

Aluminium-based ionic liquid grafted on biochar as a heterogeneous catalyst for the selective synthesis of tetrazole and 2,3-dihydroquinazolin 4(1H)-one derivatives

Masoomeh Norouzi*^a, Parisa Moradi^a, Maryam Khanmoradi^a

^aDepartment of Chemistry, Faculty of Science, Ilam University, P. O. Box69315516, Ilam, Iran.

** E-mail address: m.norouzi@ilam.ac.ir*

Data of compounds

Figure S1. ¹HNMR spectrum of 5-(4-Chloro-phenyl)-1H-tetrazole

Figure S2. ¹HNMR spectrum of 5-Phenyltetrazole

Figure S3. ¹HNMR spectrum of 5-(3-Nitrophenyl) tetrazole

Figure S4. ¹HNMR spectrum of 2-(4-Bromo-phenyl)-2,3-dihydro-1H-quinazolin-4-one

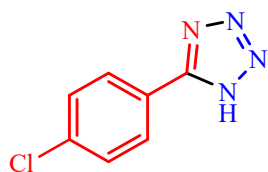
Figure S5. ¹HNMR spectrum of 2-(5-Bromo-2-hydroxy-phenyl)-2,3-dihydro-1H-quinazolin-4-one

Figure S6. ¹HNMR spectrum of 2-(3,4-Dimethoxy-phenyl)-2,3-dihydro-1H-quinazolin-4-one

Figure S7. ¹HNMR spectrum of 2-Phenyl-2,3-dihydro-1H-quinazolin-4-one

Figure S8. ¹HNMR spectrum of 2-(4-Chloro-phenyl)-2,3-dihydro-1H-quinazolin-4-one

5-(4-Chloro-phenyl)-1H-tetrazole



$^1\text{H NMR}$ (400 MHz, DMSO) δ : 16.97 (s, 1H, NH), 8.06-8.03 (d, 1H, J=8 Hz, CH), 7.72-7.67 (d, 1H, J=8 Hz, Ar-H).

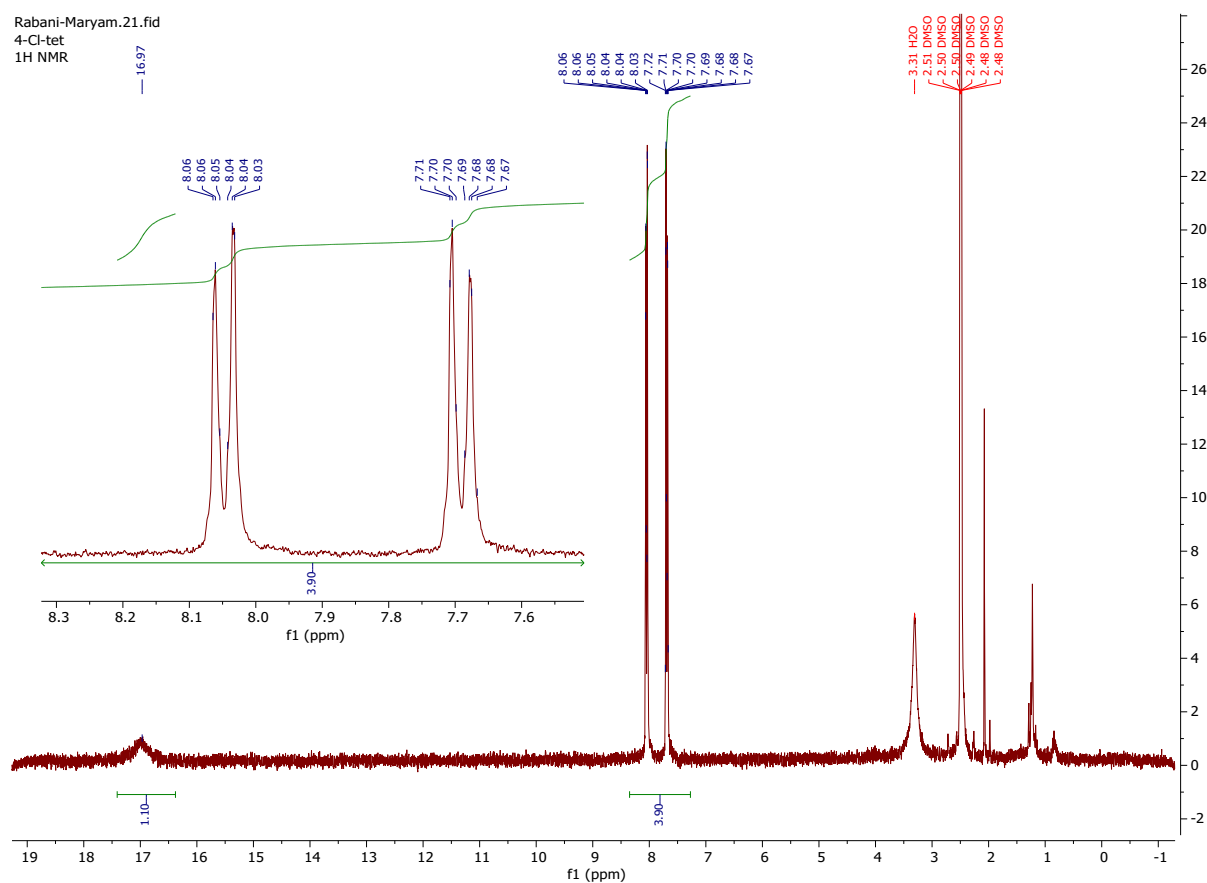
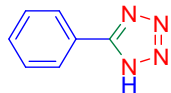


Figure S1. $^1\text{H NMR}$ spectrum of 5-(4-Chloro-phenyl)-1H-tetrazole

5-Phenyltetrazole



^1H NMR (400 MHz, DMSO) δ : 8.10-8.05 (t, $J = 8$ Hz, 2H), 7.94-7.86 (t, $J = 8$ Hz, 1H), 7.80-7.74 (t, $J = 8$ Hz, 2H).

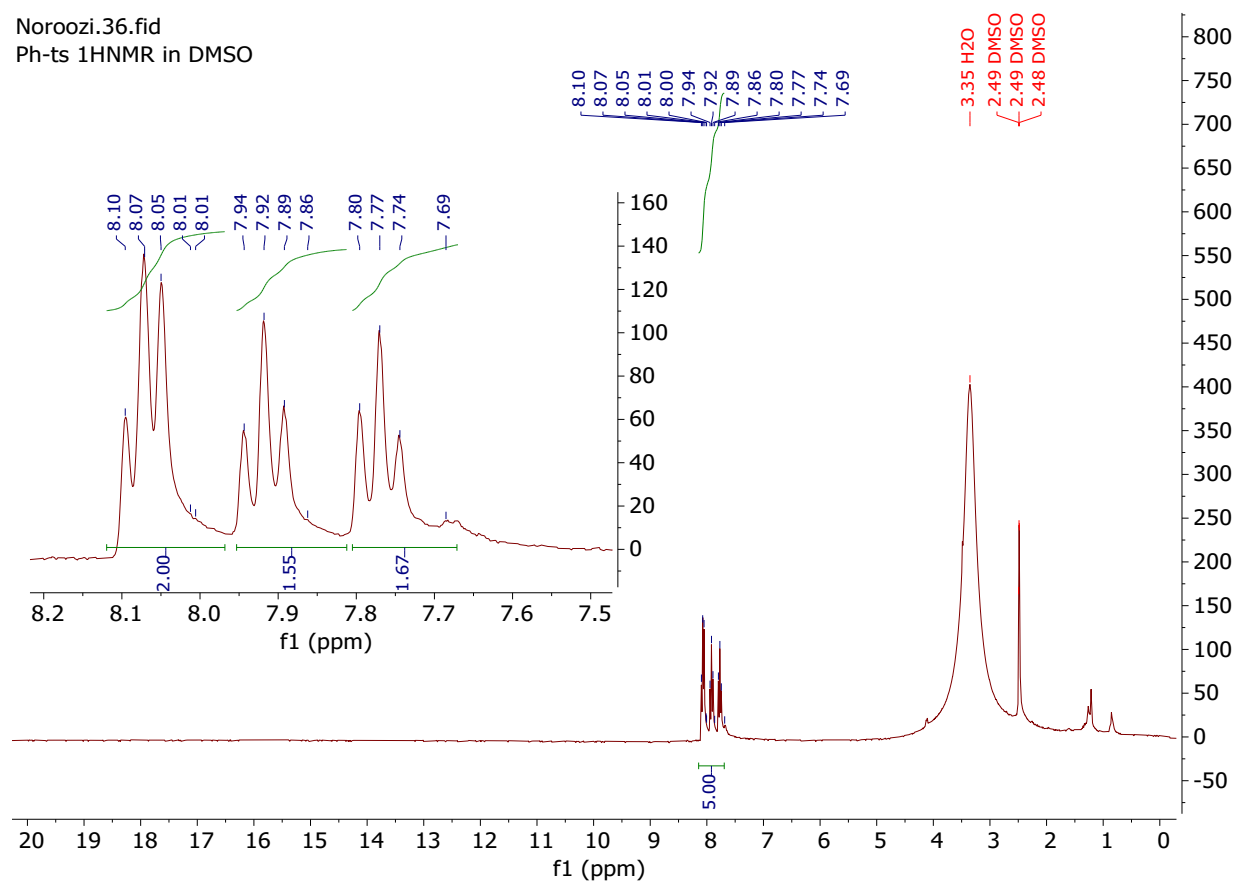
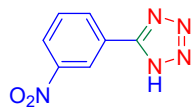


Figure S2. ^1H NMR spectrum of 5-Phenyltetrazole

5-(3-Nitrophenyl)tetrazole



$^1\text{H NMR}$ (400 MHz, DMSO) δ : 8.82 (s, 1H), 8.54 – 8.34 (m, 2H), 7.92-7.86 (t, $J = 8$. Hz, 1H).

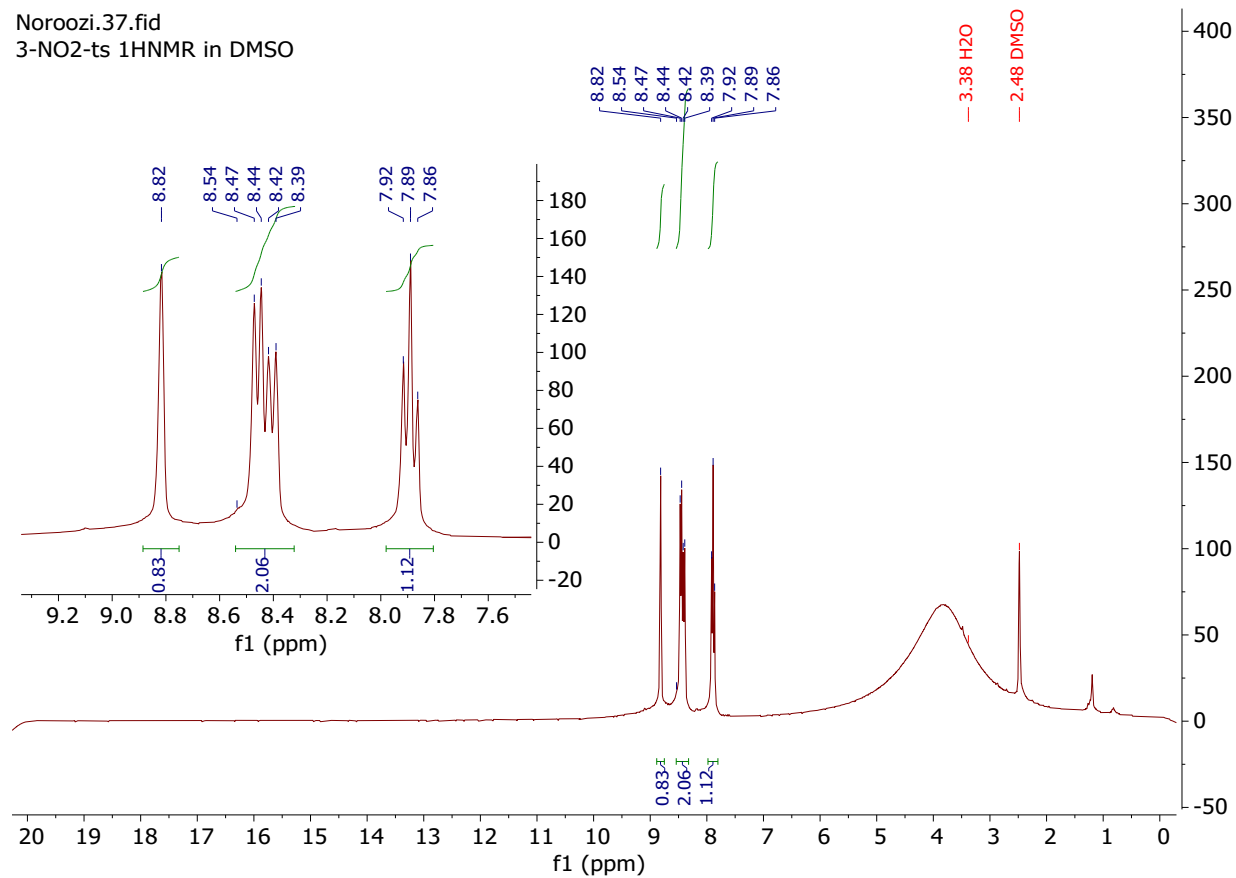
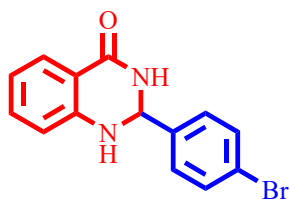
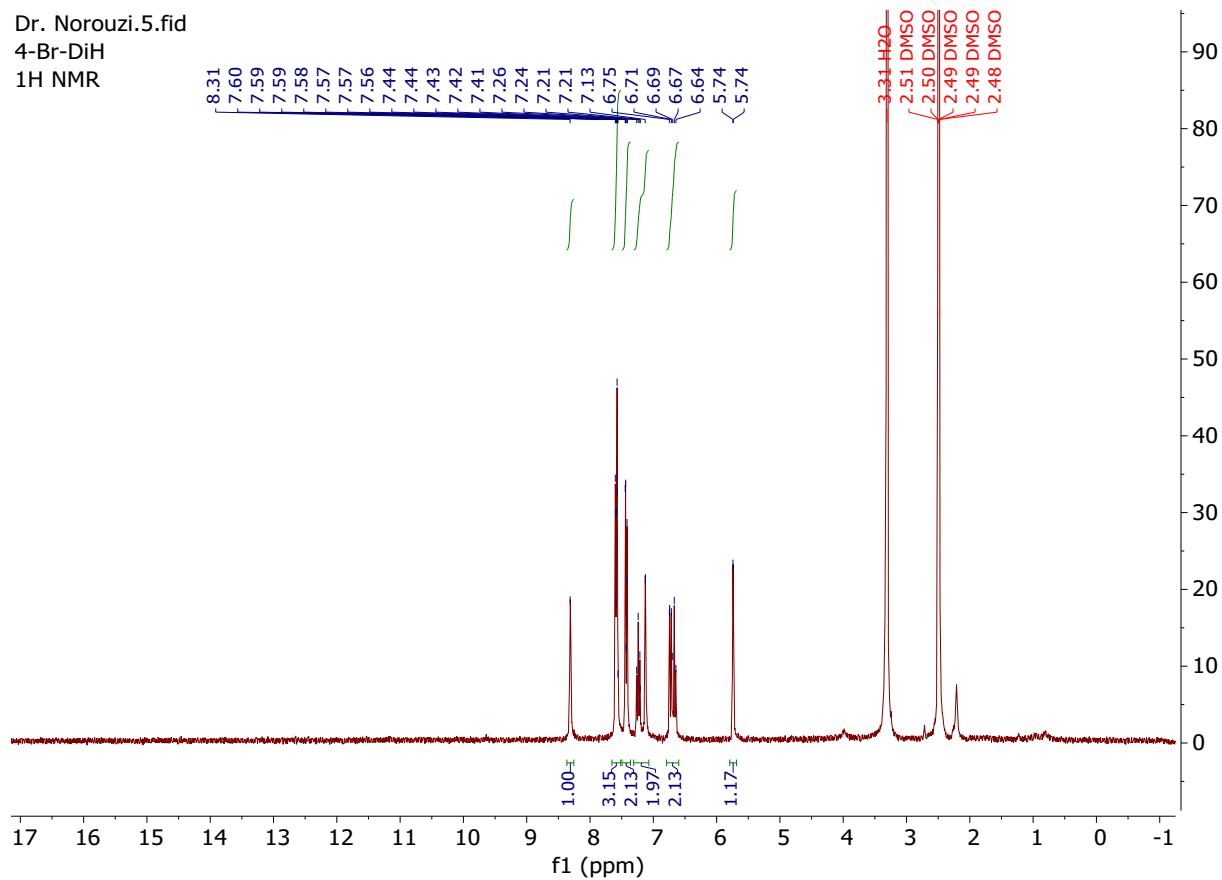


Figure S3. $^1\text{H NMR}$ spectrum of 5-(3-Nitrophenyl)tetrazole

2-(4-Bromo-phenyl)-2,3-dihydro-1H-quinazolin-4-one



$^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$): δ 8.31 (s, 1H), 7.60-7.56 (d, $J=7.6$ Hz, 3H), 7.44-7.41 (d, $J=7.4$ Hz, 2H), 7.26-7.21 (s, $J=7$ Hz, 1H), 7.13 (s, 1H), 6.75-6.4 (m, 2H), 5.74 (s, 1H) ppm.



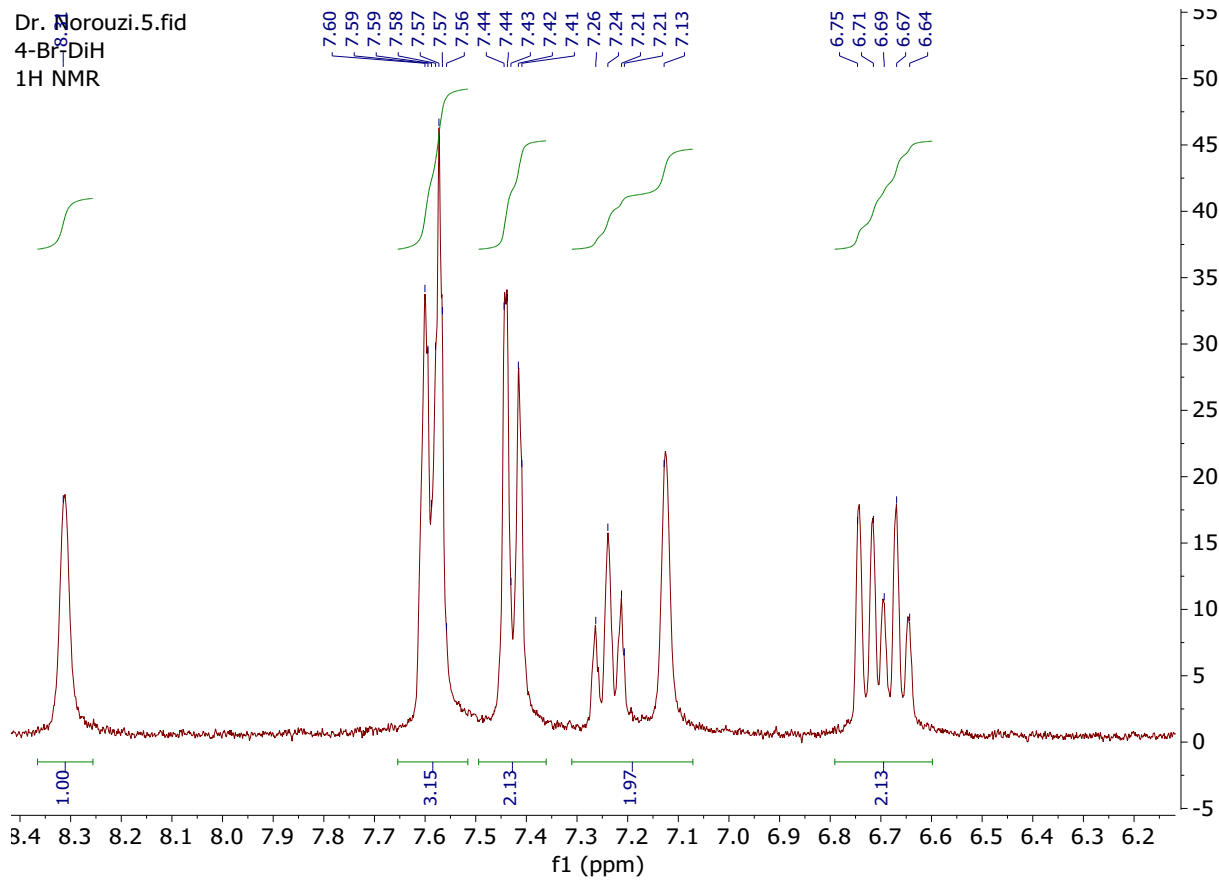
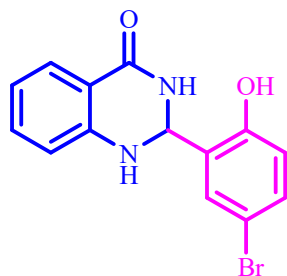


Figure S4. ¹H NMR spectrum of 2-(4-bromophenyl)-2,3-dihydro-1H-quinazolin-4-one

2-(5-Bromo-2-hydroxy-phenyl)-2,3-dihydro-1H-quinazolin-4-one



^1H NMR (400 MHz, $\text{DMSO-}d_6$): δ 10.22 (s, 1H), 7.99 (s, 1H), 7.63-7.60 (d, $J=7.6$ Hz, 1H), 7.30-7.20 (m, 2H), 6.83-6.65 (m, 4H), 5.95 (s, 1H) ppm.

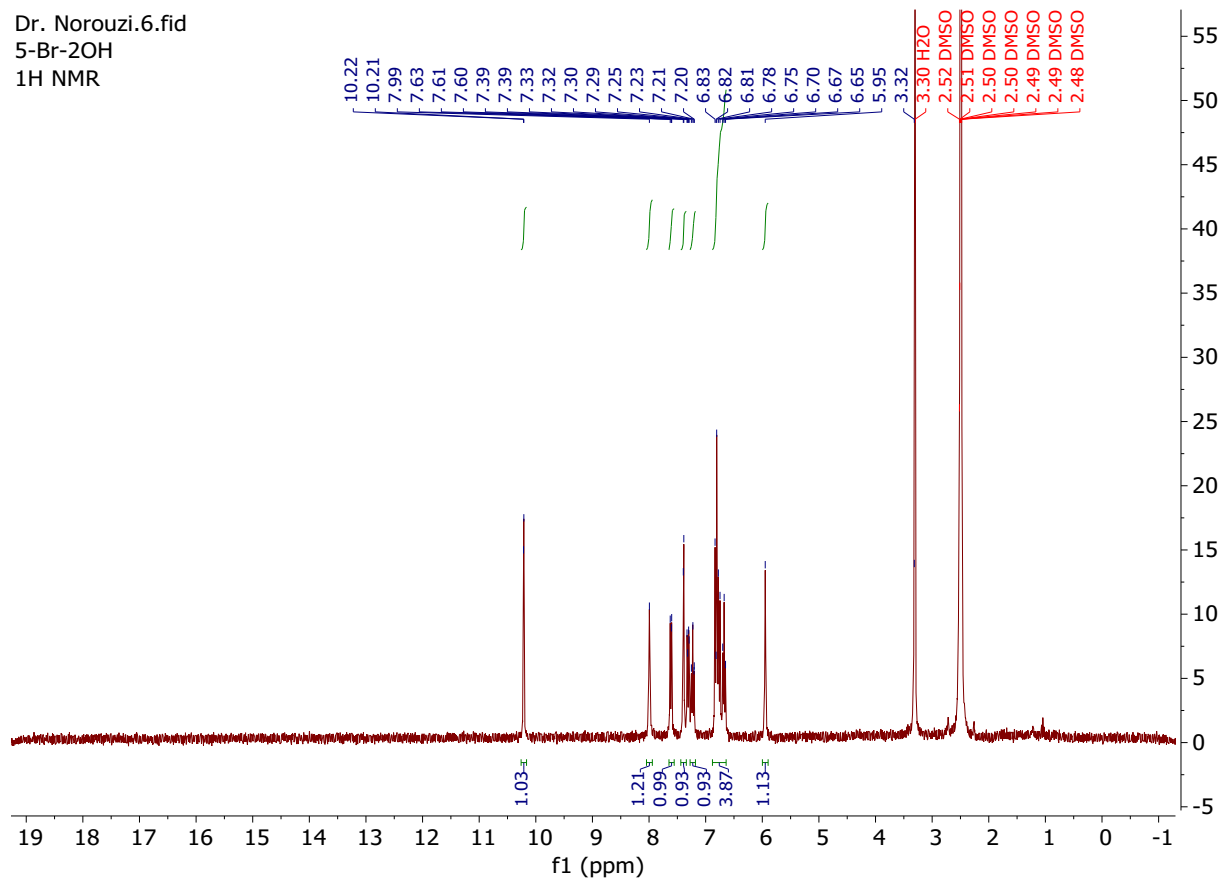
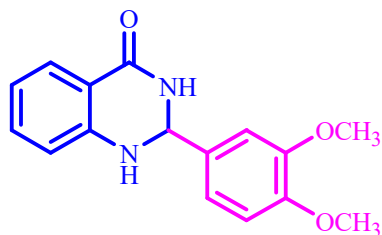
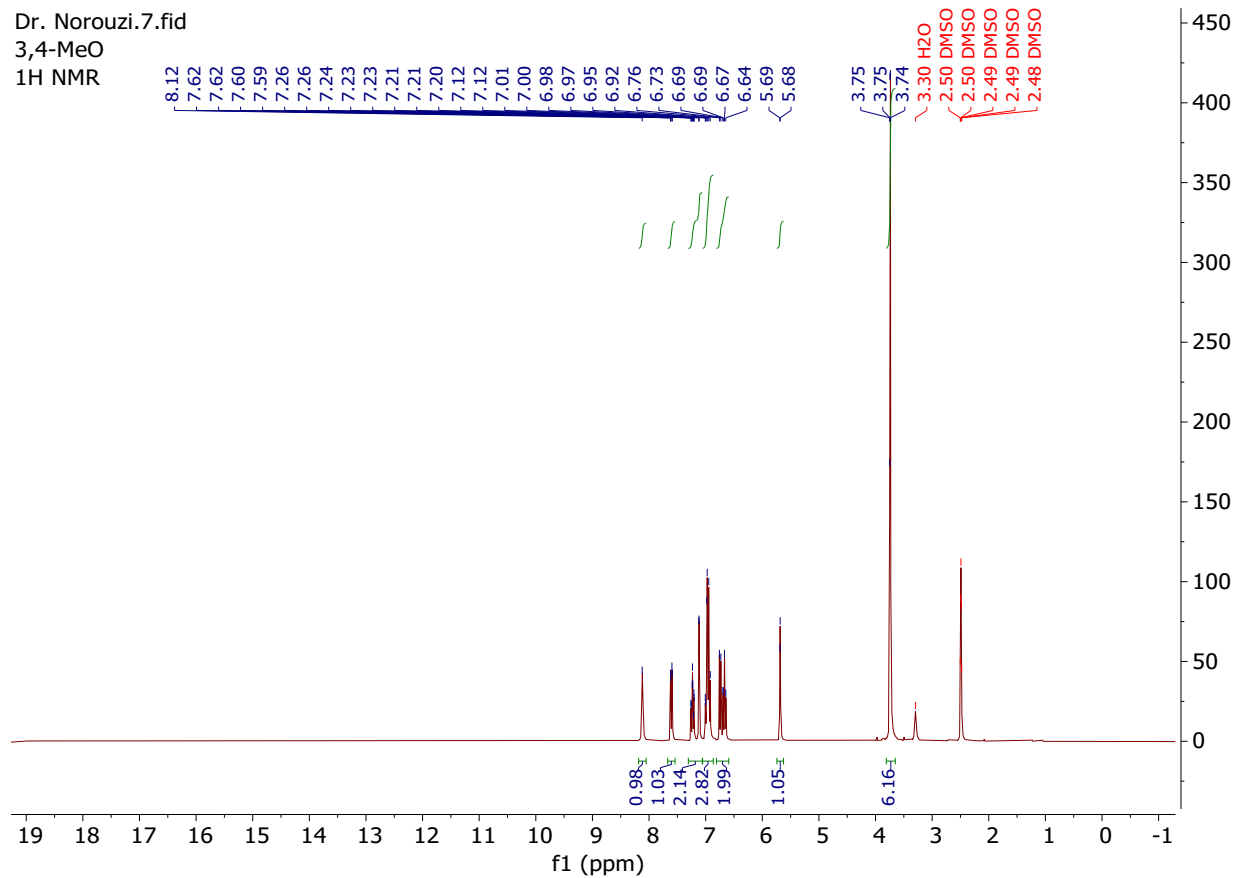


Figure S5. ^1H NMR spectrum of 2-(5-Bromo-2-hydroxyphenyl)-2,3-dihydro-1H-quinazolin-4-one

2-(3,4-Dimethoxy-phenyl)-2,3-dihydro-1H-quinazolin-4-one



^1H NMR (400 MHz, $\text{DMSO-}d_6$): δ 8.12 (s, 1H), 7.62-7.59 (d, $J=7.6$, 1H), 7.26-7.21 (t, $J=7.2$, 1H), 7.20 (s, 1H), 7.01-6.92 (m, 3H), 6.73-6.76 (d, $J=6.7$ Hz, 1H), 6.96-6.64 (t, $J=6.7$ Hz, 1H), 5.68 (s, 1H), 3.75 (s, 6H) ppm.



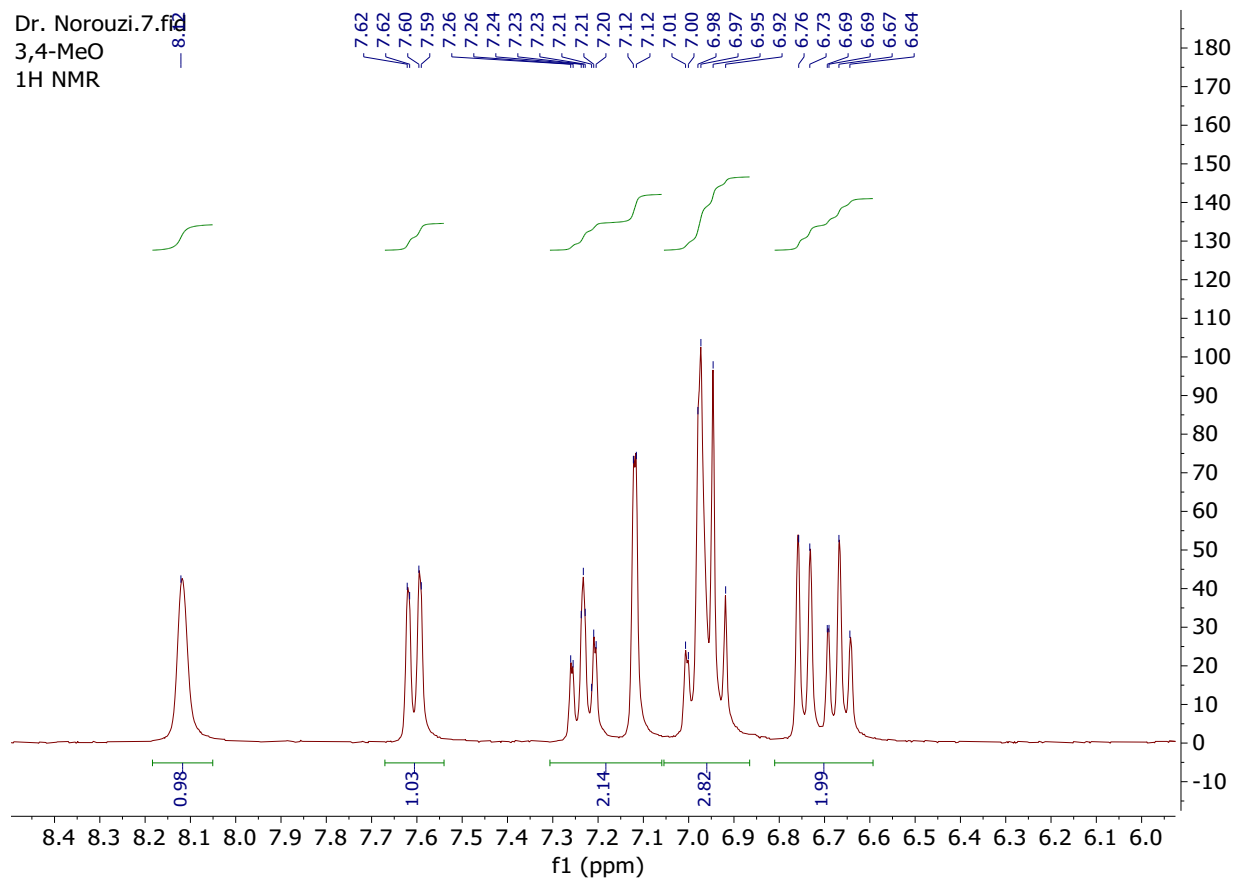
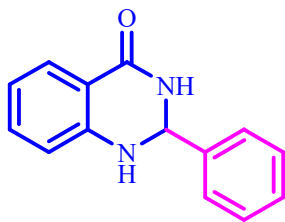
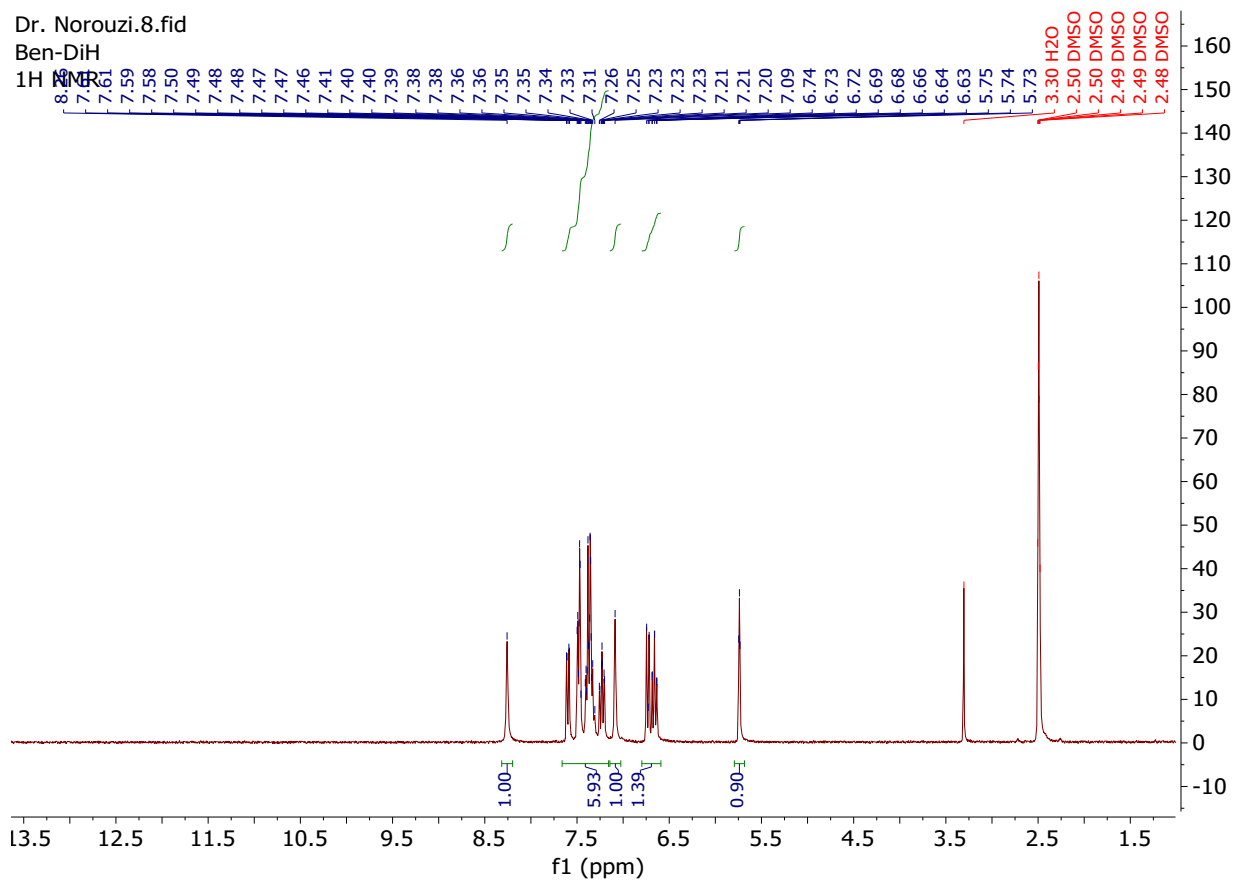


Figure S6. ^1H NMR spectrum of 2-(3,4-Dimethoxy-phenyl)-2,3-dihydro-1H-quinazolin-4-one

2-Phenyl-2,3-dihydro-1H-quinazolin-4-one



^1H NMR (400 MHz, DMSO): δ 8.25 (s, 1H), 7.61-7.57 (d, $J = 7.6$ Hz, 1H), 7.49-7.46 (d, $J = 7.6$ Hz, 2H), 7.41-7.34 (m, 3H), 7.28-7.30 (t, $J = 7.0$ Hz, 1H), 7.08 (s, 1H), 6.74-6.70 (d, $J = 7.0$ Hz, 1H), 6.69-6.64 (t, $J = 7.0$ Hz, 1H), 5.74 (s, 1H).



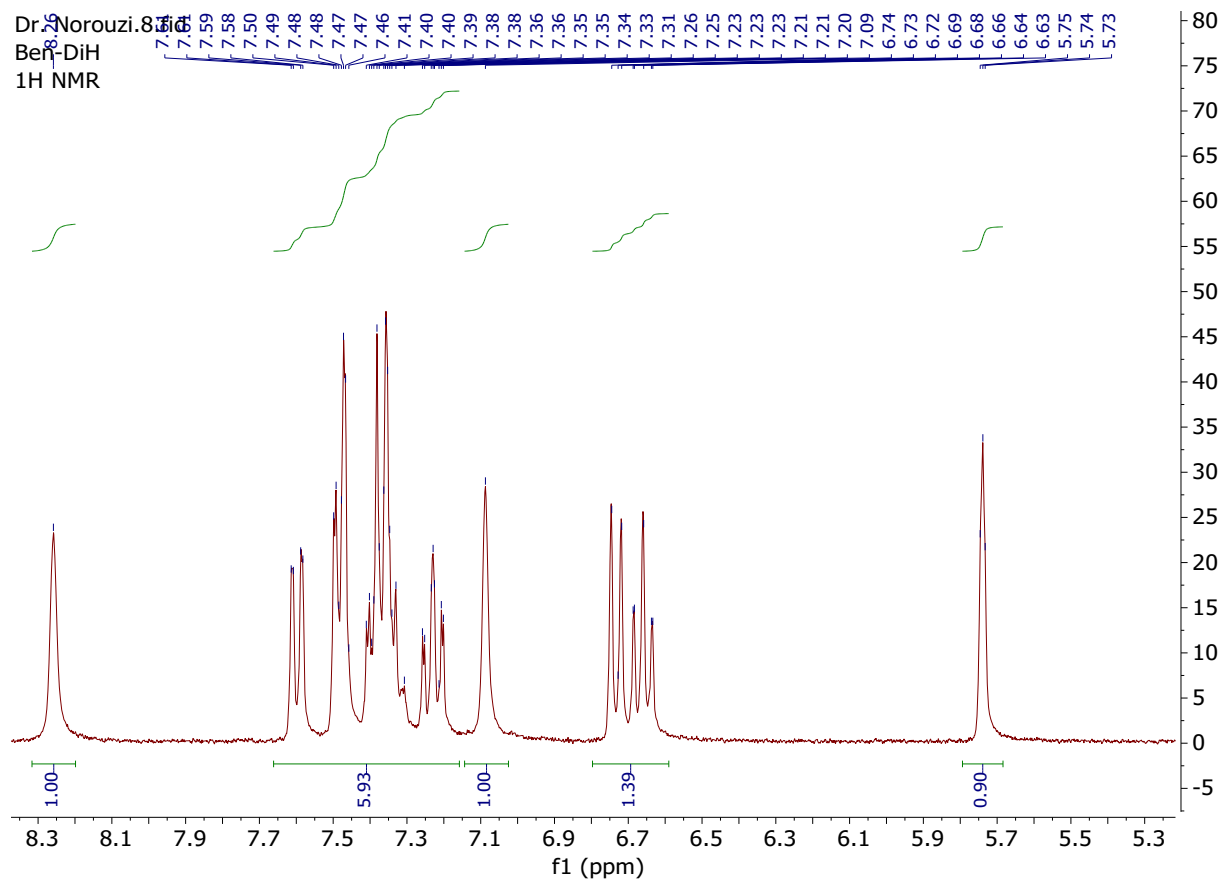
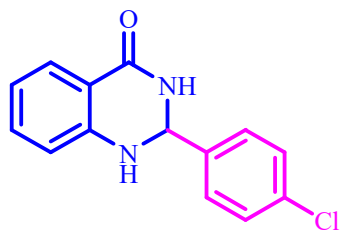
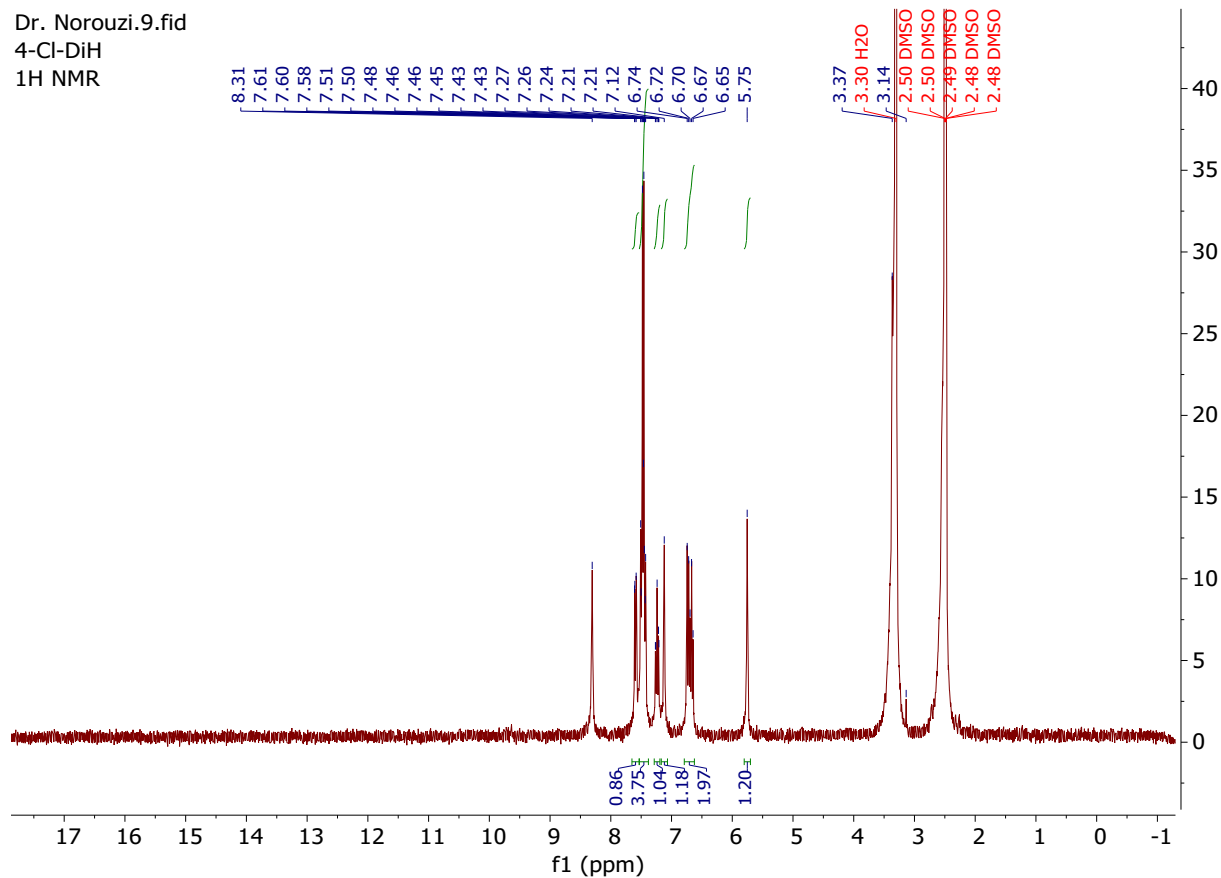


Figure S7. ^1H NMR spectrum of 2-Phenyl-2,3-dihydro-1H-quinazolin-4-one

2-(4-Chloro-phenyl)-2,3-dihydro-1H-quinazolin-4-one



$^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$): δ 8.31 (s, 1H), 7.62-7.55 (d, $J = 7.1$ Hz, 1H), 7.52-7.40 (m, 4H), 7.26-7.20 (t, 1H), 7.12 (s, 1H), 6.75-6.70 (d, $J = 7.0$, 1H), 6.71-6.64 (t, $J = 7.0$, 1H), 5.75 (s, 1H) ppm.



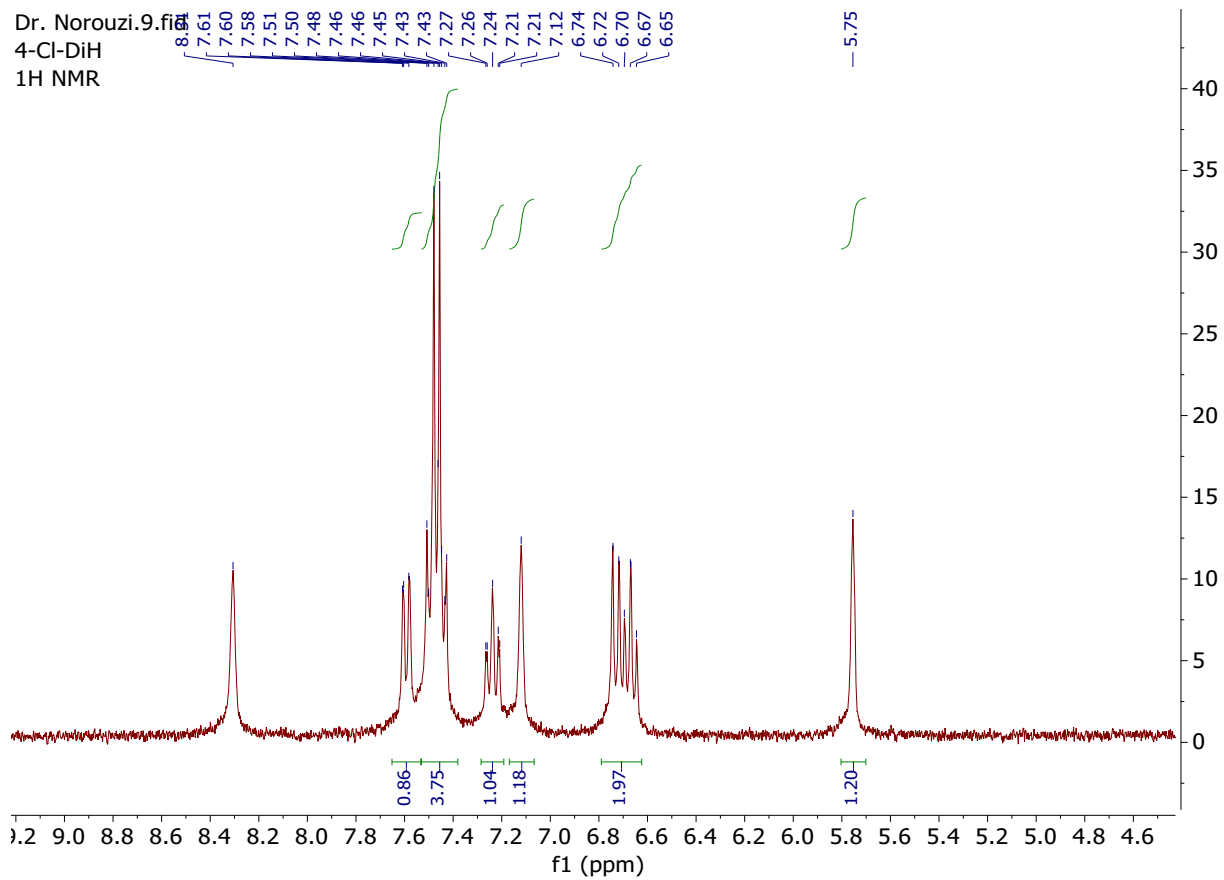


Figure S8. ^1H NMR spectrum of 2-(4-Chloro-phenyl)-2,3-dihydro-1H-quinazolin-4-one