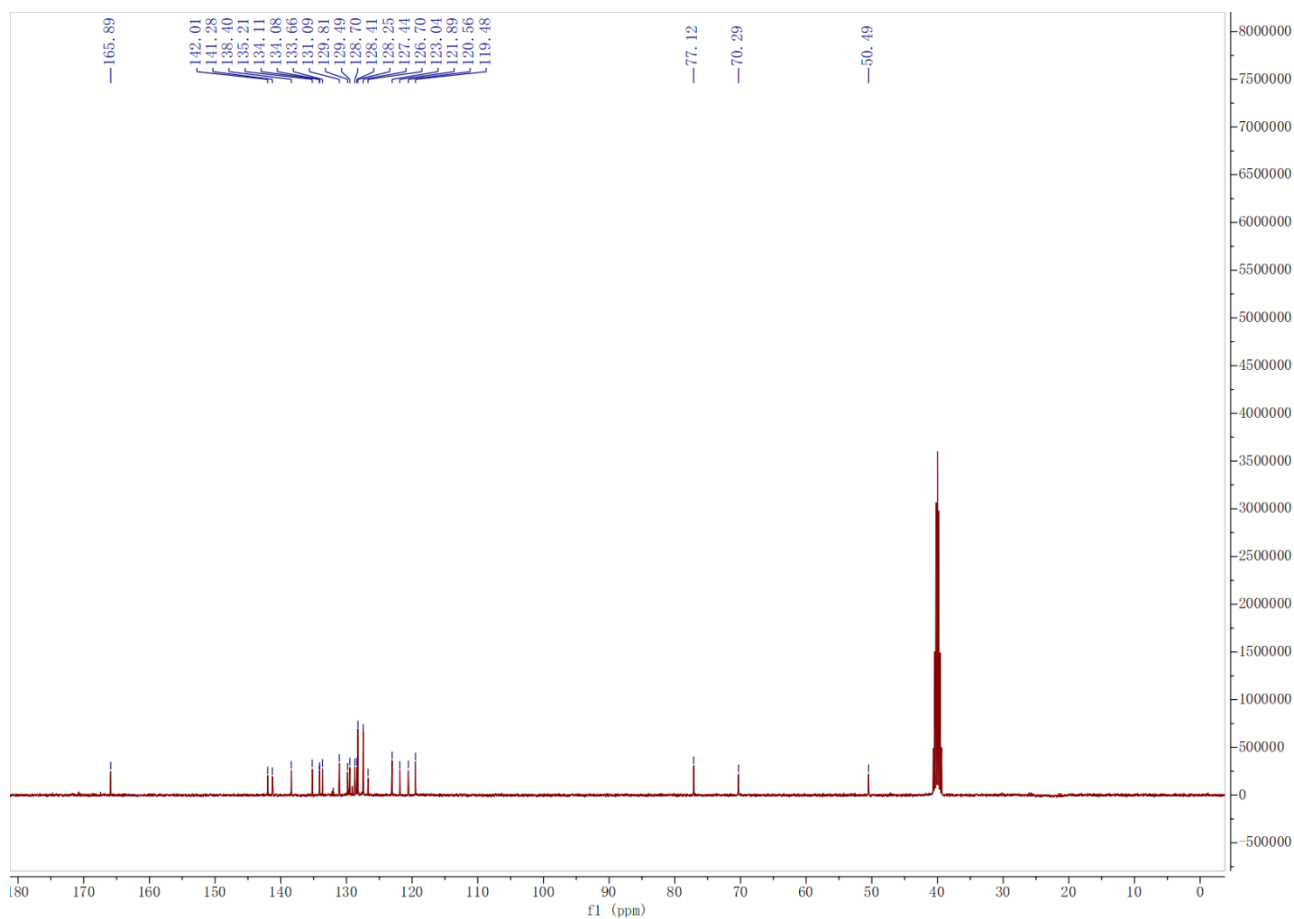
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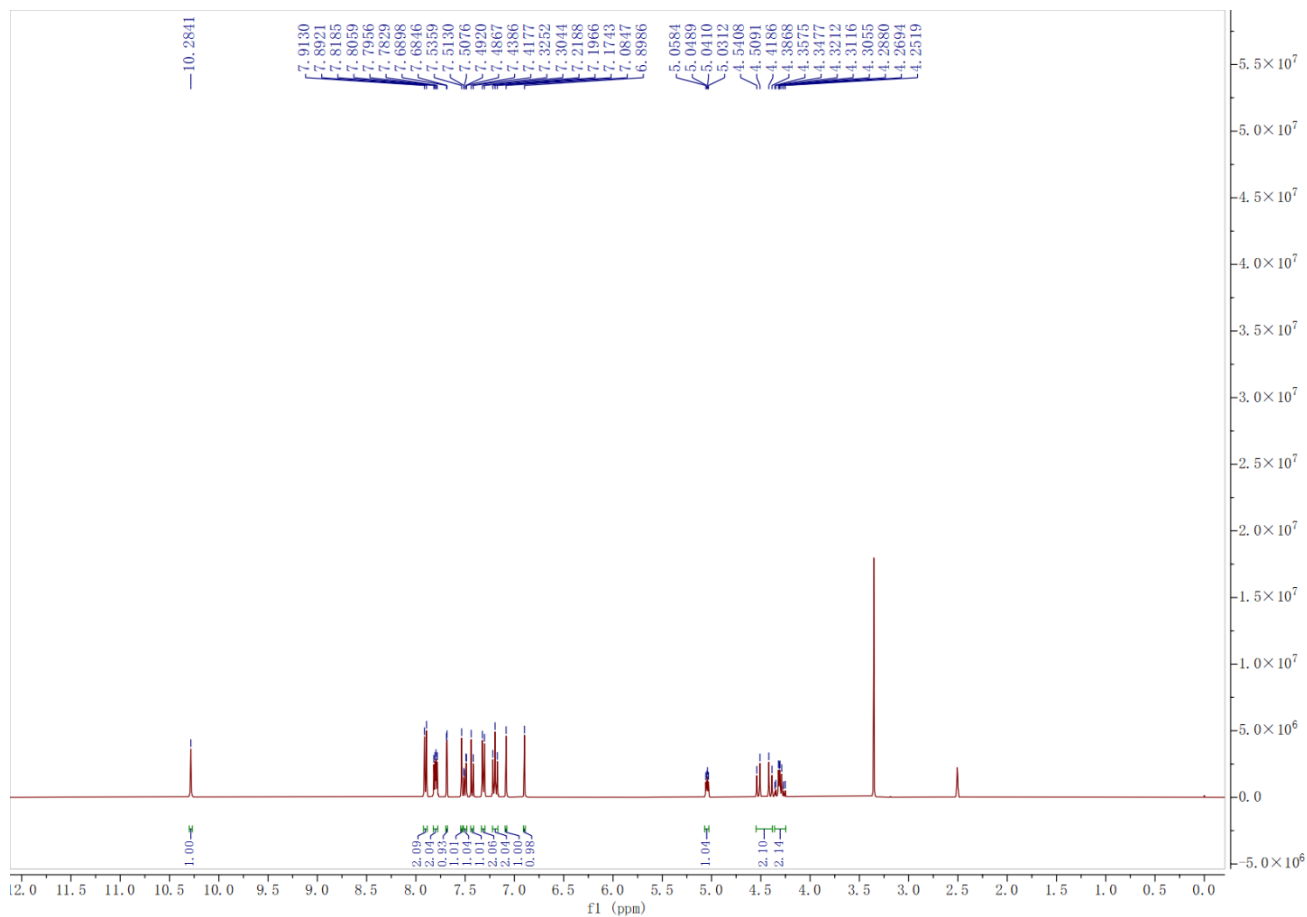
The ^1H -NMR spectrum of *N*-(3-chlorophenyl)-4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)benzamide (**A09**)



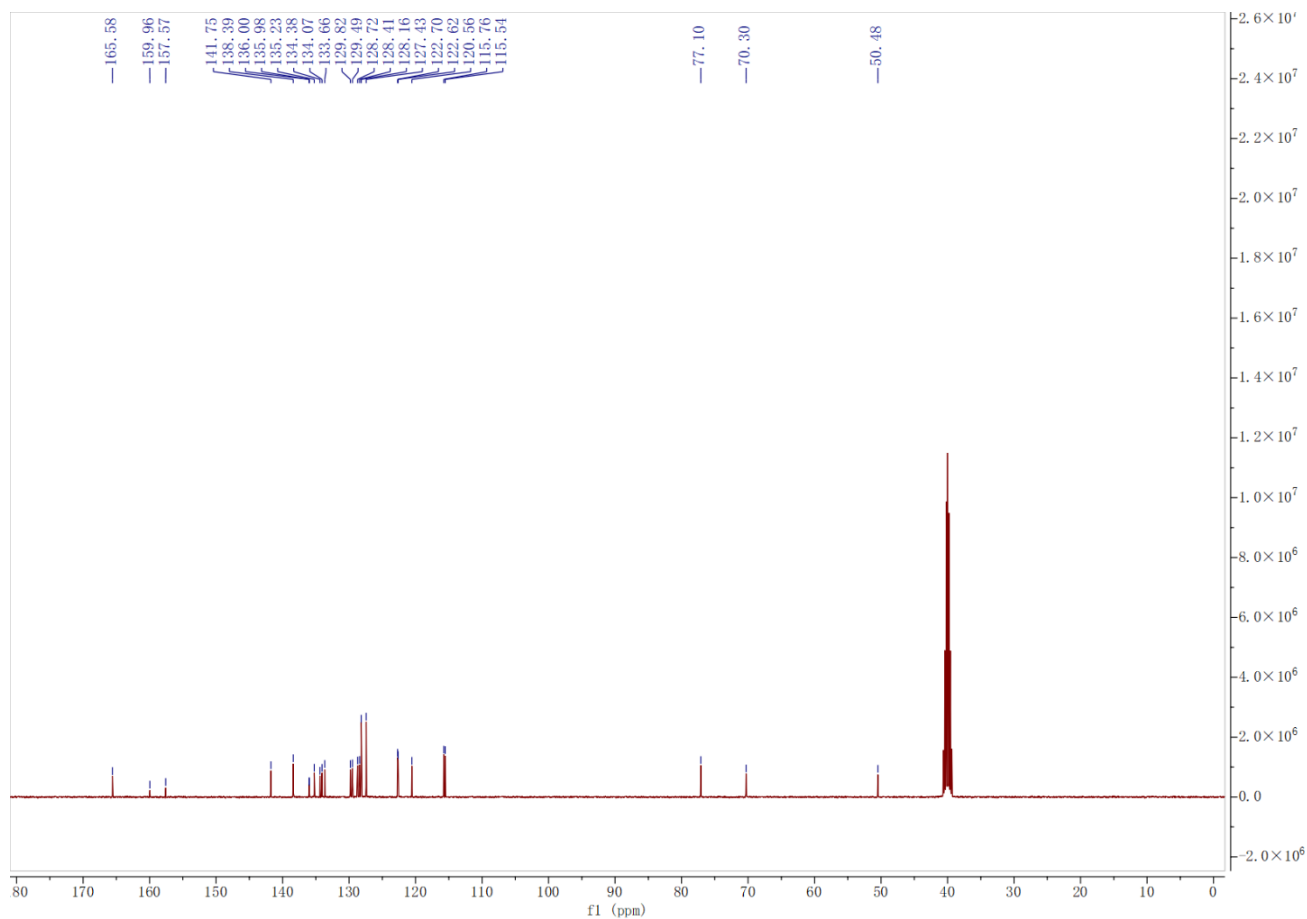
The ^{13}C -NMR spectrum of *N*-(3-chlorophenyl)-4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)benzamide (**A09**)



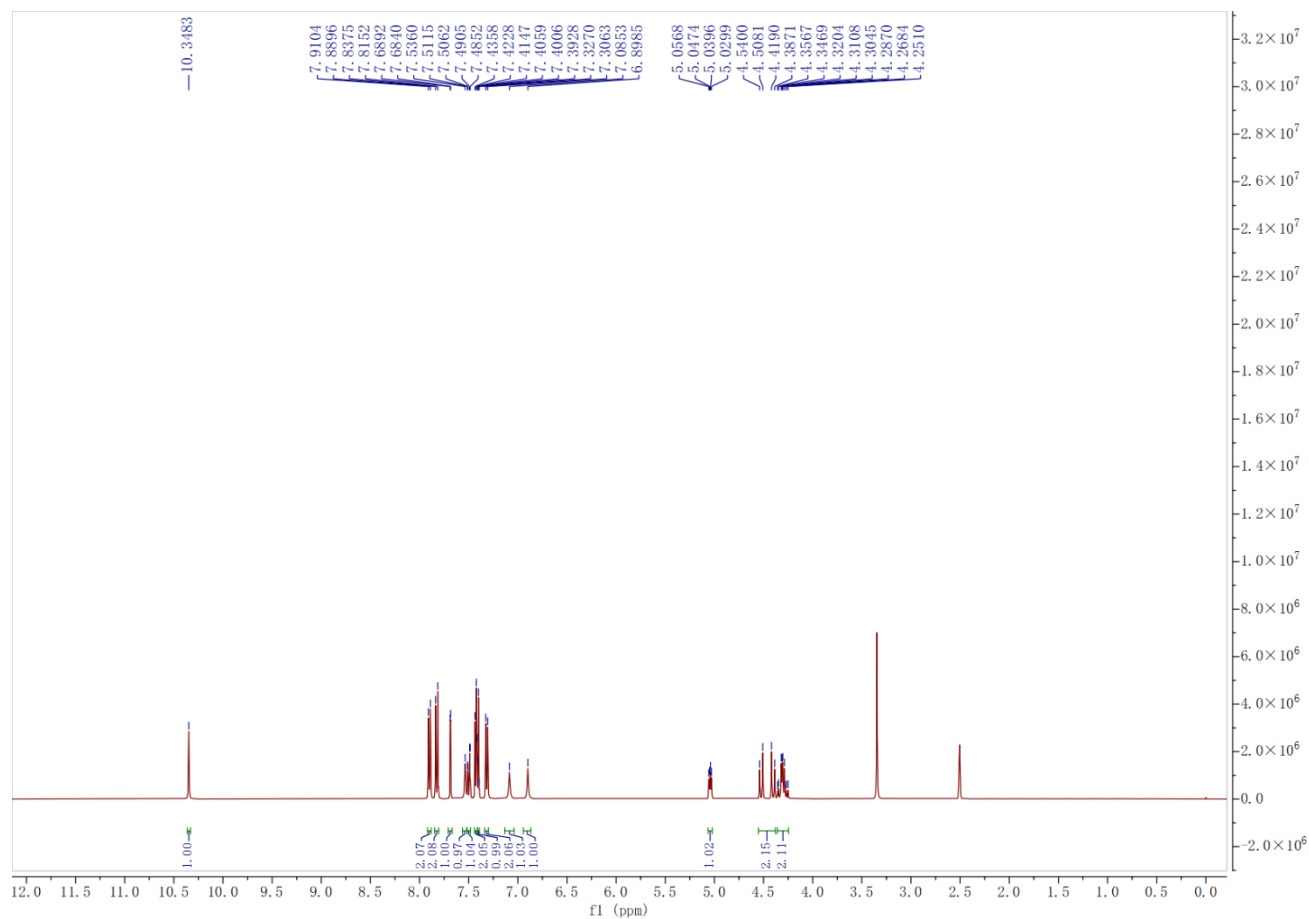
The ^1H -NMR spectrum of *N*-(3-bromophenyl)-4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)benzamide (**A10**)



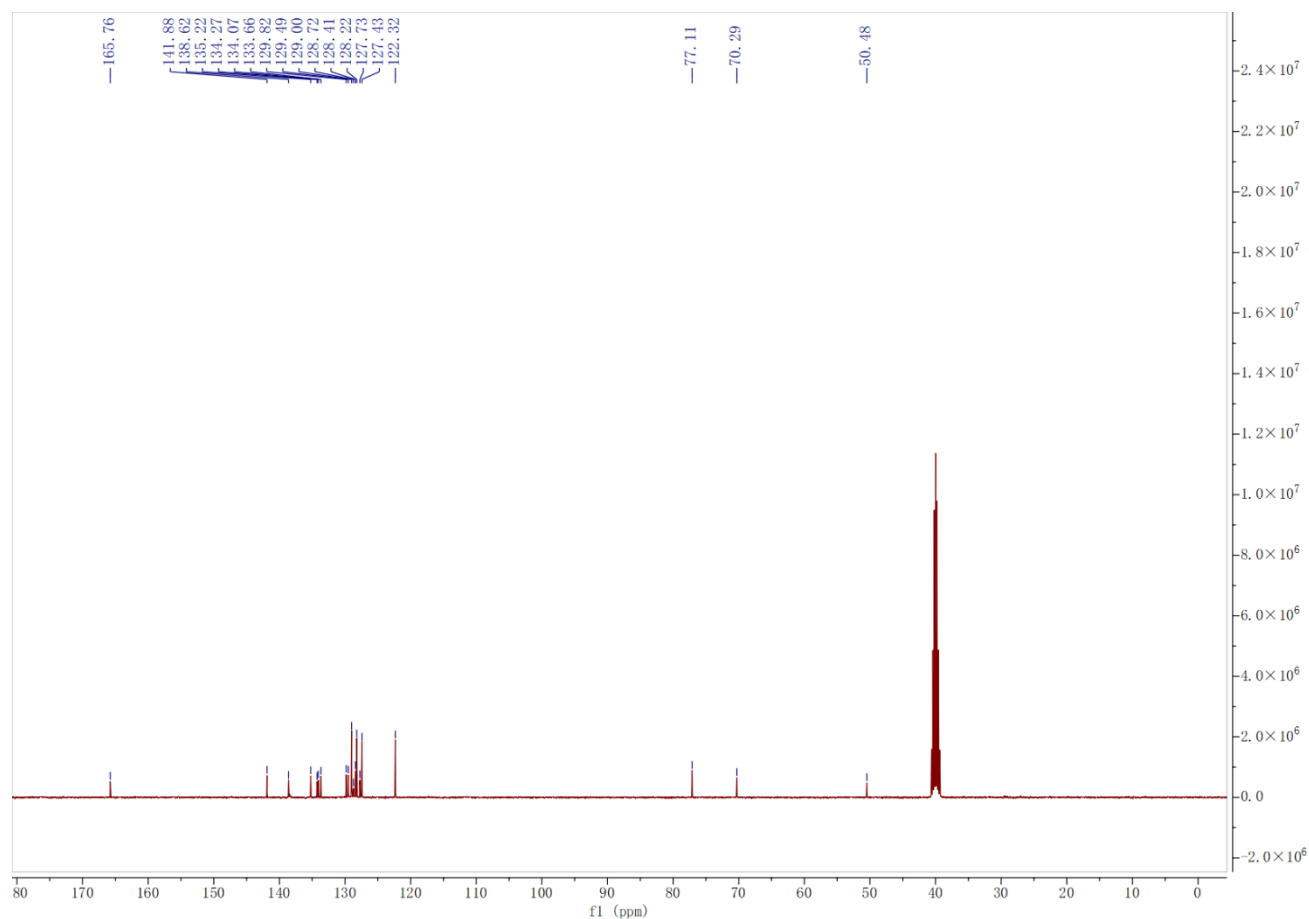
The ^{13}C -NMR spectrum of *N*-(3-bromophenyl)-4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)benzamide (**A10**)



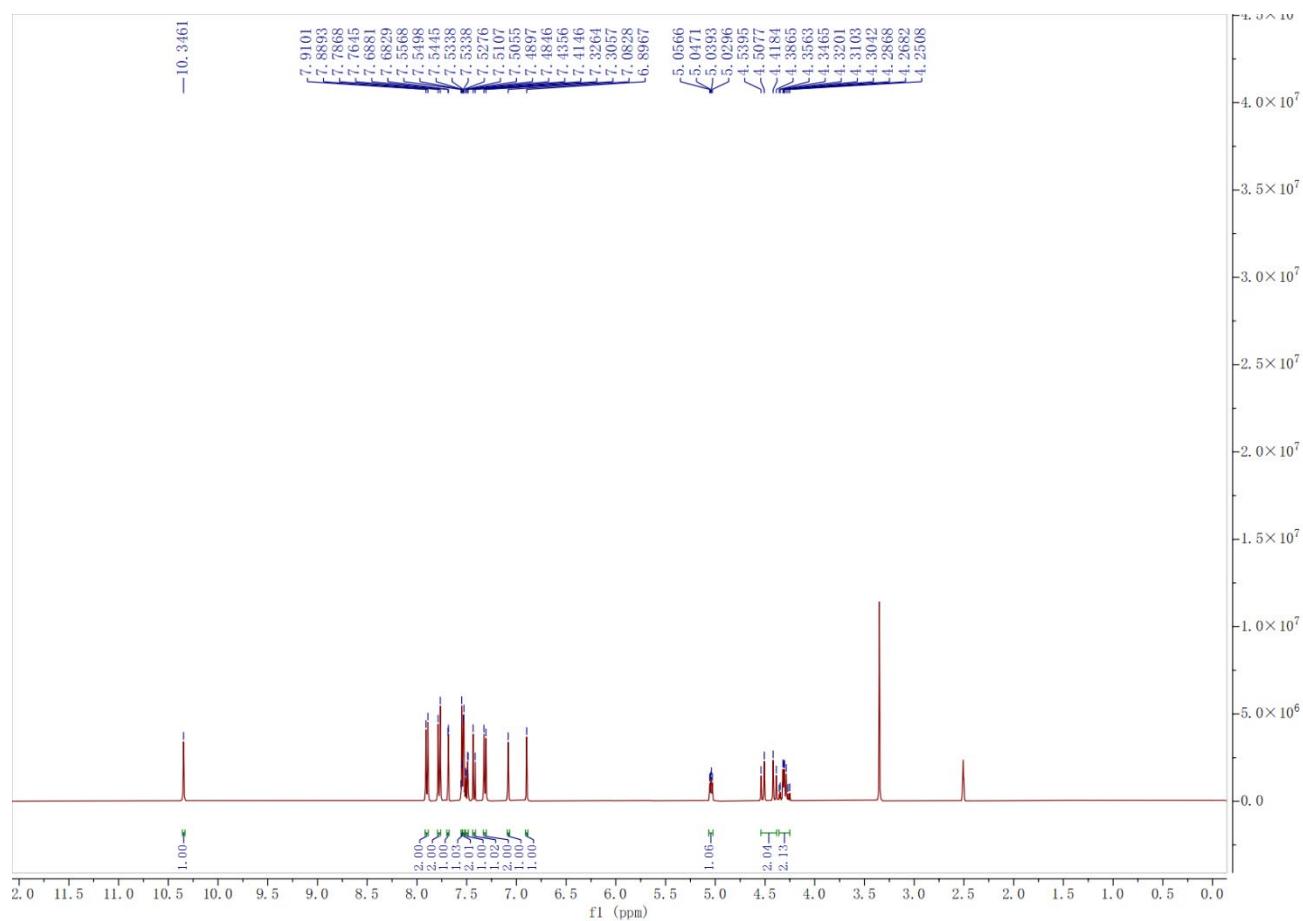
The ^1H -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(2,4-difluorophenyl)benzamide (**A11**)



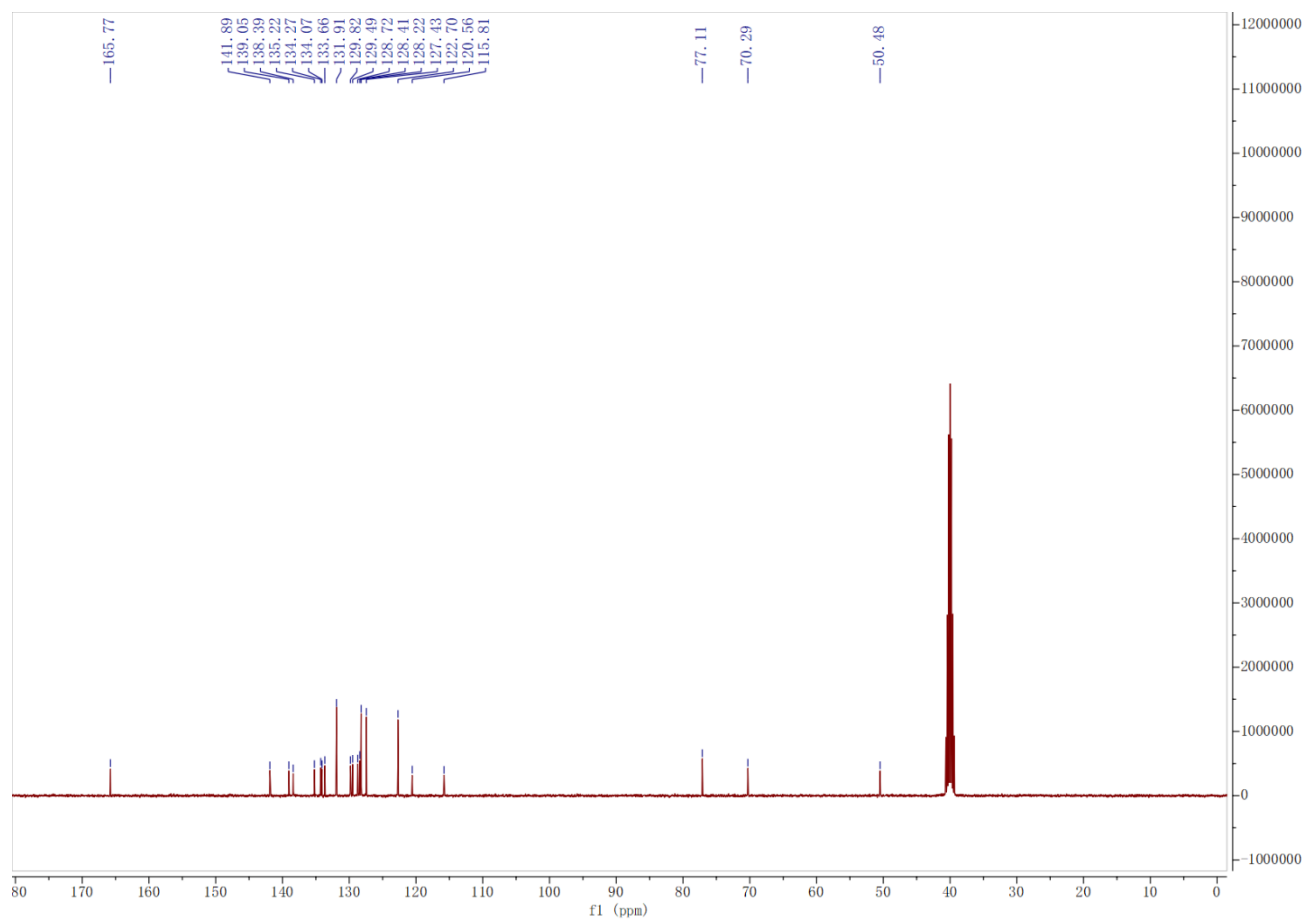
The ^{13}C -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(2,4-difluorophenyl)benzamide (**A11**)



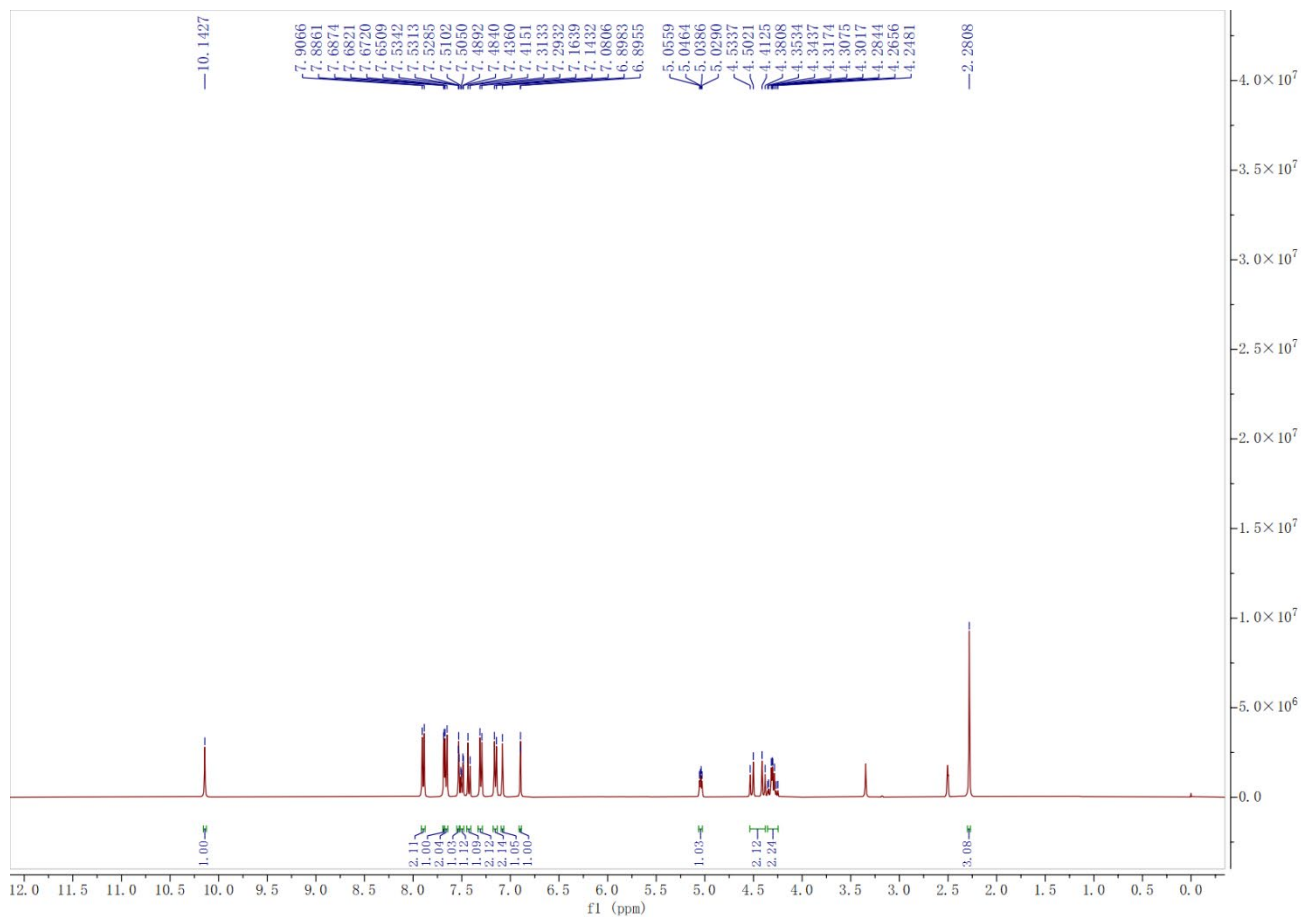
The ^1H -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(quinolin-7-yl)benzamide (**A12**)



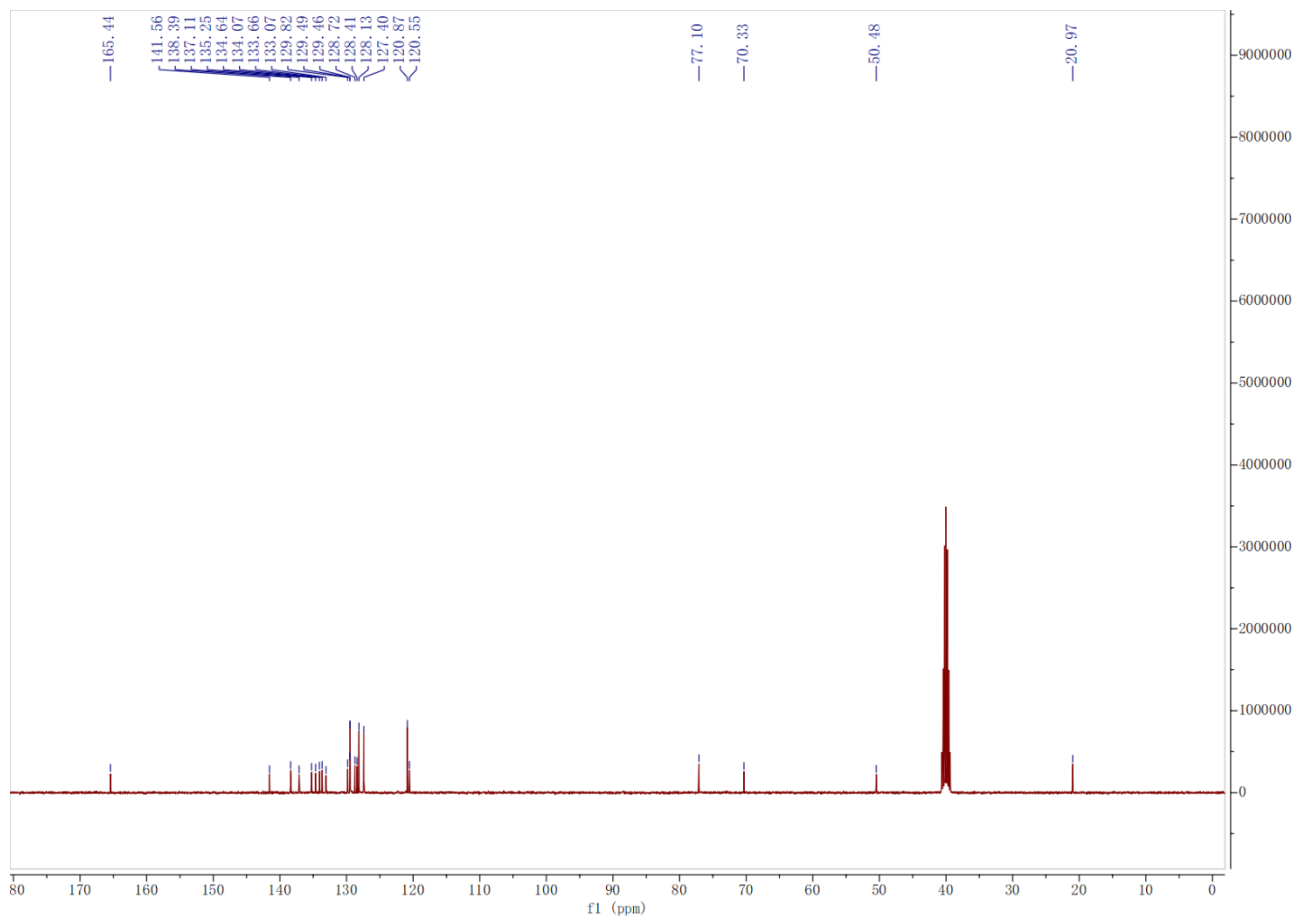
The ^{13}C -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(quinolin-7-yl)benzamide (**A12**)



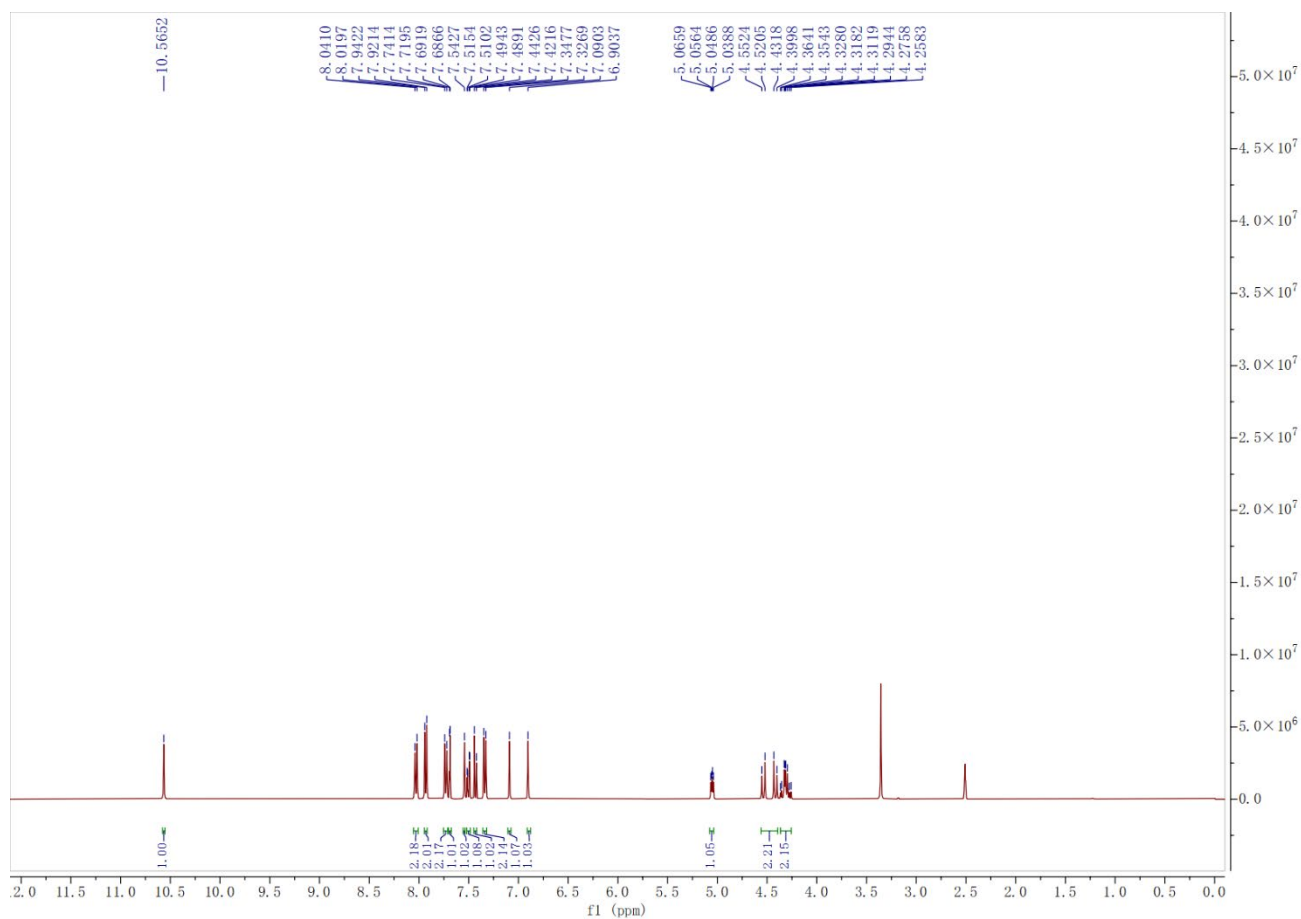
The ^1H -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(naphthalen-1-yl)benzamide (**A13**)



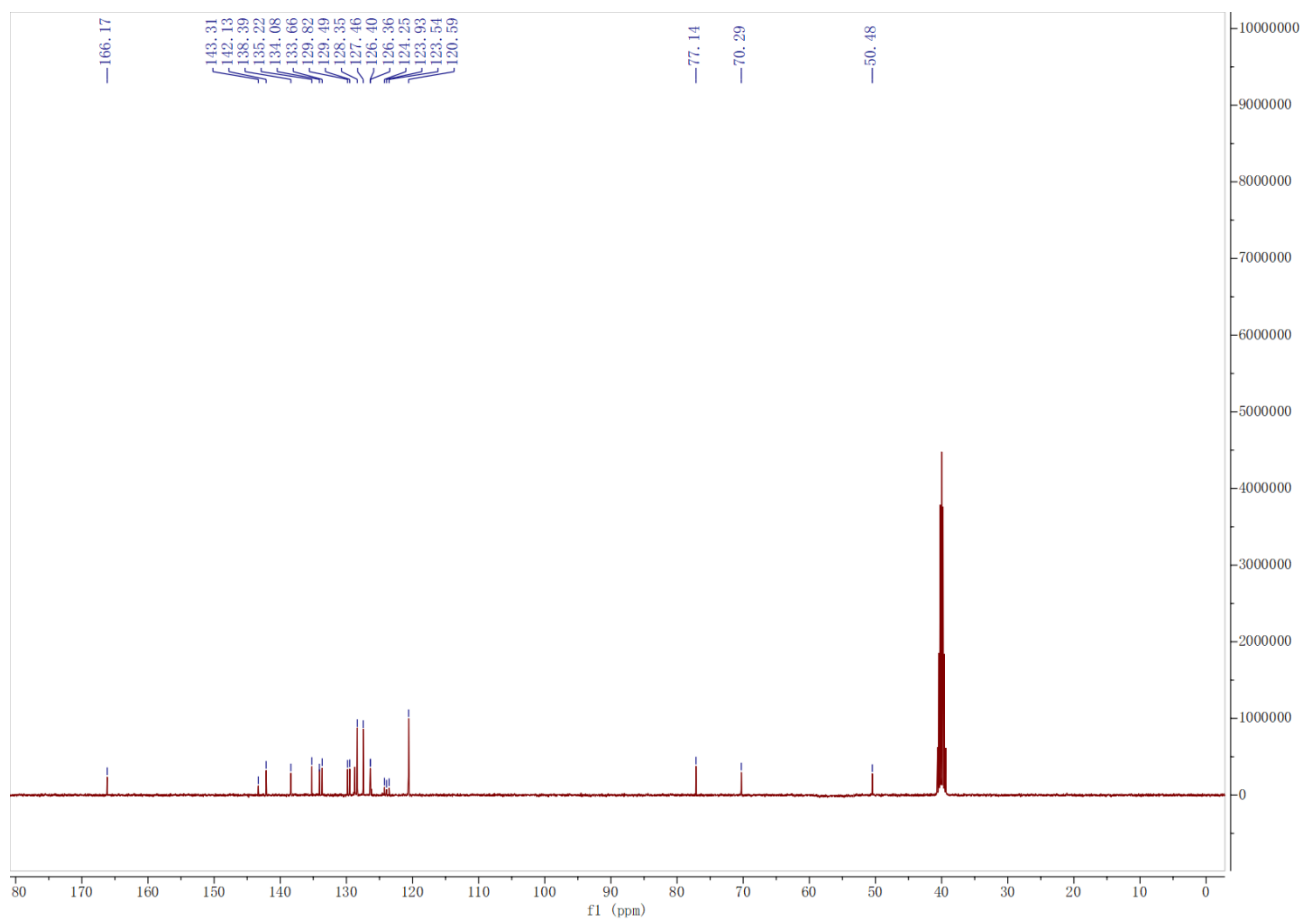
The ^{13}C -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(naphthalen-1-yl)benzamide (**A13**)



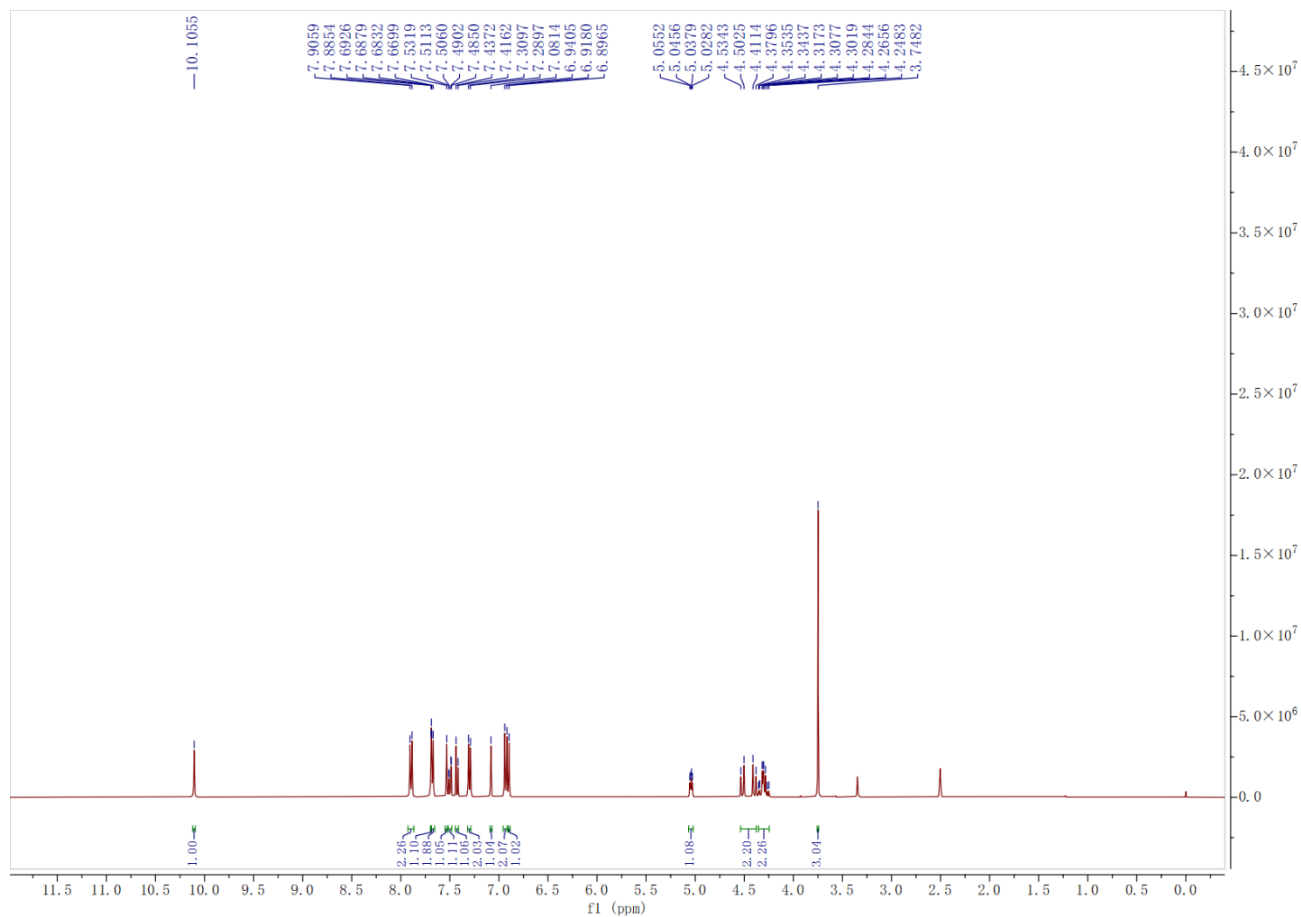
The ^1H -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(naphthalen-2-yl)benzamide (**A14**)



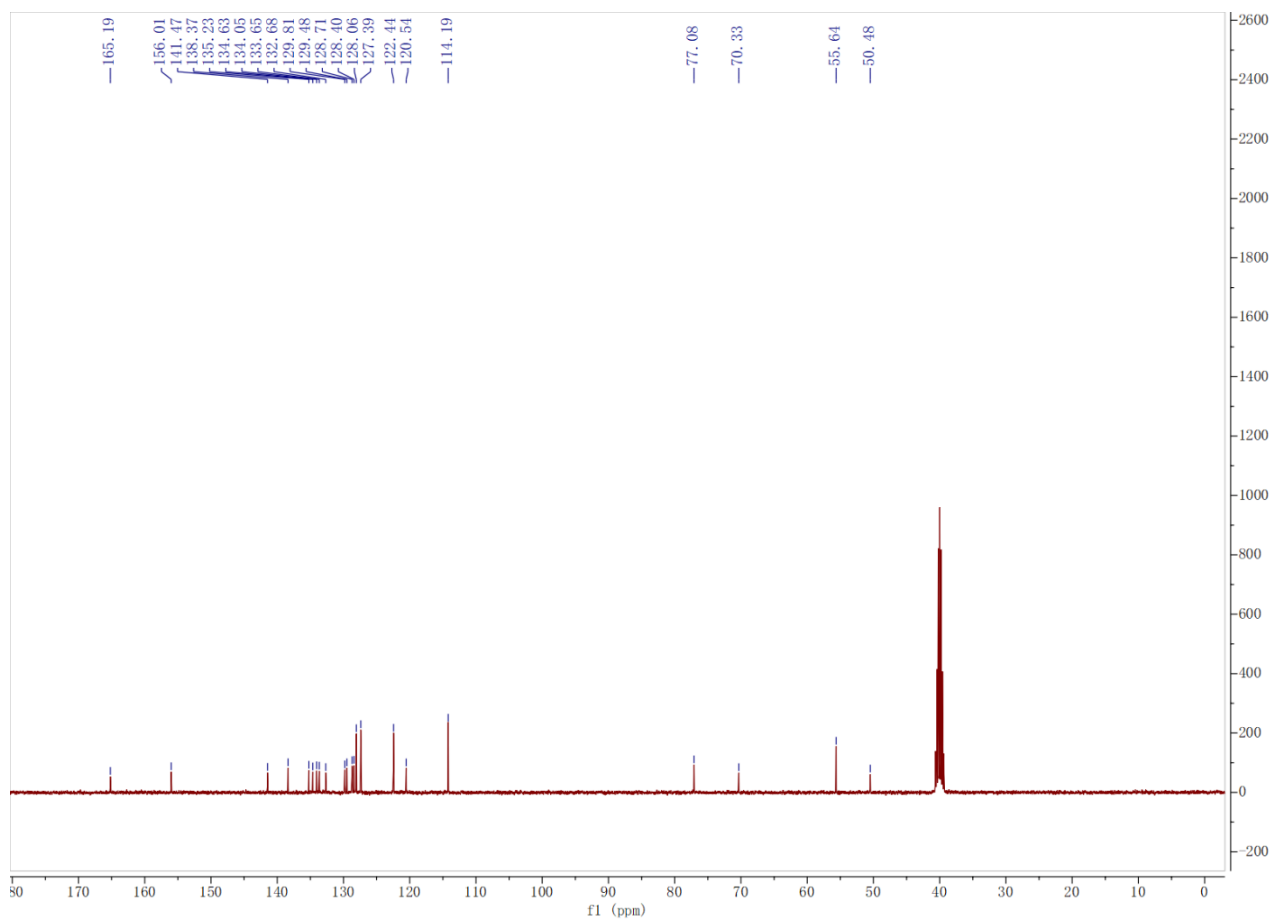
The ^{13}C -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(naphthalen-2-yl)benzamide (**A14**)



The ^1H -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(1*H*-indol-5-yl)benzamide (**A15**)



The ^{13}C -NMR spectrum of 4-((1-(2,4-dichlorophenyl)-2-(1*H*-imidazol-1-yl)ethoxy)methyl)-*N*-(1*H*-indol-5-yl)benzamide (**A15**)



Abbreviations:

Abbreviations: *C.alb.*, *Candida albicans* (CPCC400616); *C.alb* (SC5314), *Candida albicans* (ATCC SC5314); *C.gla.*, *Candida glabrata* (Clinical isolation); *C.par.*, *Candida parapsilosis* (ATCC 22019); *C.kru.*, *Candida krusei* (AS 2.1045); strain CaR, fluconazole-resistant strain of *C. albicans*; strain 17#, fluconazole-resistant strain of *C. albicans*; strain 632, fluconazole-resistant strain of *C. albicans*; strain 901, fluconazole-resistant strain of *C. albicans*; strain 904, fluconazole-resistant strain of *C. albicans*; FCZ, Fluconazole.