

Supporting Information

Transition-metal-free direct C-3 alkylation of quinoxalin-2(1*H*)-ones with ethers

Jin-Wei Yuan,^{a,*} Jun-Hao Fu,^a Ji-Hong Yin,^a Zhen-Hua Dong,^a

Yong-Mei Xiao,^a Pu Mao,^a Ling-Bo Qu^{a,b,*}

^a School of Chemistry and Chemical Engineering, Henan University of Technology; Academician Workstation for Natural Medicinal Chemistry of Henan Province, Zhengzhou 450001, PR China

^b College of Chemistry and Molecular Engineering, Zhengzhou University, Zhengzhou 450001, PR China

*Corresponding authors:

E-mail: yuanjinweigs@126.com (Jin-Wei Yuan); qulingbo@zzu.edu.cn (Ling-Bo Qu)

Contents

1. Copies of spectra of products
2. HR MS of the adduct of TEMPO and 1,4-dioxan-2-yl radical

1. Copies of spectra of products

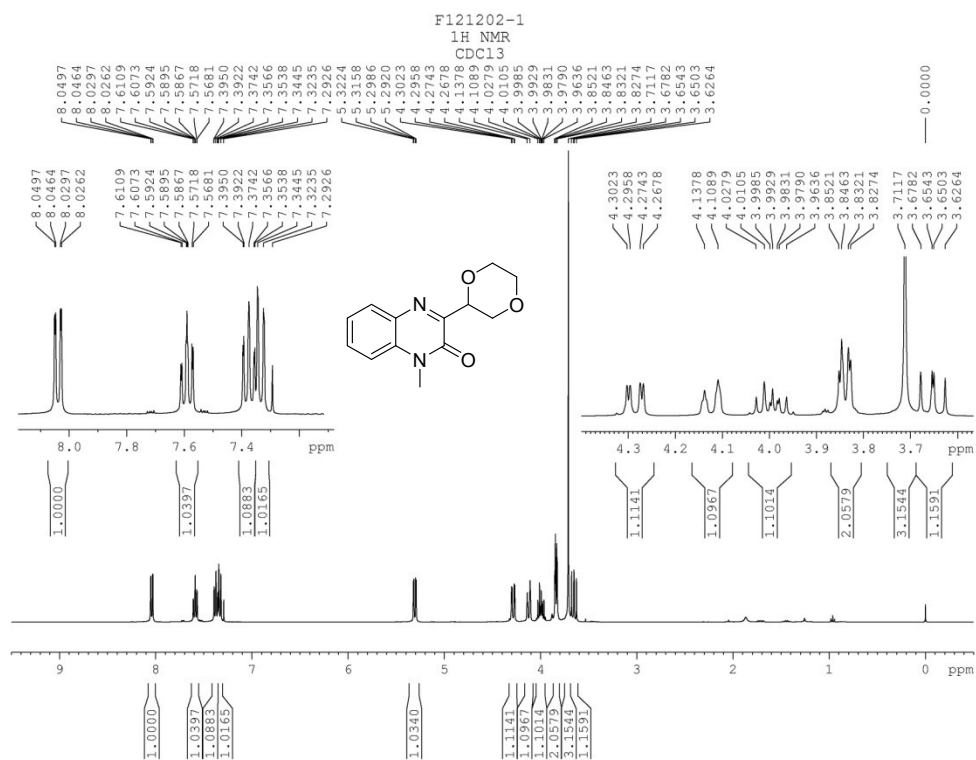


Fig. 1 ¹H NMR spectrum of compound 3aa

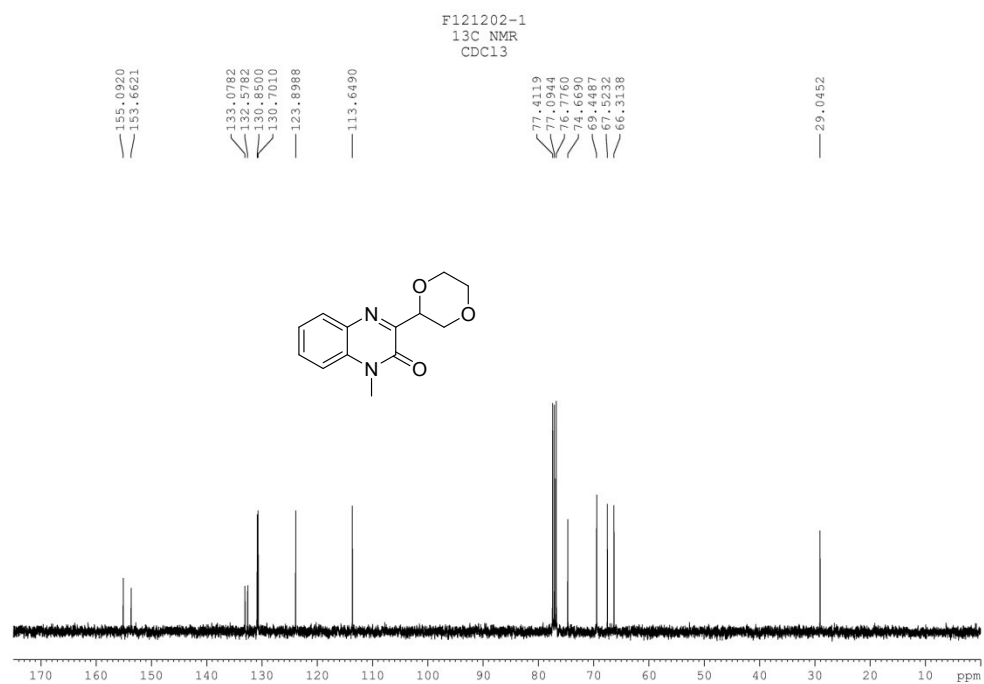


Fig. 2 ¹³C NMR spectrum of compound 3aa

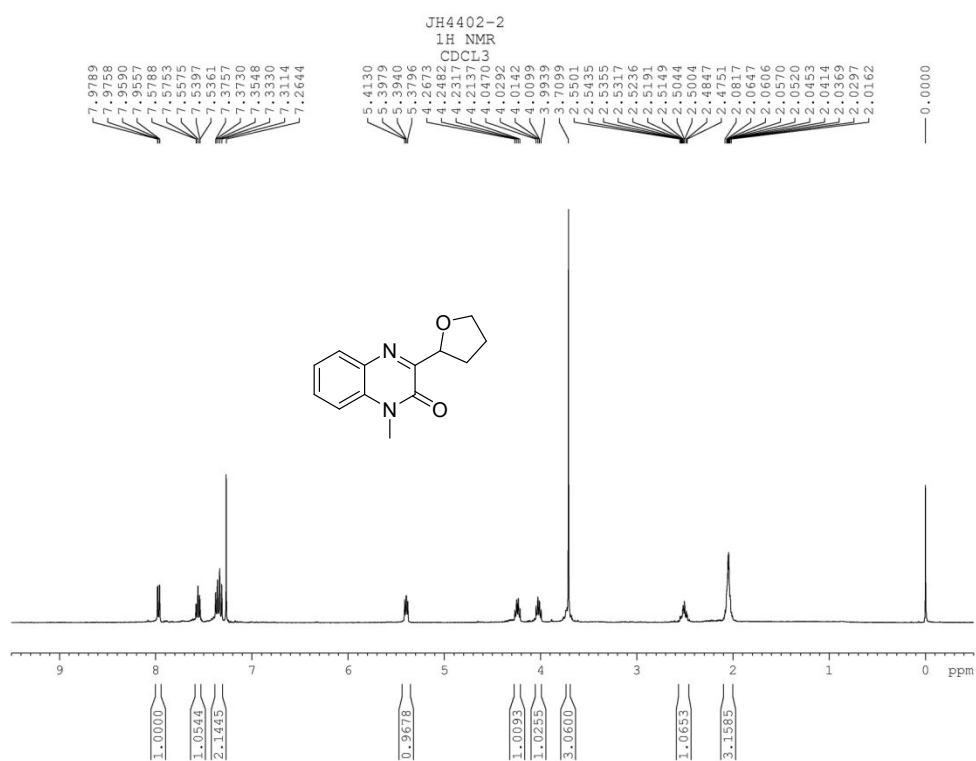


Fig. 3 ¹H NMR spectrum of compound 3ab

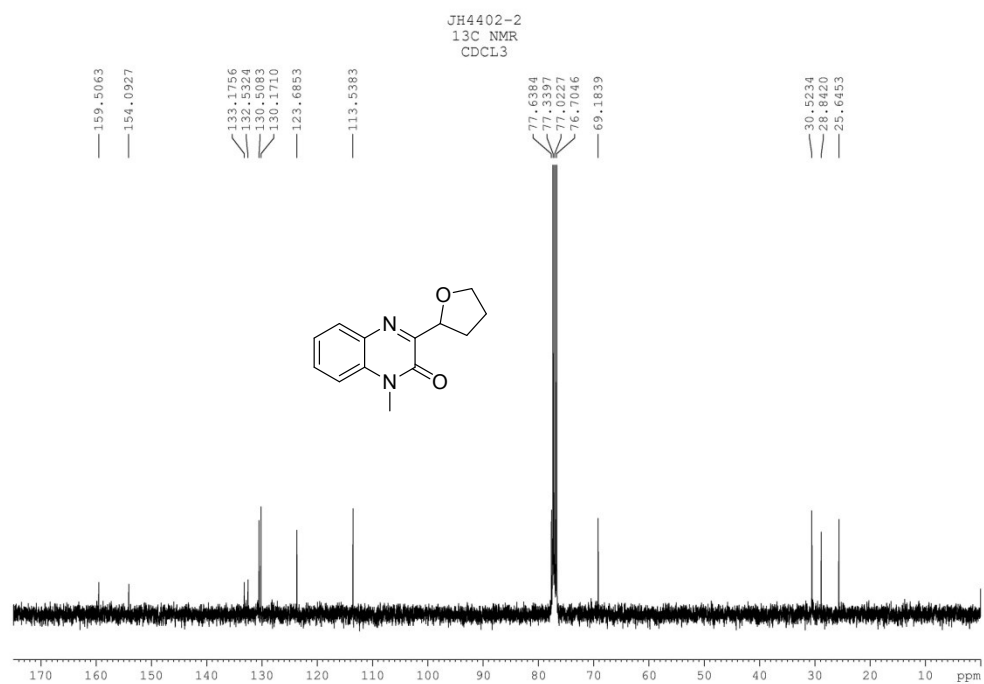


Fig. 4 ¹³C NMR spectrum of compound 3ab

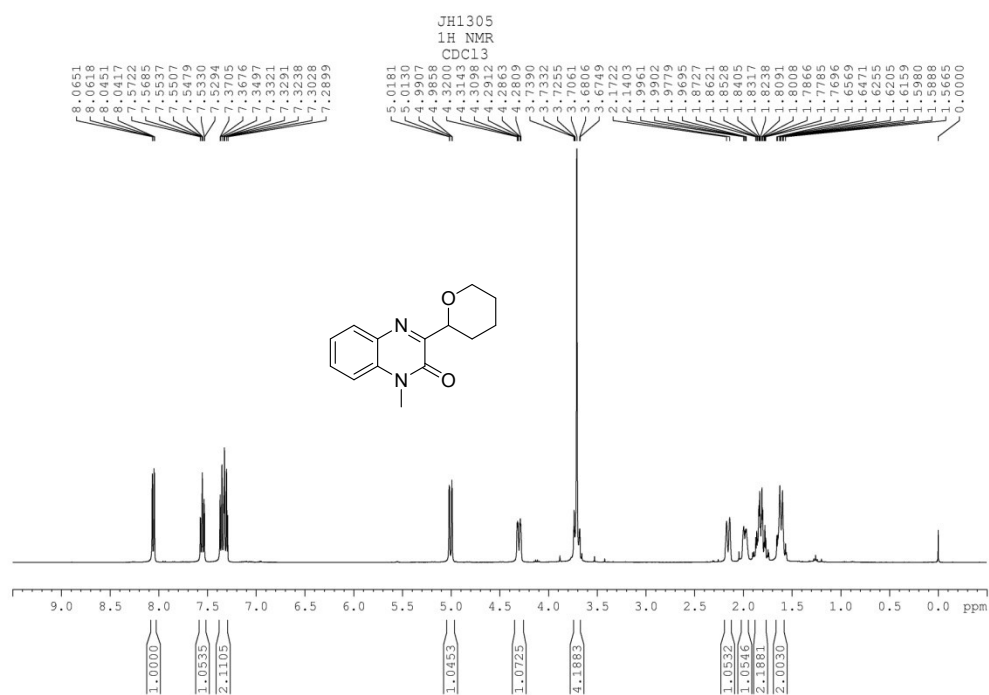


Fig. 5 ¹H NMR spectrum of compound **3ac**

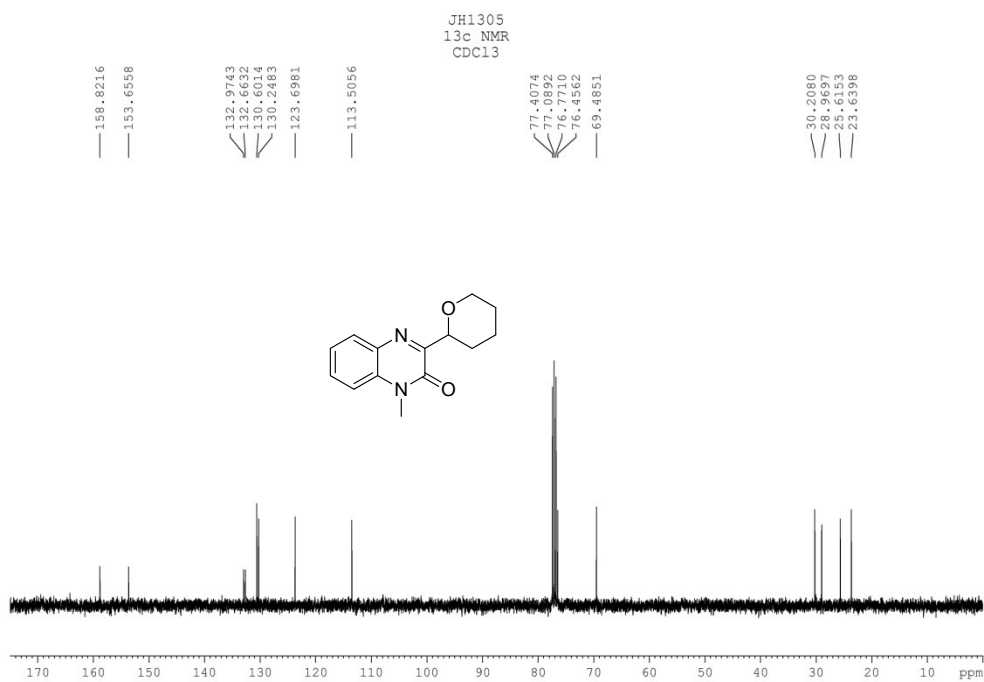


Fig. 6 ¹³C NMR spectrum of compound **3ac**

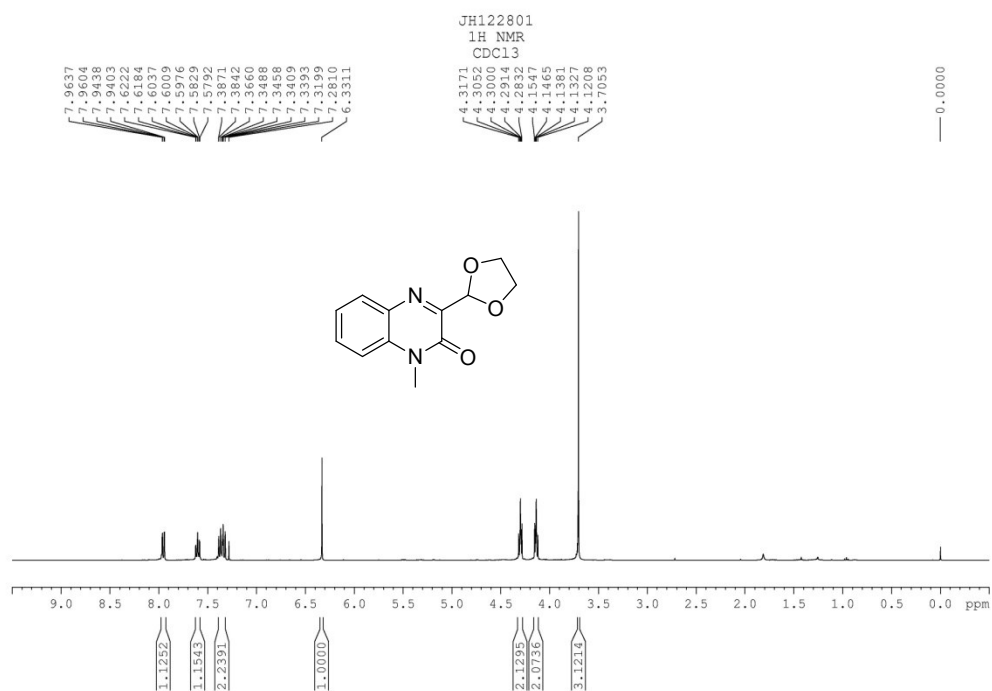


Fig. 7 ^1H NMR spectrum of compound 3ad

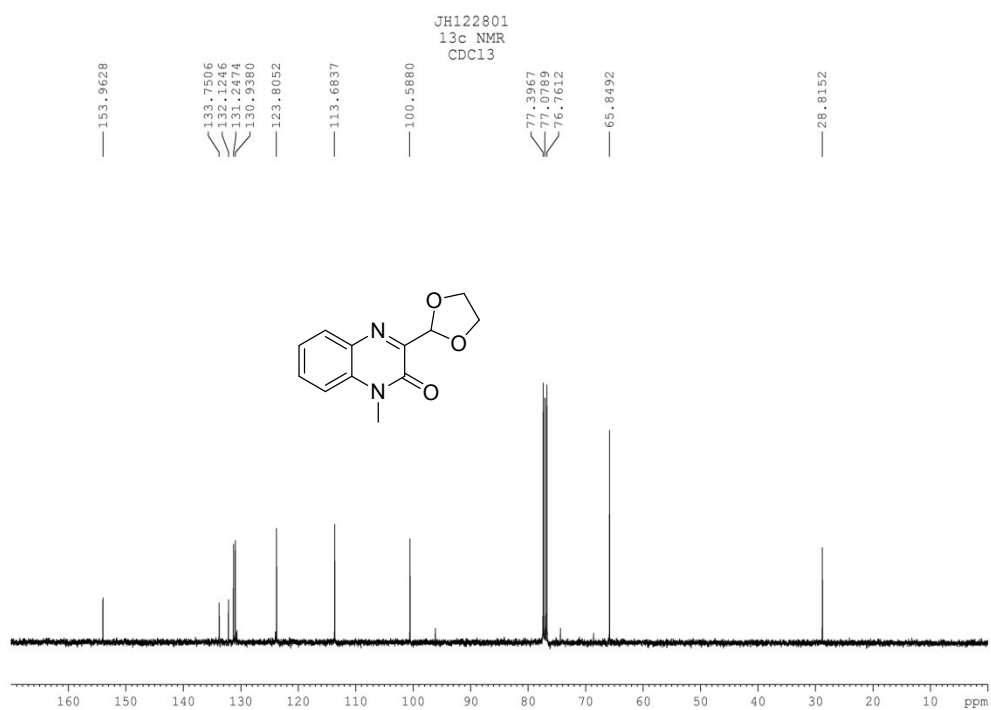


Fig. 8 ^{13}C NMR spectrum of compound 3ad

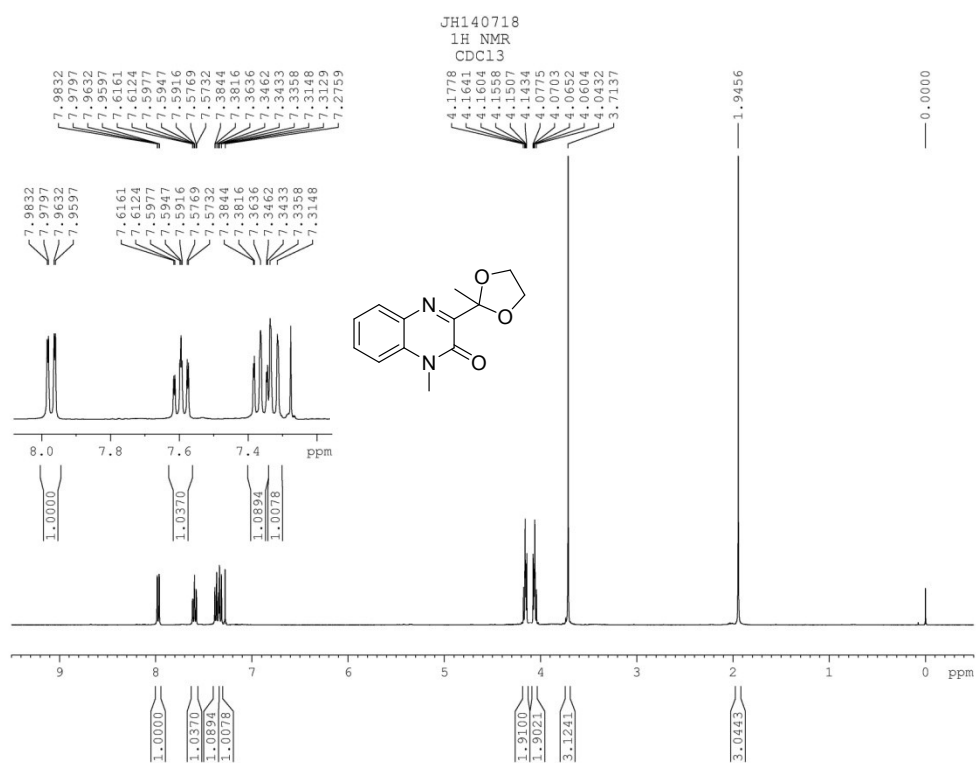


Fig. 9 ¹H NMR spectrum of compound 3ae

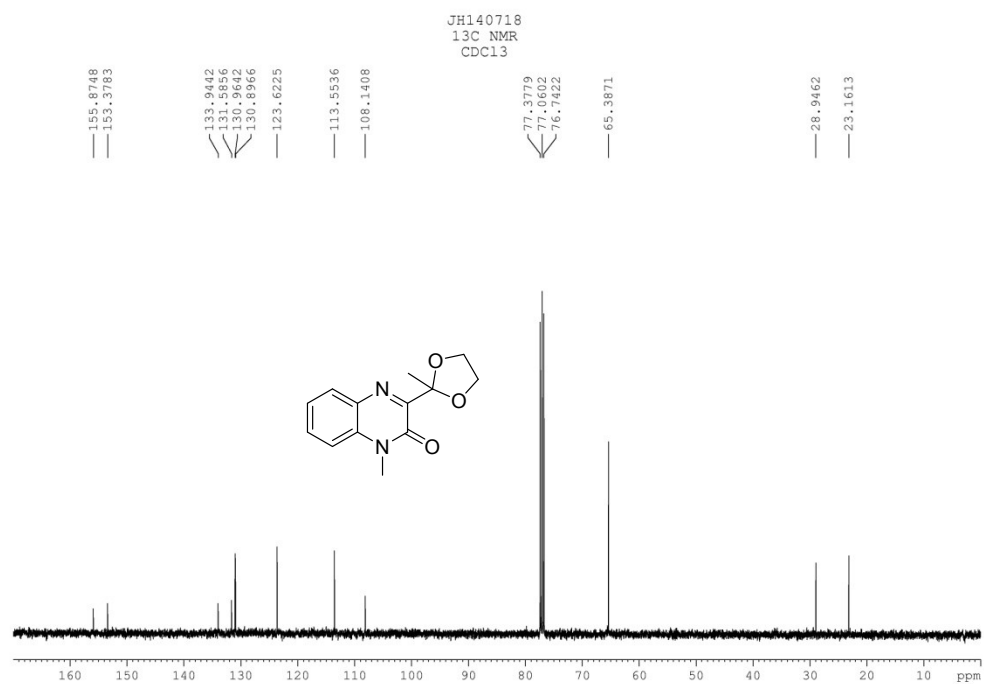


Fig. 10 ¹³C NMR spectrum of compound 3ae

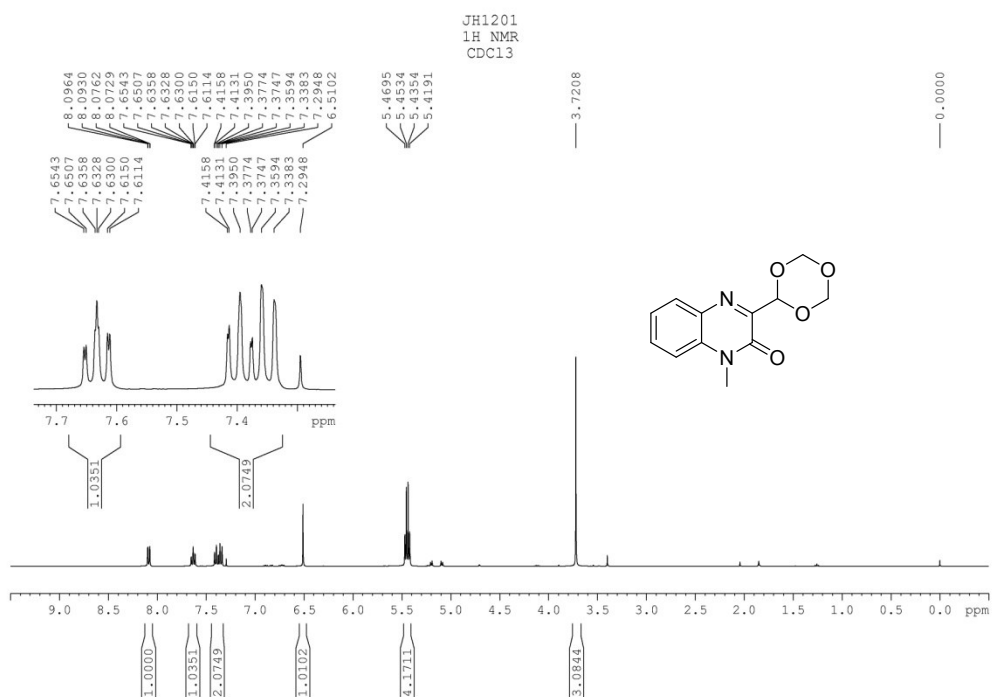


Fig. 11 ^1H NMR spectrum of compound **3af**

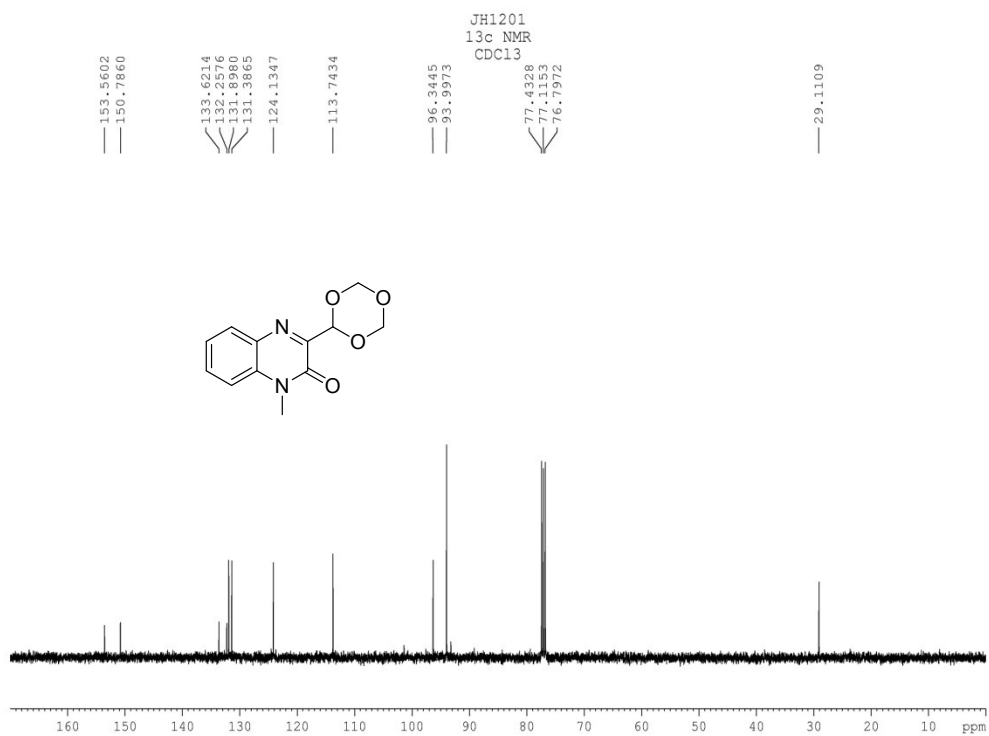


Fig. 12 ^{13}C NMR spectrum of compound **3af**

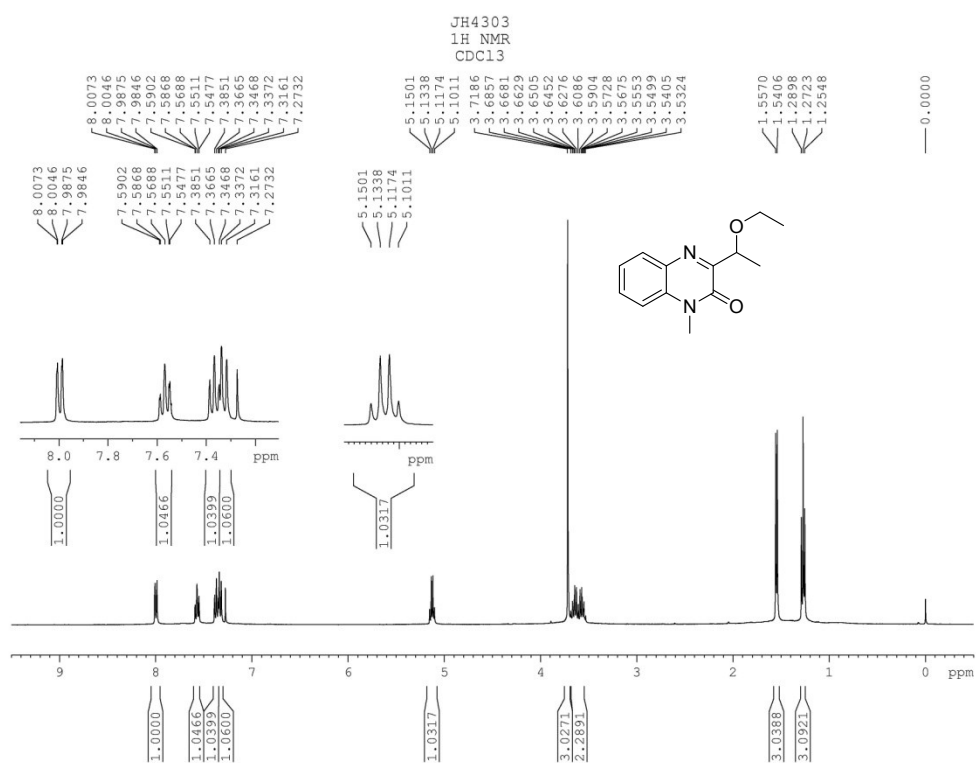


Fig. 13 ^1H NMR spectrum of compound 3ag

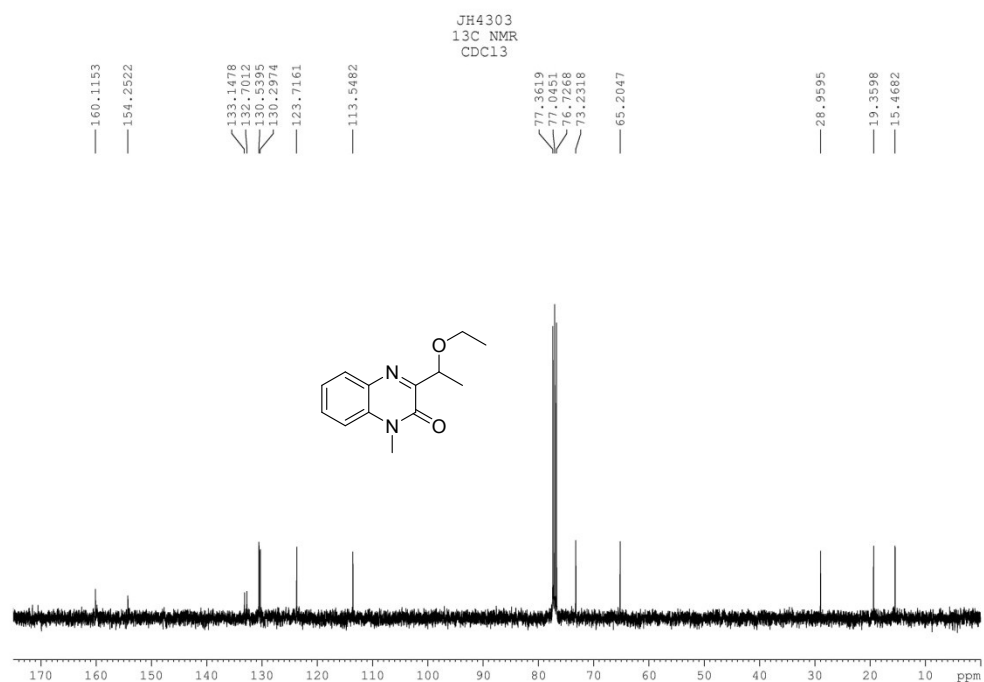


Fig. 14 ^{13}C NMR spectrum of compound 3ag

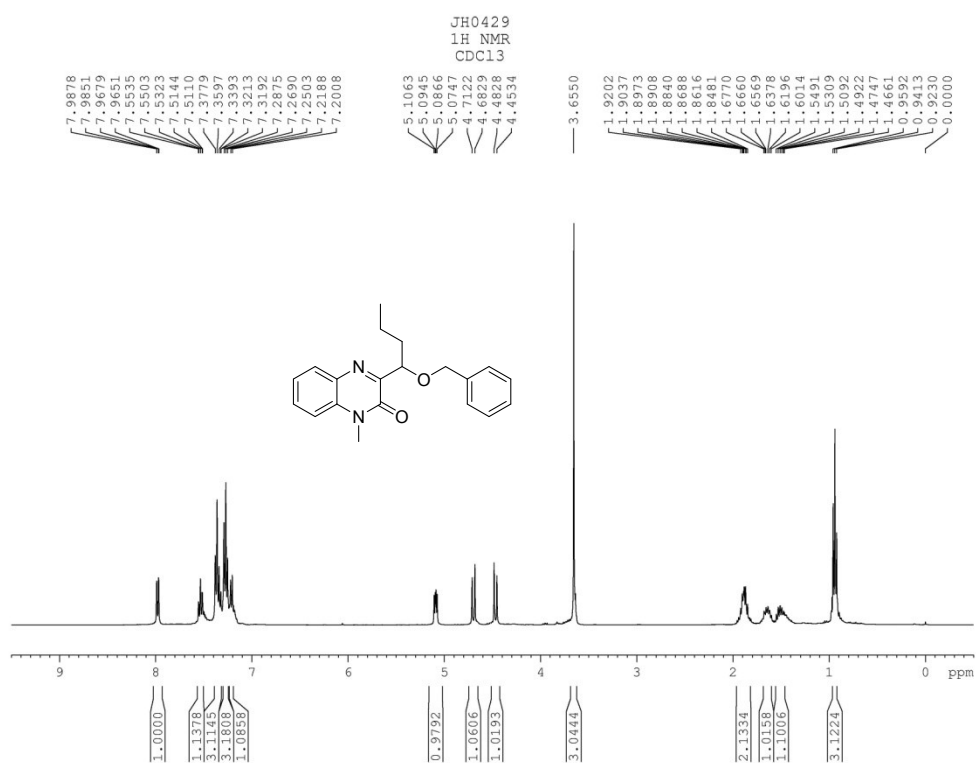


Fig. 17 ¹H NMR spectrum of compound 3ai

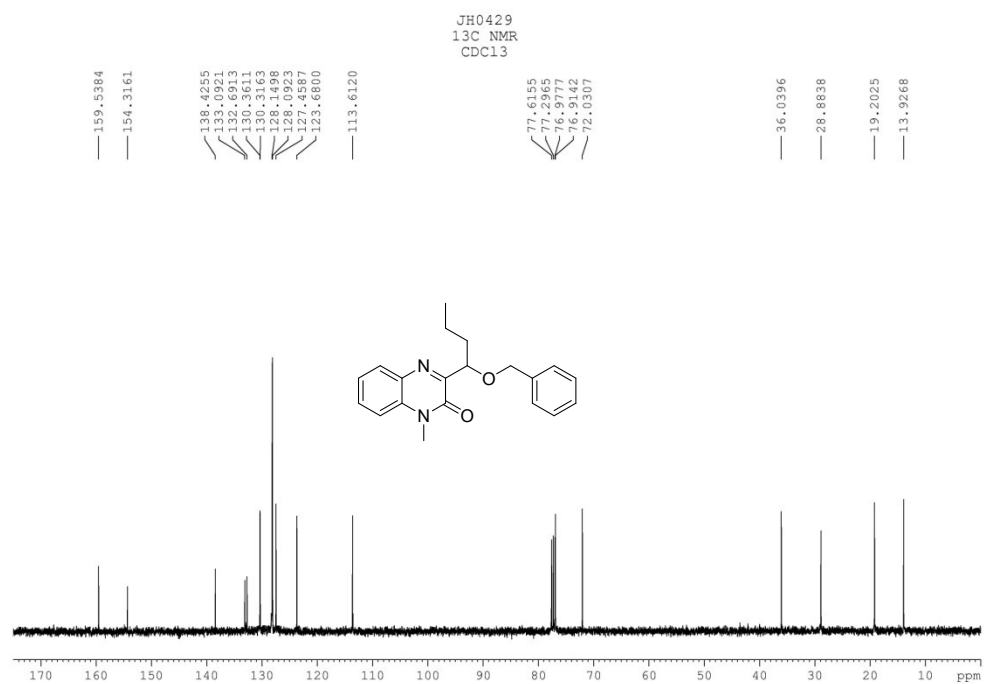


Fig. 18 ¹³C NMR spectrum of compound 3ai

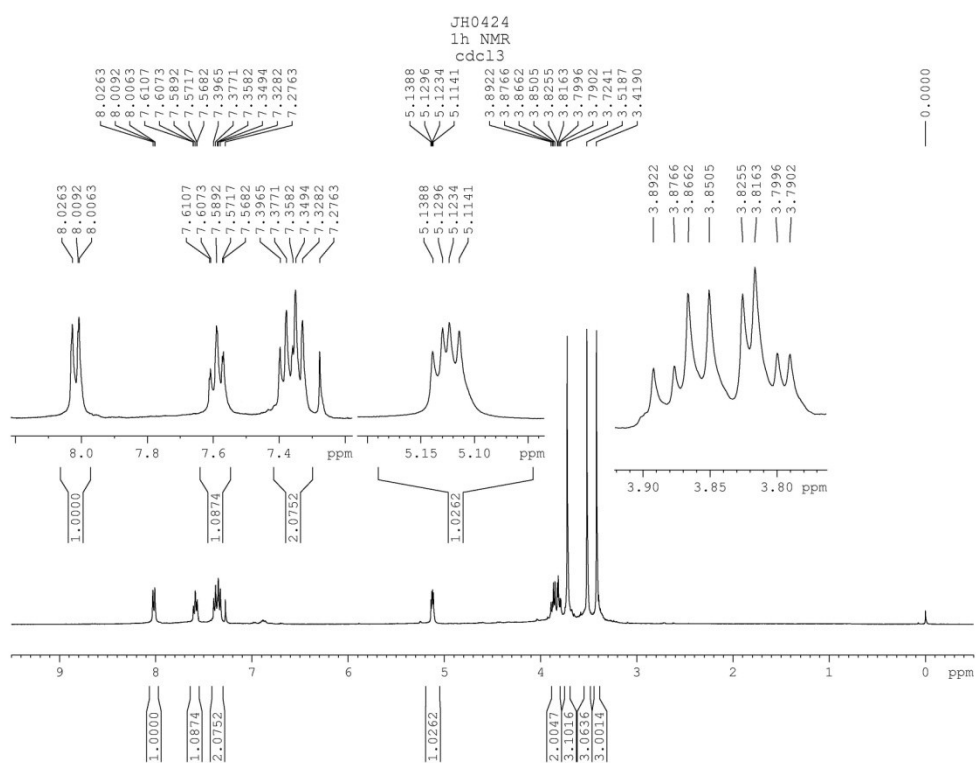


Fig. 19 ^1H NMR spectrum of compound 3aj

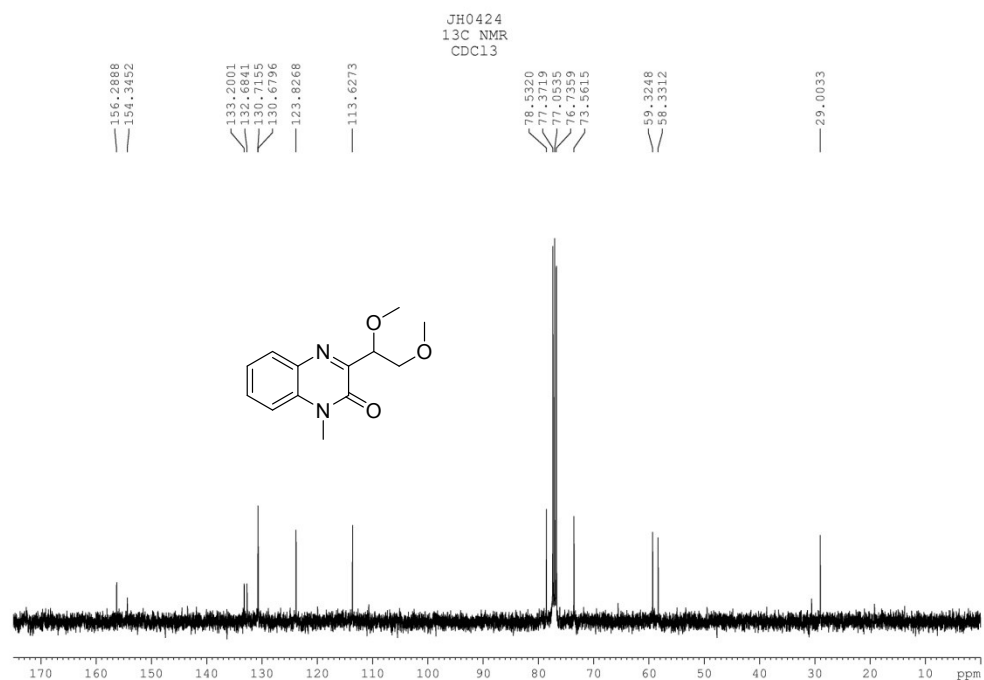


Fig. 20 ^{13}C NMR spectrum of compound 3aj

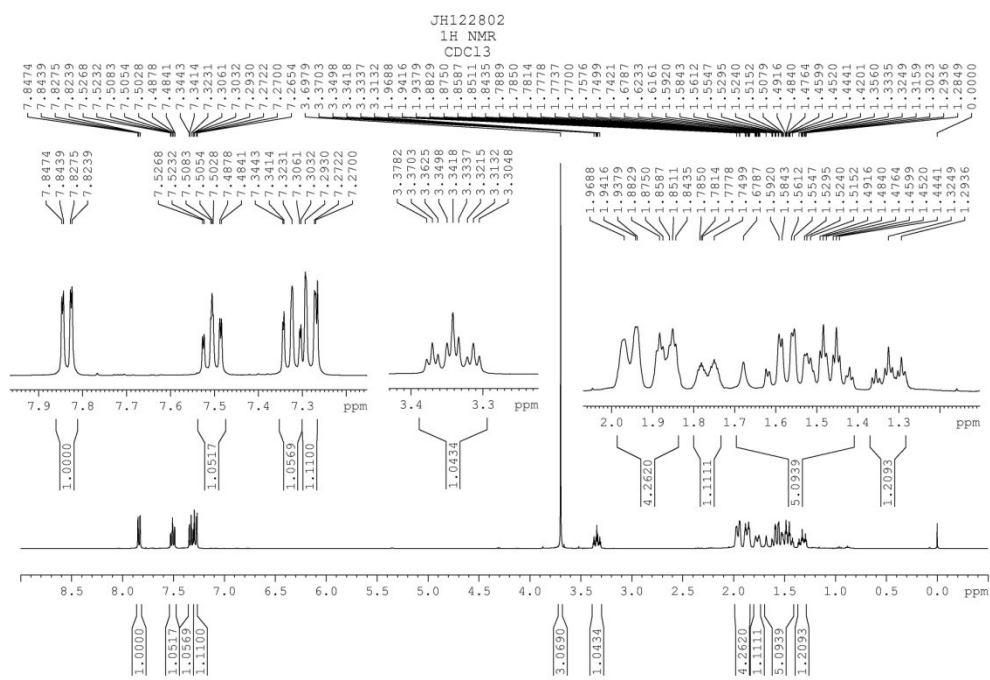


Fig. 21 ^1H NMR spectrum of compound 3ak

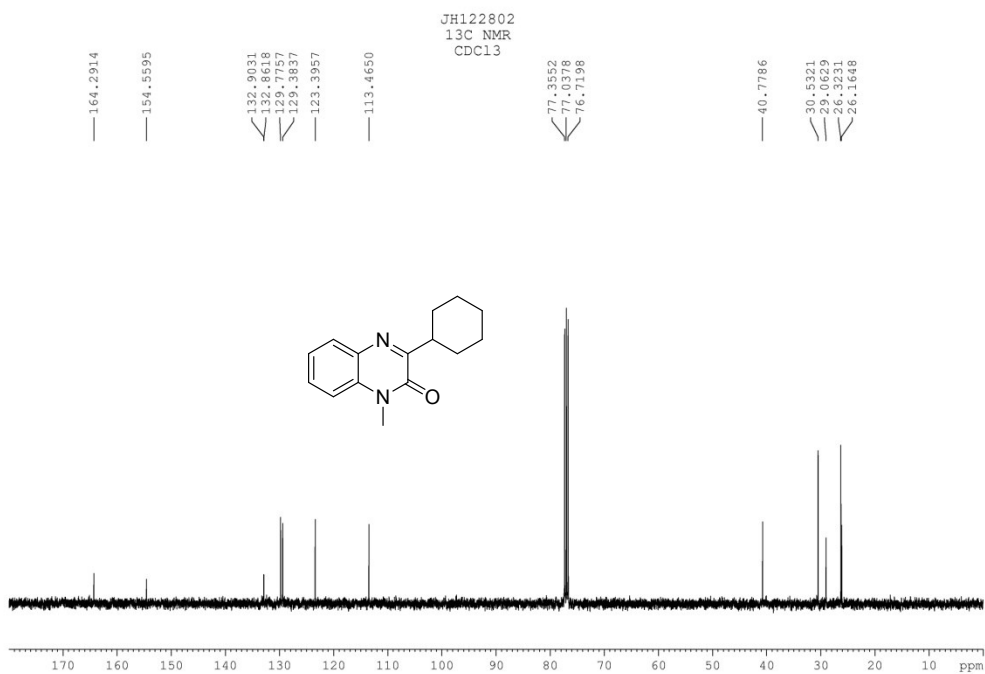


Fig. 22 ^{13}C NMR spectrum of compound 3ak

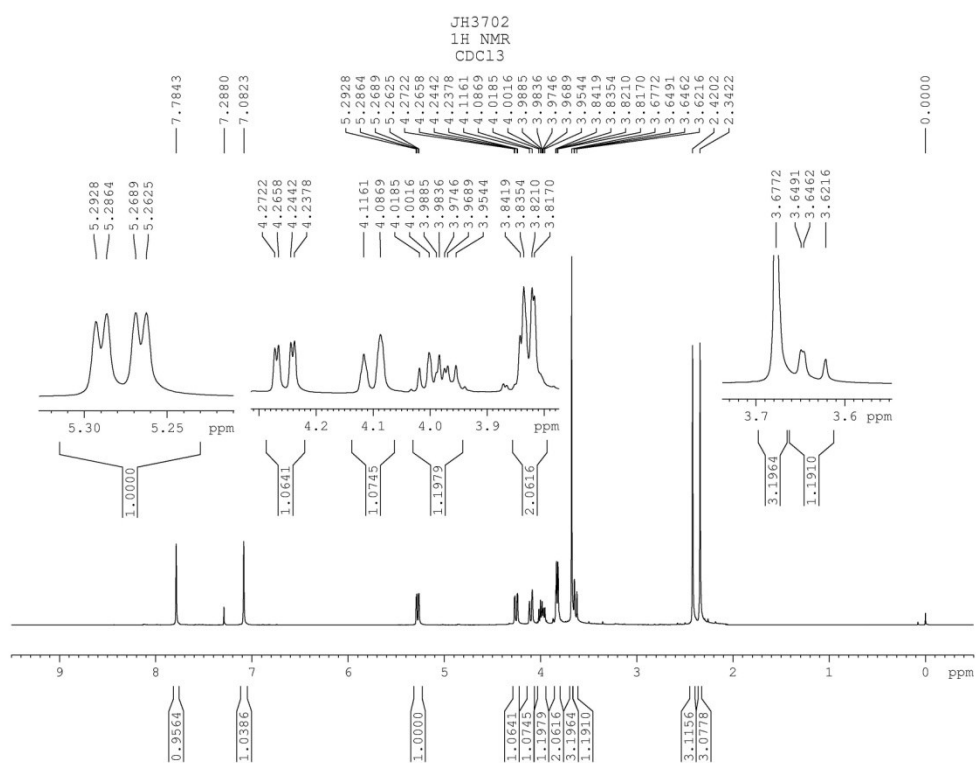


Fig. 23 ^1H NMR spectrum of compound 3ba

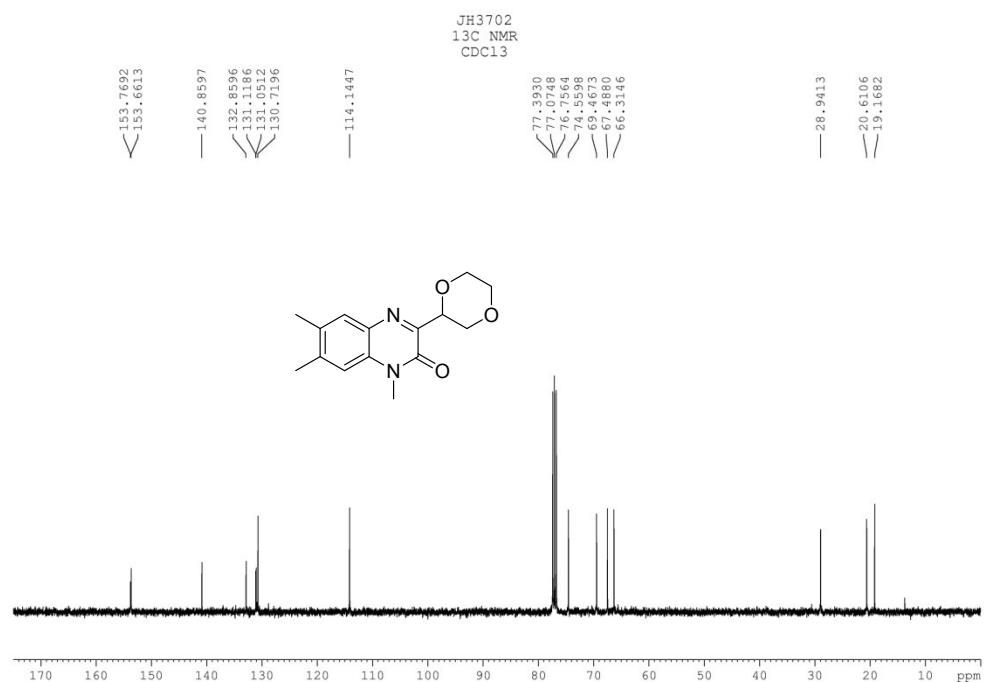


Fig. 24 ^{13}C NMR spectrum of compound 3ba

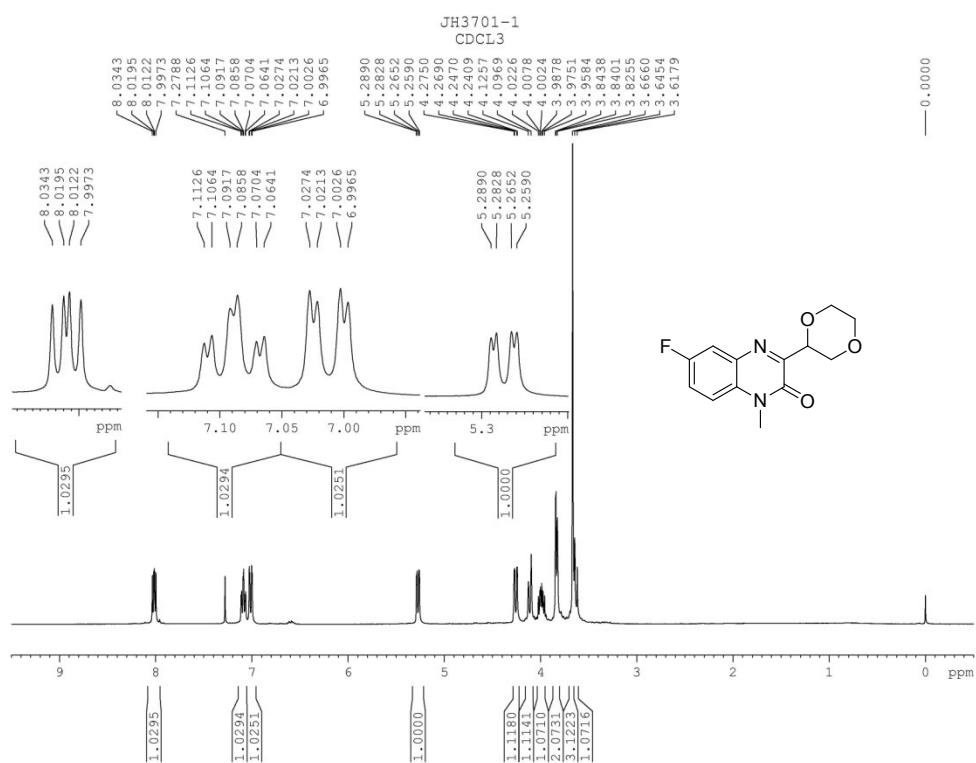


Fig. 25 ¹H NMR spectrum of compound 3ca

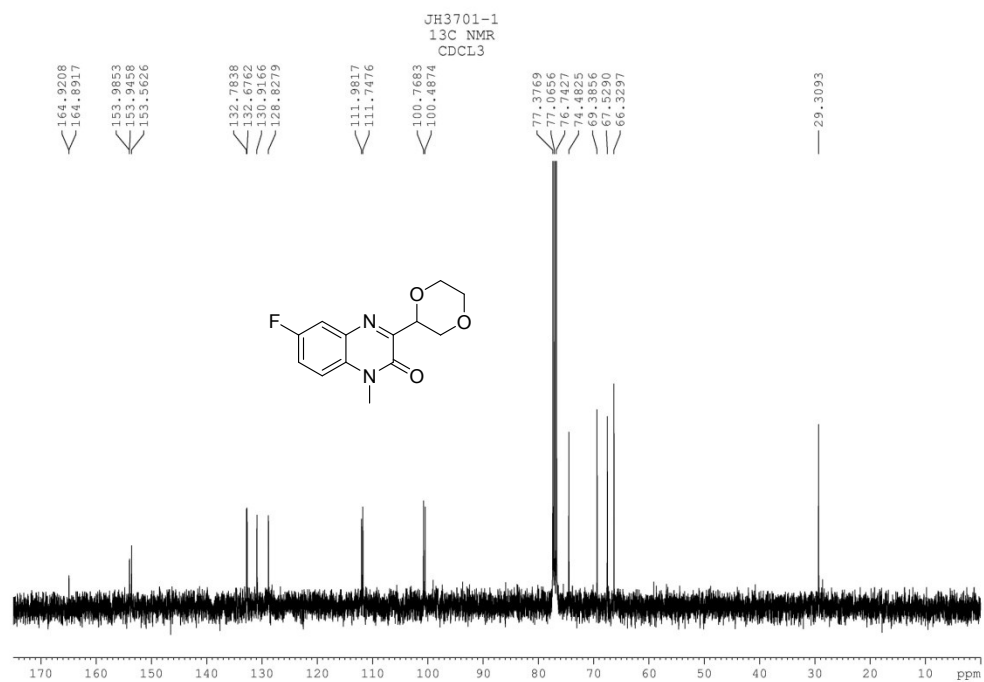


Fig. 26 ¹³C NMR spectrum of compound 3ca

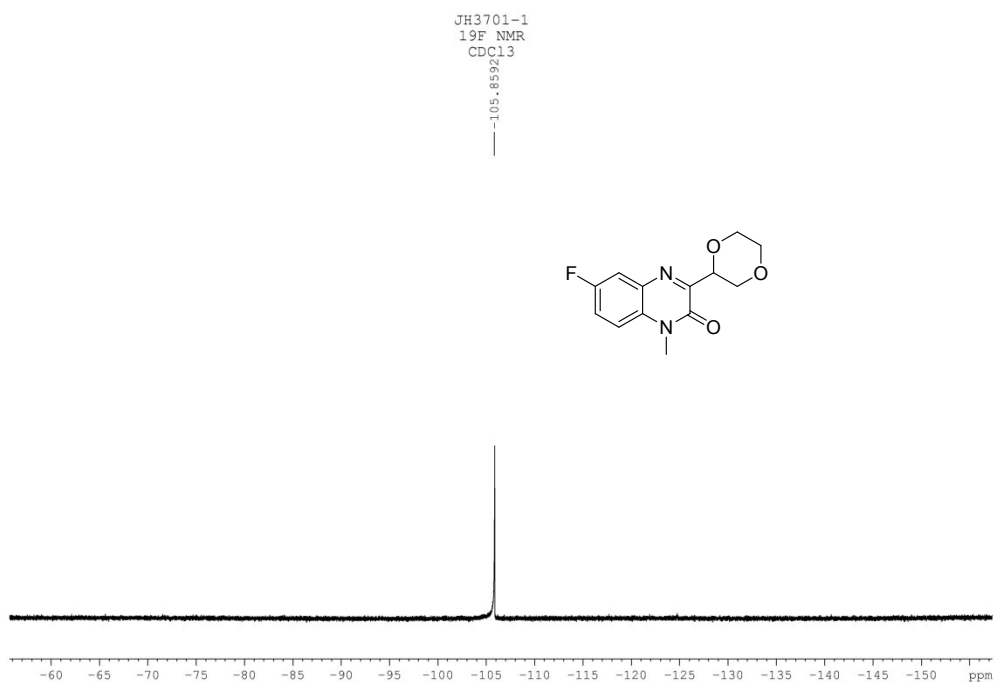


Fig. 27 ¹⁹F NMR spectrum of compound 3ca

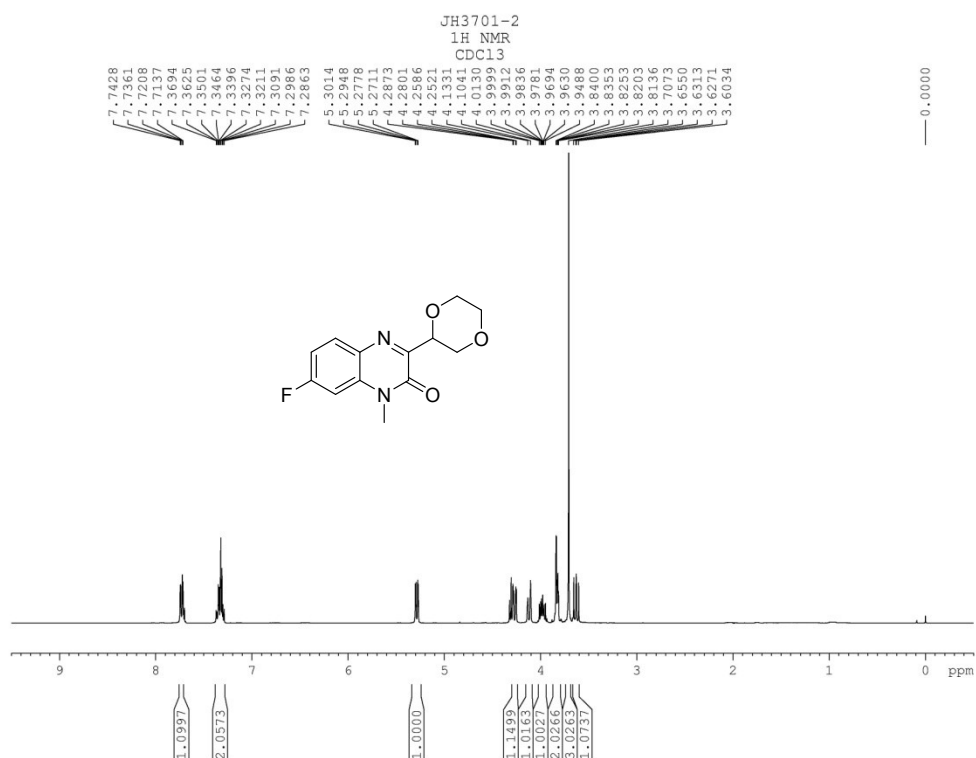


Fig. 28 ¹H NMR spectrum of compound 3da

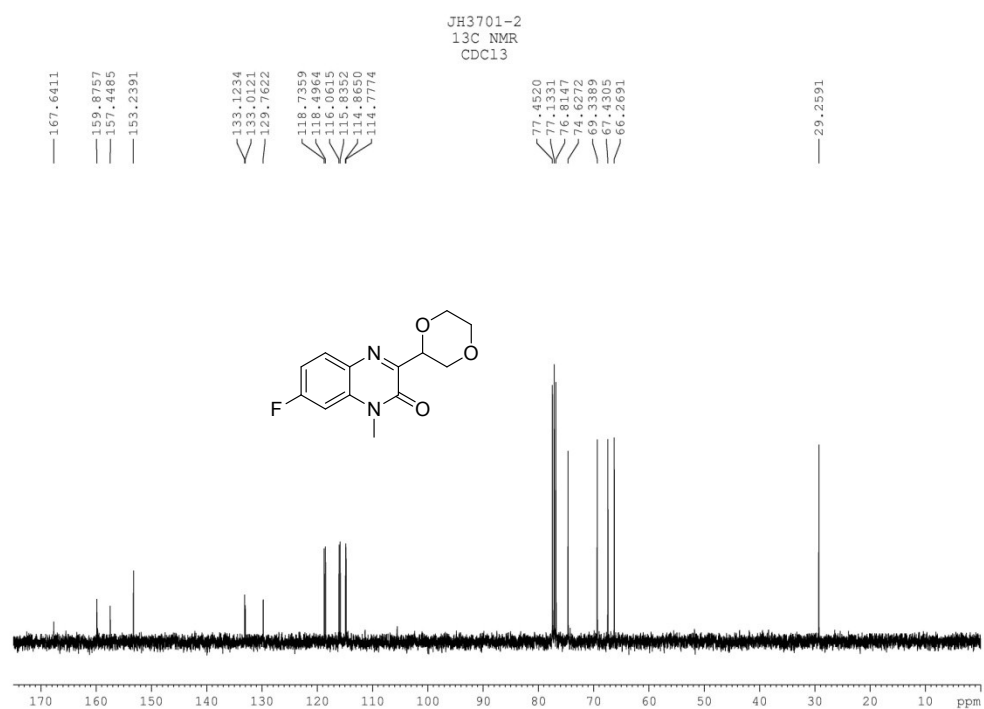


Fig. 29 ¹³C NMR spectrum of compound 3da

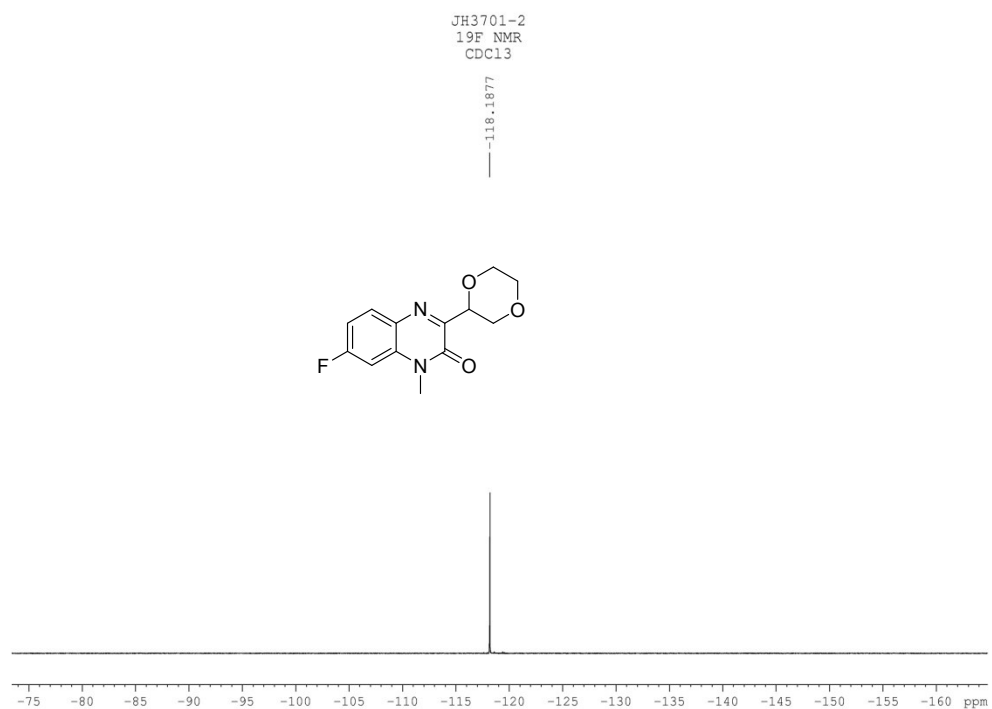


Fig. 30 ¹⁹F NMR spectrum of compound 3da

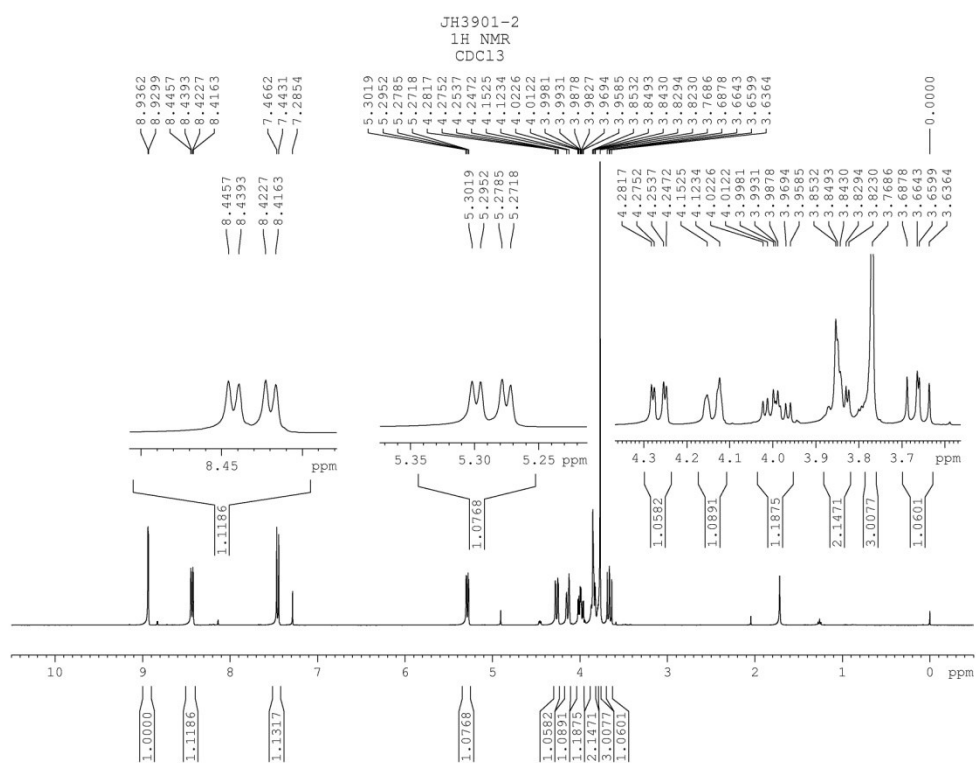


Fig. 31 ¹H NMR spectrum of compound 3ea

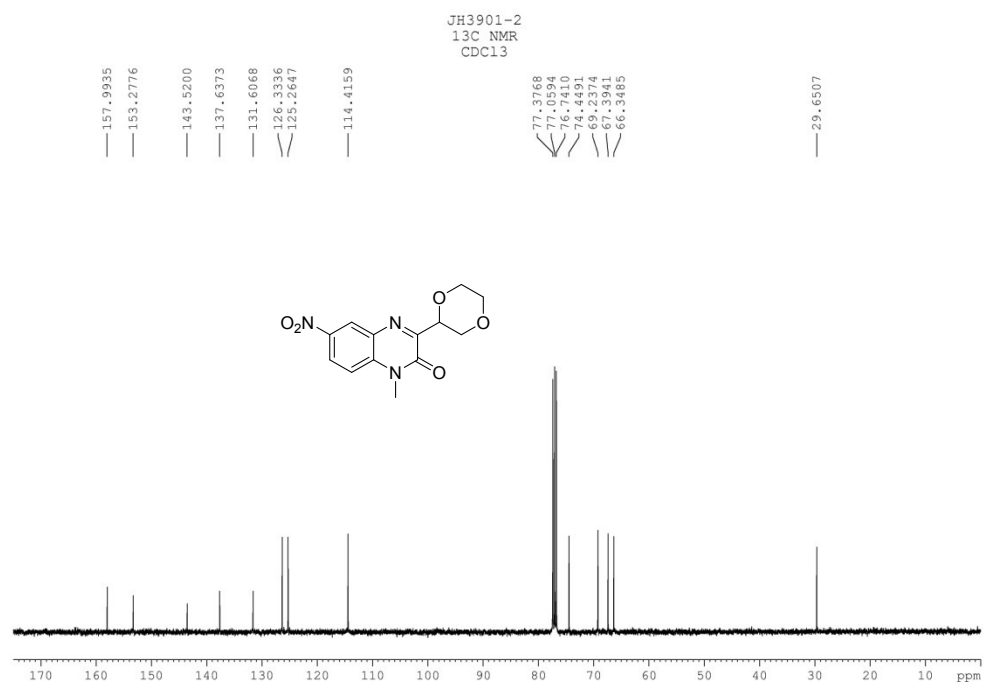


Fig. 32 ¹³C NMR spectrum of compound 3ea

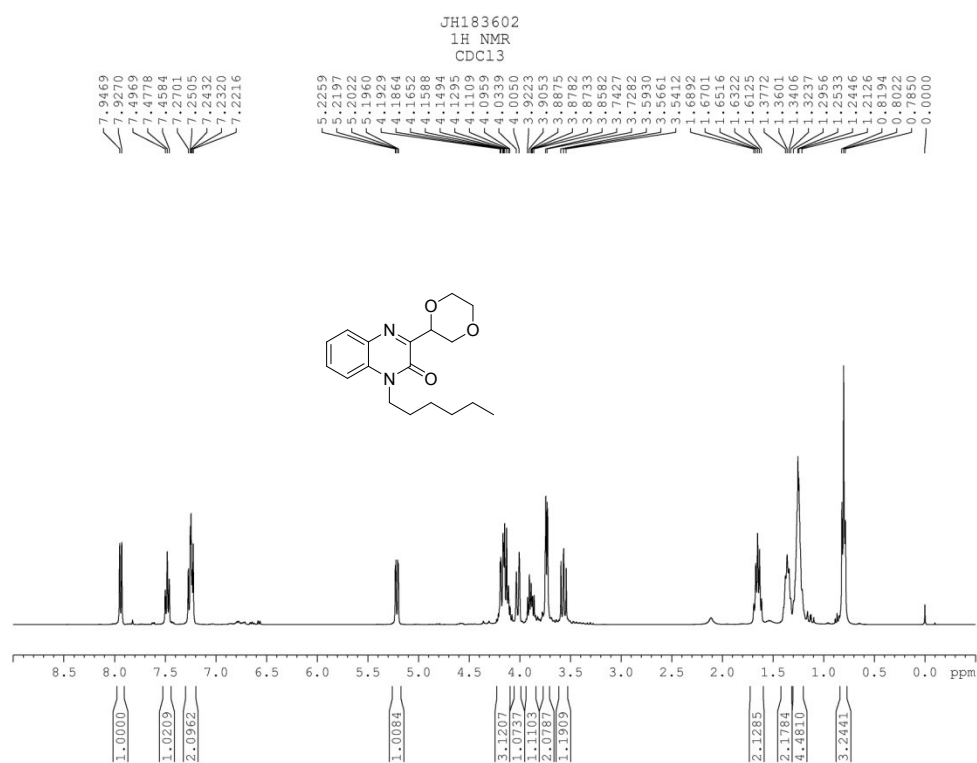


Fig. 33 ¹H NMR spectrum of compound **3fa**

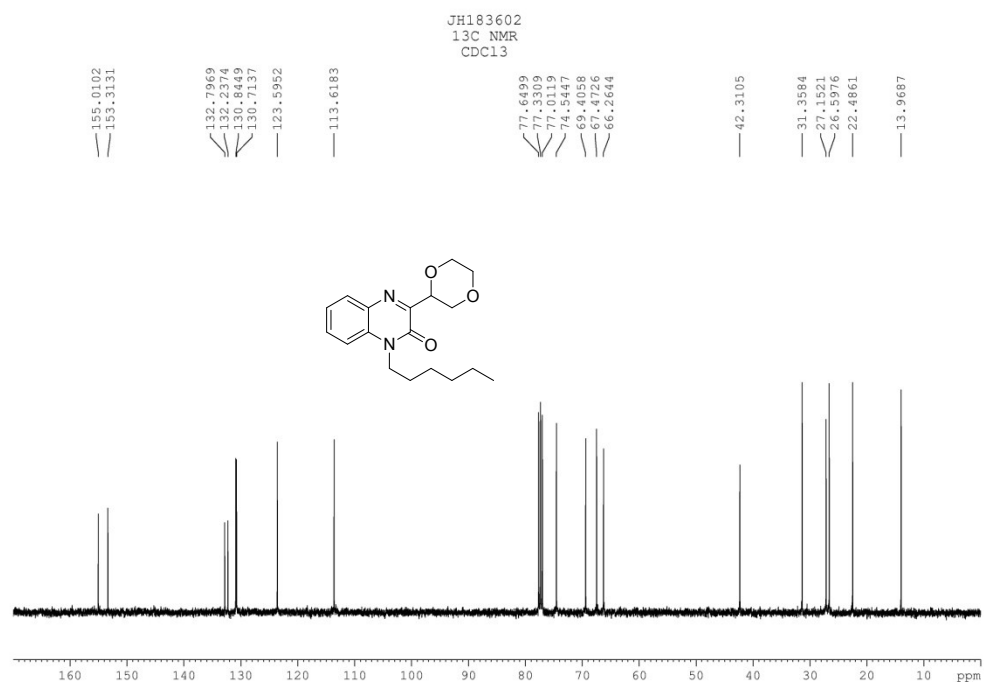


Fig. 34 ¹³C NMR spectrum of compound **3fa**

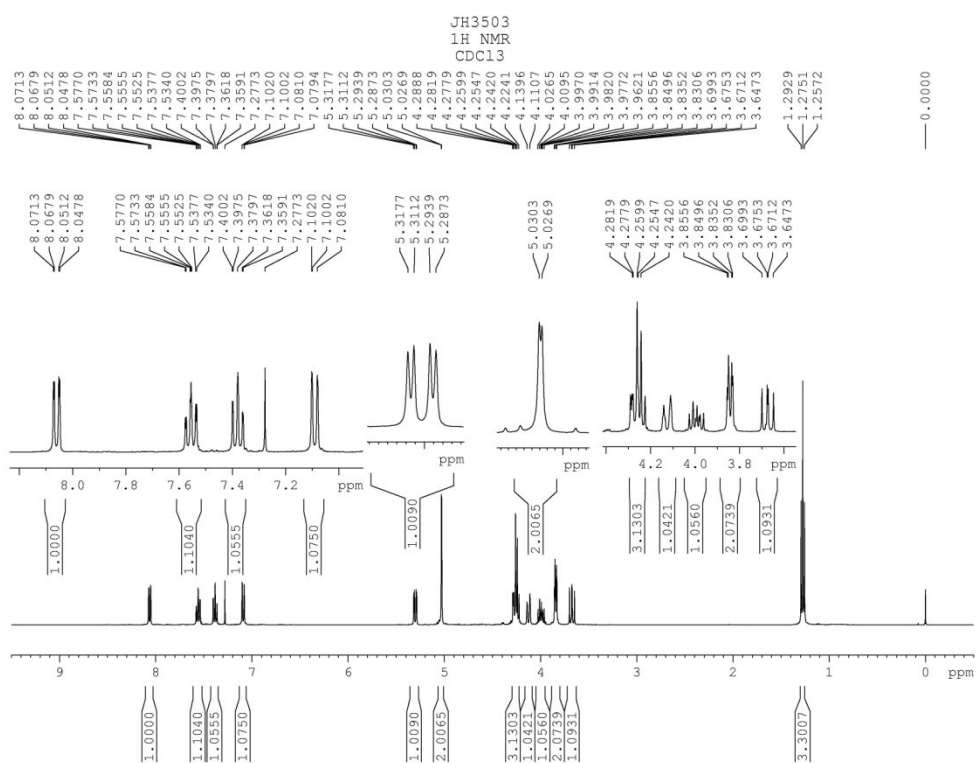


Fig. 35 ^1H NMR spectrum of compound **3ga**

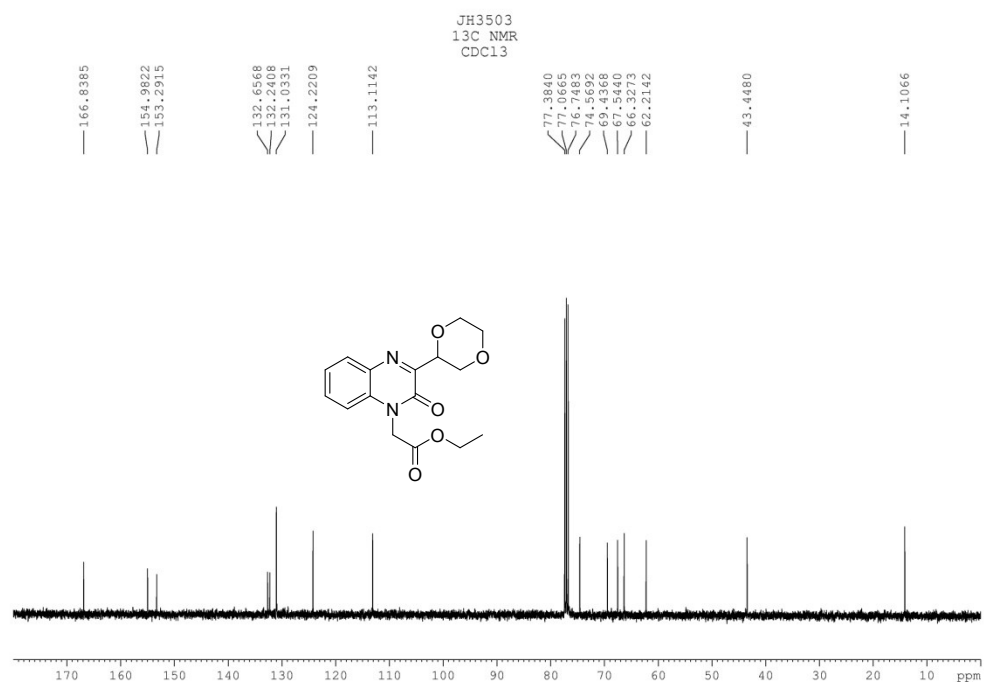


Fig. 36 ^{13}C NMR spectrum of compound **3ga**

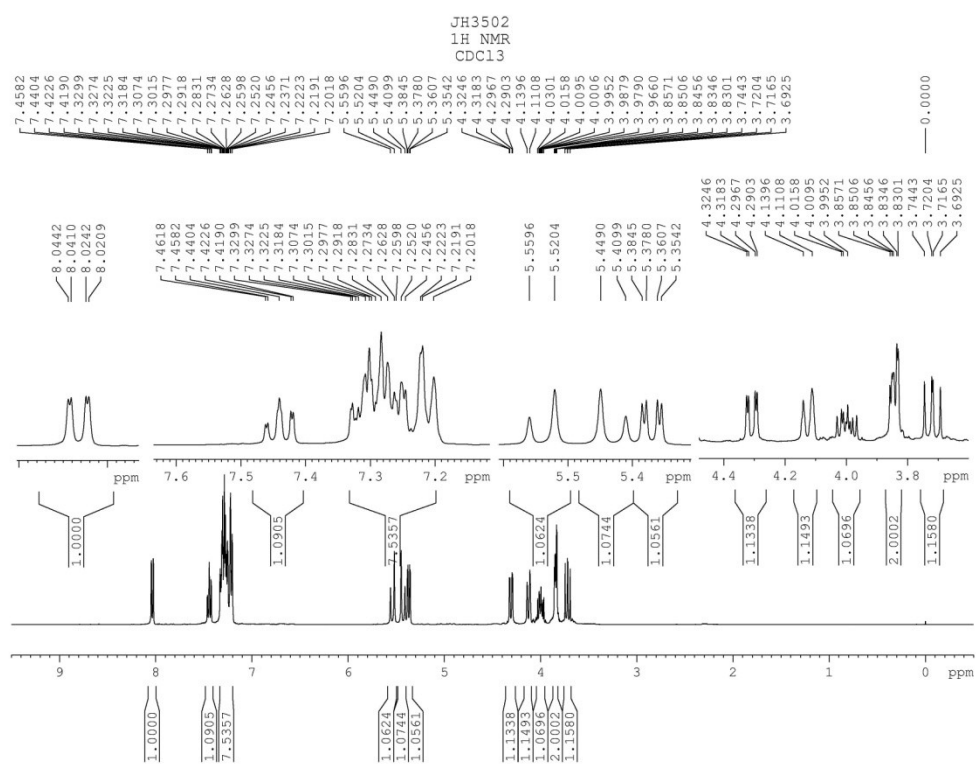


Fig. 37 ^1H NMR spectrum of compound 3ha

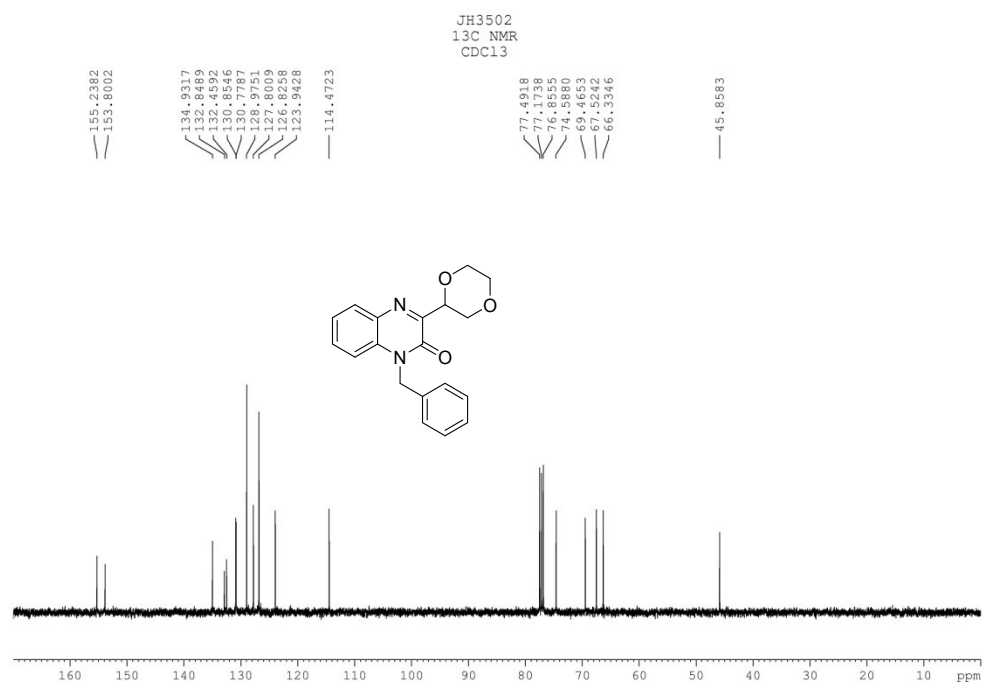


Fig. 38 ^{13}C NMR spectrum of compound 3ha

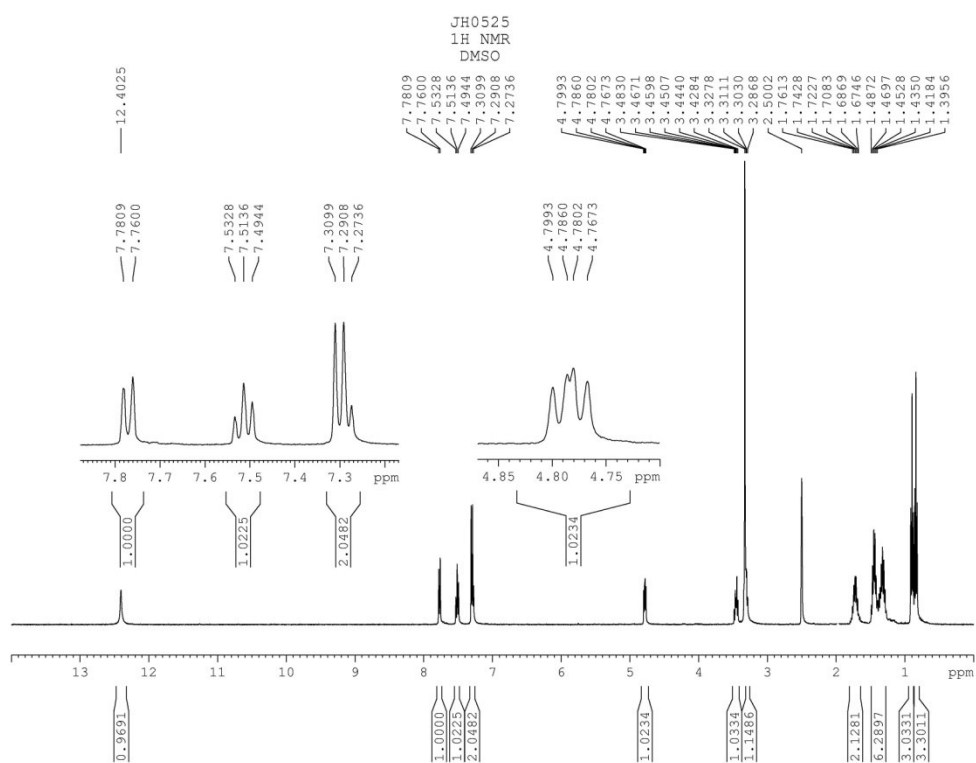


Fig. 39 ^1H NMR spectrum of compound **3ia**

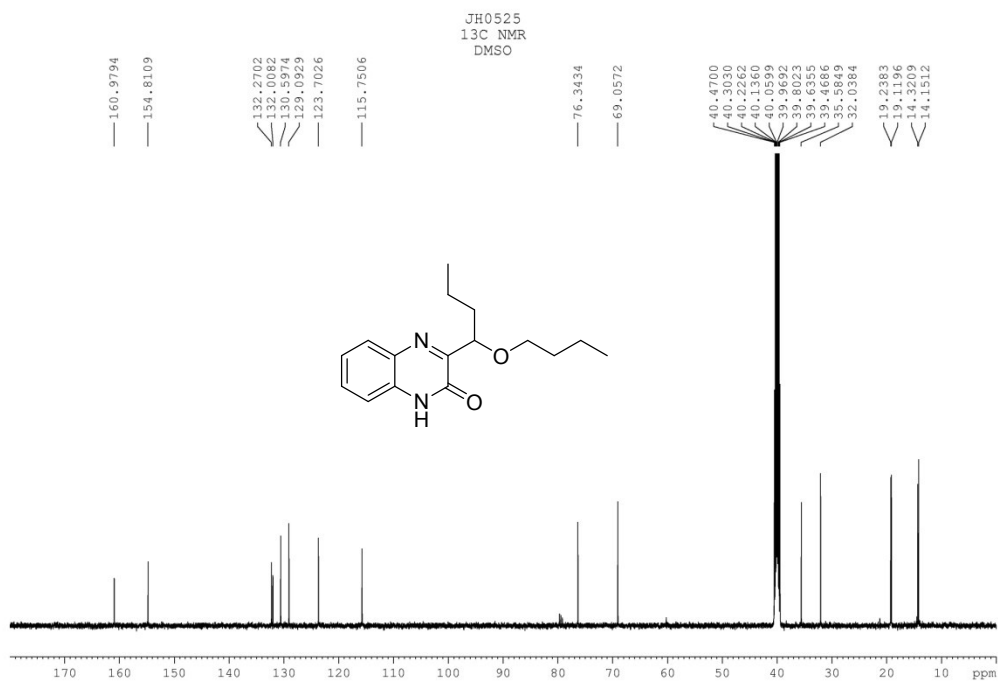


Fig. 40 ^{13}C NMR spectrum of compound **3ia**

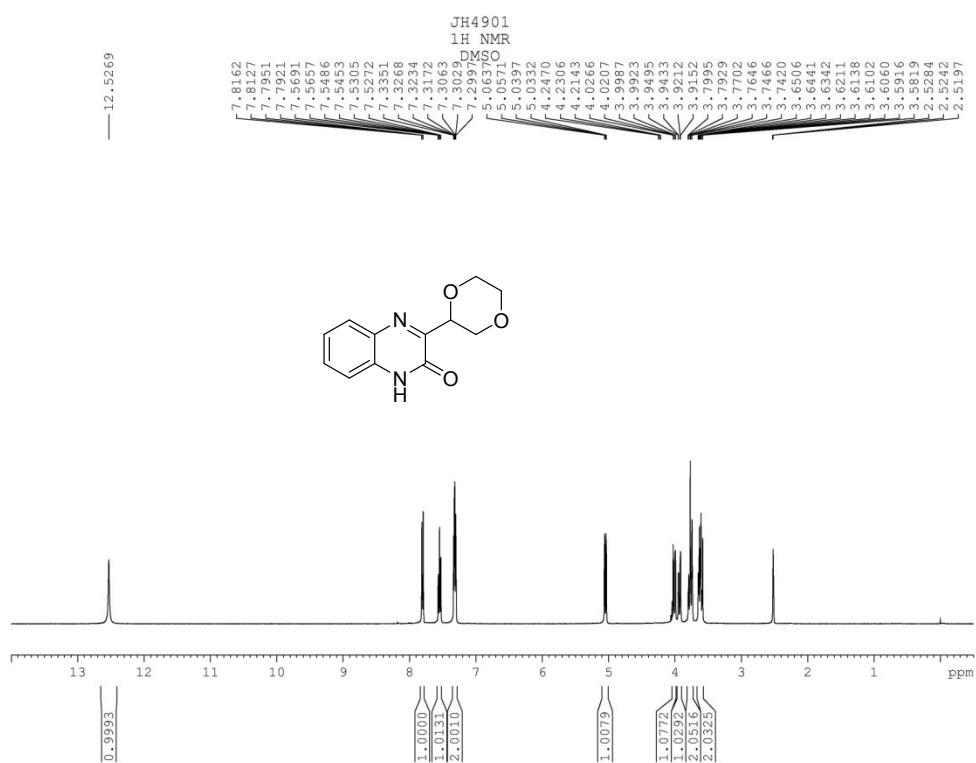


Fig. 41 ^1H NMR spectrum of compound **3ib**

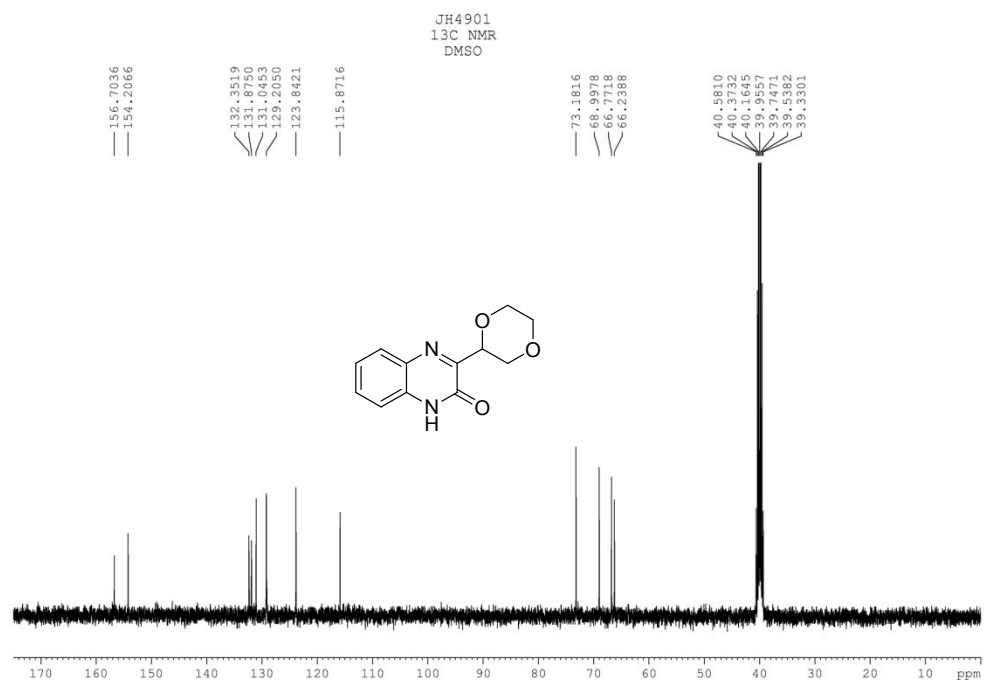


Fig. 42 ^{13}C NMR spectrum of compound **3ib**

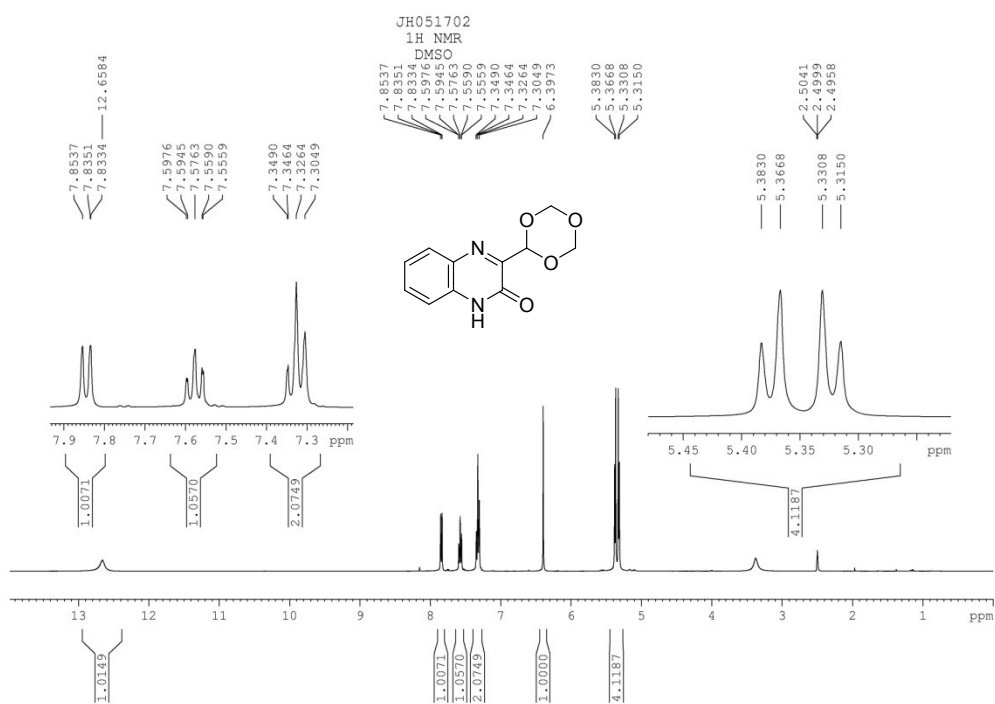


Fig. 43 ^1H NMR spectrum of compound **3ic**

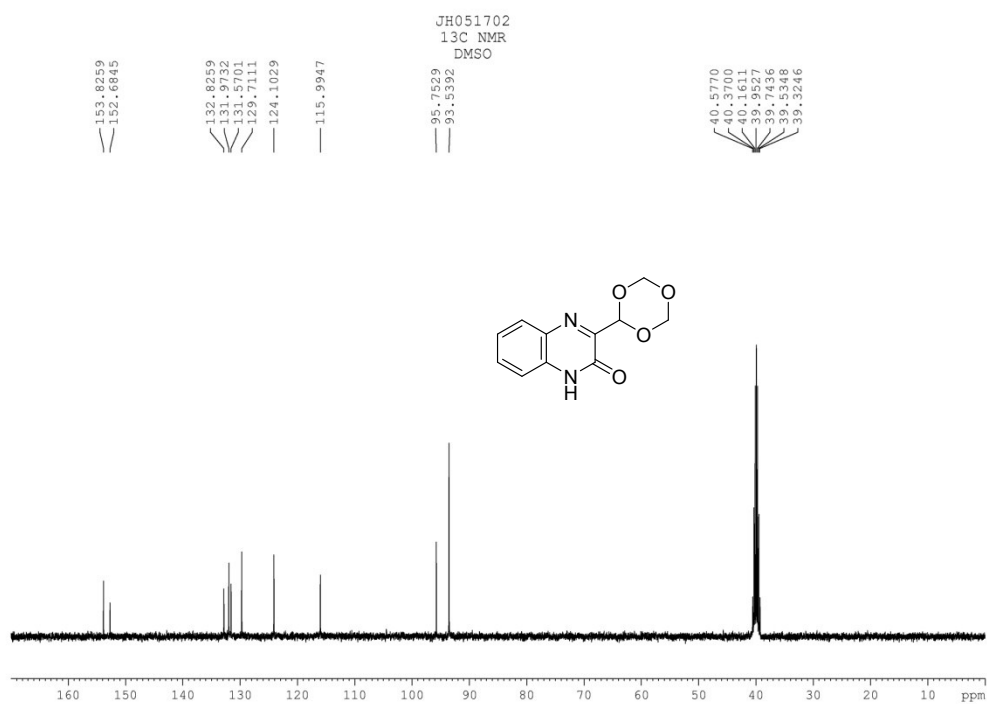


Fig. 44 ^{13}C NMR spectrum of compound **3ic**

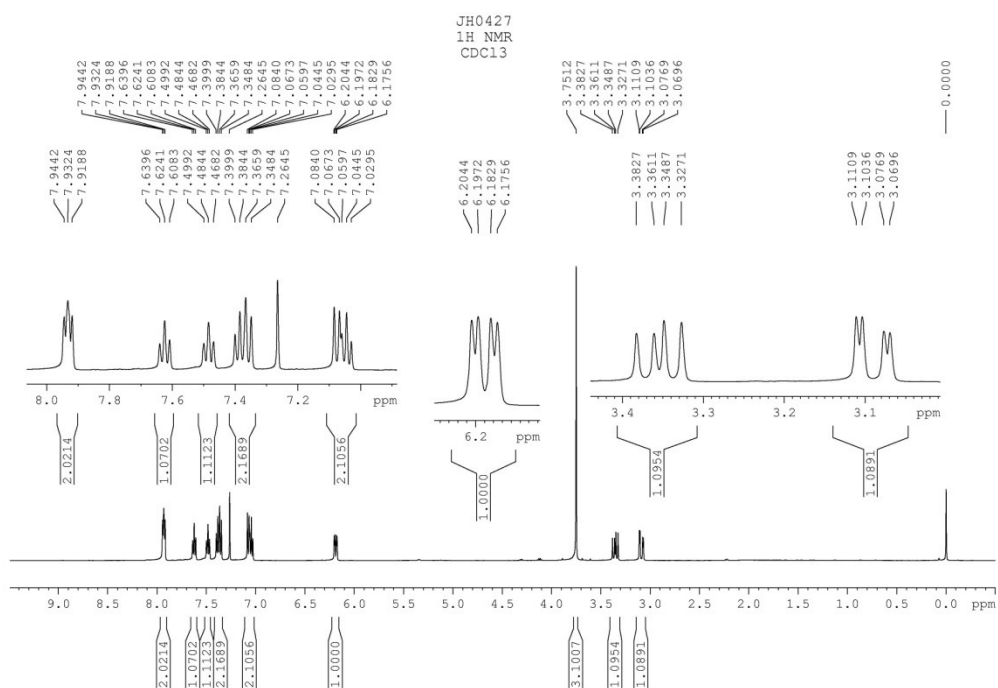


Fig. 45 ¹H NMR spectrum of compound 5

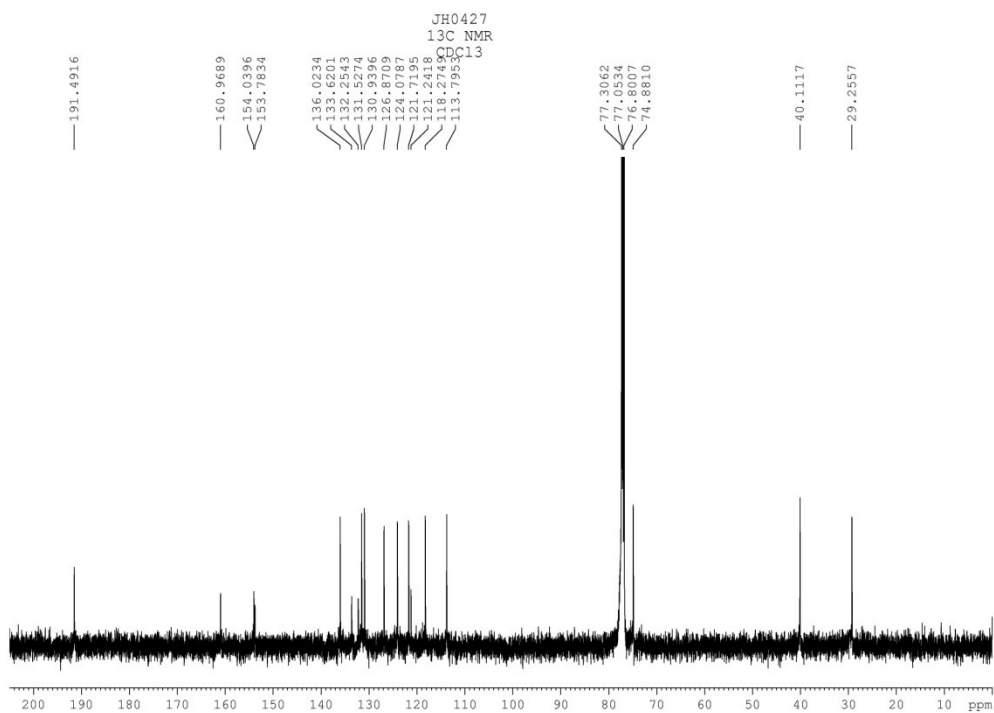


Fig. 46 ¹³C NMR spectrum of compound 5

2. HR MS of the adduct of TEMPO and 1,4-dioxan-2-yl radical

168 #17 RT: 0.22 AV: 1 NL: 2.20E8
T: FTMS + p ESI Full ms [150.00-2000.00]

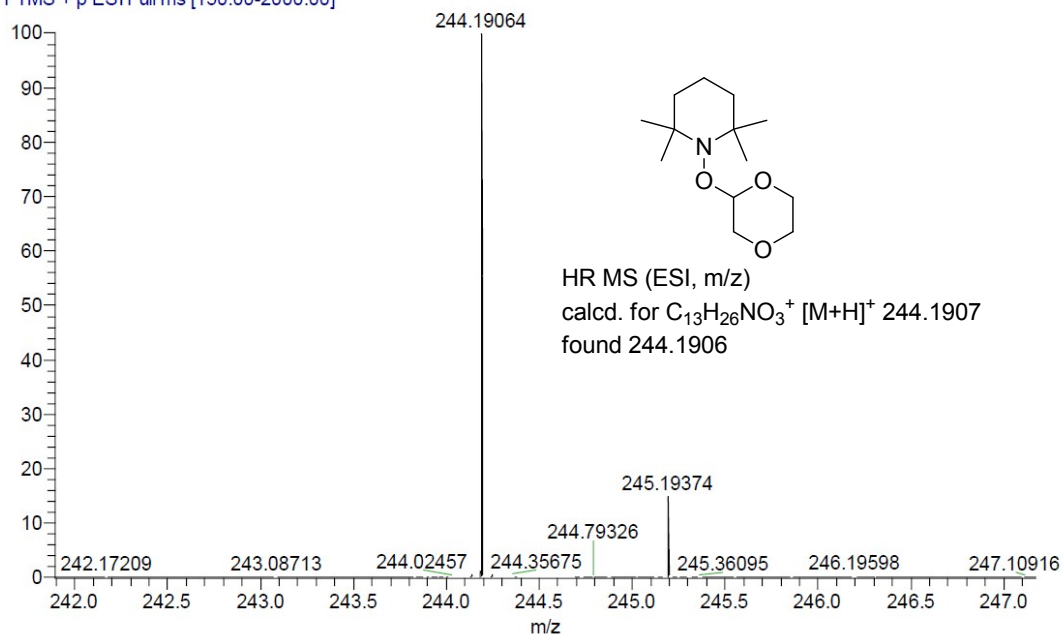


Fig. 47 HR MS of the adduct of TEMPO and 1,4-dioxan-2-yl radical