

Supplementary Material

Synthesis of 9-Hydroxy-1*H*-Benzo[*f*]chromene Derivatives with Effective Cytotoxic Activity on MCF7/ADR, *P*-Glycoprotein Inhibitors, Cell Cycle Arrest and Apoptosis

Fawzia F. Albalawi 1,* , Mohammed A. A. El-Nassag 2, Raafat A. El-Eisawy 2,3, Mahmoud Basseem I. Mohamed 2 , Ahmed M. Fouda 4 , Tarek H. Afifi 1 , Ahmed A. Elhenawy 2,5 , Ahmed Mora 2 , Ahmed M. El-Agropy 2,* and Heba K. A. El-Mawgoud 6

1 Chemistry Department, Faculty of Science, Taibah University,
Al-Madinah Al-Munawarah 30002, Saudi Arabia

2 Chemistry Department, Faculty of Science, Al-Azhar University, Cairo 11884, Egypt

3 Chemistry Department, Faculty of Science and Art, Al-Baha University, Al-Baha 65582, Saudi Arabia

4 Chemistry Department, Faculty of Science, King Khalid University, Abha 61413, Saudi Arabia

5 Chemistry Department, Faculty of Science and Art, Albaha University, Albahah 65731, Saudi Arabia

6 Chemistry Department, Faculty of Women for Arts, Science, and Education, Ain Shams University,
Cairo 11757, Egypt

* Correspondence: ffs.chem443@gmail.com (F.F.A.); elagropy_am@azhar.edu.eg (A.M.E.-A.)

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ASATTAR 64 20-07-2020.160.fd
Dr.A.Sattar
Sample : 64-DH12_H DMSO

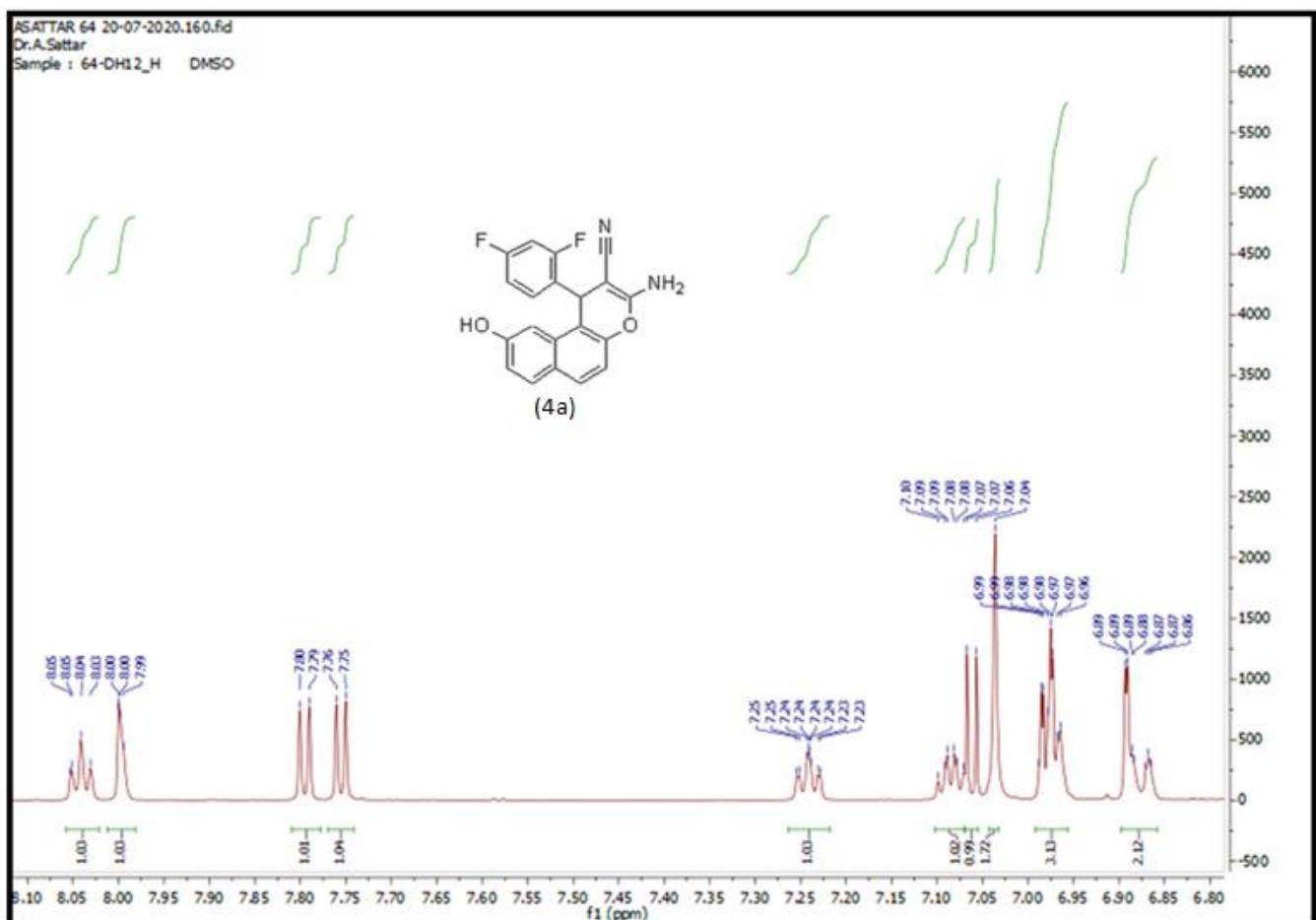


Figure S1: ¹H NMR 8.5-6.5 ppm of cpd. (4a).

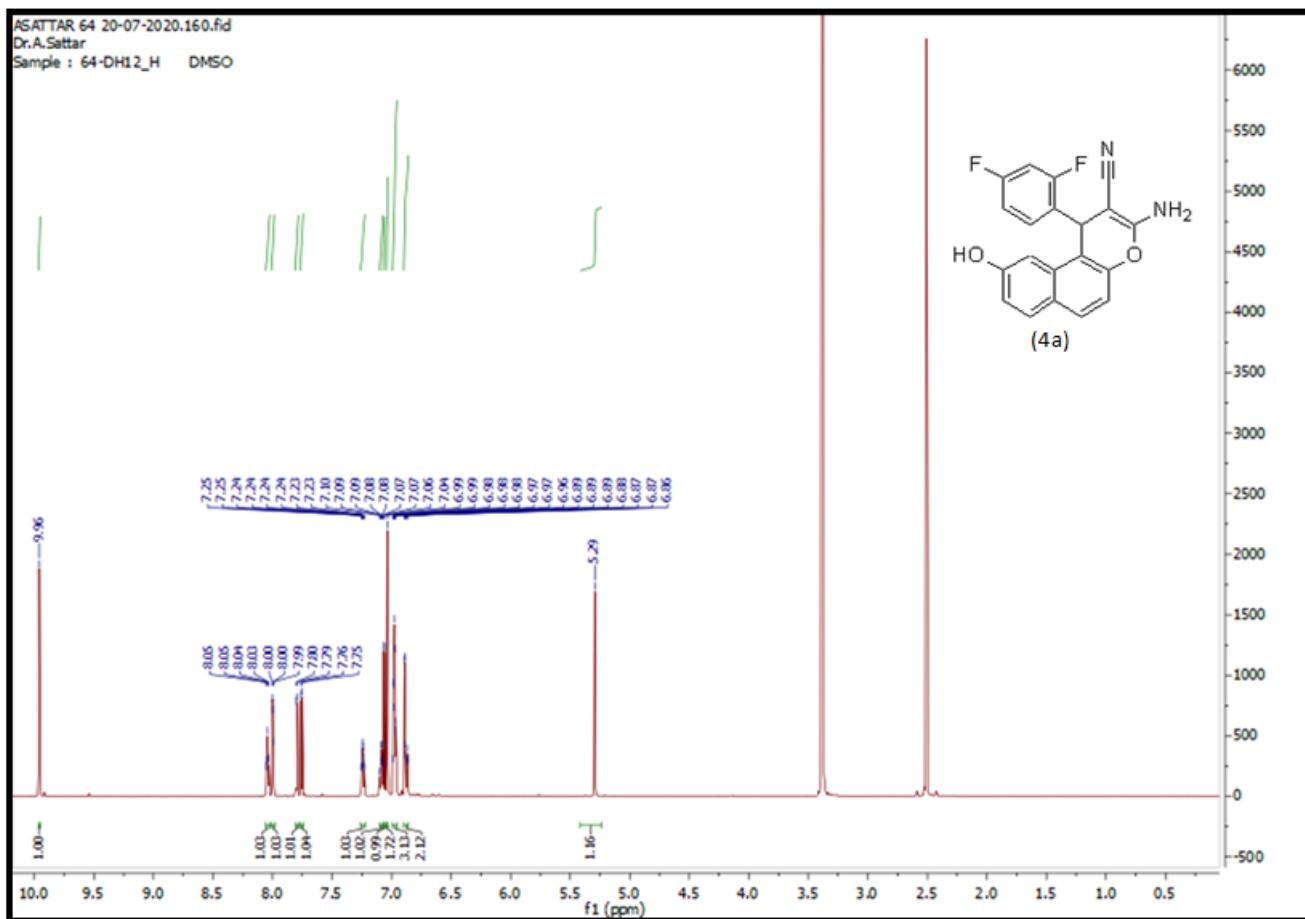


Figure S2: ¹H NMR of cpd. (4a).

ASATTAR 64 20-07-2020.161.fid
Dr.A.Sattar
Sample : 64-DH12_C DMSO

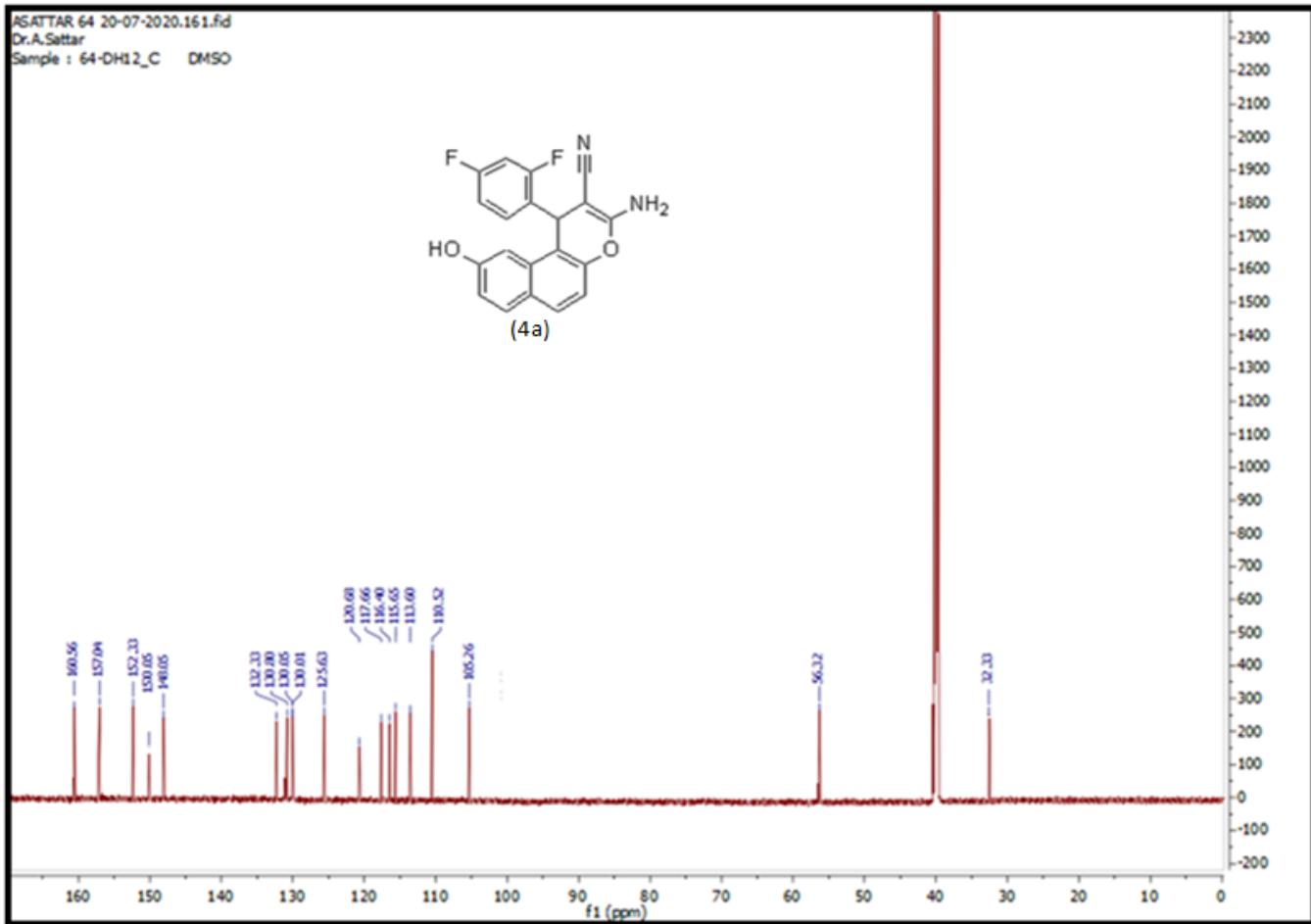
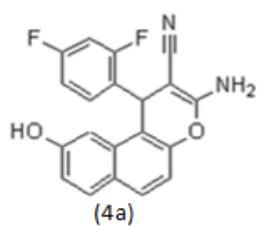


Figure S3: ¹³C NMR of cpd. (4a).

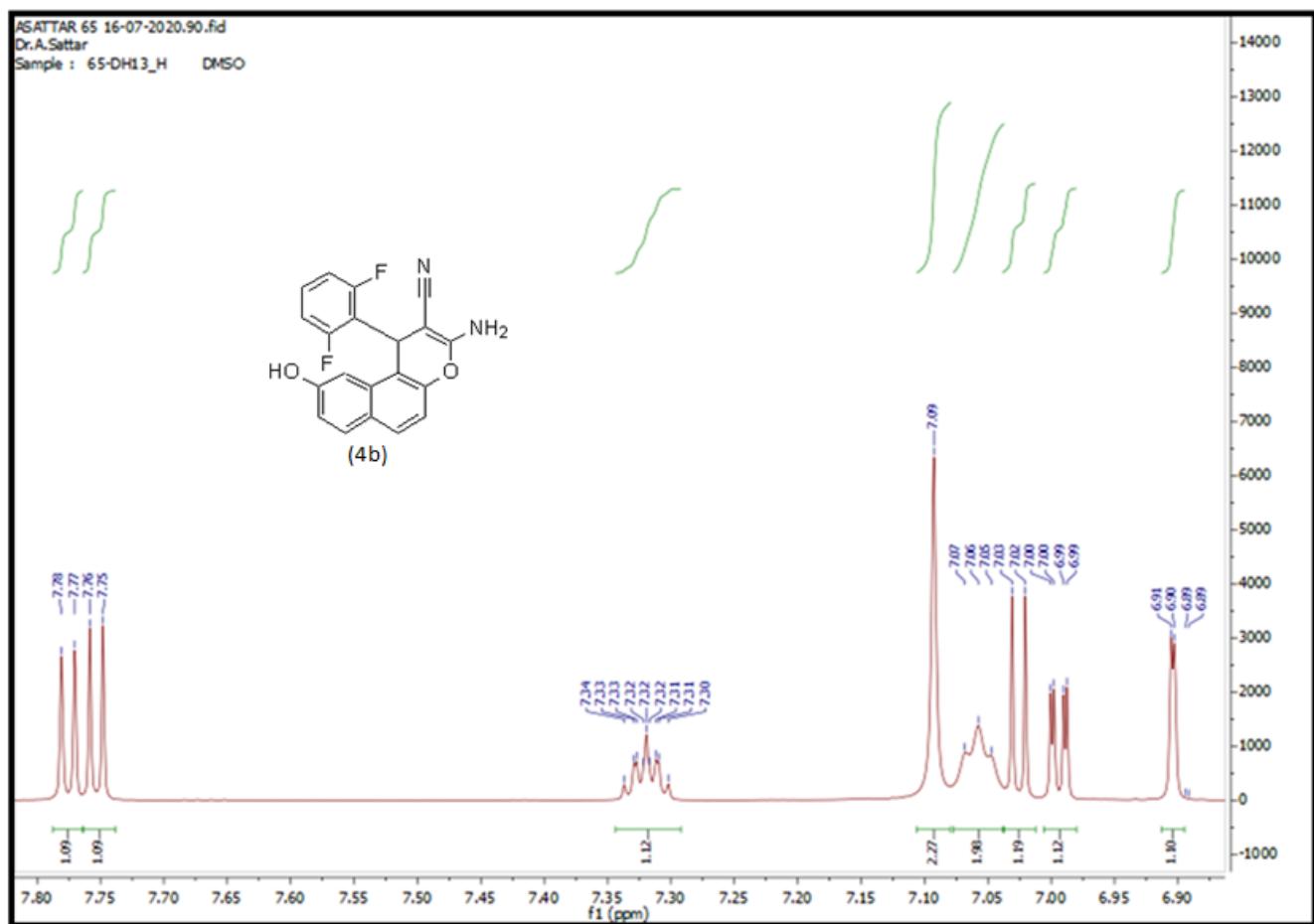


Figure S4: ^1H NMR 8.5-6.5 ppm of cpd. **(4b).**

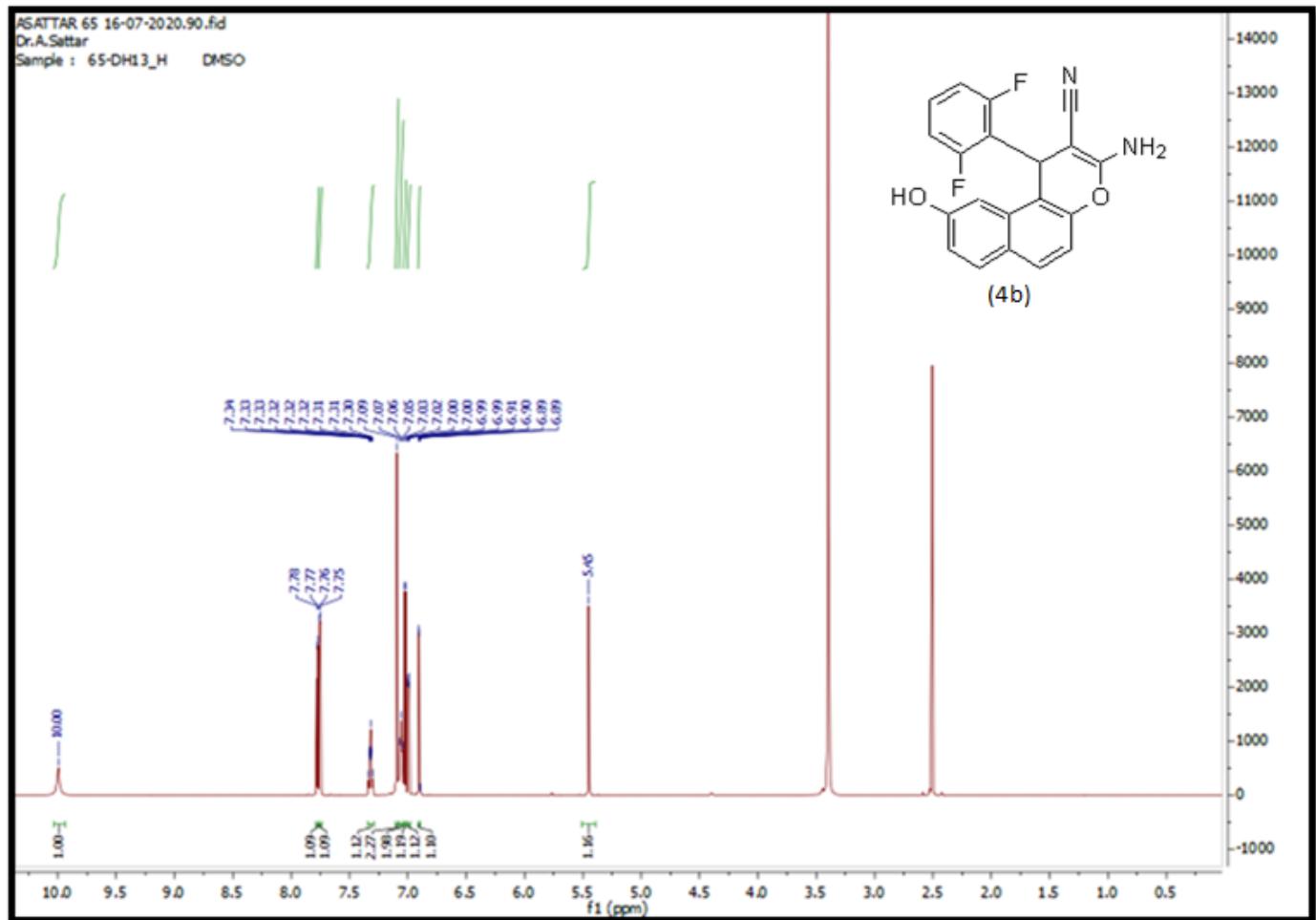


Figure S5: ¹H NMR of cpd. (4b).

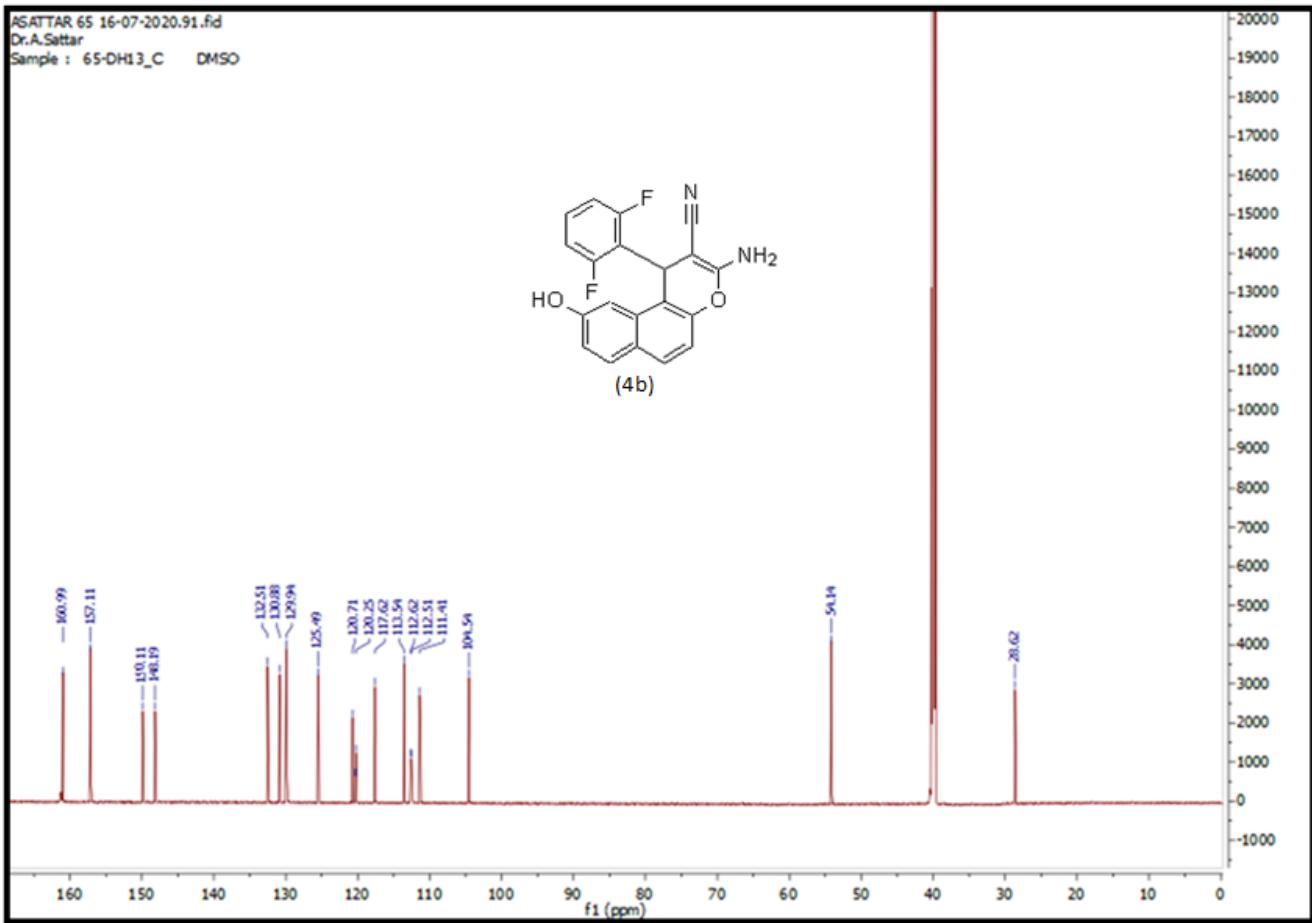


Figure S6: ¹³C NMR of cpd. (4b).

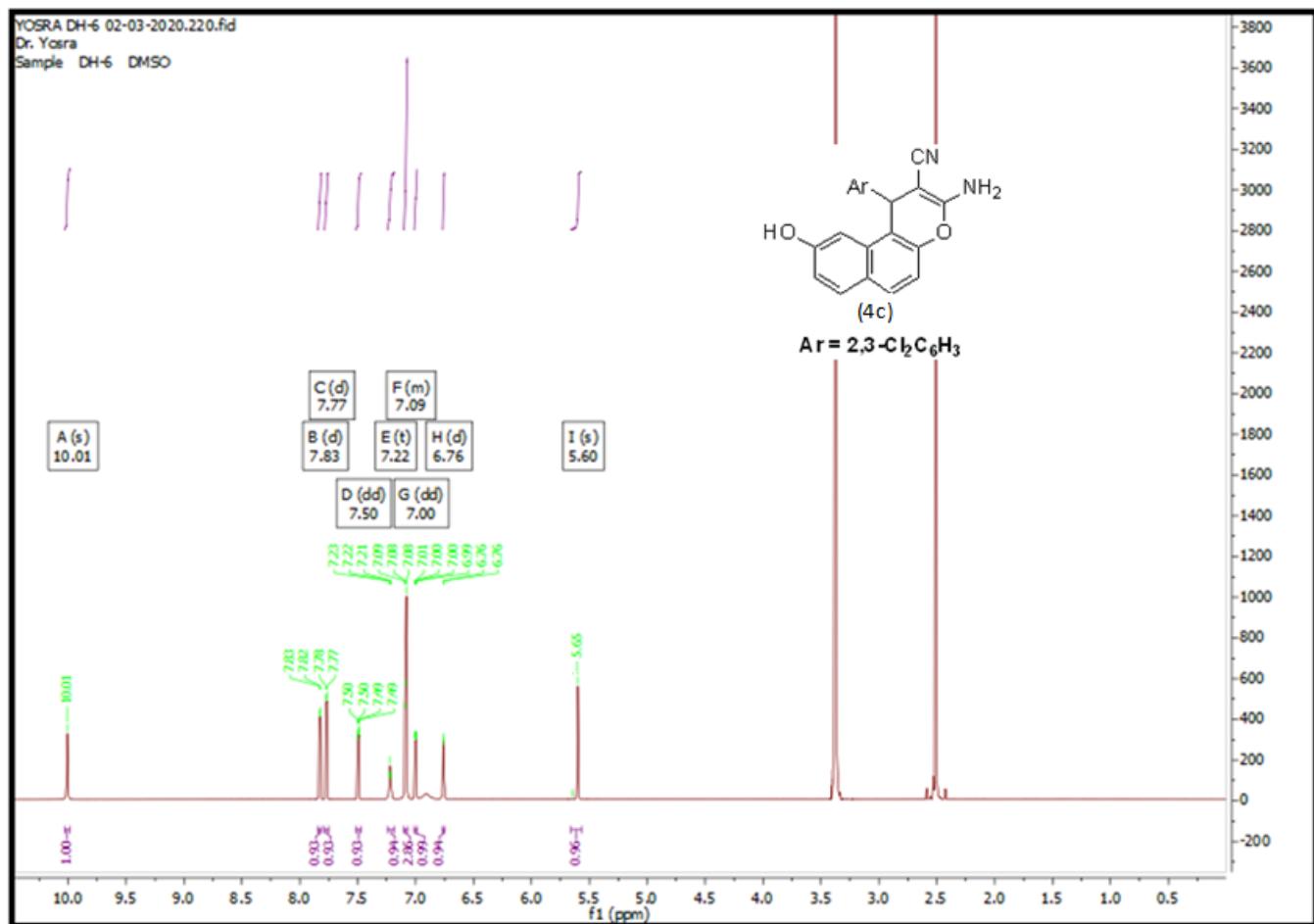


Figure S7: ¹H NMR of cpd. (4c).

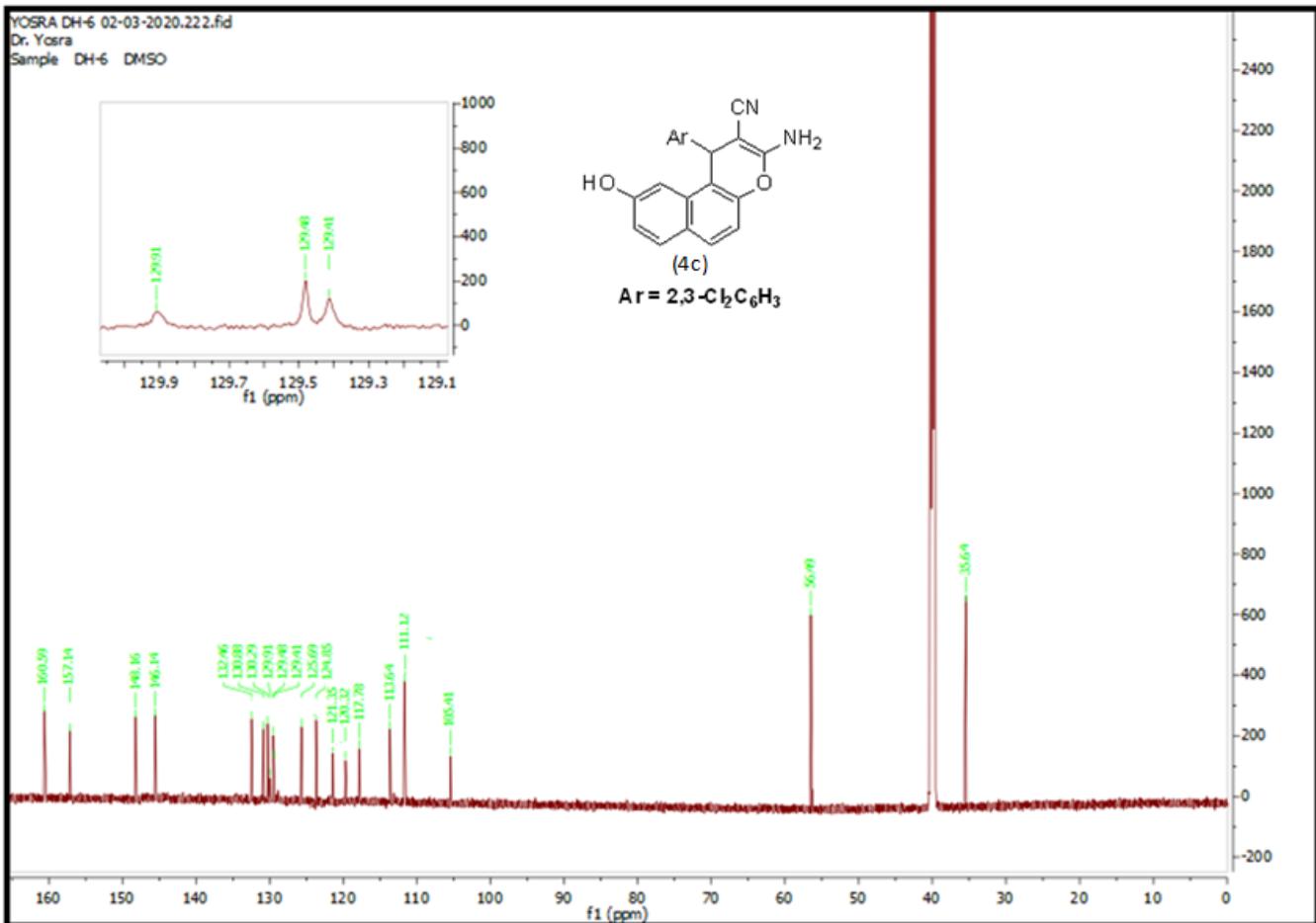


Figure S8: ^{13}C NMR of cpd. (4c).

ASATTAR_61 16-07-2020.130.fid
Dr.A.Sattar
Sample : 61-DH7_H DMSO

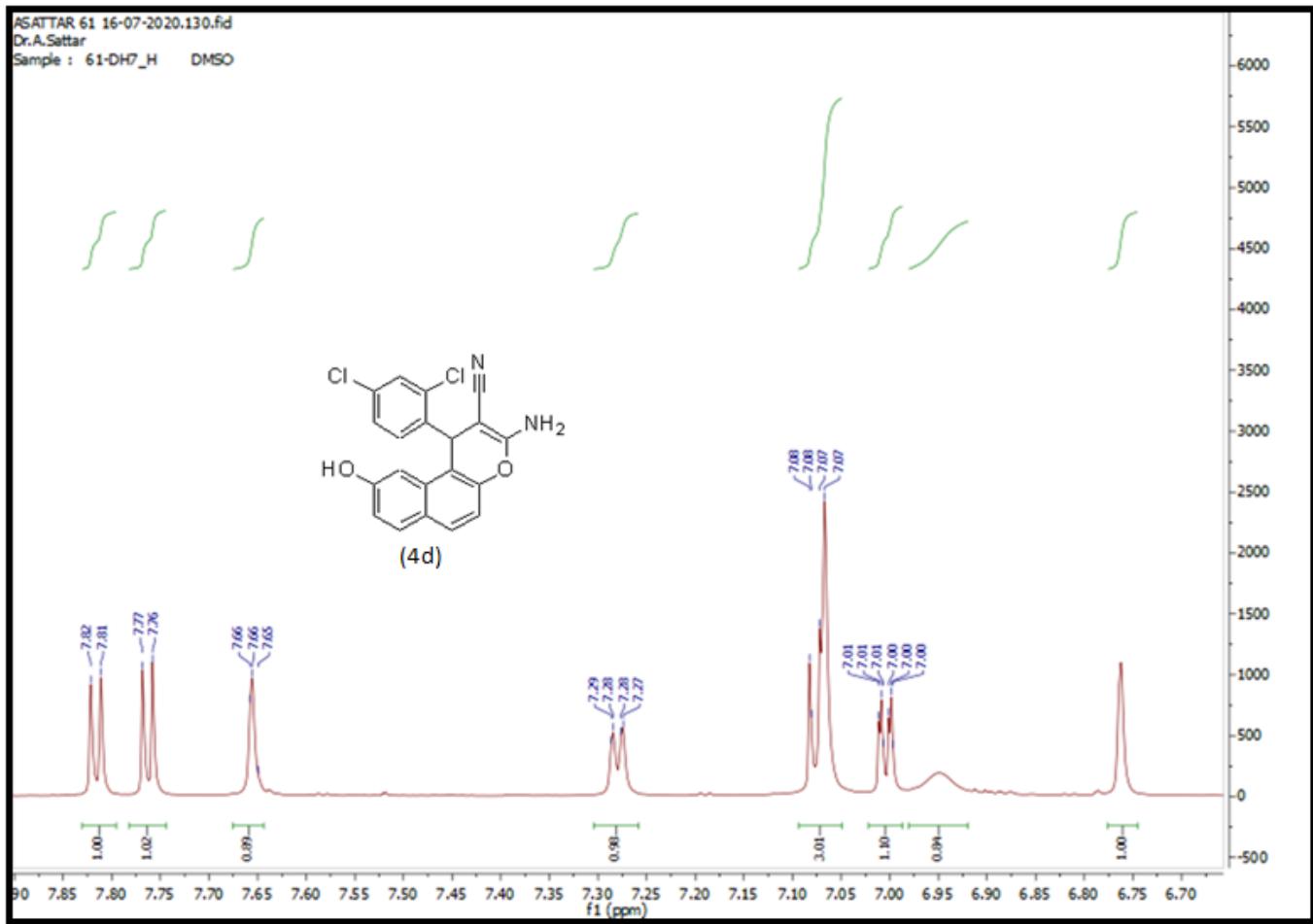


Figure S9: ^1H NMR 8.5–6.5 ppm of cpd. (4d).

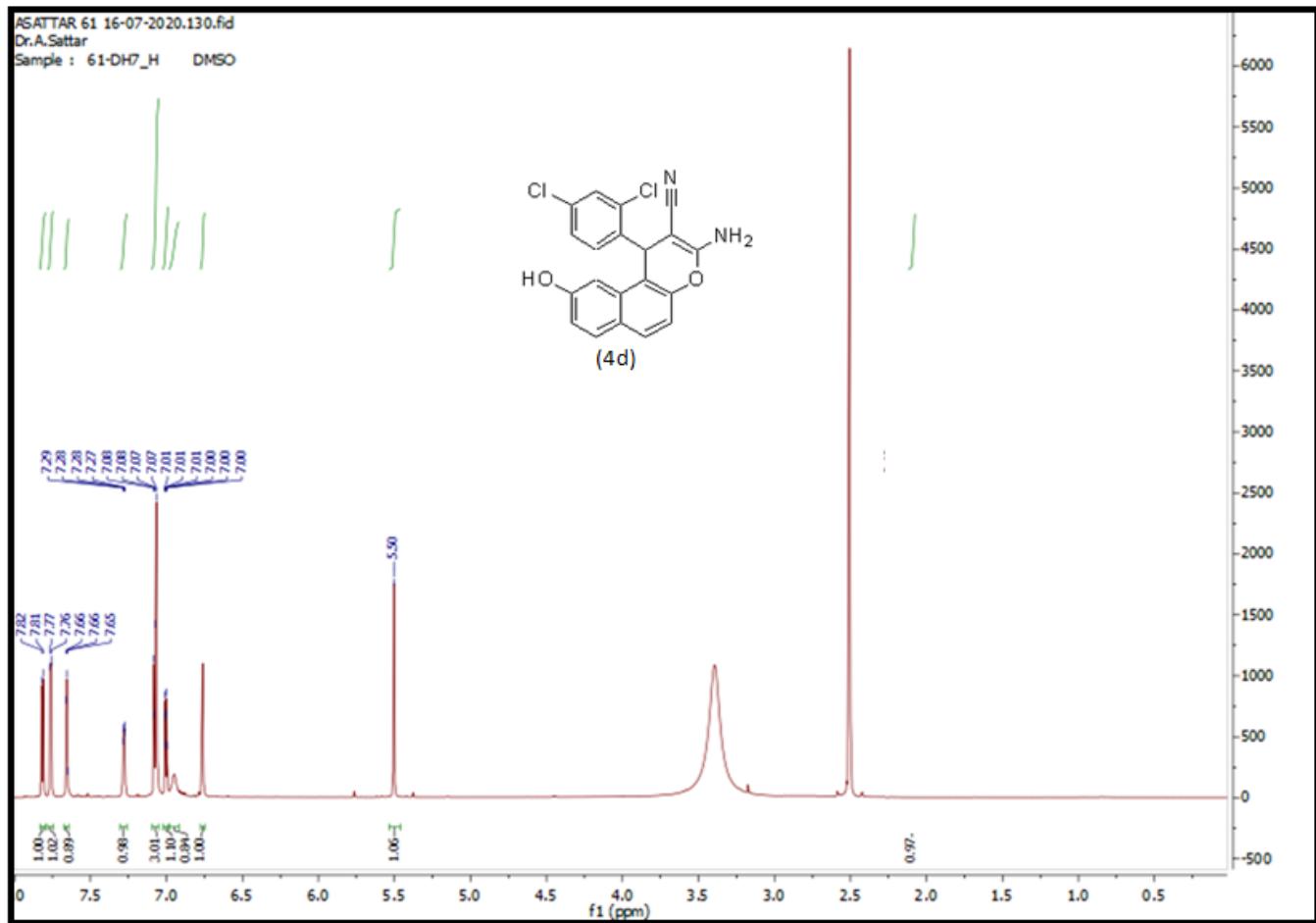


Figure S10: ^1H NMR of cpd **(4d)**.

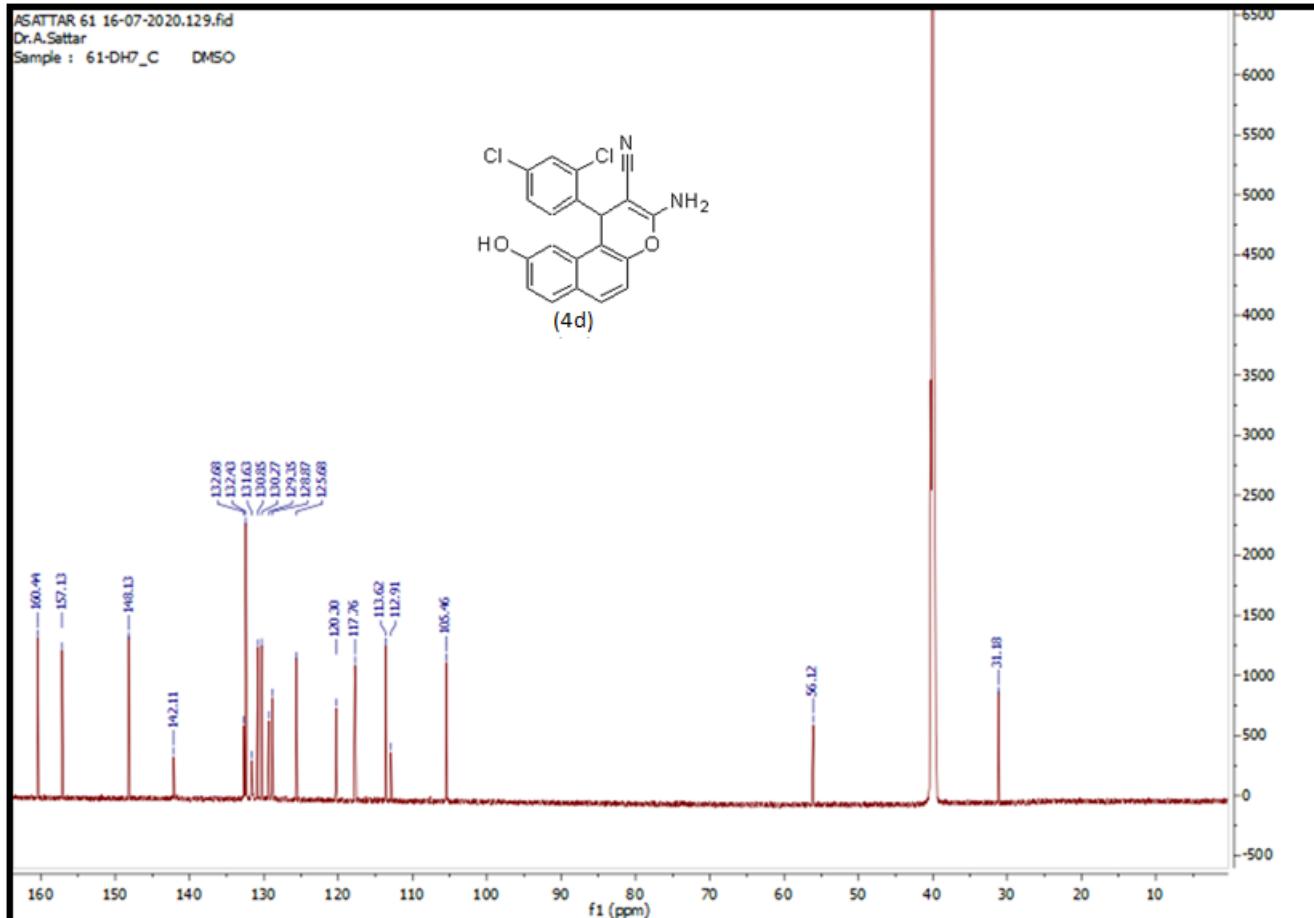


Figure S11: ¹³C NMR of cpd. (4d).

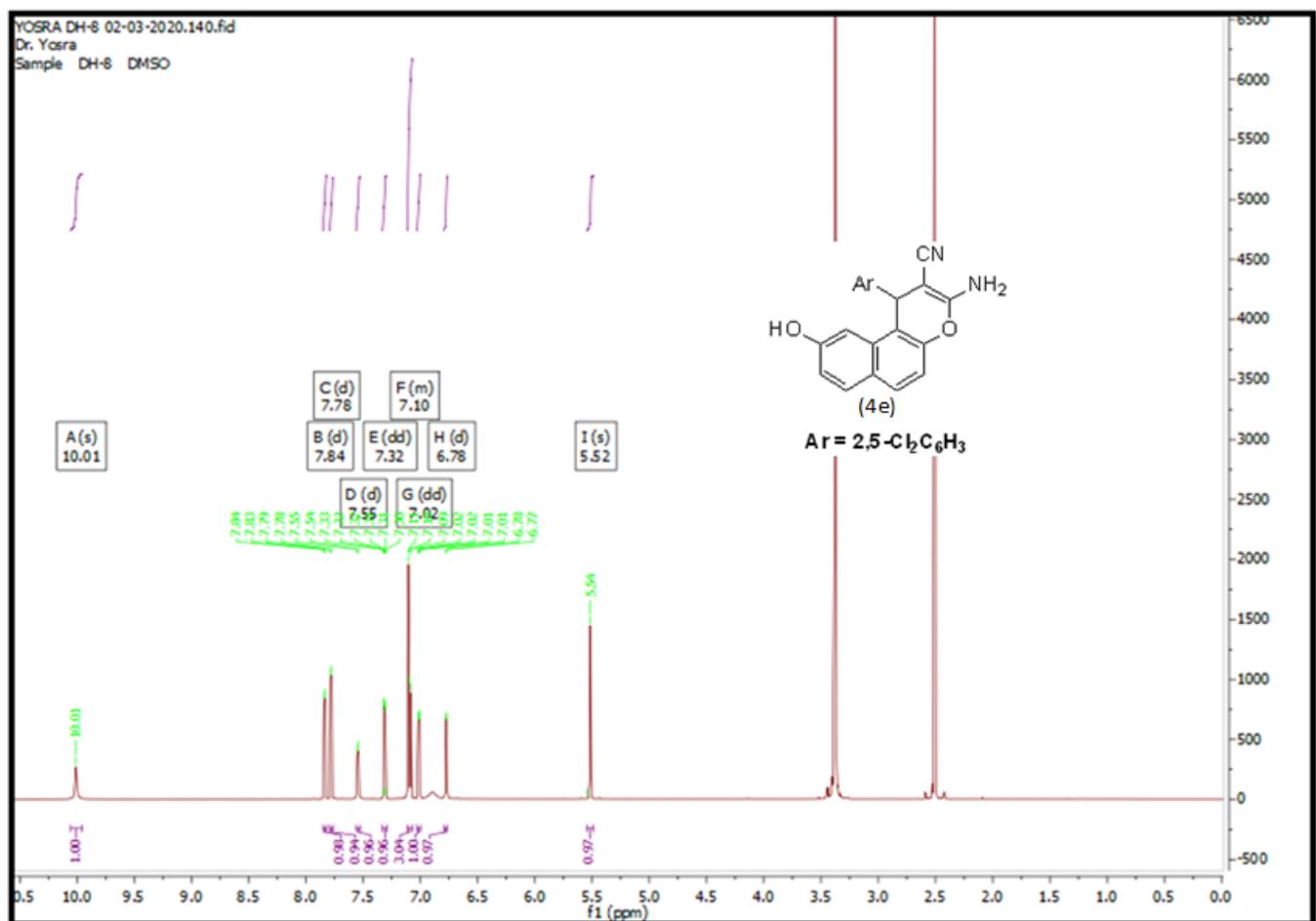


Figure S12: ^1H NMR of cpd (4e).

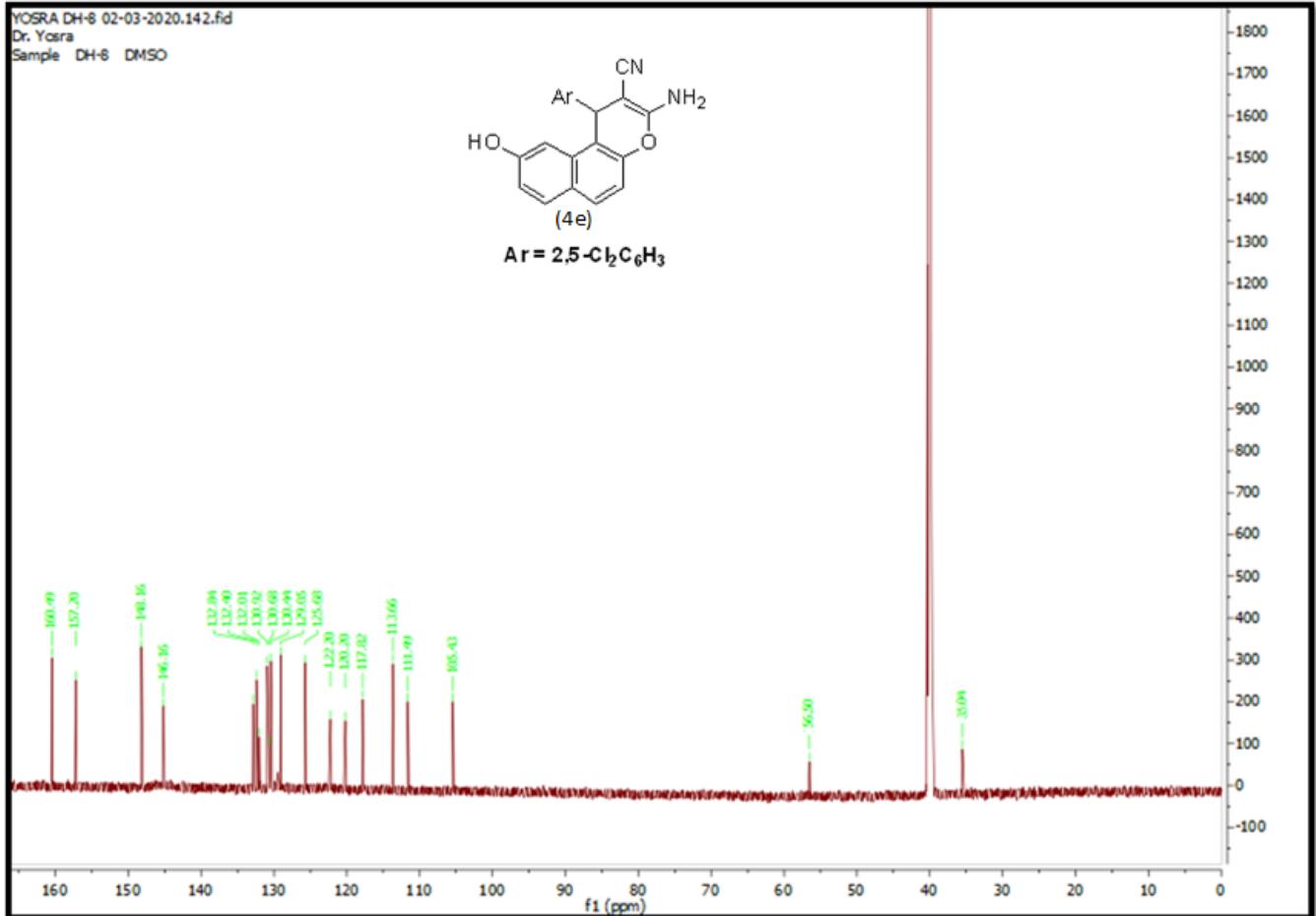
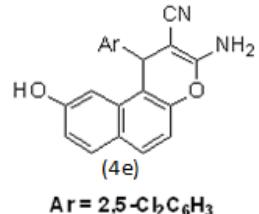


Figure S13: ^{13}C NMR of cpd. (4e).

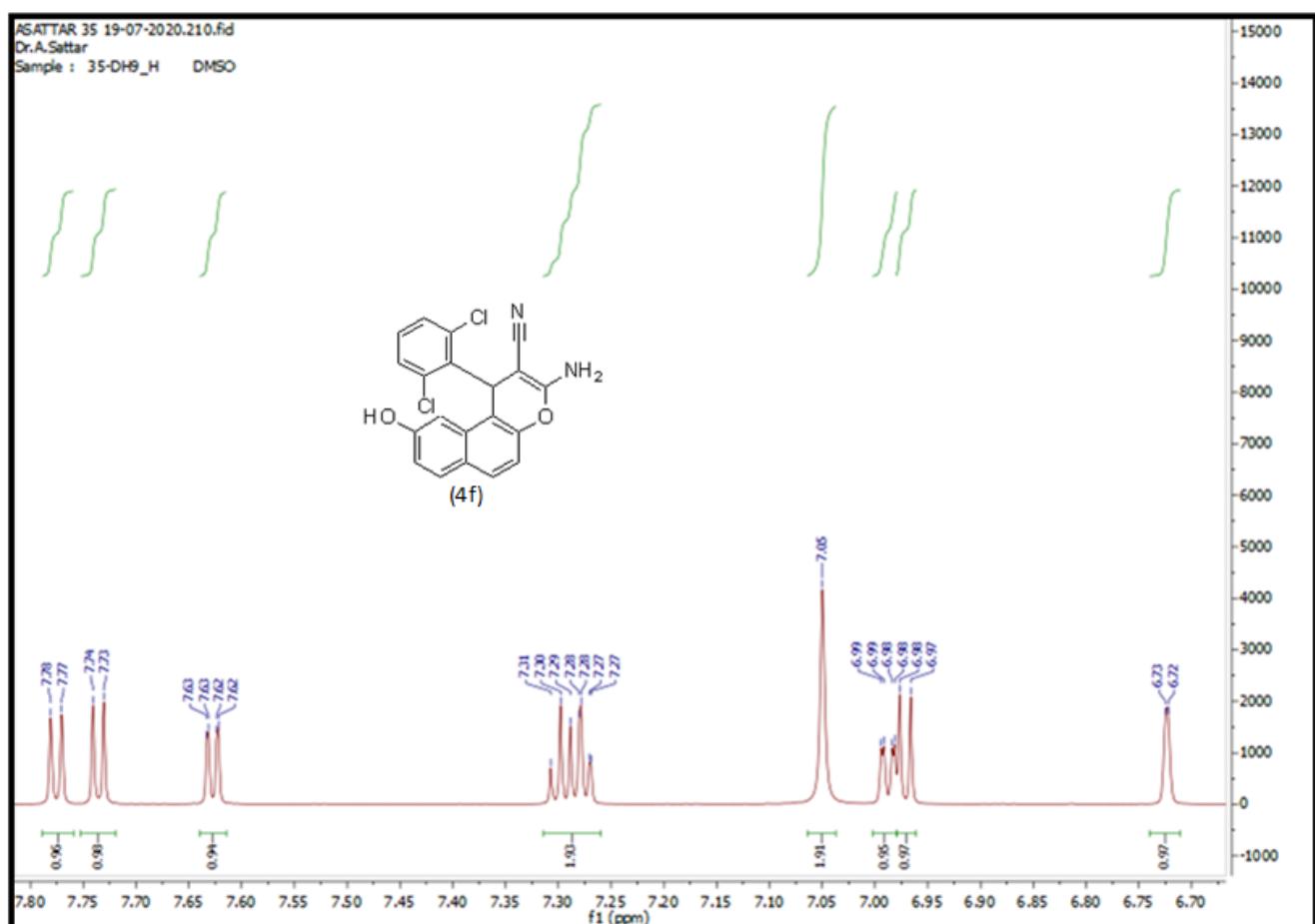


Figure S14: ^1H NMR 8.5-6.5 ppm of cpd. (4f).

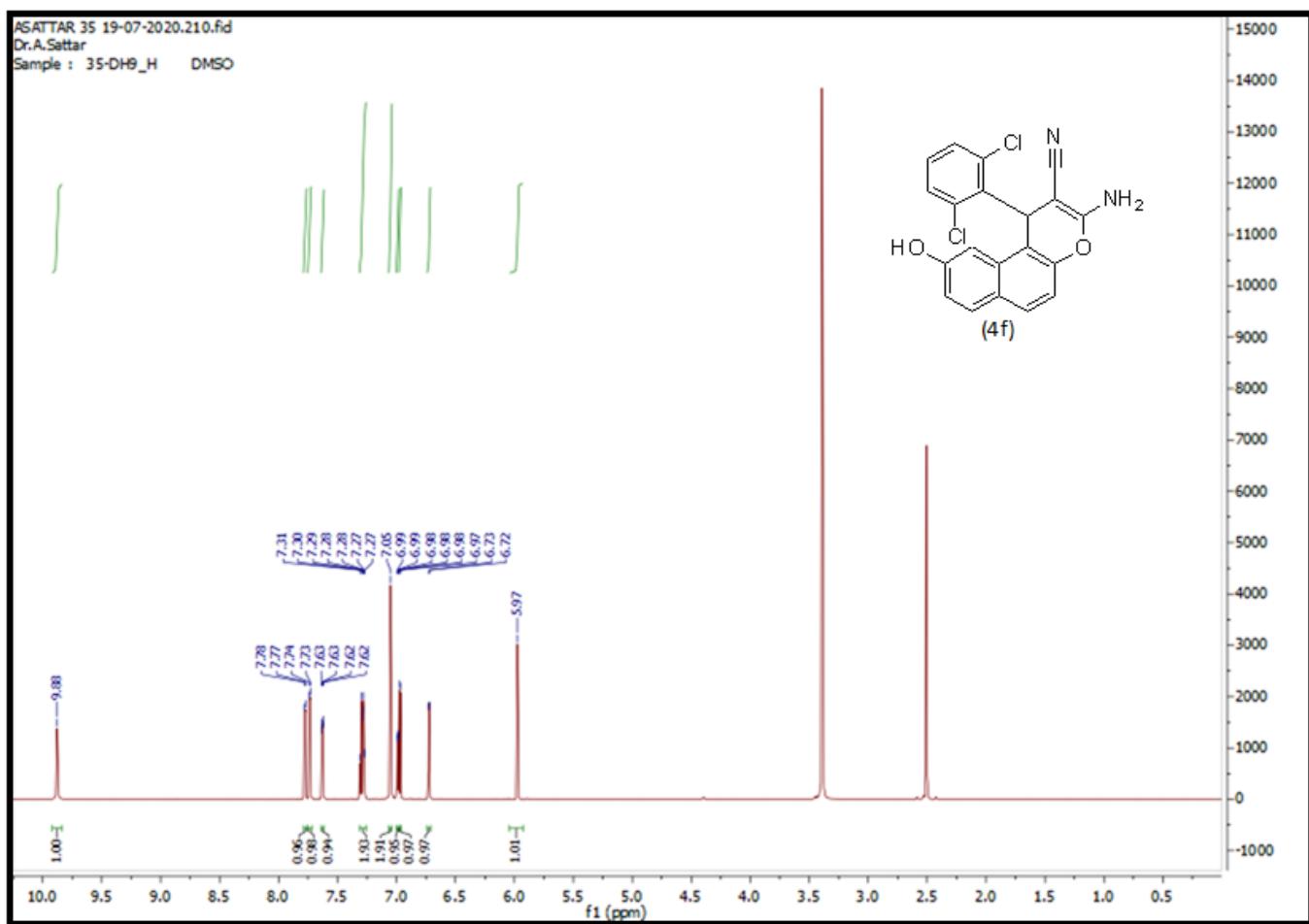


Figure S15: ¹H NMR of cpd. (4f).

ASATTAR 35 19-07-2020.211.fid
Dr.A.Sattar
Sample : 35-DH9_C DMSO

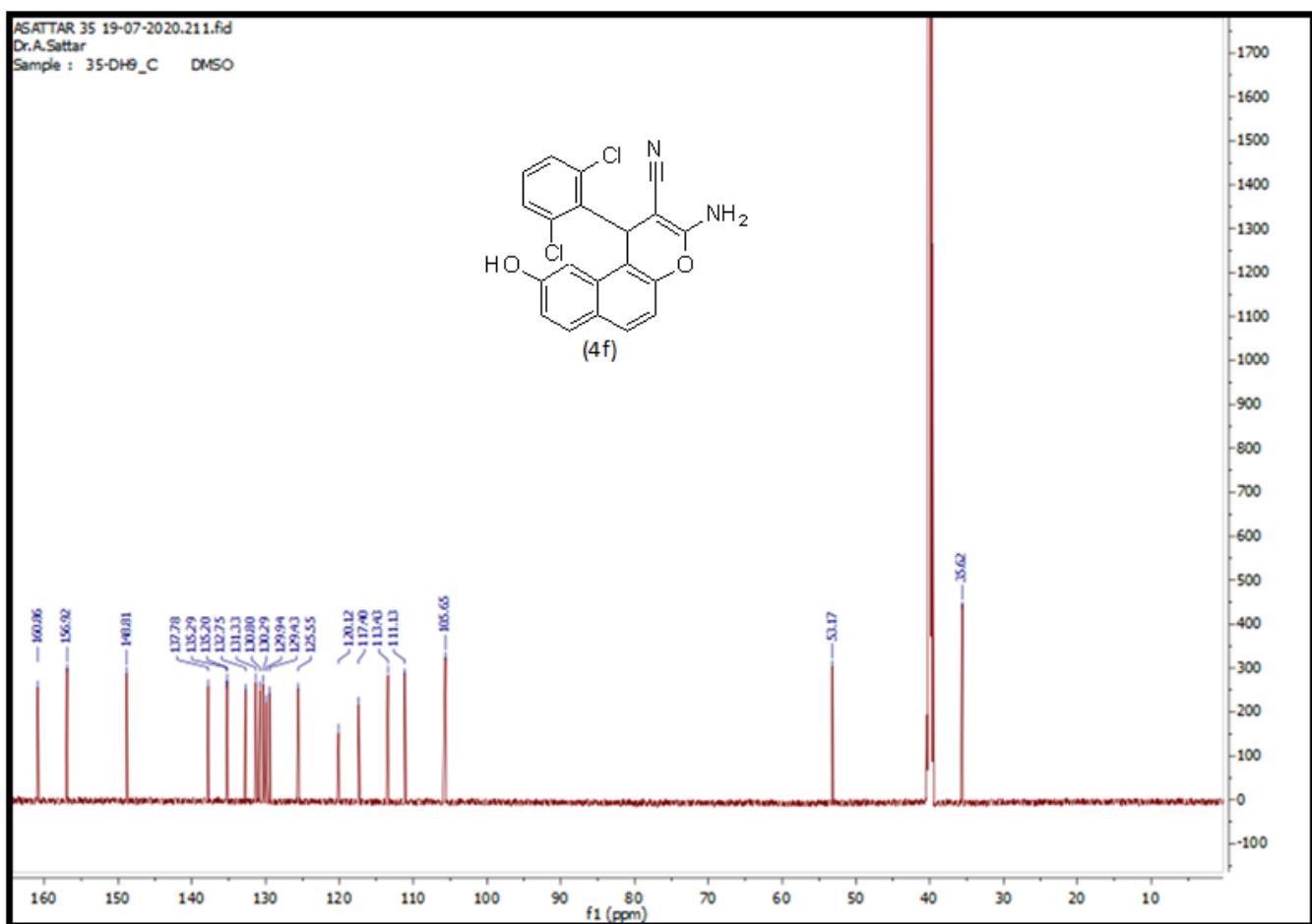
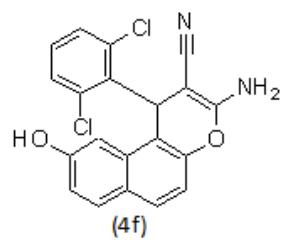


Figure S16: ¹³C NMR of cpd. (4f).

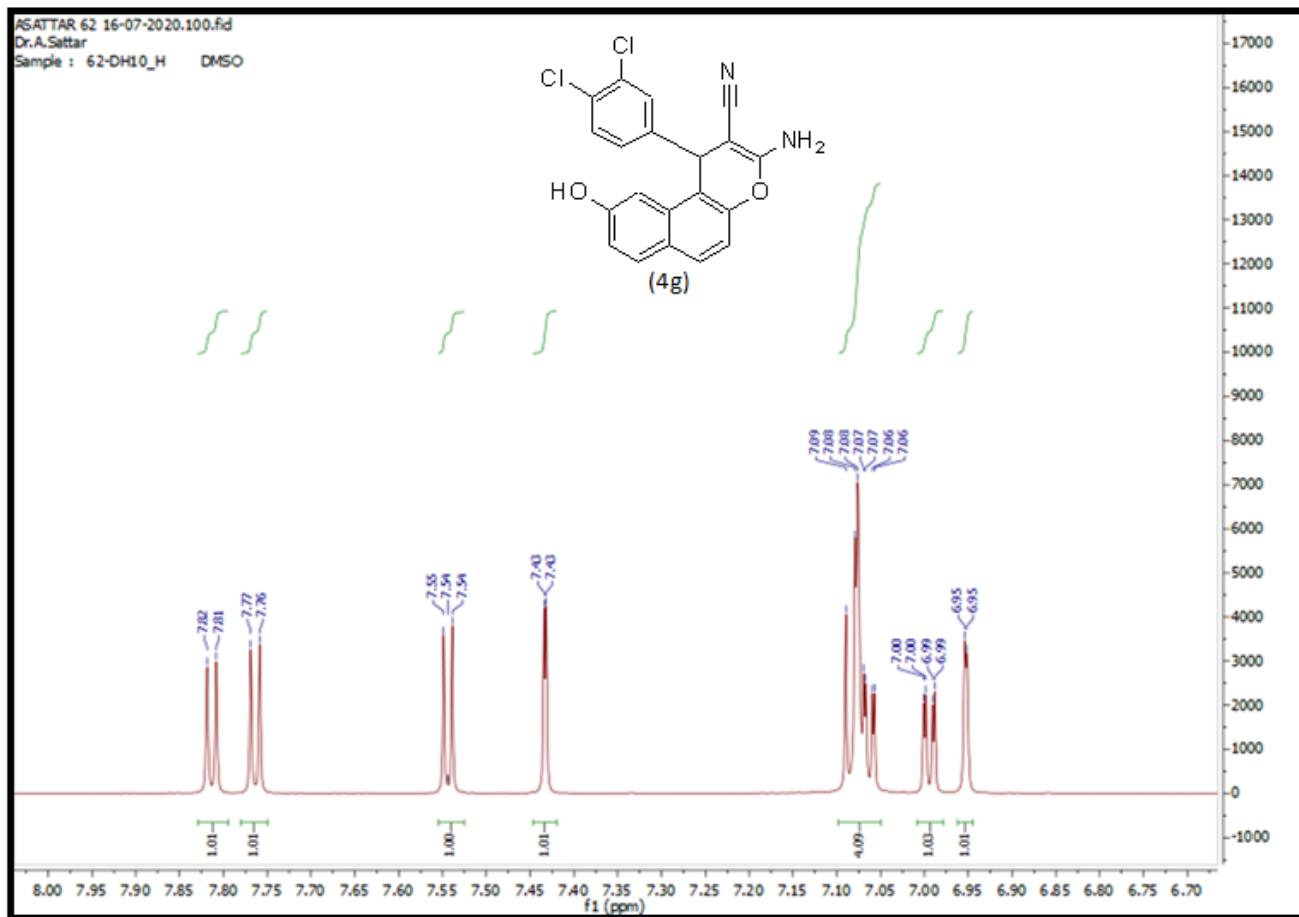


Figure S17: ^1H NMR 8.5-6.5 ppm of cpd. (4g).

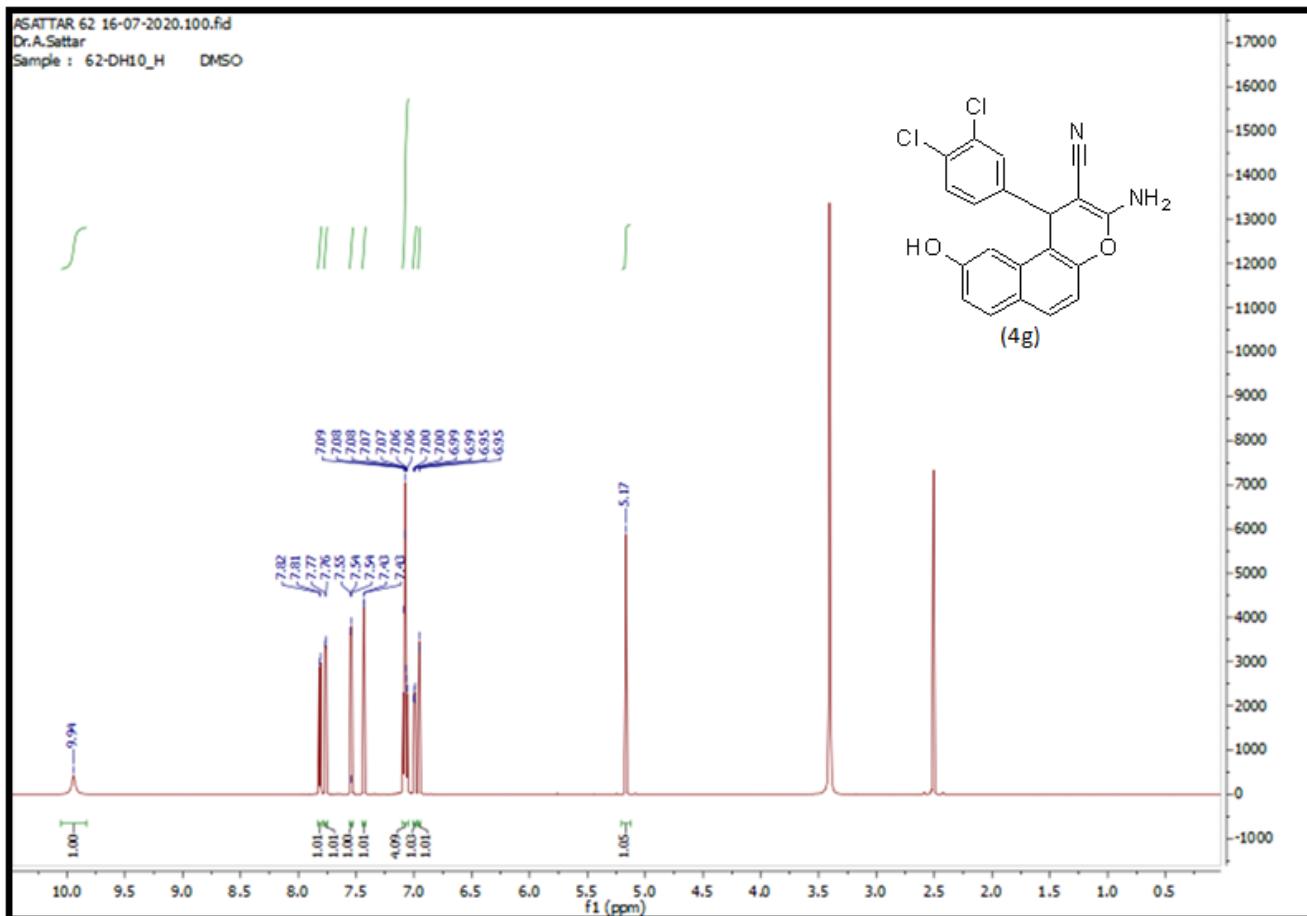


Figure S18: ¹H NMR of cpd. (4g).

ASATTAR_62 16-07-2020.101.fid
Dr.A.Sattar
Sample : 62-DH10_C DMSO

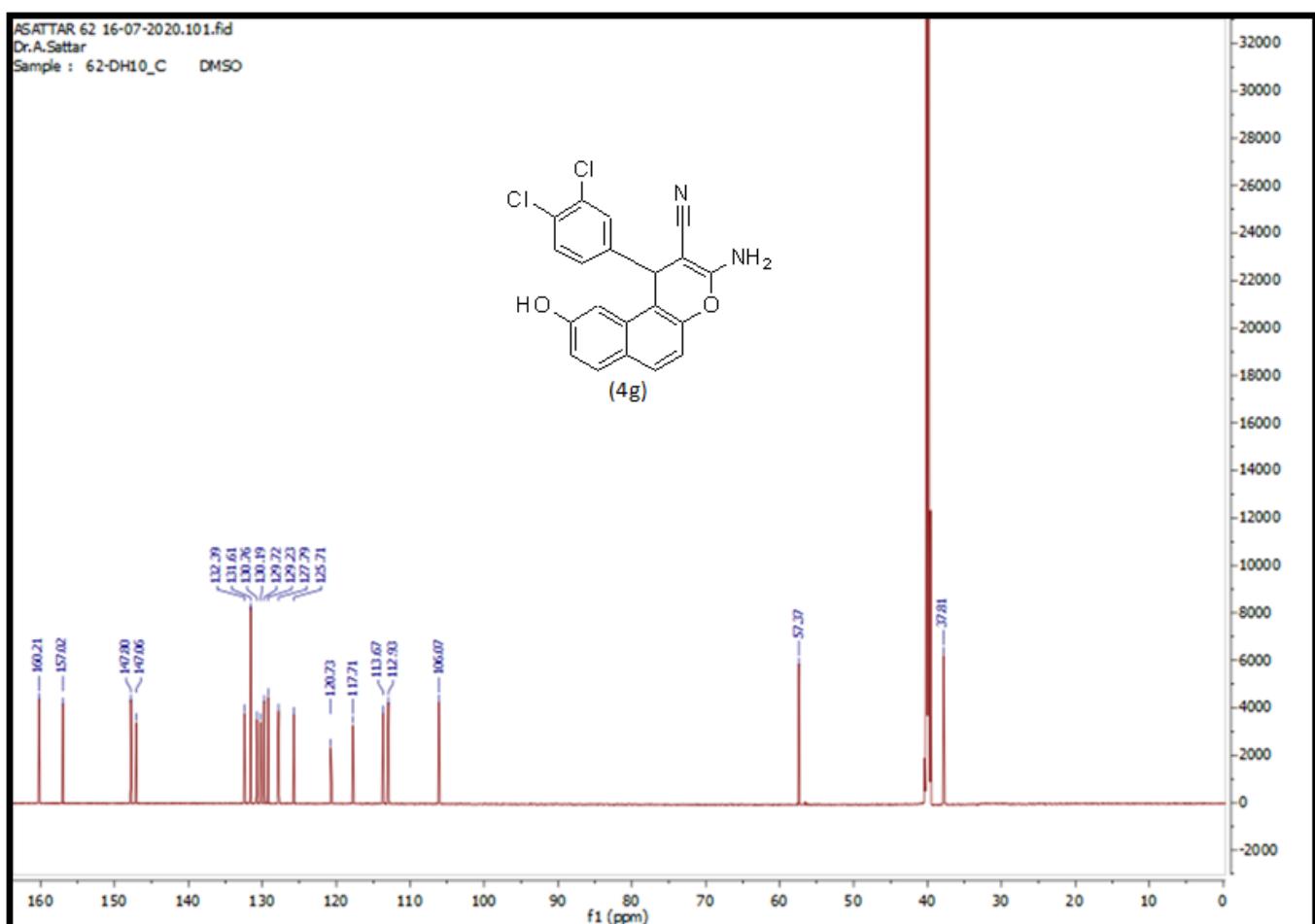


Figure S19: ^{13}C NMR of cpd. (4g).

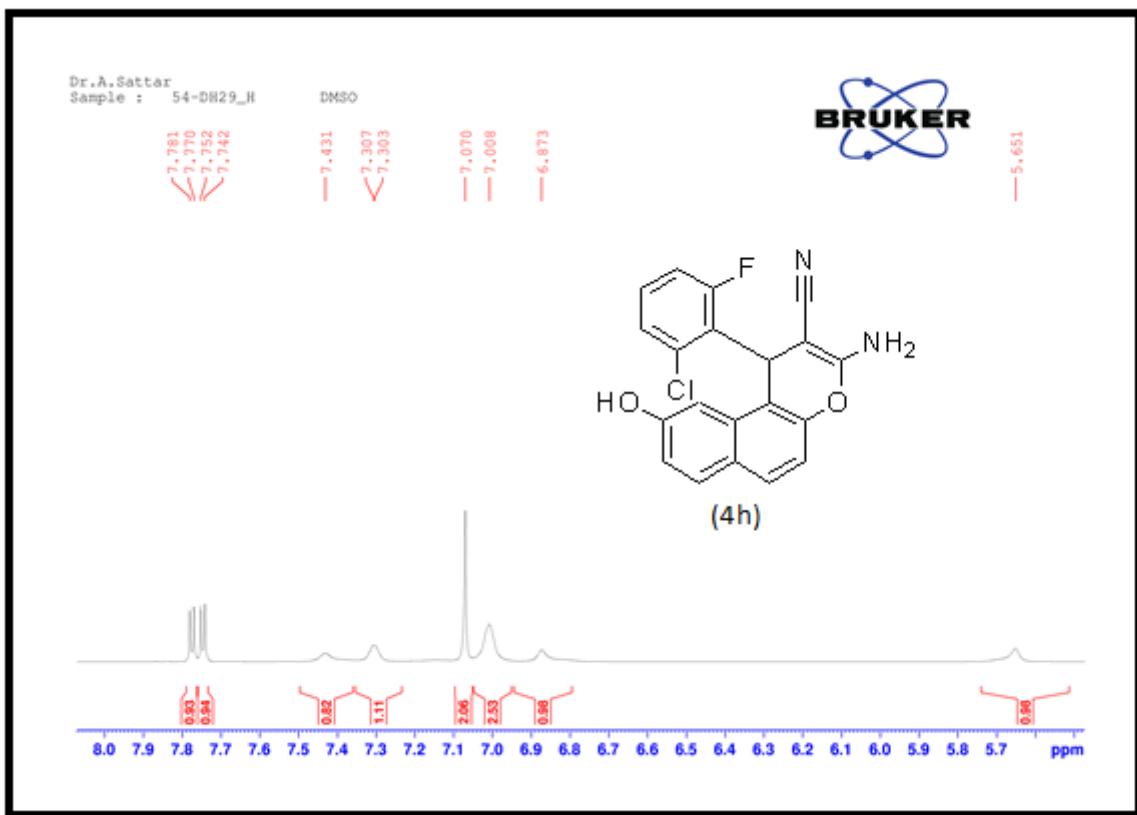


Figure S20: ^1H NMR 8.5-6.5 ppm of cpd. (4h).

Dr.A.Sattar
Sample : 54-DH29_R

DMSO

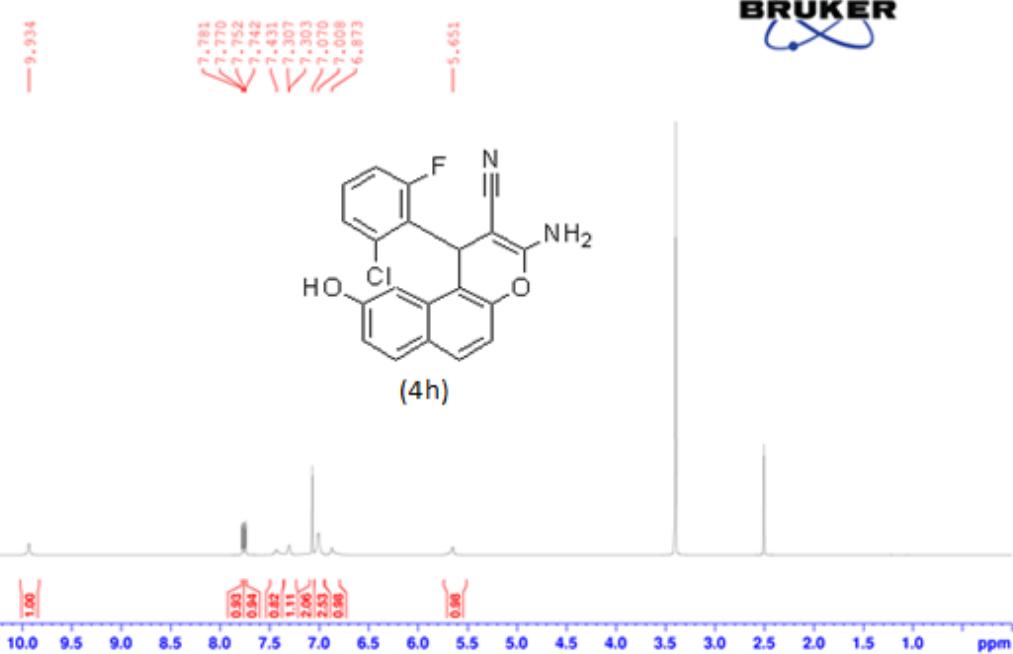


Figure S21: ¹H NMR of cpd. (4h).

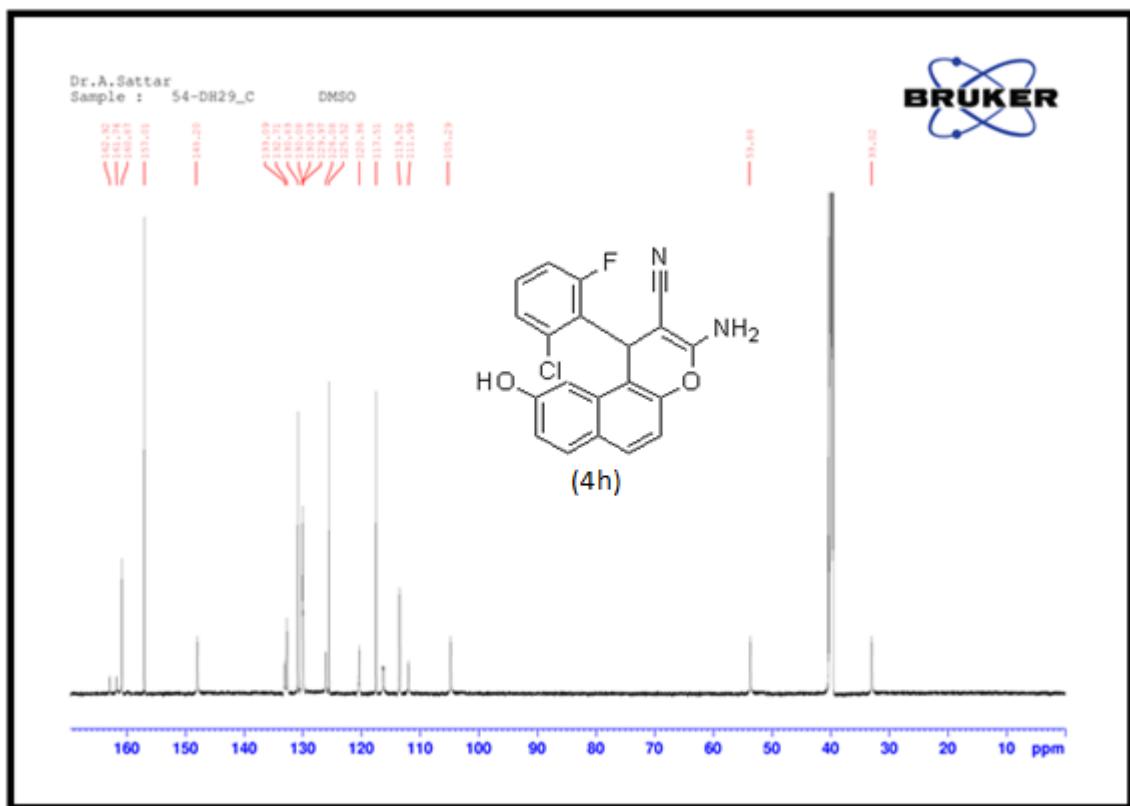


Figure S22: ^{13}C NMR of cpd. (4h).

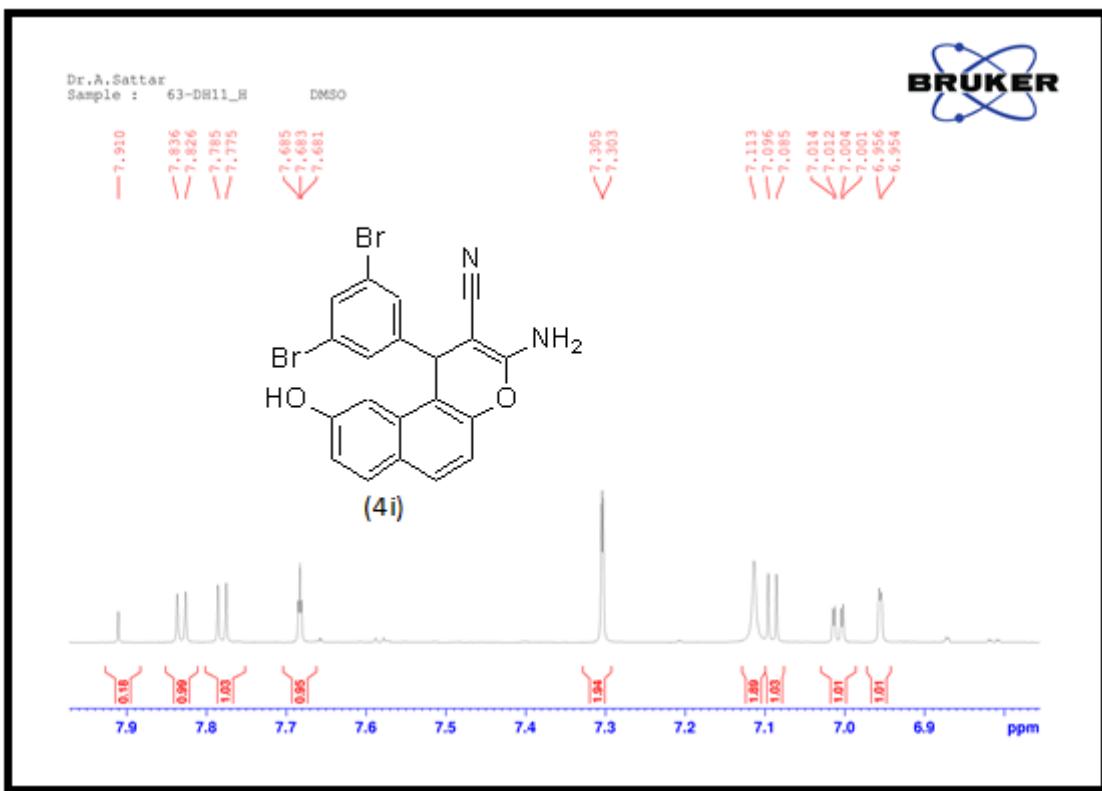


Figure S23: ^1H NMR 8.5-6.5 ppm of cpd. (4i).

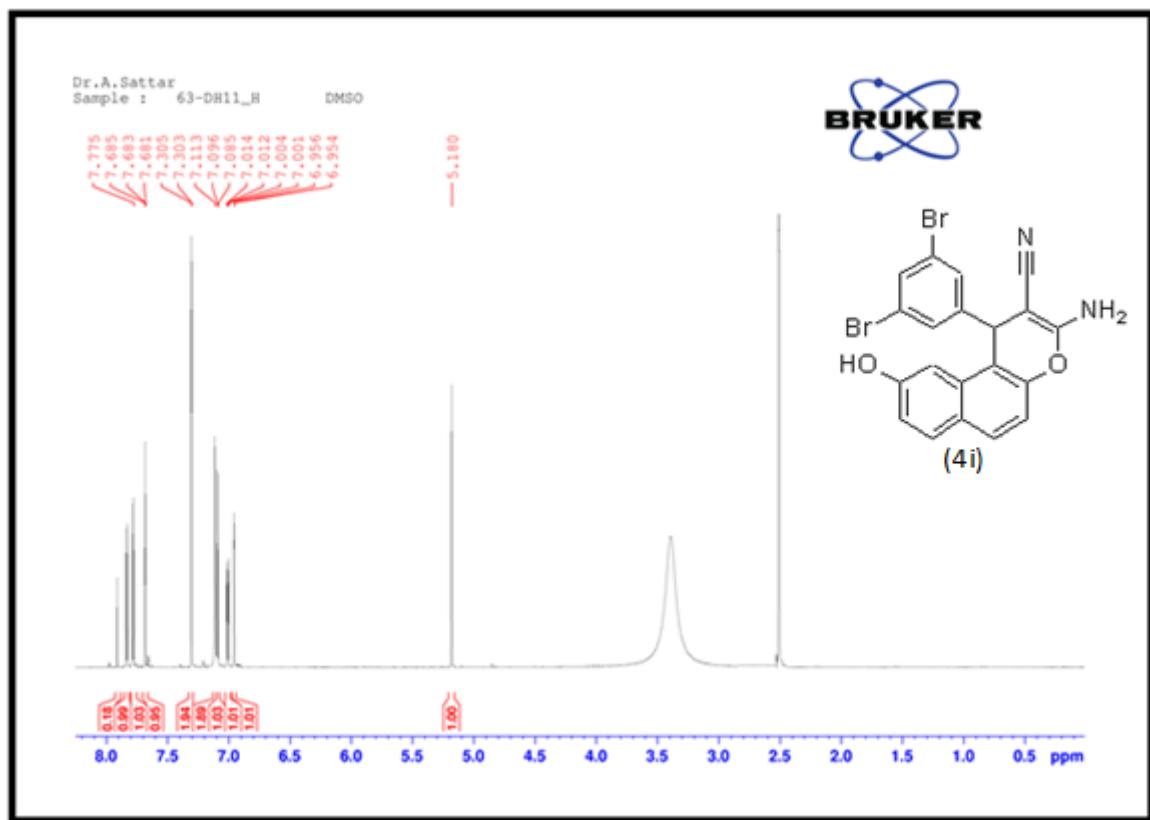


Figure S24: ¹H NMR of cpd. (4i).

ASATTAR.63 16-07-2020.121.fd
Dr.A.Sattar
Sample : 63-DH11_C DMSO

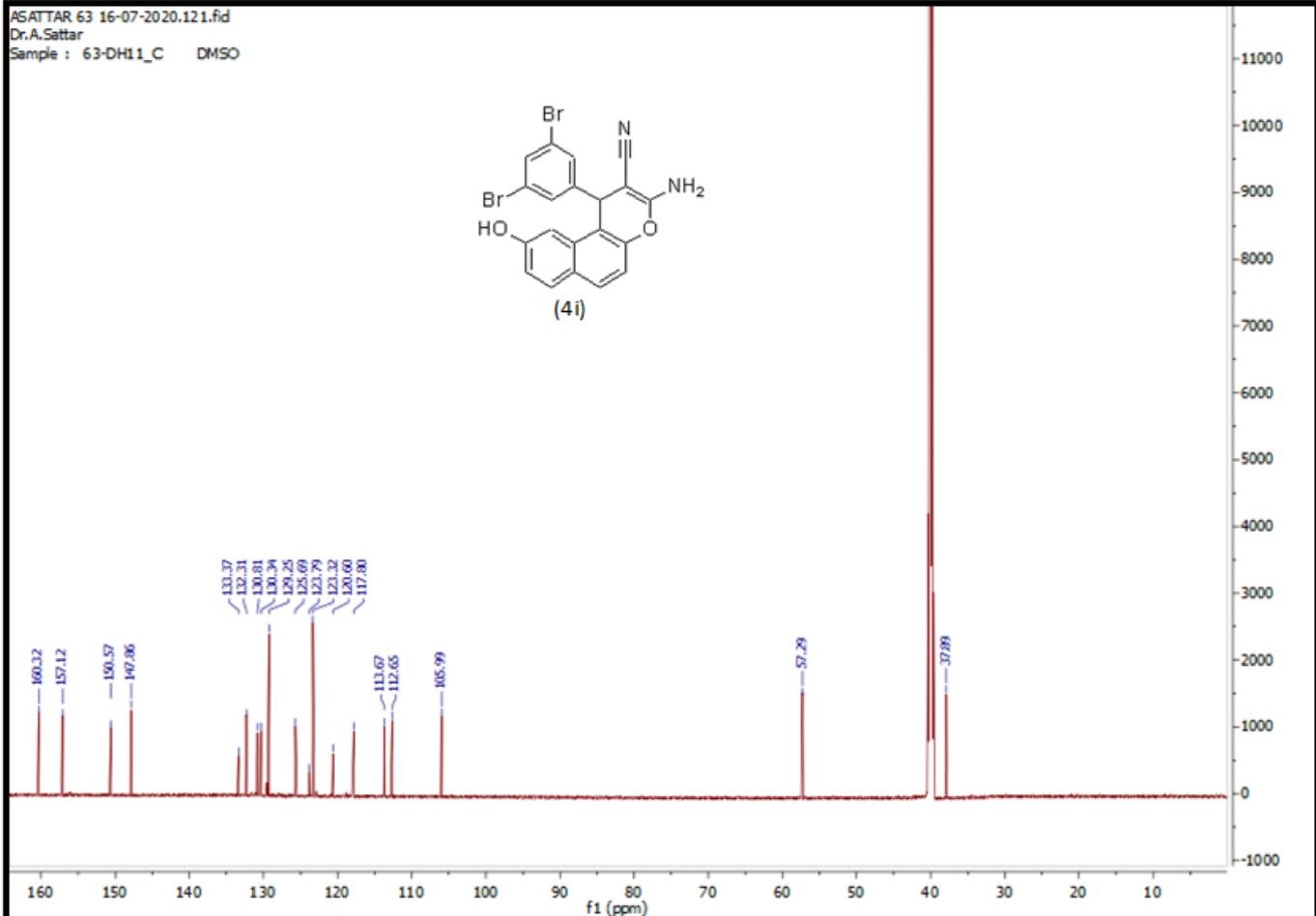
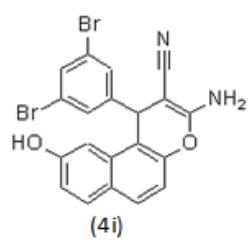


Figure S25: ^{13}C NMR of cpd. (4i).

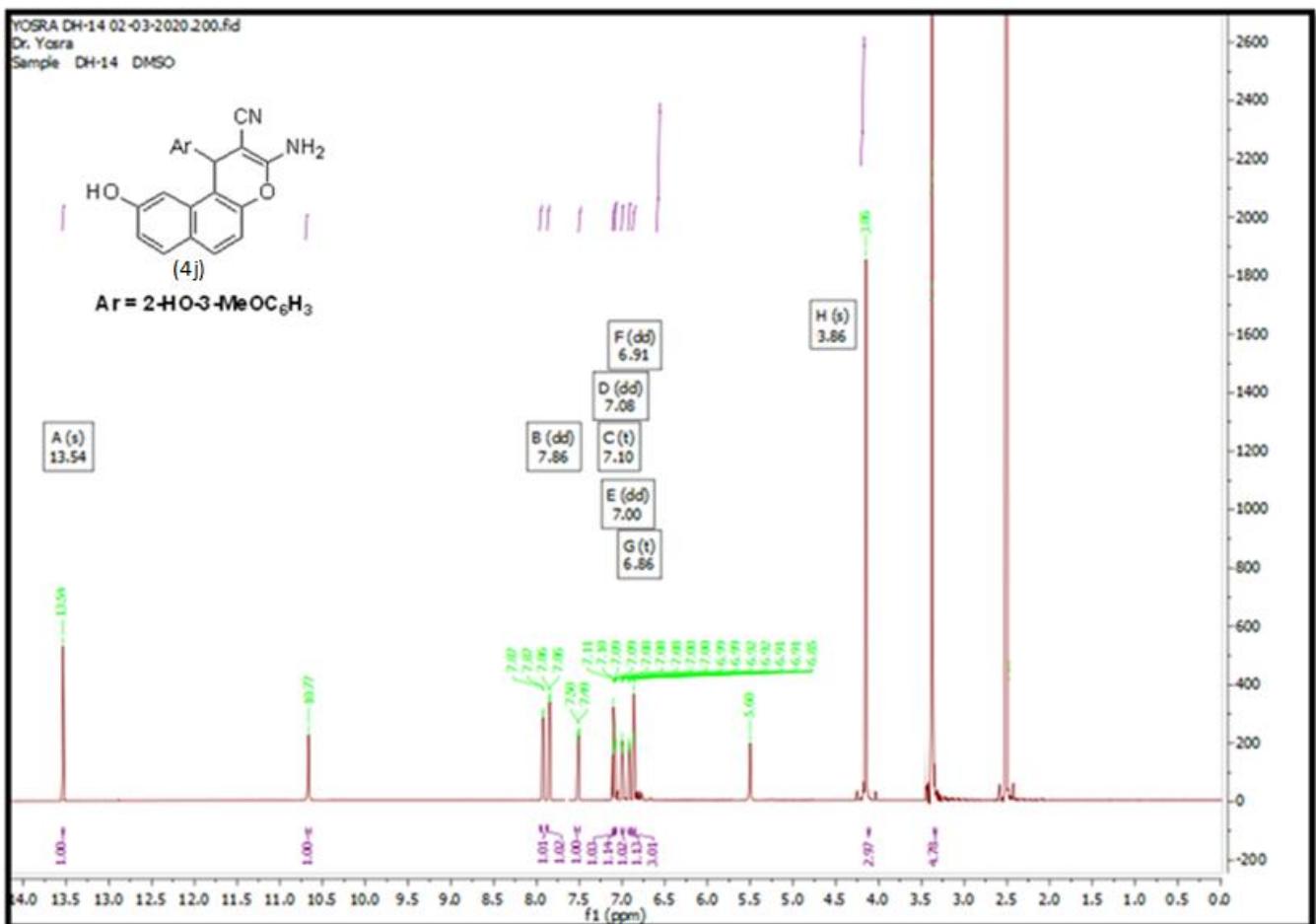


Figure S26: ¹H NMR of cpd. (4j).

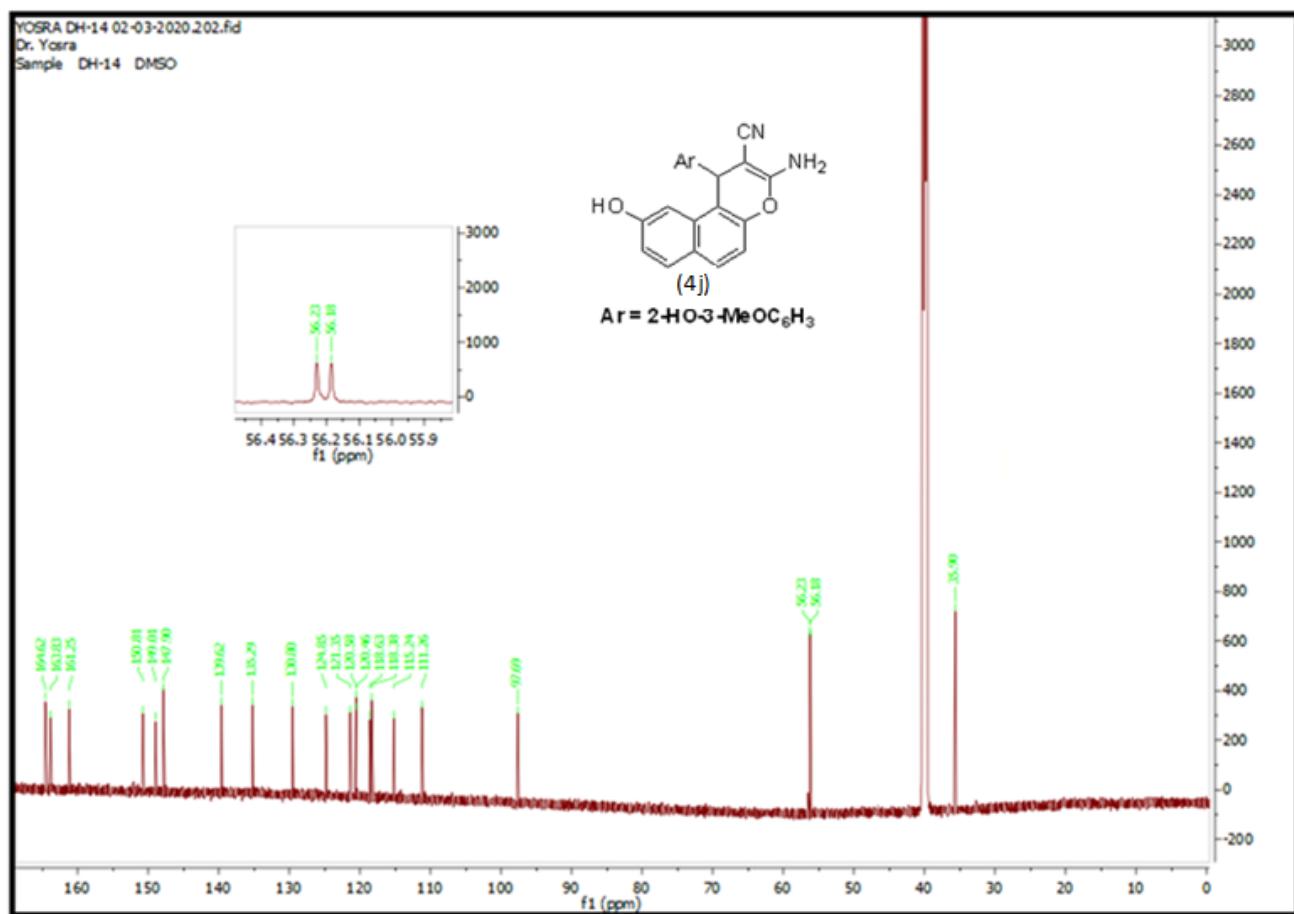


Figure S27: ^{13}C NMR of cpd. (4j).

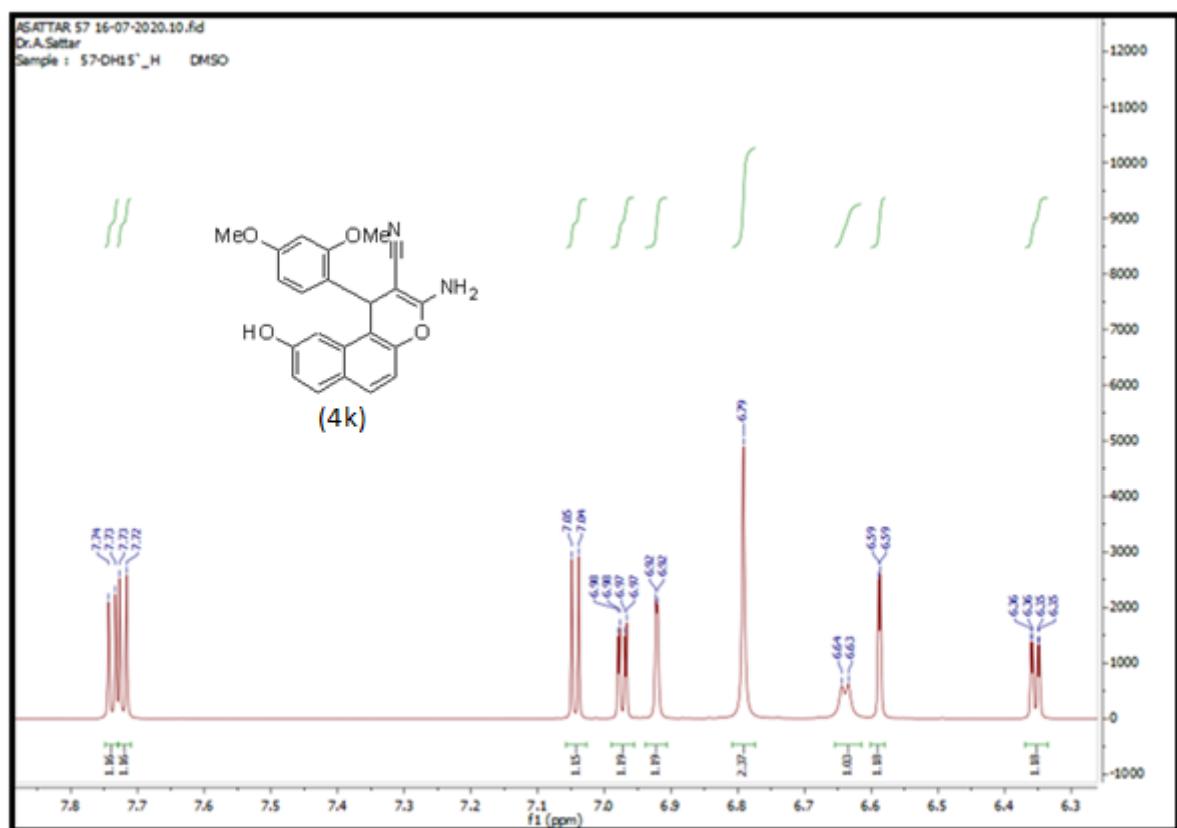


Figure S28: ^1H NMR 8.5-6.5 ppm of cpd. (4k).

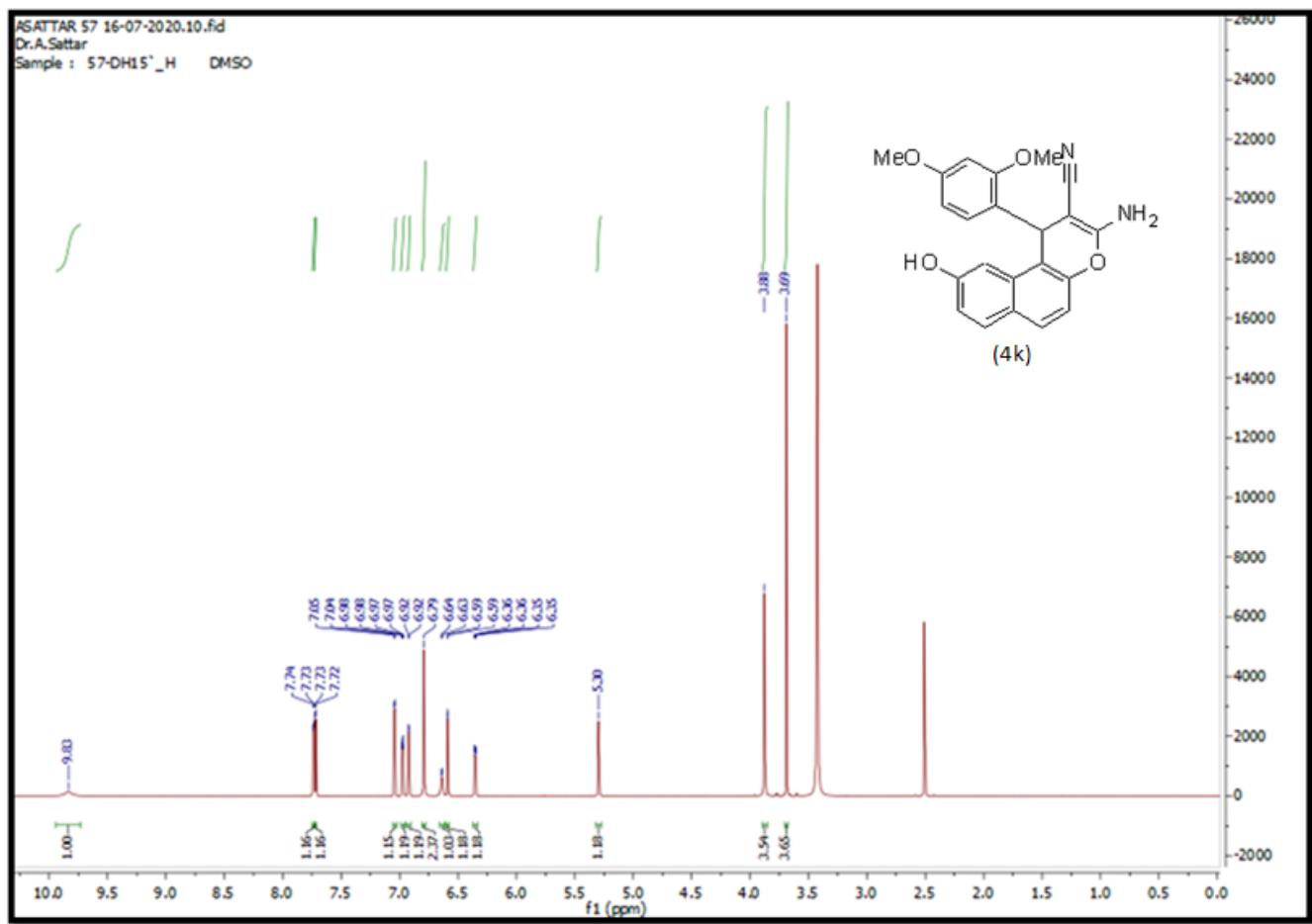


Figure S29: ¹H NMR of cpd. (4k).

ASATTAR_57 16-07-2020.11.rid
Dr.A.Settar
Sample : 57-DH15' _C DMSO

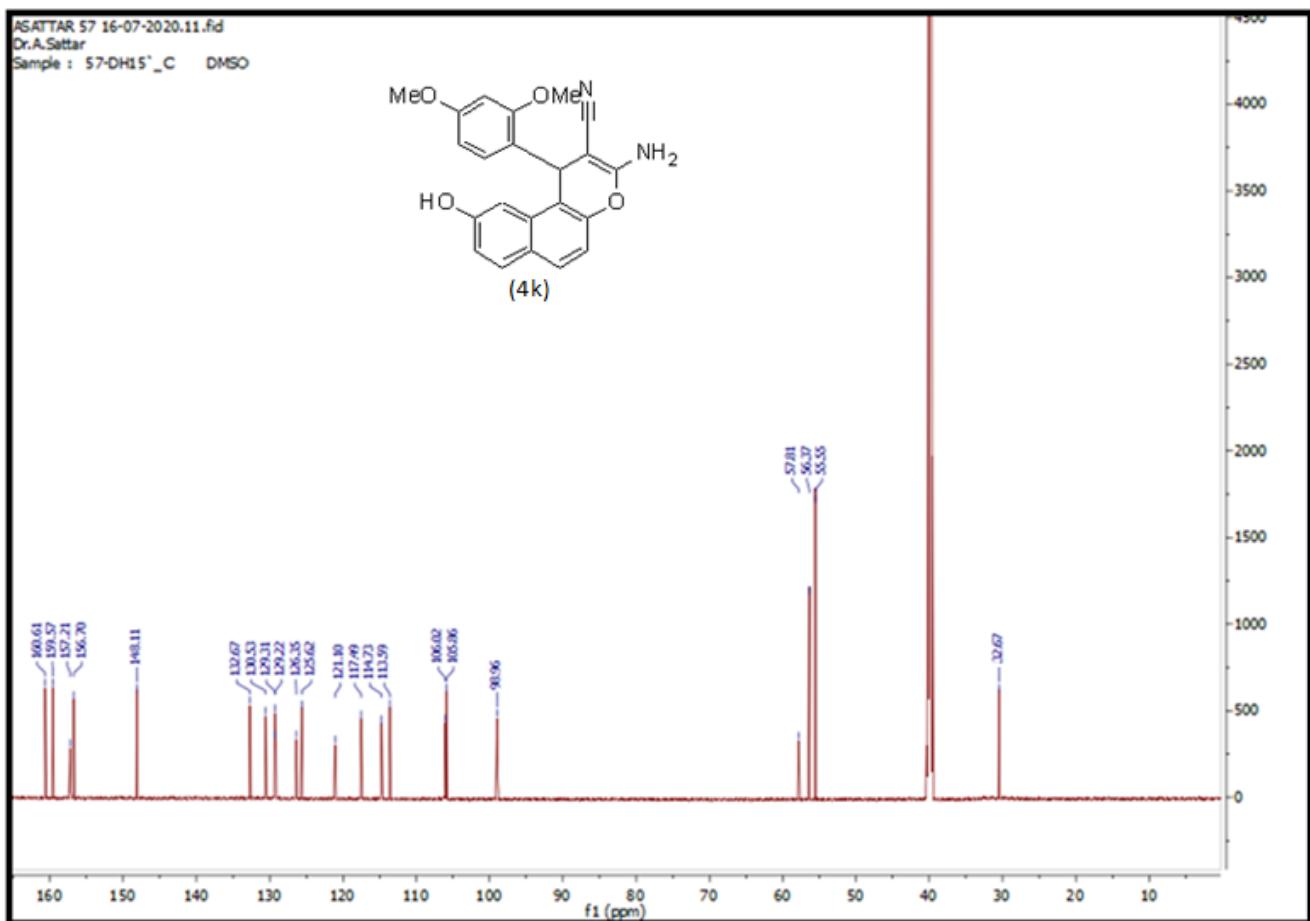
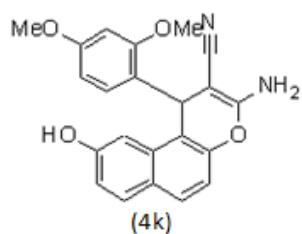


Figure S30: ¹³C NMR of cpd. (4k).

ASATTAR S9 19-07-2020.140.fid
Dr.A.Settar
Sample : 59-DH17'_H DMSO

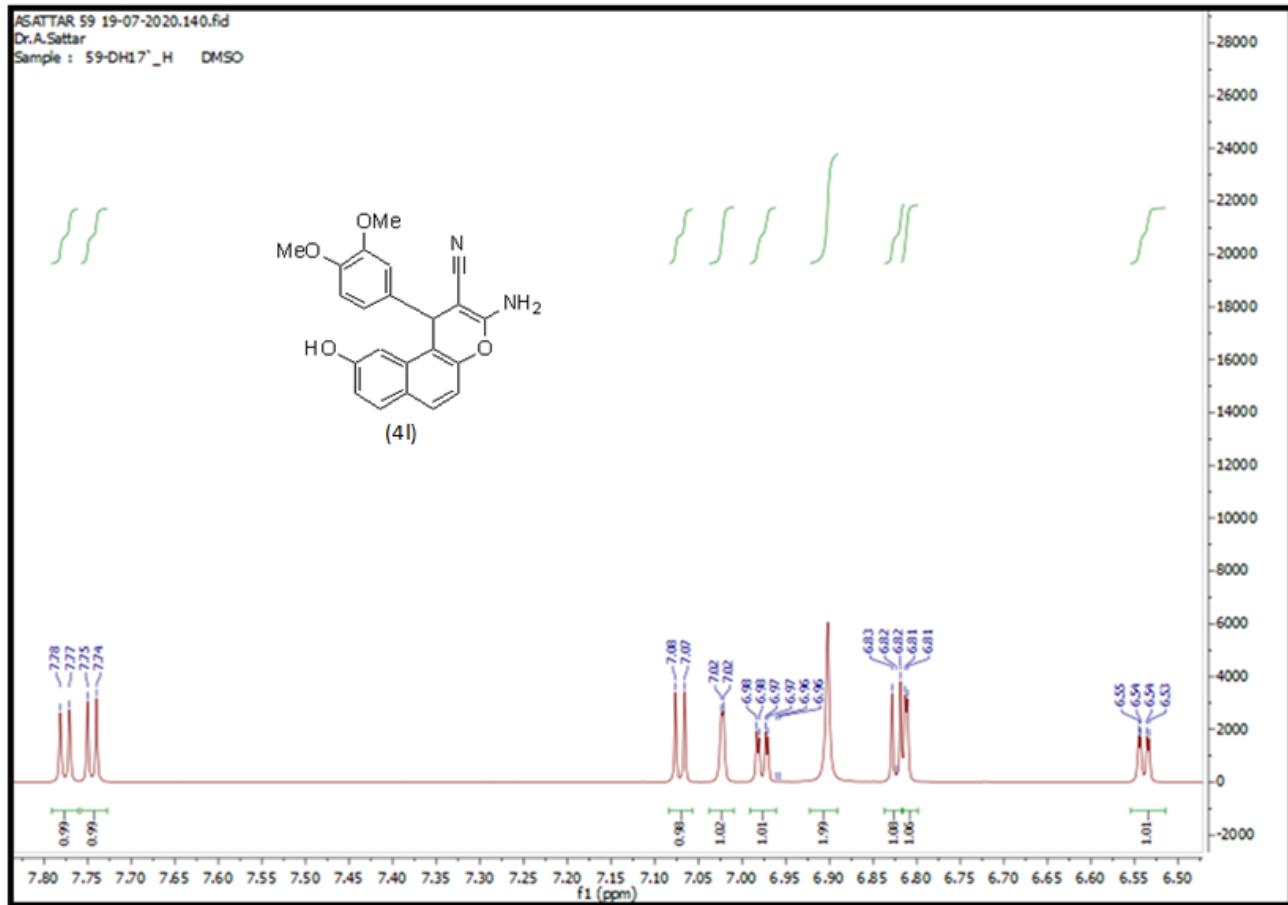


Figure S31: ^1H NMR 8.5-6.5 ppm of cpd. (4l).

ASATTAR.59 19-07-2020.140.fid
Dr.A.Sattar
Sample : 59-DH17'_H DMSO

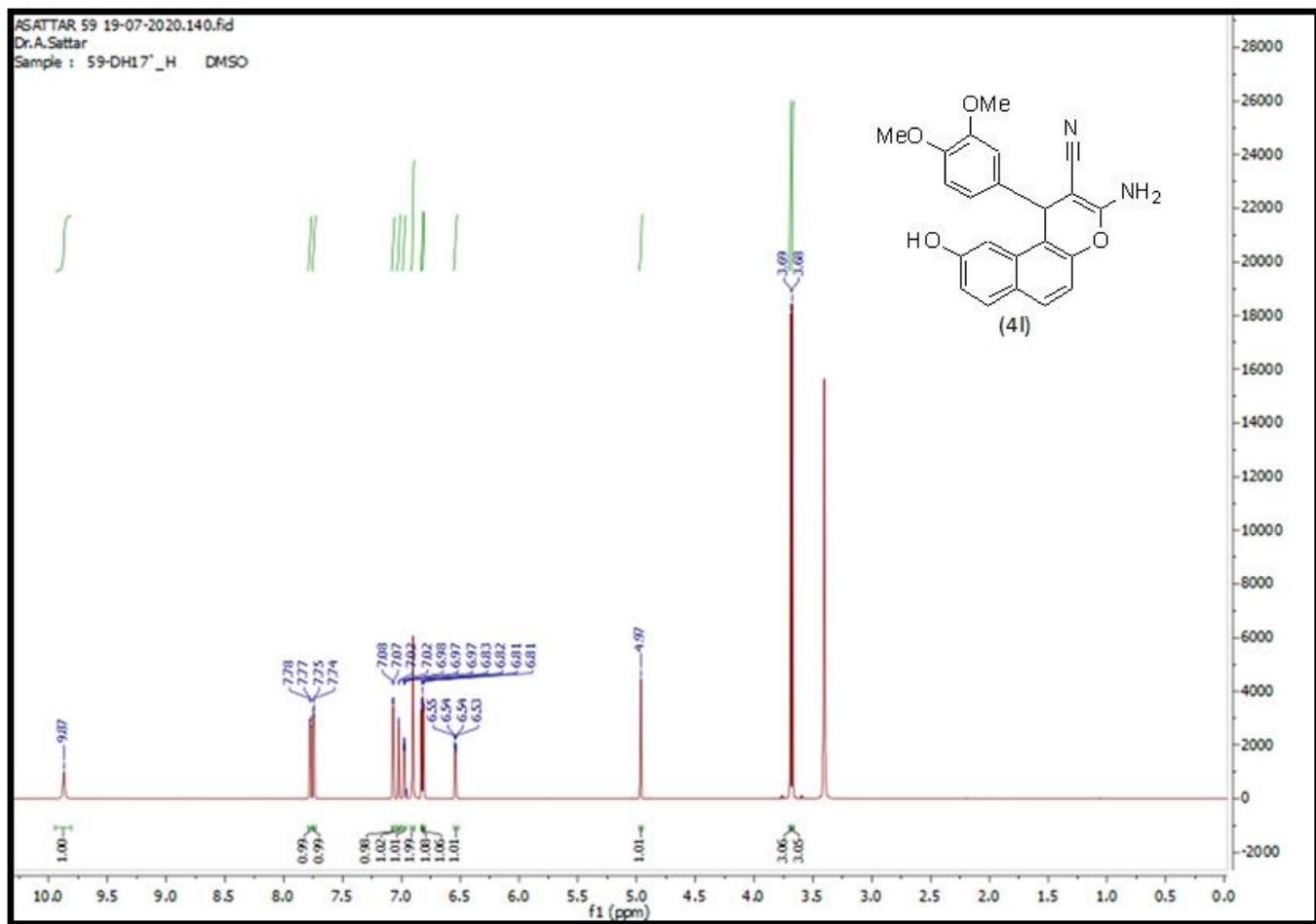


Figure S32: ¹H NMR of cpd. (4l).

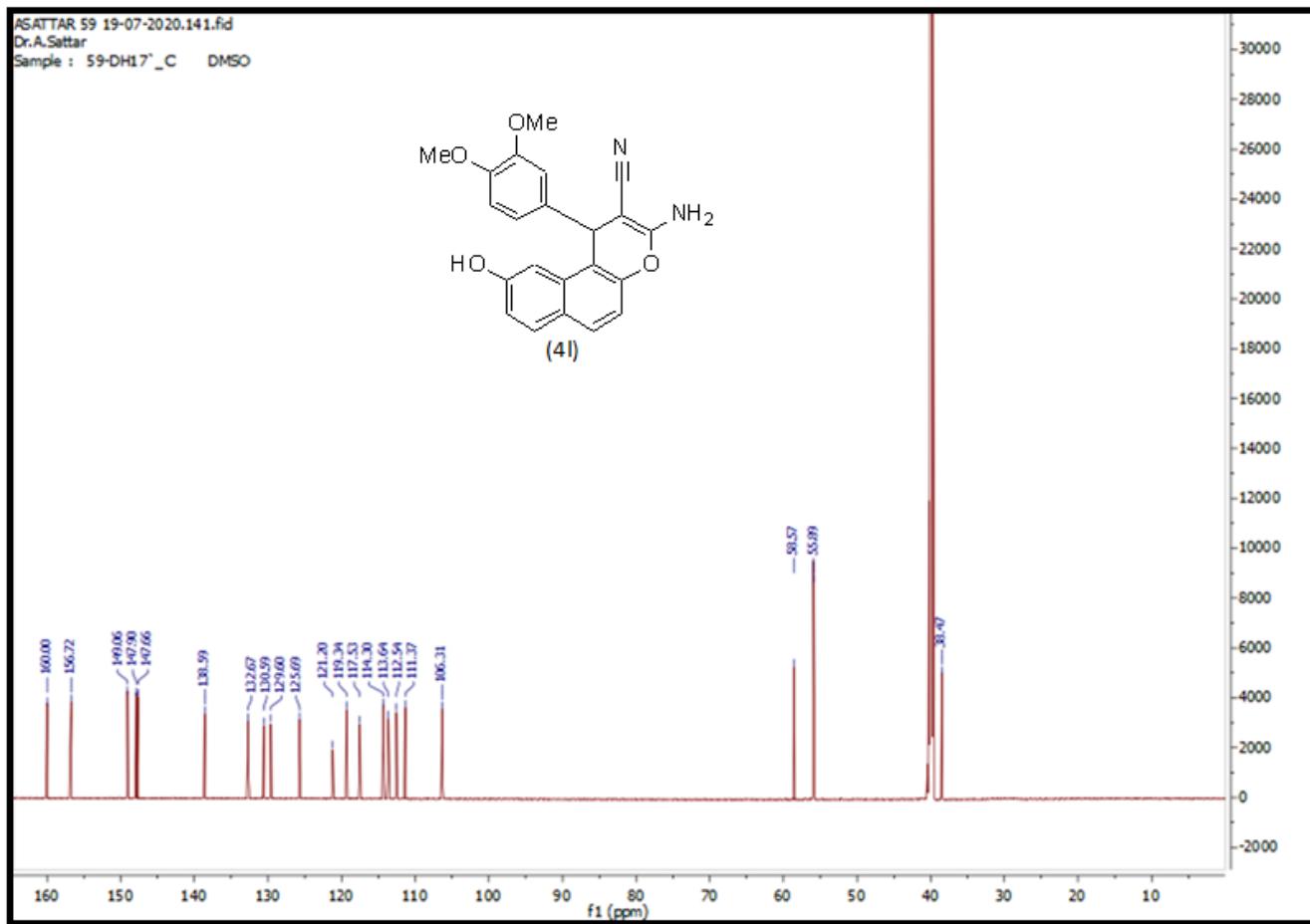


Figure S33: ¹³C NMR of cpd. (4l).

ASATTAR 58 19-07-2020.170.fid
Dr.A.Sattar
Sample : 58-OH16 DMSO

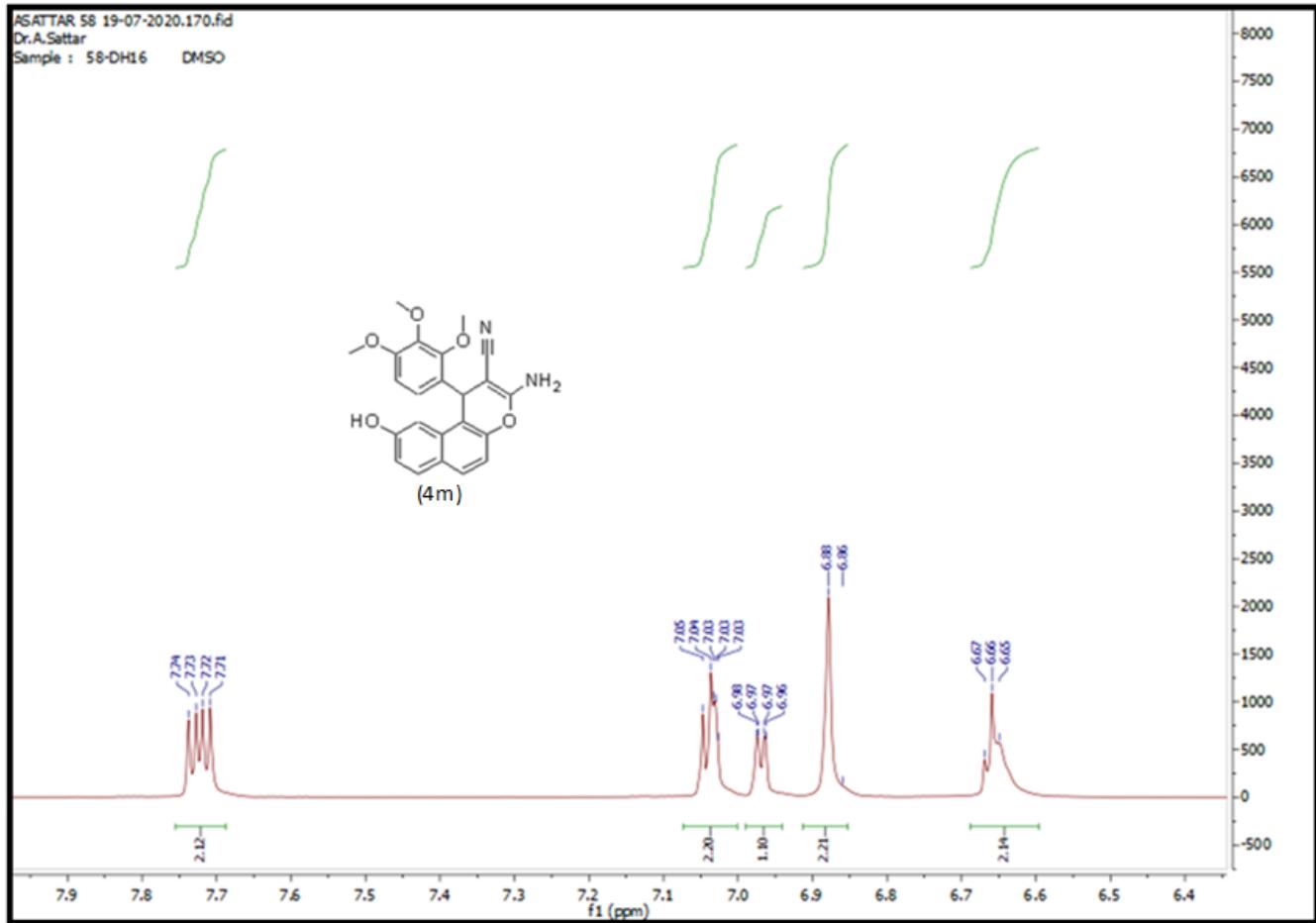


Figure S34: ^1H NMR 8.5-6.5 ppm of cpd. (4m).

ASATTAR 58 19-07-2020.170.rdx
Dr.A.Sattar
Sample : 58-DH16 DMSO

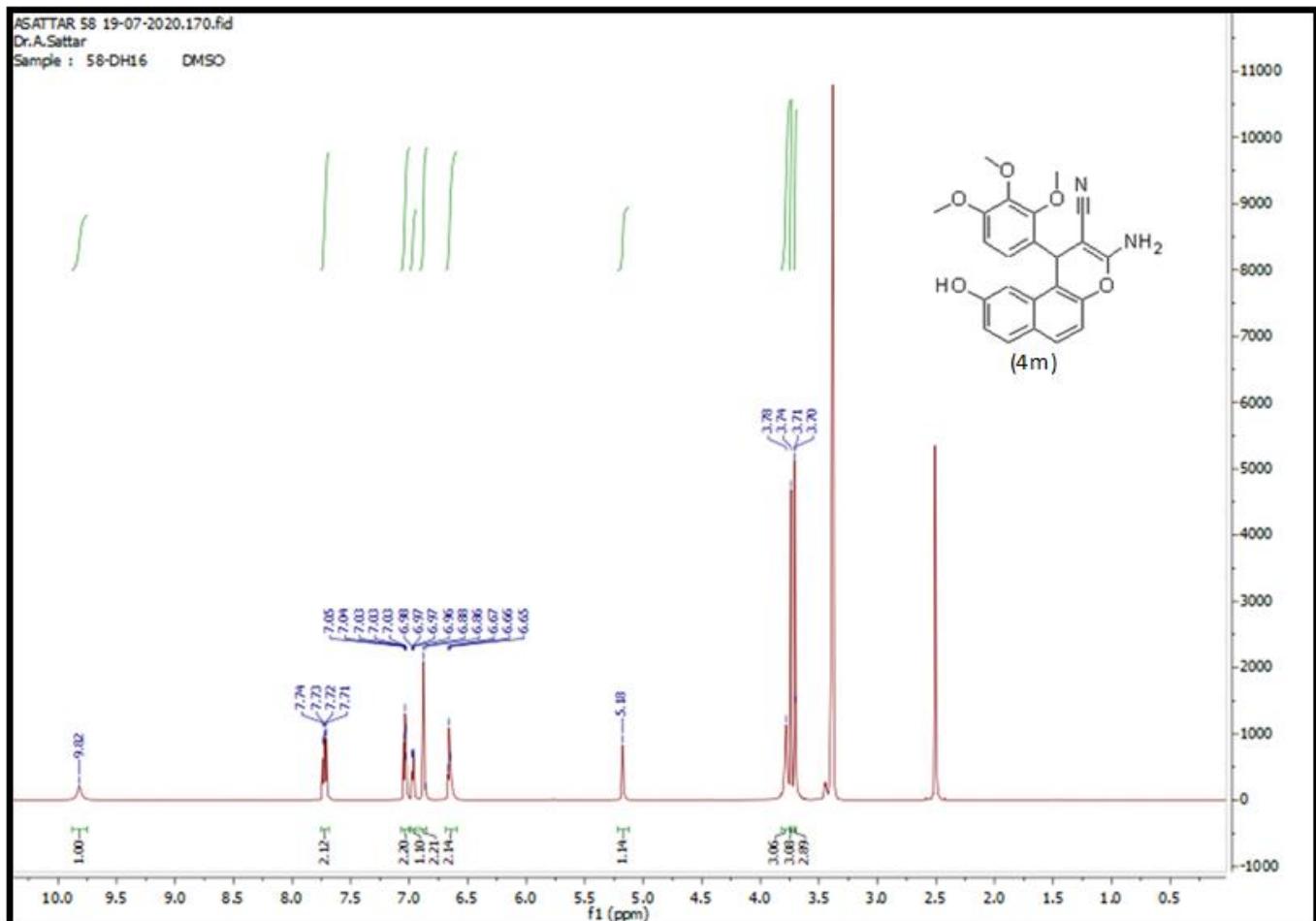


Figure S35: ¹H NMR of cpd. (4m).

ASATTAR_58_19-07-2020.171.fid
Dr.A.Setter
Sample : 58-DH16_C DMSO

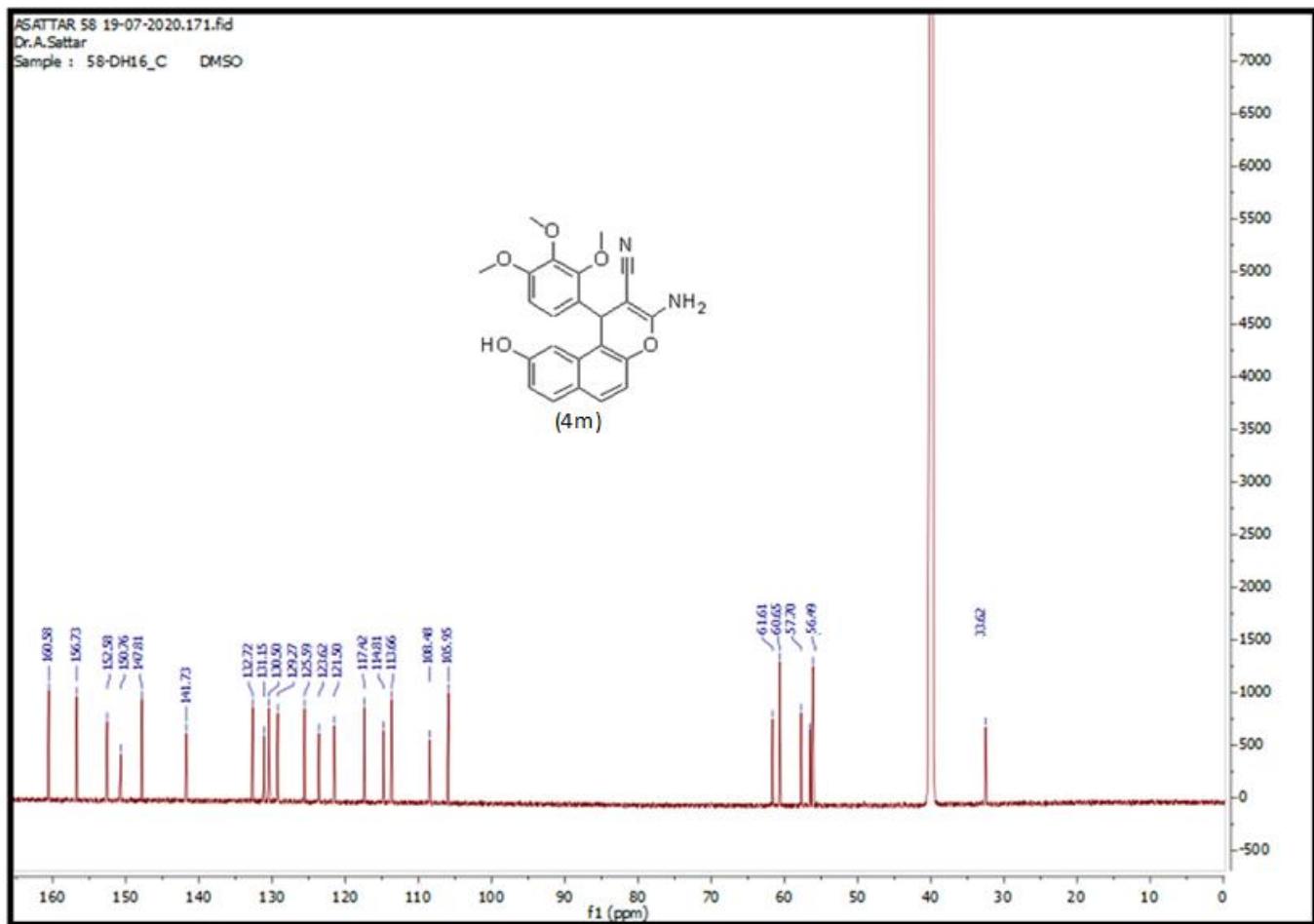


Figure S36: ^{13}C NMR of cpd. (4m).

ASATTAR 43 20-07-2020.80.fid
Dr.A.Sattar
Sample : 43-DH18_H DMSO

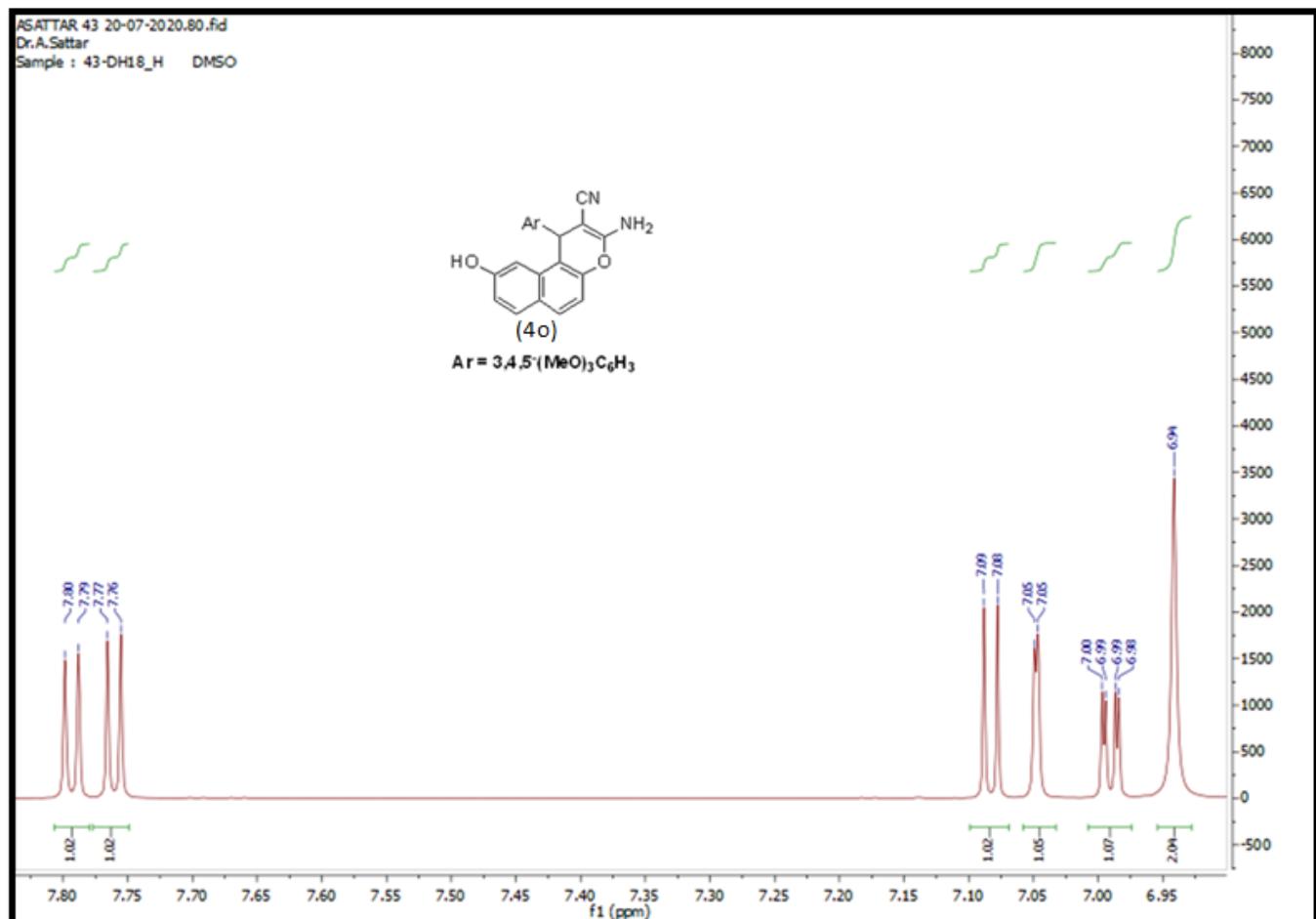


Figure S37: ¹H NMR 8.5-6.5 ppm of cpd. (4n).

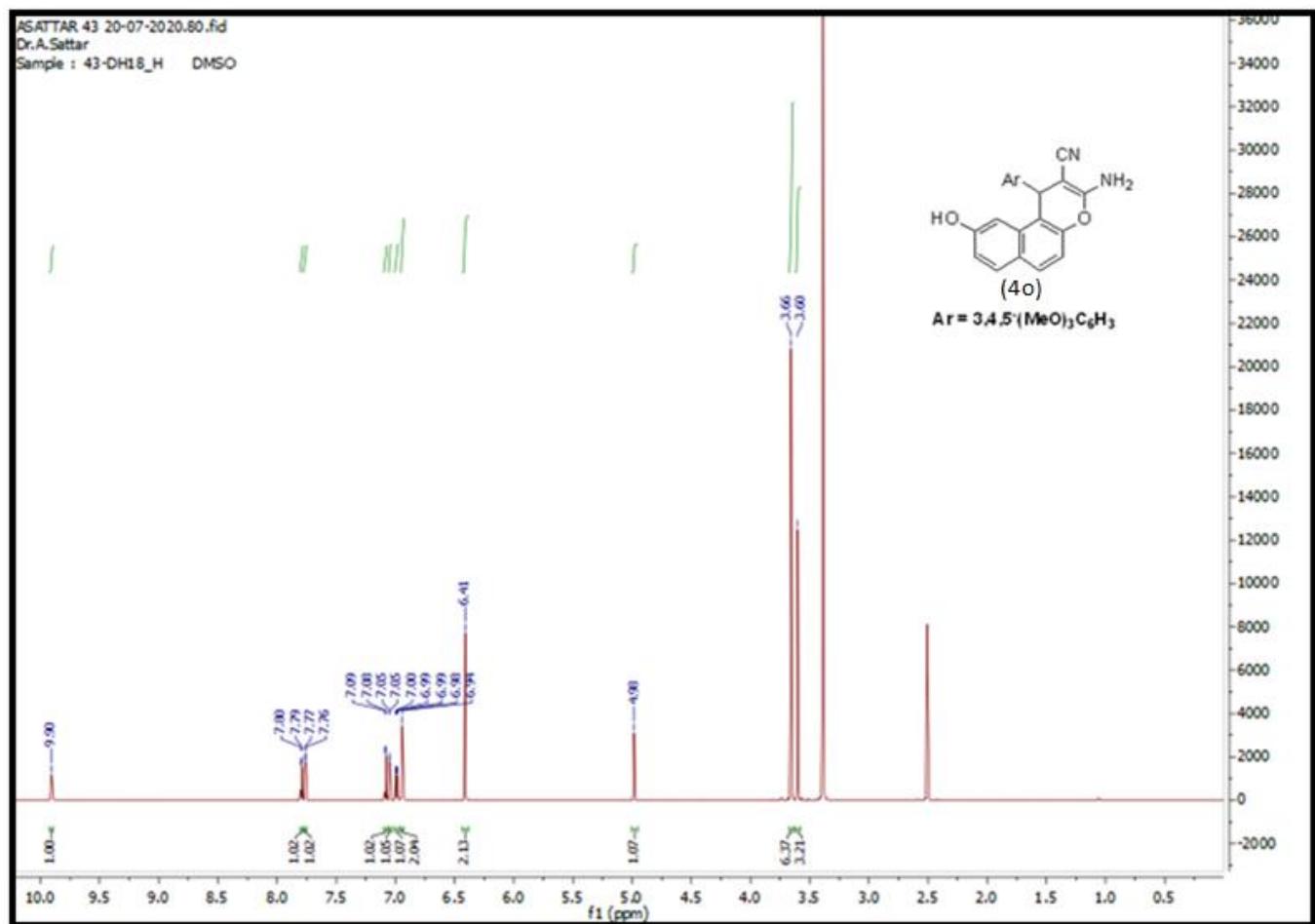


Figure S38: ^1H NMR of cpd. (4n).

ASATTAR 43 20-07-2020.81.fid
Dr.A.Sattar
Sample : 43-DH18_C DMSO

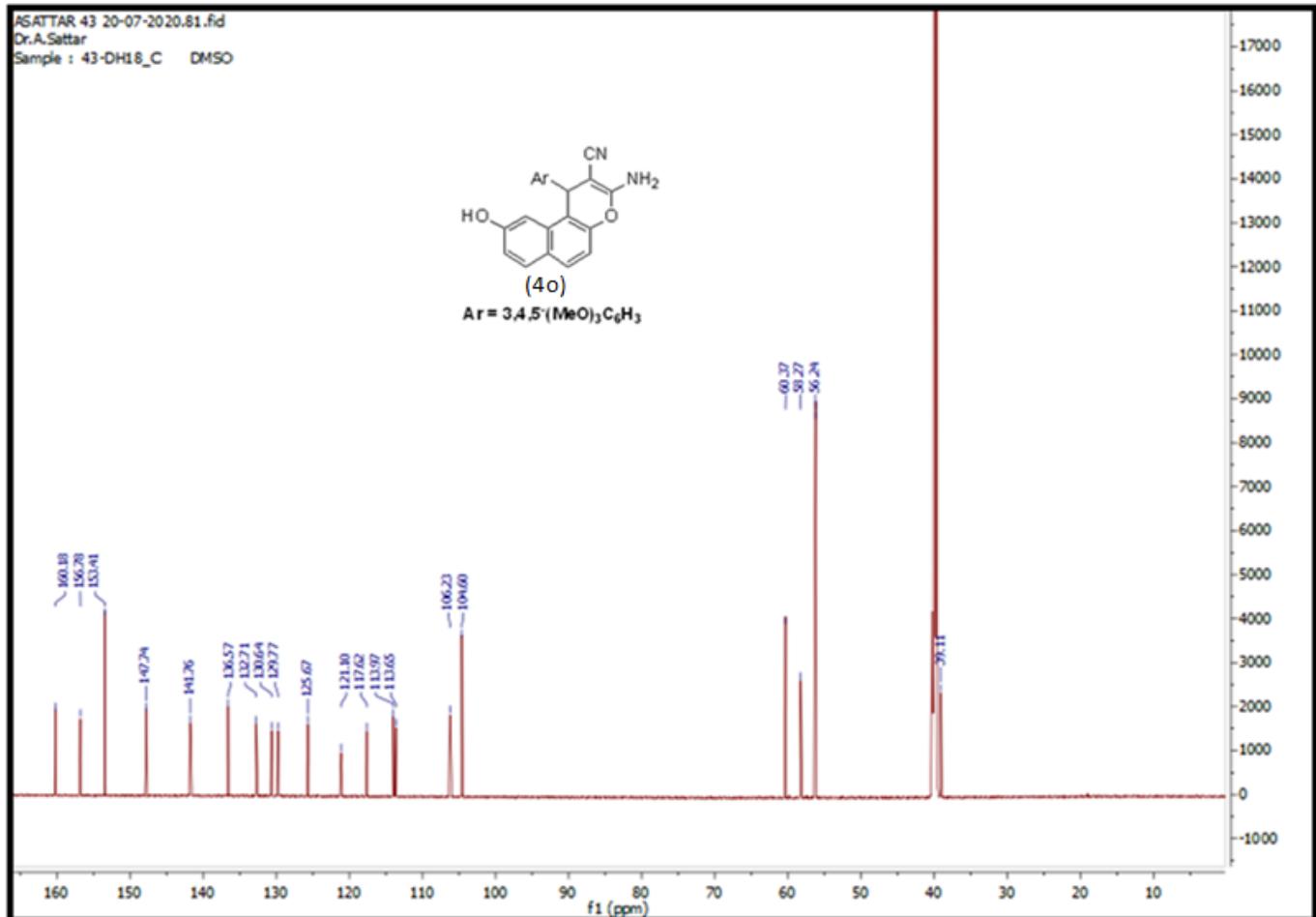
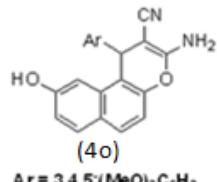


Figure S39: ¹³C NMR of cpd. (4n).

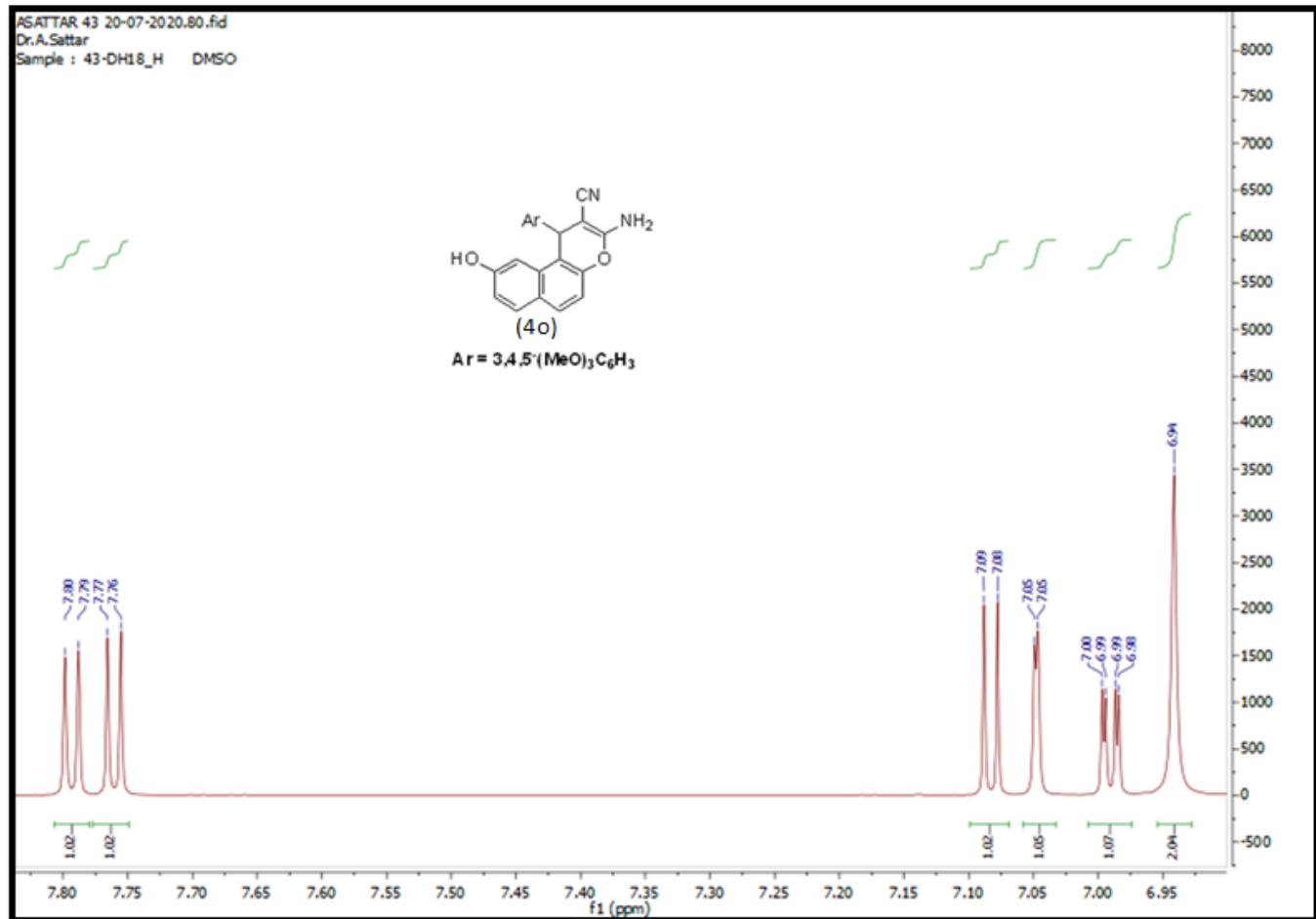
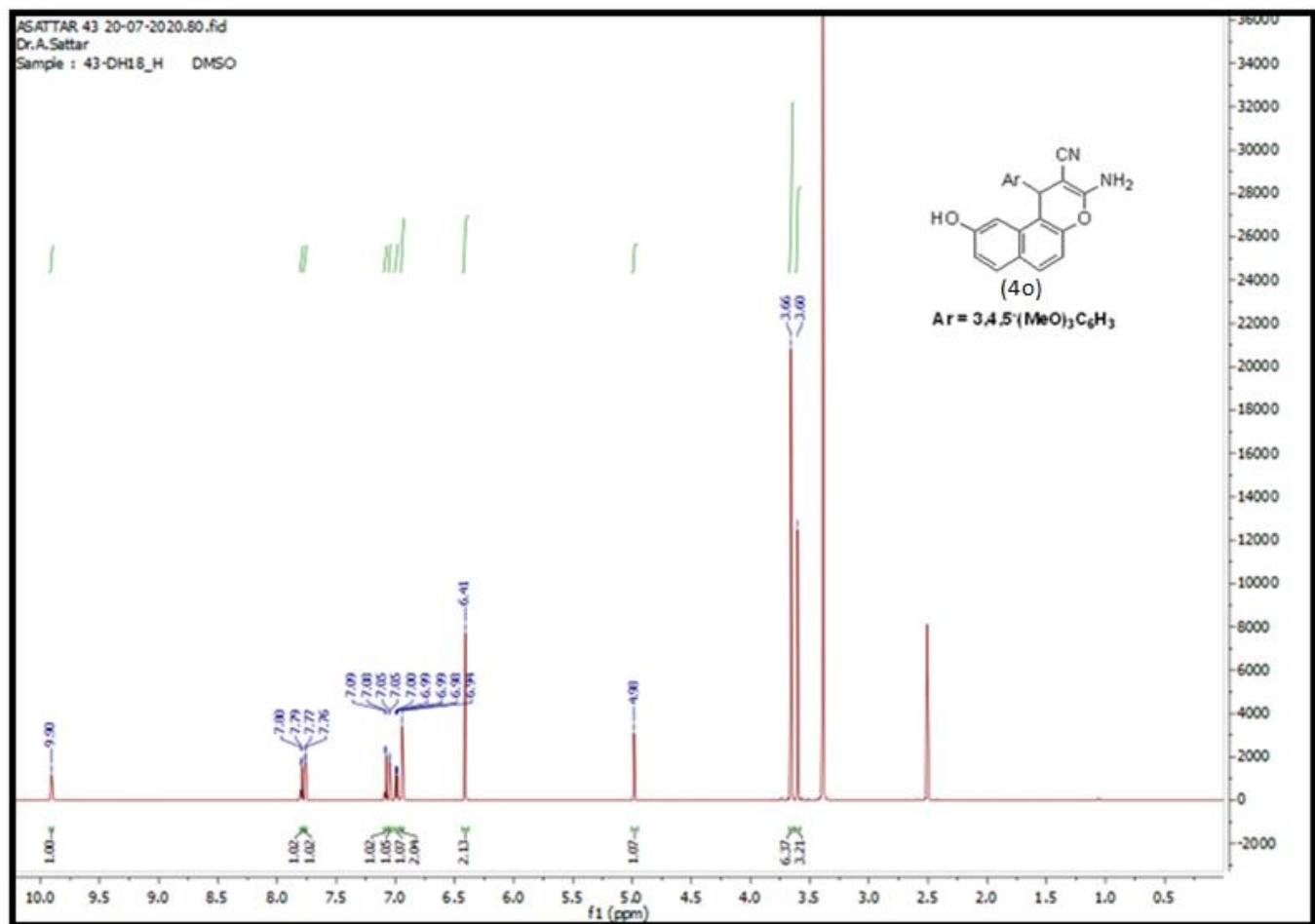


Figure S40: ¹H NMR 8.5–6.5 ppm of cpd. (4o).



ASATTAR 43 20-07-2020.81.fid
Dr.A.Sattar
Sample : 43-DH18_C DMSO

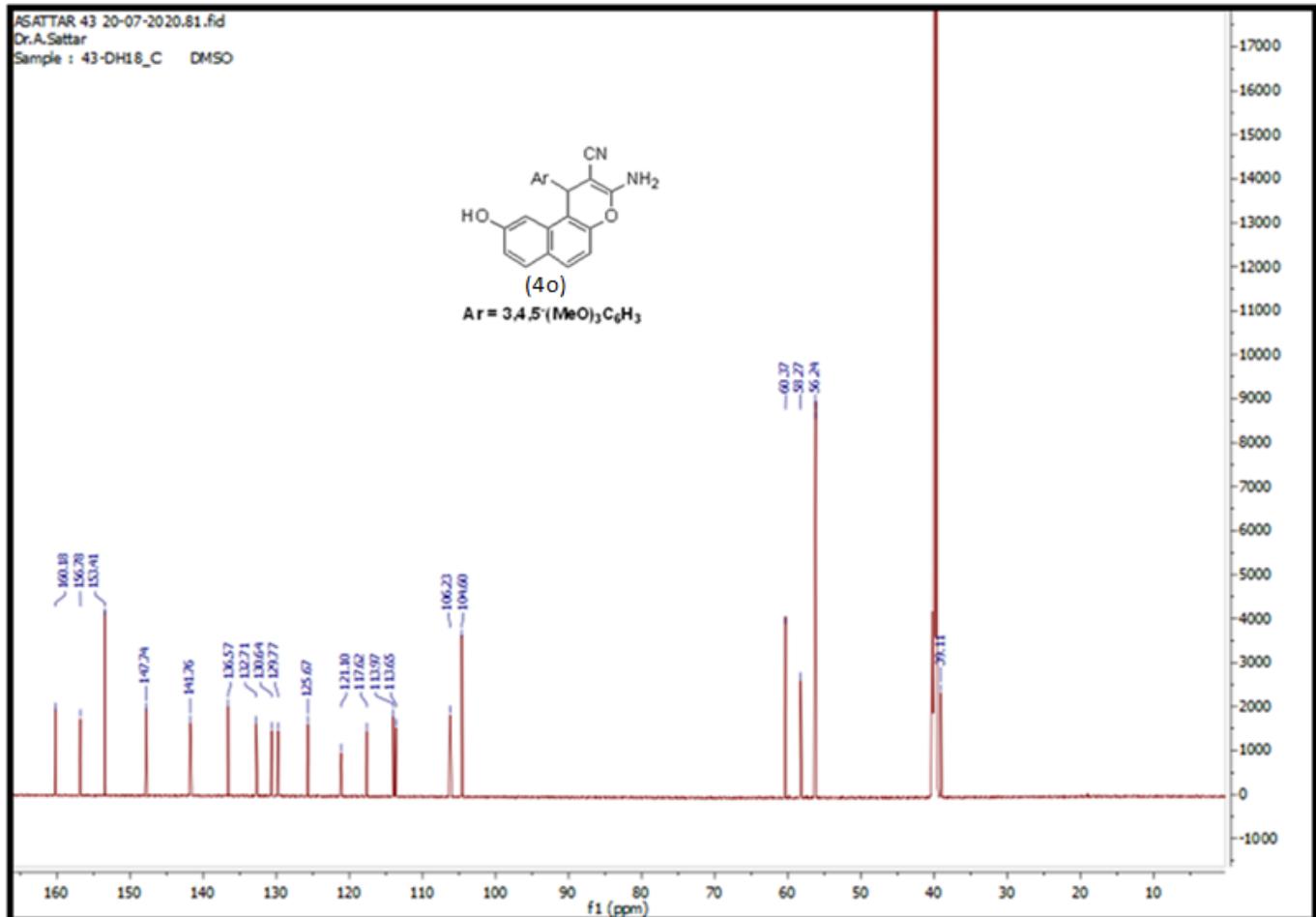
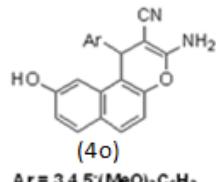


Figure S42: ¹³C NMR of cpd. (4o).

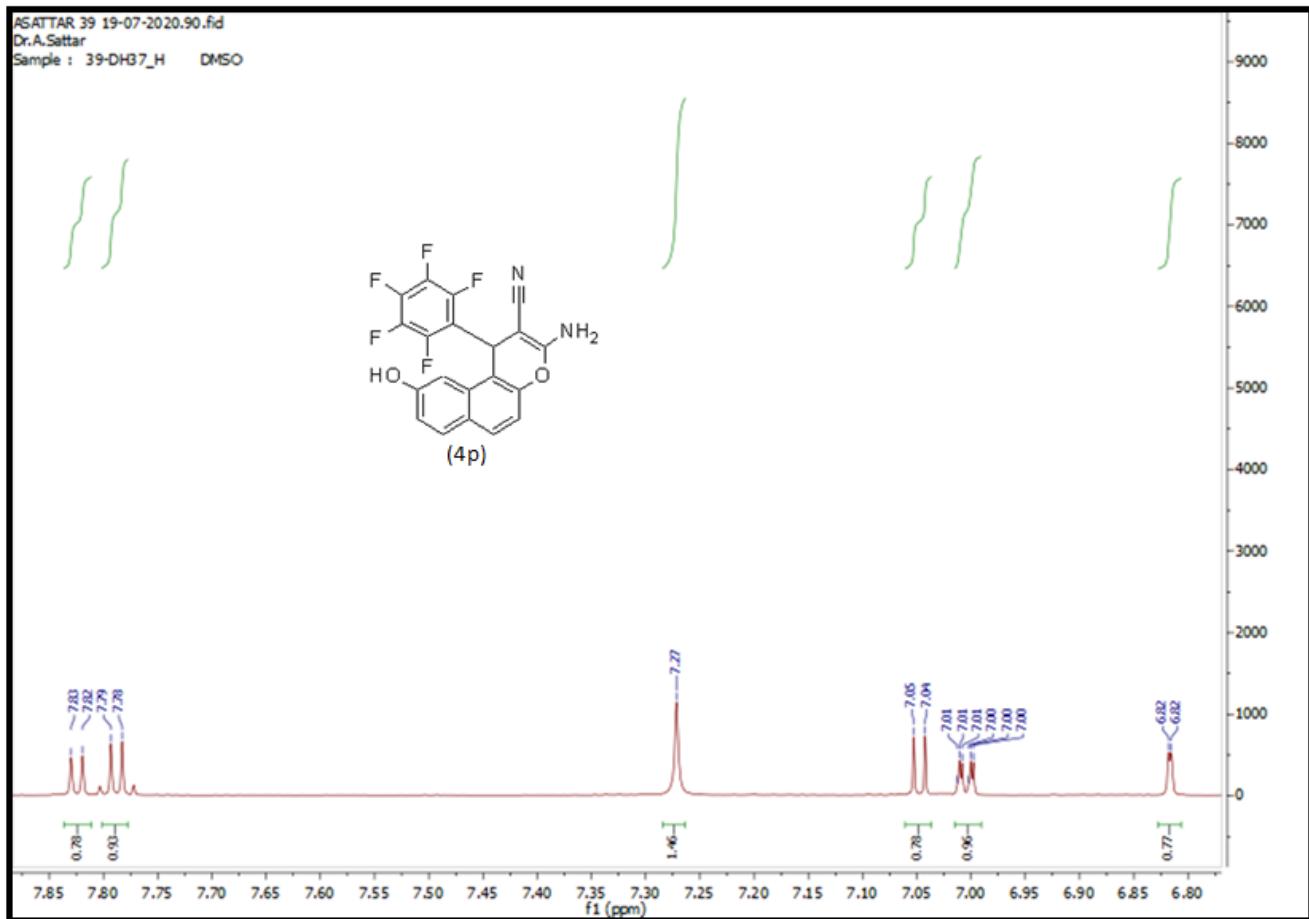


Figure S43: ^1H NMR 8.5-6.5 ppm of cpd. (4p).

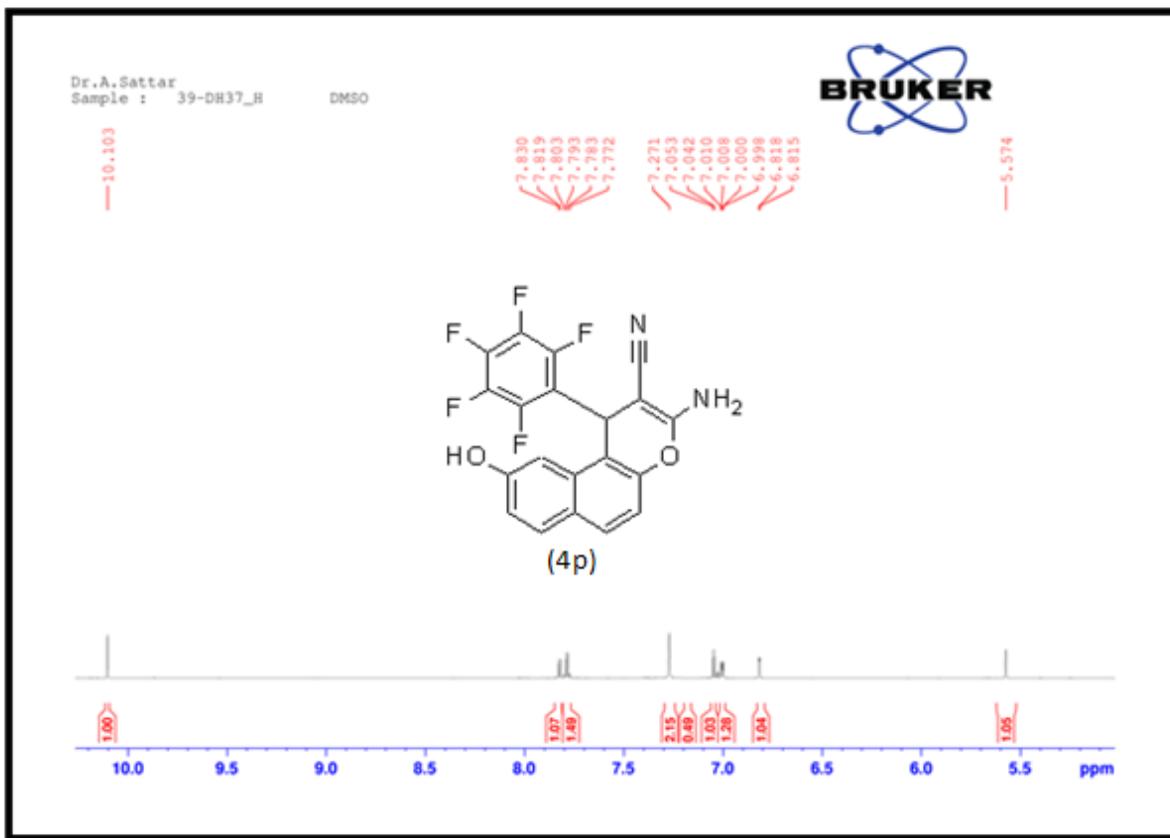


Figure S44: ^1H NMR 10.5-5.5 ppm of cpd. (4p).

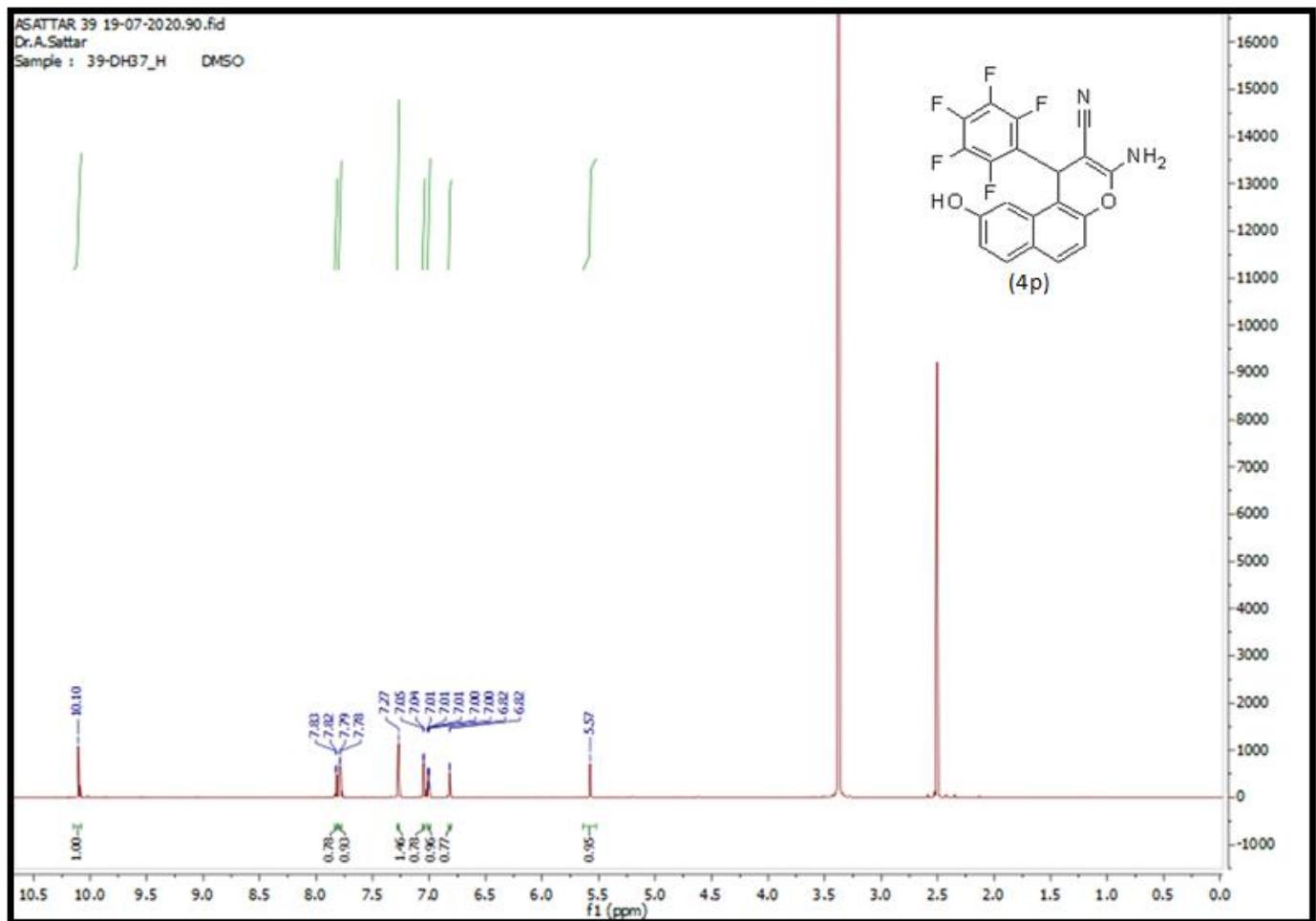


Figure S45: ¹H NMR of cpd. (4p).

ASATTAR_39_19-07-2020.91.fid
Dr.A.Sattar
Sample : 39-DHG7_C DMSO

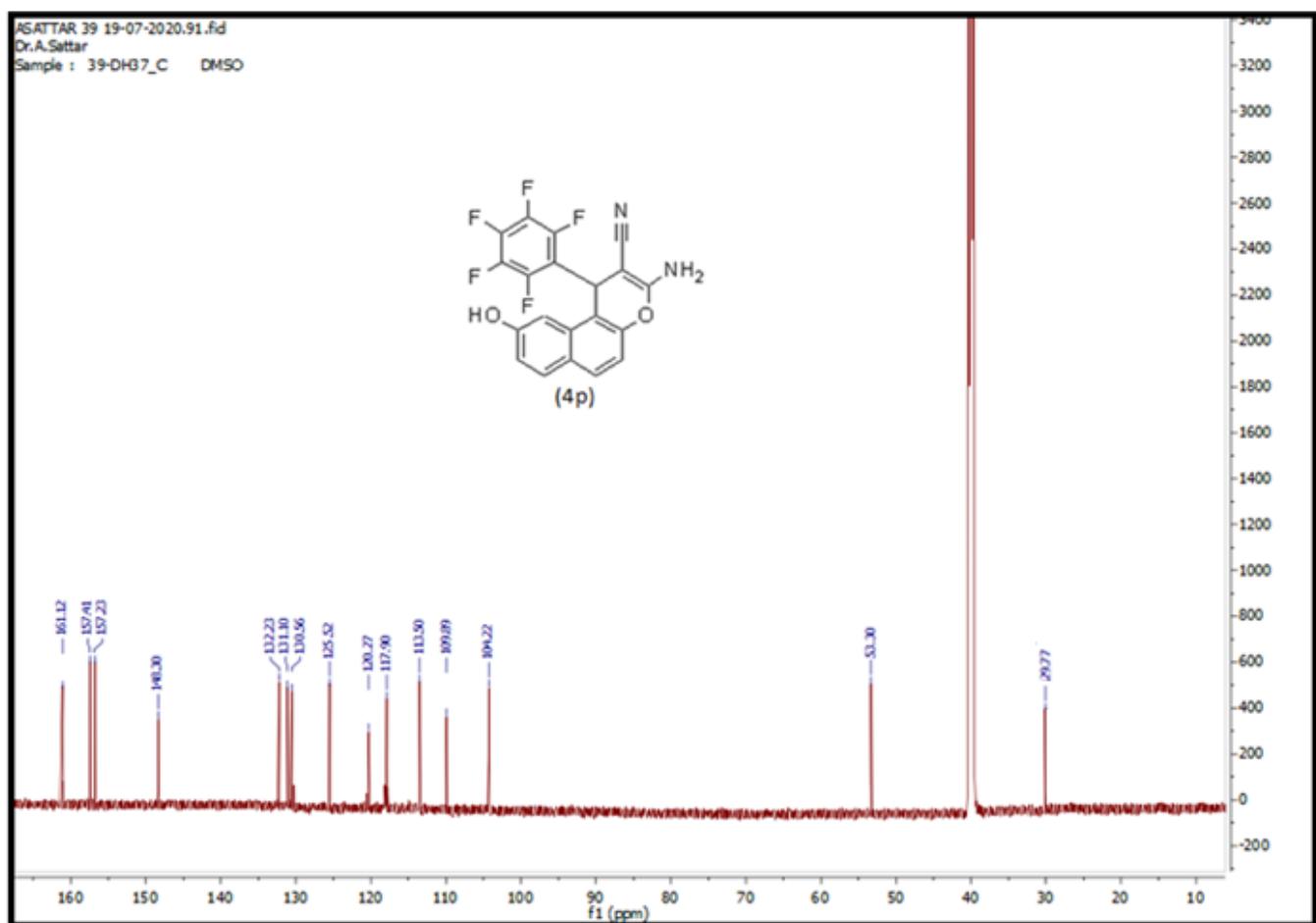
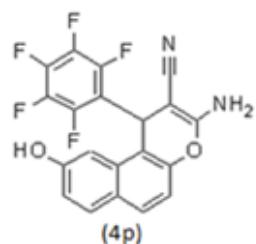


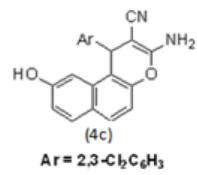
Figure S46: ¹³C NMR of cpd. (4p).

YOSRA DH-6 02-03-2020
Dr. Yosra
Sample: DH-6 DMSO

10.00

7.82
7.76
7.59
7.20
6.97
6.88
6.75

5.59



12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0

Figure S47: ¹H NMR of cpd. (4c).

YOSRA DH-6 02-03-2020
Dr. Yosra
Sample: DH-6 DMSO

— 160.53
— 157.14
— 148.13

132.42
130.85
130.26
129.45
125.66
120.34
117.74
113.69
101.13
105.37

— 56.75
— 40.36

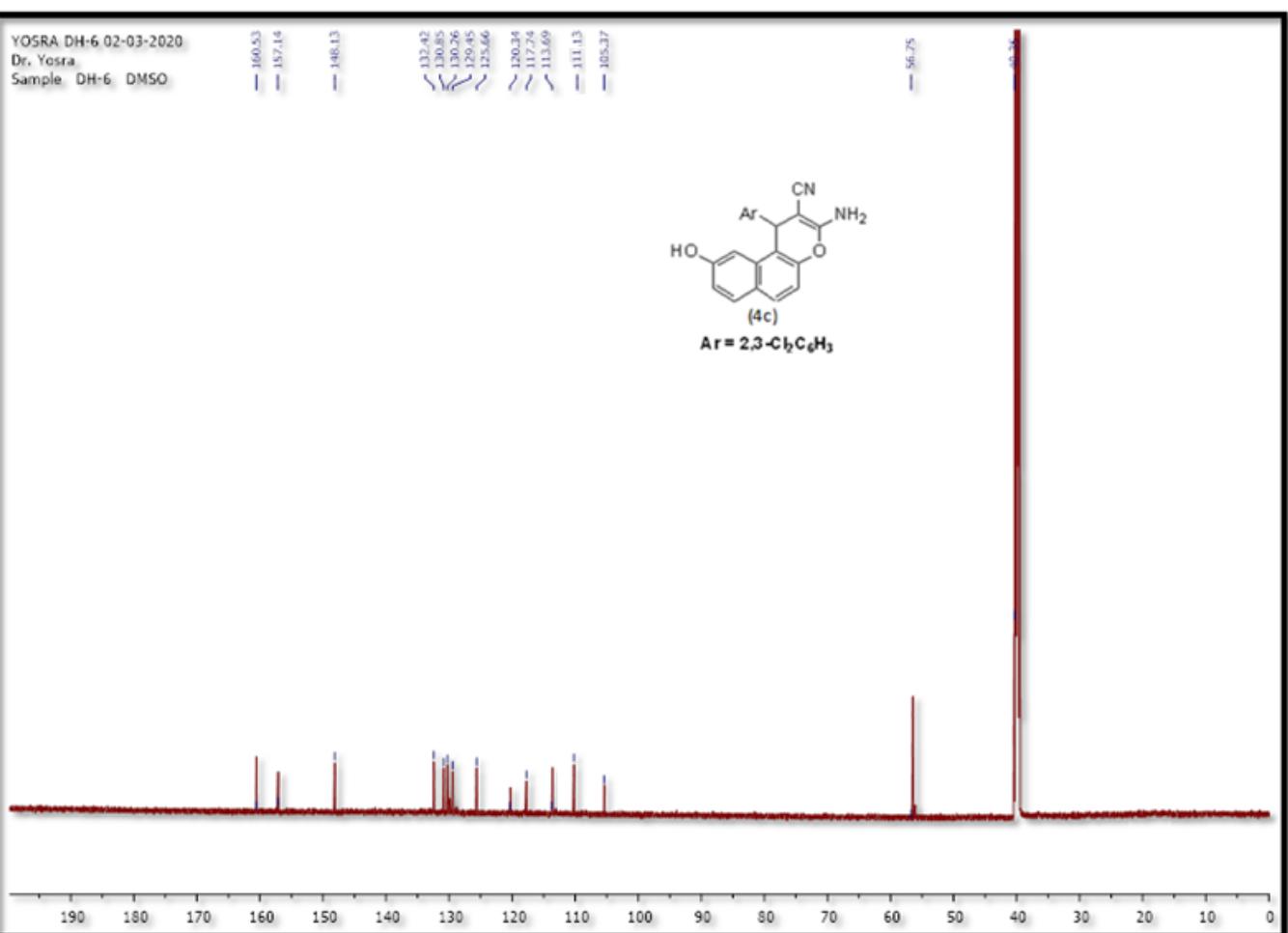
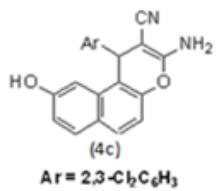


Figure S48: ^{13}C NMR of cpd. (4c).

YOSRA.DH-8.02-03-2020
Dr. Yosra
Sample: DH-8 DMSO

— 10.00

7.84
7.82
7.78
7.77
7.54
7.53
7.31
7.30
7.10
7.09
7.08
7.01
7.00
6.77

— 5.51

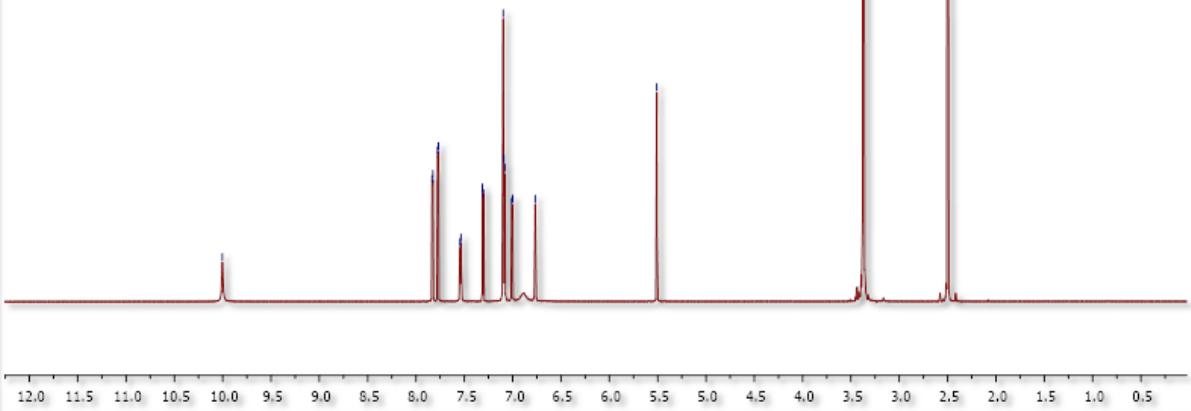
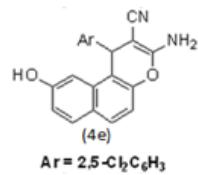


Figure S49: ^1H NMR of cpd. (4e).

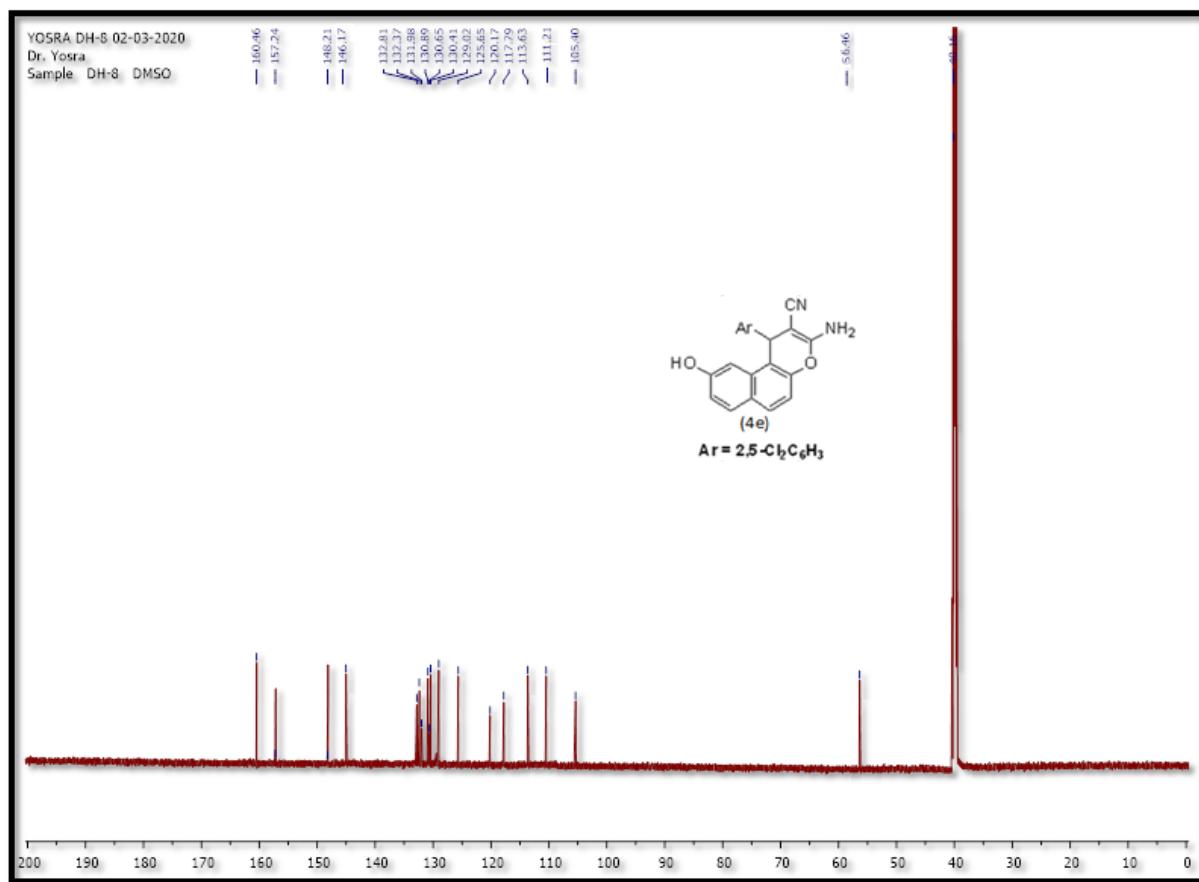


Figure S50: ^{13}C NMR of cpd. (4e).

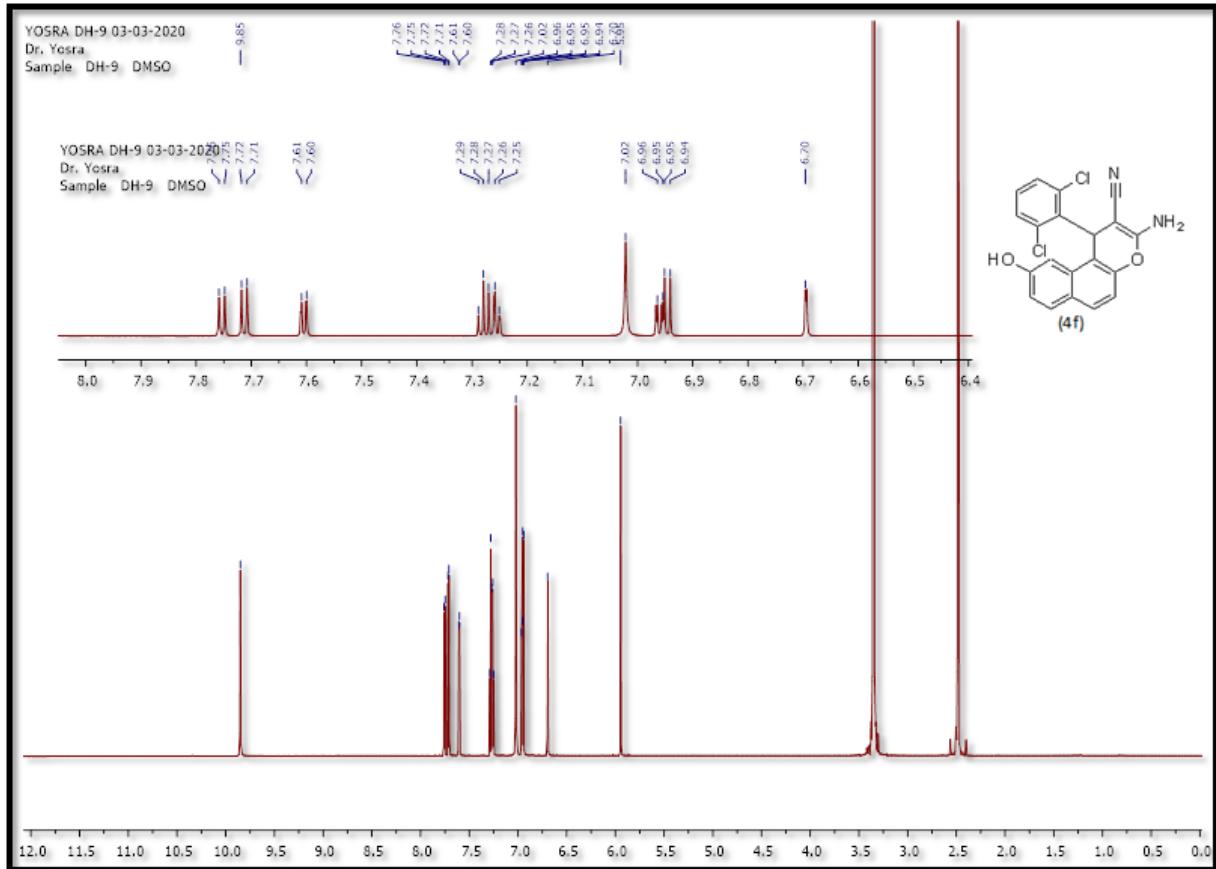


Figure S51: ^1H NMR of cpd. (4f).

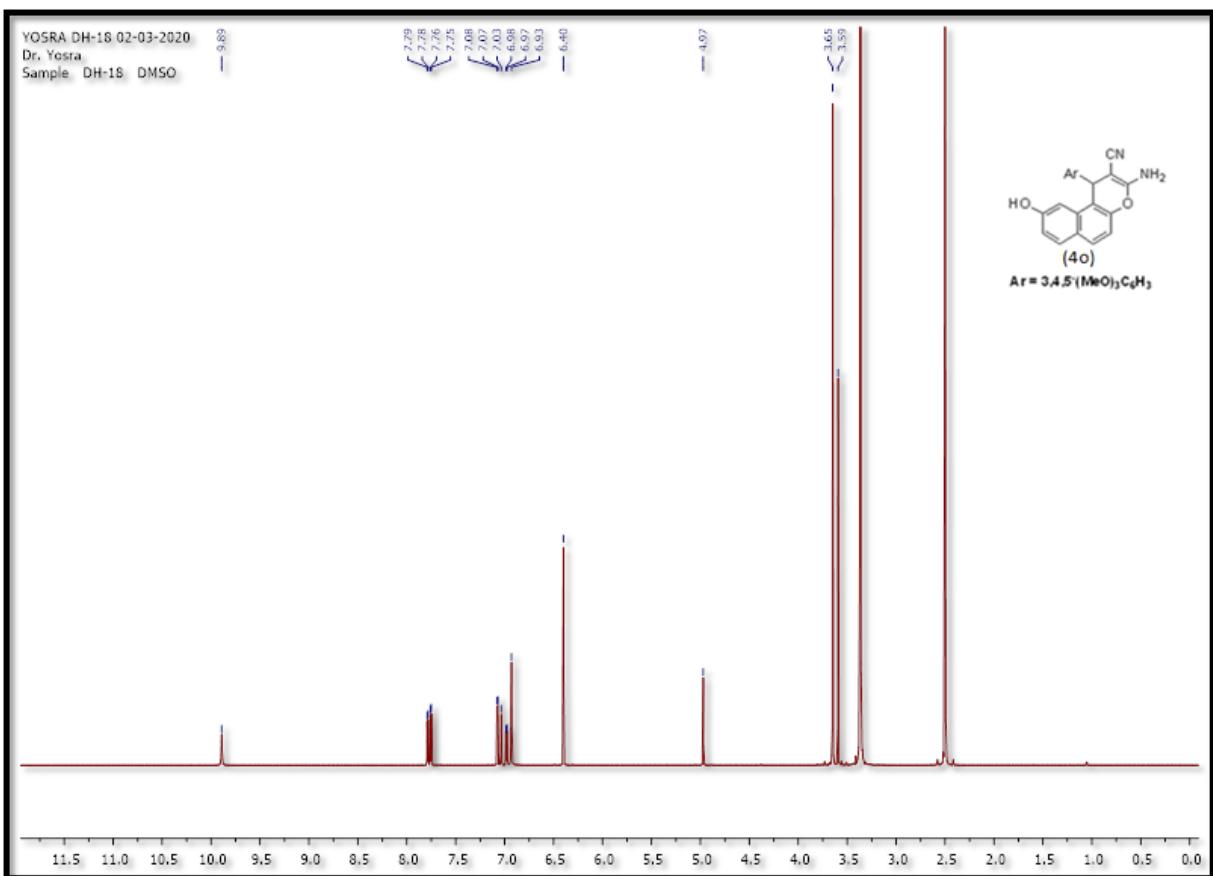
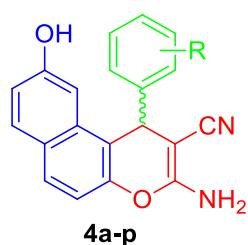


Figure S52: ¹H NMR of cpd. (4o).

Table S1: The optimization Microwave irradiation condition for Synthesis of **4a-p**.



Cpd.	R	yield (%) ^a	yield (%) ^b	yield (%) ^c
4a	2,4-F ₂	56	75	88
4b	2,6-F ₂	77	81	85
4c	2,3-Cl ₂	76	83	89
4d	2,4-Cl ₂	74	85	88
4e	2,5-Cl ₂	79	81	84
4f	2,6-Cl ₂	63	83	84
4g	3,4-Cl ₂	66	76	83
4h	2-Cl-6-F	69	80	87
4i	3,5-Br ₂	59	83	86
4j	2-HO-3-MeO	72	76	83
4k	2,4-(MeO) ₂	62	84	90
4l	3,4-(MeO) ₂	76	78	89
4m	2,3,4-(MeO) ₃	78	80	90
4n	2,4,5-(MeO) ₃	73	76	87
4o	3,4,5-(MeO) ₃	64	80	89
4p	2,3,4,5,6-F ₅	65	77	79

^a: 200 W/ 1 min.; ^b: 300 W/ 1.5 min.; ^c: 400 W/2 min.