

Nuevas Aplicaciones de la L-Serina Hidroximetiltransferasa y la Benzaldehído Liasa en Síntesis Orgánica

Karel Hernández Sánchez



Aquesta tesi doctoral està subjecta a la llicència **Reconeixement- Compartiqual 3.0. Espanya de Creative Commons.**

Esta tesis doctoral está sujeta a la licencia **Reconocimiento - Compartiqual 3.0. España de Creative Commons.**

This doctoral thesis is licensed under the **Creative Commons Attribution-ShareAlike 3.0. Spain License.**

Nuevas Aplicaciones de la L-Serina Hidroximetiltransferasa y la Benzaldehído Liasa en Síntesis Orgánica.

Instituto de Química Avanzada de Cataluña (IQAC).

Consejo Superior de Investigaciones Científicas (CSIC).

Facultad de Farmacia, Universidad de Barcelona. Departamento de
Bioquímica y Biología Molecular. Programa de Biotecnología.

Karel Hernández Sánchez
2014

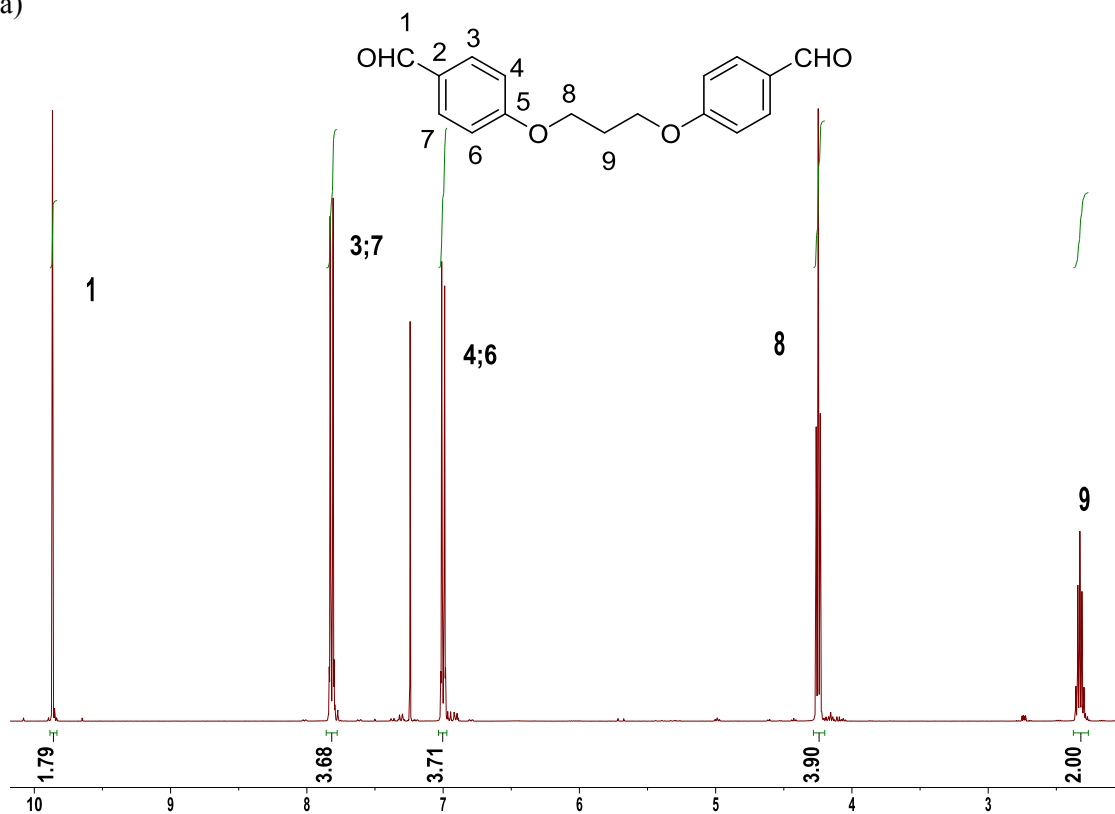
Contenido

Figura1S(3.3) Espectros de RMN(CDCl ₃) de 17ab :a) ¹ H y b) ¹³ C.....	3
Figura2S(3.3) Espectros de RMN(CDCl ₃) de 17ac :a) ¹ H y b) ¹³ C.....	4
Figura3S(3.3) Espectros de RMN(CDCl ₃) de 17ad :a) ¹ H y b) ¹³ C.....	5
Figura4S(3.3) Espectros de RMN (CDCl ₃) de 17ae :a) ¹ H y b) ¹³ C.....	6
Figura5S(3.3) Espectros de RMN(CDCl ₃) de 17af :a) ¹ H y b) ¹³ C.....	7
Figura6S(3.3) Espectros de RMN (CDCl ₃) de 17bb :a) ¹ H y b) ¹³ C.....	8
Figura7S(3.3) Espectros de RMN (CDCl ₃) de 17bc :a) ¹ H y b) ¹³ C.....	9
Figura9S(3.3) Espectros de RMN (CDCl ₃) de 17be :a) ¹ H y b) ¹³ C.....	11
Figura10S(3.3) Espectros de RMN (CDCl ₃) de 17ca :a) ¹ H y b) ¹³ C.....	12
Figura11S(3.3) Espectros de RMN(CDCl ₃) de 17cb :a) ¹ H y b) ¹³ C.....	13
Figura12S(3.3) Espectros de RMN(CDCl ₃) de 17cc :a) ¹ H y b) ¹³ C.....	14
Figura13S(3.3) Espectros de RMN (CDCl ₃) de 18cb : a) ¹ H; b) ¹³ C; c) 2D ¹ H- ¹ H COSY; d) HSQC y e) HMBC.....	15
Figura14S(3.3) Espectros de RMN (CDCl ₃) de 21bb : a) ¹ H; b) ¹³ C; c) 2D ¹ H- ¹ H COSY; d) HSQC y e) HMBC.....	18
Figura15S(3.3) Espectros de RMN (CDCl ₃) de 21bc : a) ¹ H; b) ¹³ C; c) 2D ¹ H- ¹ H COSY; d) HSQC y e) HMBC.....	21
Figura16S(3.3) Espectros de RMN (DMSO- <i>d</i> ₆) de 22 : a) ¹ H y b) ¹³ C.....	24
Figura17S(3.3) Espectros de RMN (CDCl ₃) de 24a :a) ¹ H y b) ¹³ C.....	25
Figura18S(3.3) Espectros de RMN(CDCl ₃) de 24b :a) ¹ H y b) ¹³ C.....	26
Figura19S(3.3) Espectros de RMN (CDCl ₃) de 24c : a) ¹ H y b) ¹³ C.....	27
Figura20S(3.3) Espectros de RMN (CDCl ₃) de 24d : a) ¹ H y b) ¹³ C.....	28
Figura21S(3.3) Espectros de RMN(CDCl ₃) de 26 : a) ¹ H y b) ¹³ C.....	29
Figura22S(3.3) Espectros de RMN (CDCl ₃) de 28 : a) ¹ H y b) ¹³ C.....	30
Figura23S(3.3) Espectros de RMN(CDCl ₃) de 31 : a) ¹ H y b) ¹³ C.....	31
Figura24S(3.3) Espectros de RMN (CDCl ₃) de 34 : a) ¹ H y b) ¹³ C.....	32
Figura25S(3.3) Espectros de RMN(CDCl ₃) de 38 : a) ¹ H y b) ¹³ C.....	33
Figura26S(3.3) Espectros de RMN (CDCl ₃) de 42 : a) ¹ H y b) ¹³ C.....	34
Figura27S(3.3) Espectros de RMN (CDCl ₃) de 46 : a) ¹ H y b) ¹³ C.....	35
Figura28S(3.3) Espectros de RMN (DMSO- <i>d</i> ₆) de 51a : a) ¹ H y b) ¹³ C.....	36
Figura29S(3.3) Espectros de RMN(DMSO- <i>d</i> ₆) de 51b : a) ¹ H y b) ¹³ C.....	37
Figura30S(3.3) Espectros de RMN (CDCl ₃) de 55 : a) ¹ H y b) ¹³ C.....	38
Figura31S(3.3) Espectros de RMN (CDCl ₃) de 58 : a) ¹ H y b) ¹³ C.....	39
Figura32S(3.3) Espectros de RMN (CDCl ₃) de 61a : a) ¹ H y b) ¹³ C.....	40

Figura33S(3.3) Espectros de RMN(CDCl ₃) de 61b : a) ¹ H y b) ¹³ C.....	41
Figura34S(3.3) Espectros de RMN (CDCl ₃) de 67 : a) ¹ H y b) ¹³ C.....	42
Figura35S(3.3) Espectros de RMN(CDCl ₃) de 68 : a) ¹ H; b) ¹³ C; c) 2D ¹ H- ¹ H COSY; d) HSQC y e) HMBC.....	43
Figura36S(3.3) Espectros de RMN(CDCl ₃) de 69 : a) ¹ H; b) ¹³ C; c) 2D ¹ H- ¹ H COSY; d) HSQC y e) HMBC.....	46
Figura37S(3.3) Espectros de RMN (CDCl ₃) de 70 : a) ¹ H; b) ¹³ C; c) 2D ¹ H- ¹ H COSY; d) HSQC y e) HMBC.....	49
Figura38S(3.3) Espectros de RMN(CDCl ₃) de 71e,f : a) ¹ H; b) ¹³ C; c) 2D ¹ H- ¹ H COSY; d) HSQC y e) HMBC.....	52
Figura39S(3.3) Espectros de RMN(CDCl ₃) de 72e,f : a) ¹ H; b) ¹³ C; c) 2D ¹ H- ¹ H COSY; d) HSQC y e) HMBC.....	58
Figura40S(3.3) Espectros de RMN(CDCl ₃) de 73e : a) ¹ H; b) ¹³ C; c) 2D ¹ H- ¹ H COSY; d) HSQC y e) HMBC.....	63
Figura41S(3.3) Espectros de RMN(CDCl ₃) de 73f : a) ¹ H; b) ¹³ C; c) 2D ¹ H- ¹ H COSY; d) HSQC y e) HMBC.....	67

Figura S(3.3) Espectros de RMN(CDCl₃) de 17ab:a) ¹H y b) ¹³C.

a)



b)

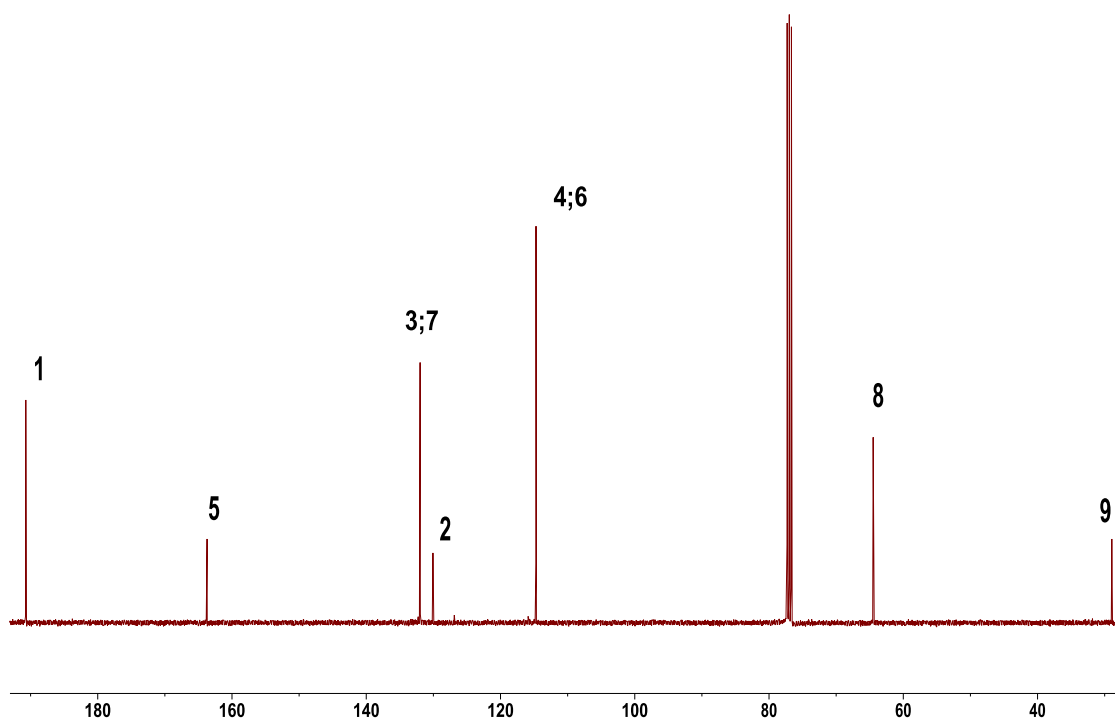
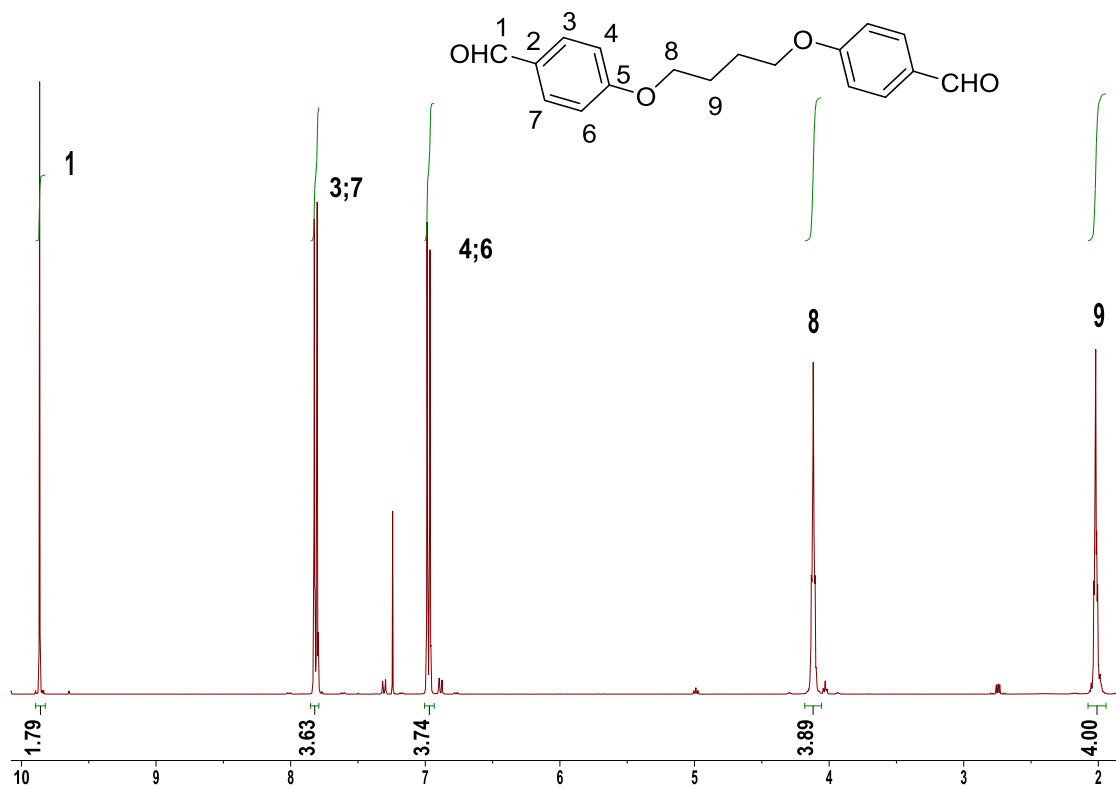


Figura2S(3.3) Espectros de RMN(CDCl₃) de **17ac**:a) ¹H y b) ¹³C.

a)



b)

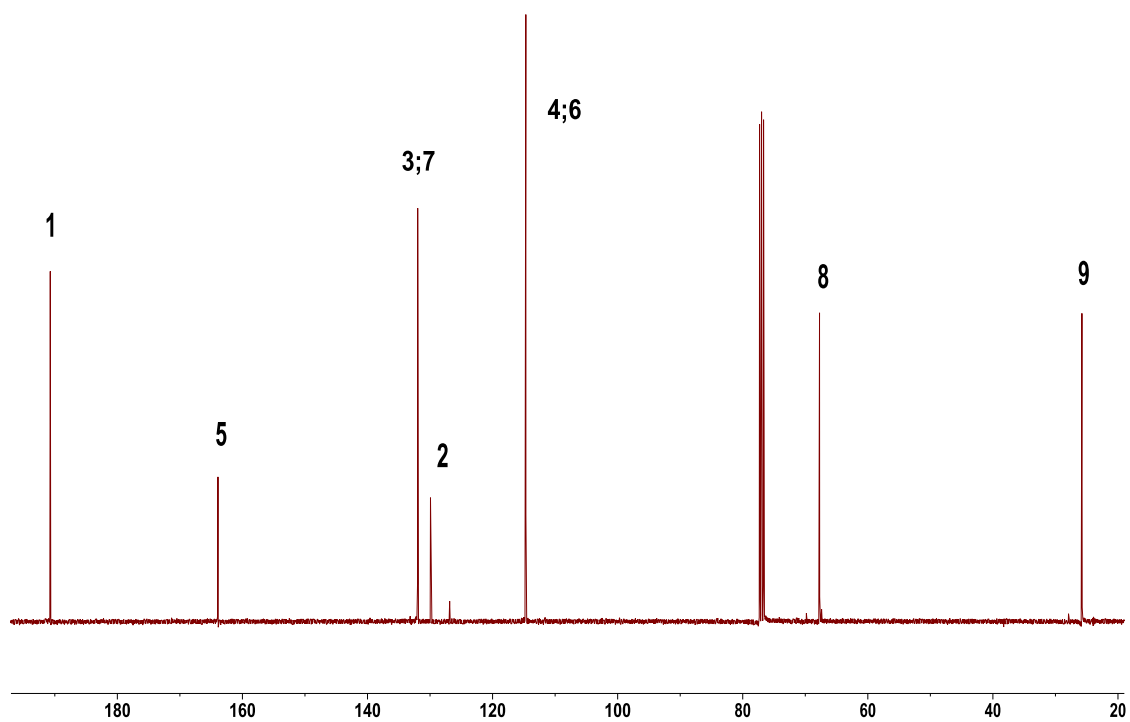


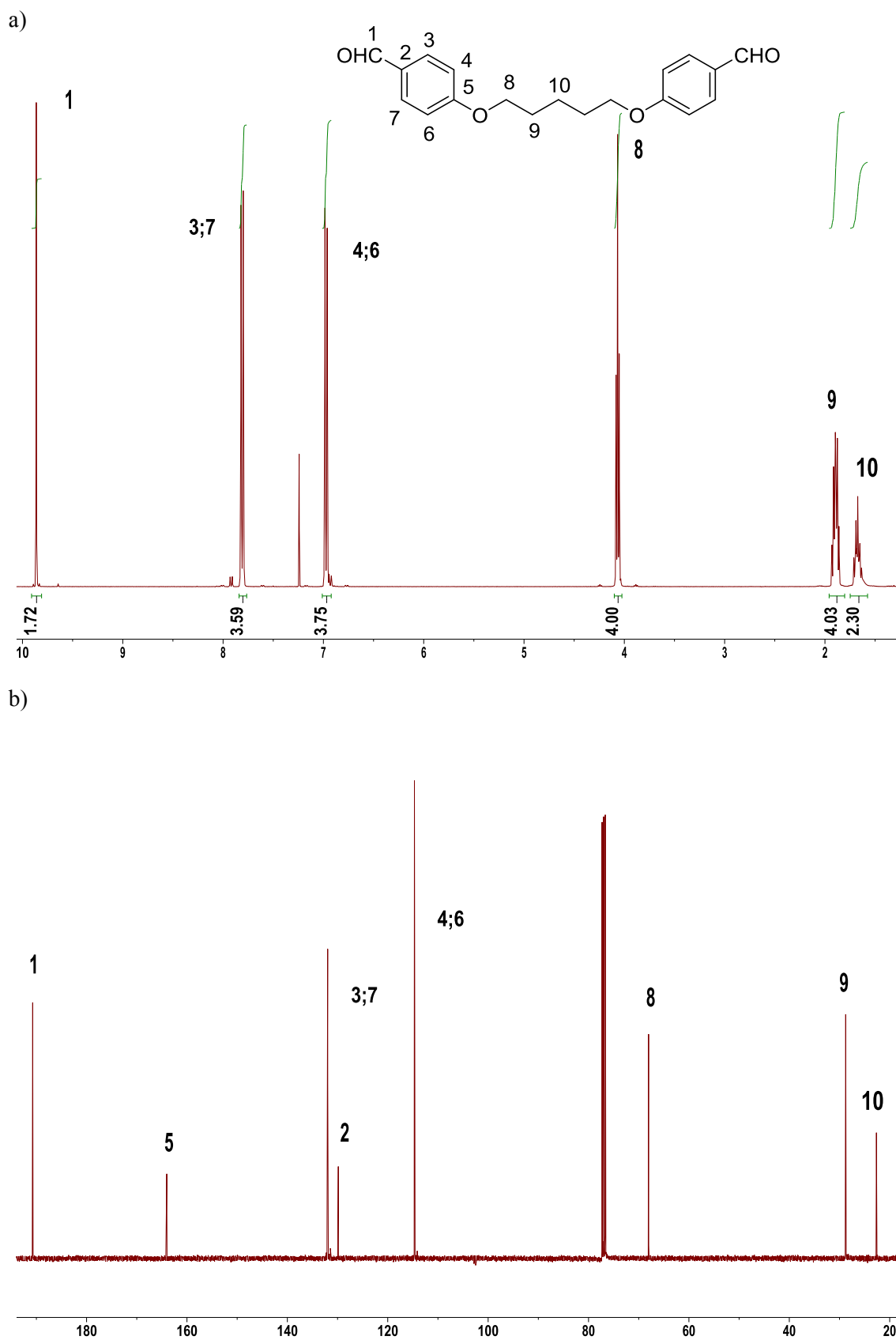
Figura3S(3.3) Espectros de RMN(CDCl₃) de **17ad**:a) ¹H y b) ¹³C.

Figura4S(3.3) Espectros de RMN (CDCl₃) de 17ae:a) ¹H y b) ¹³C.

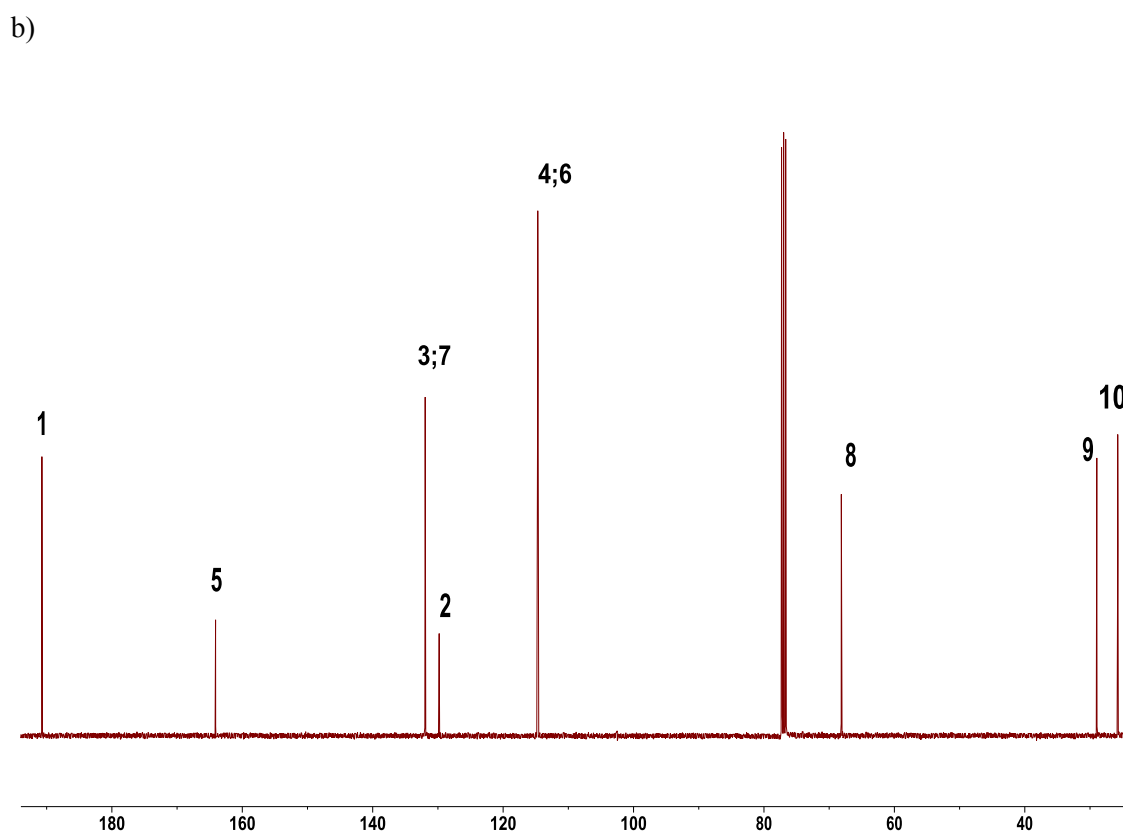
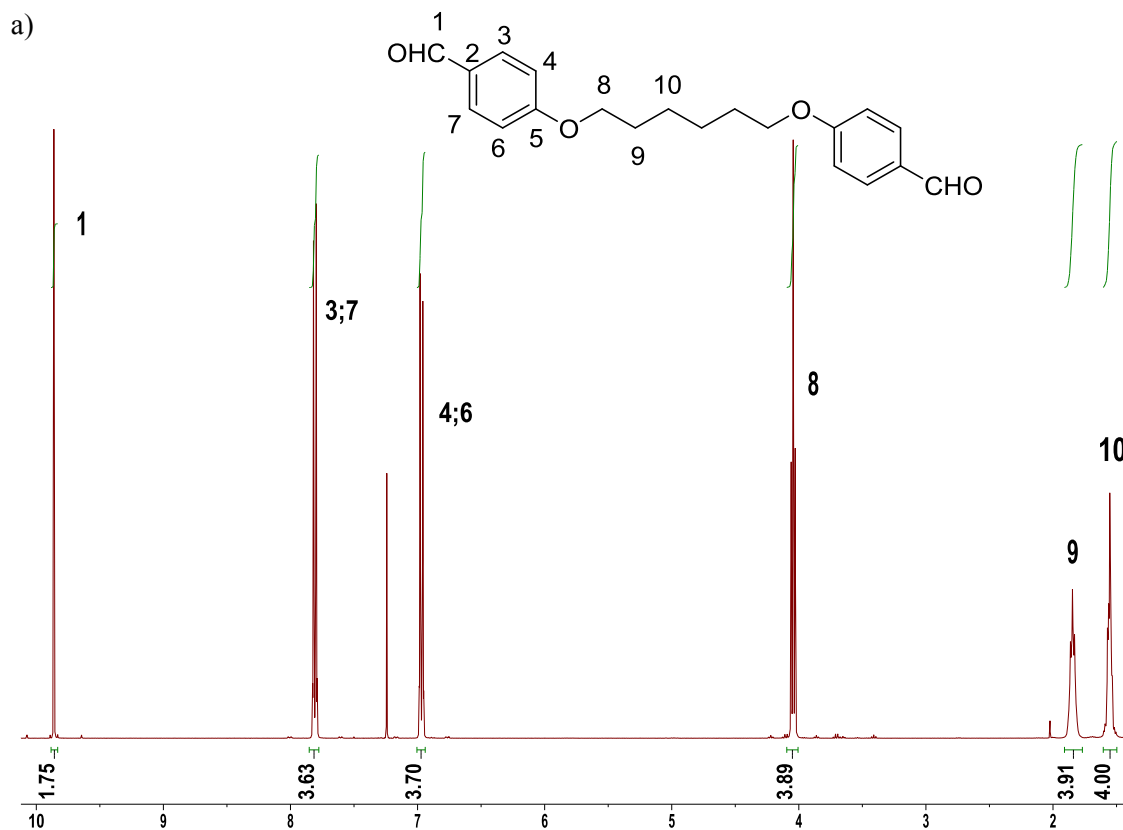


Figura5S(3.3) Espectros de RMN(CDCl₃) de 17af:a) ¹H y b) ¹³C.

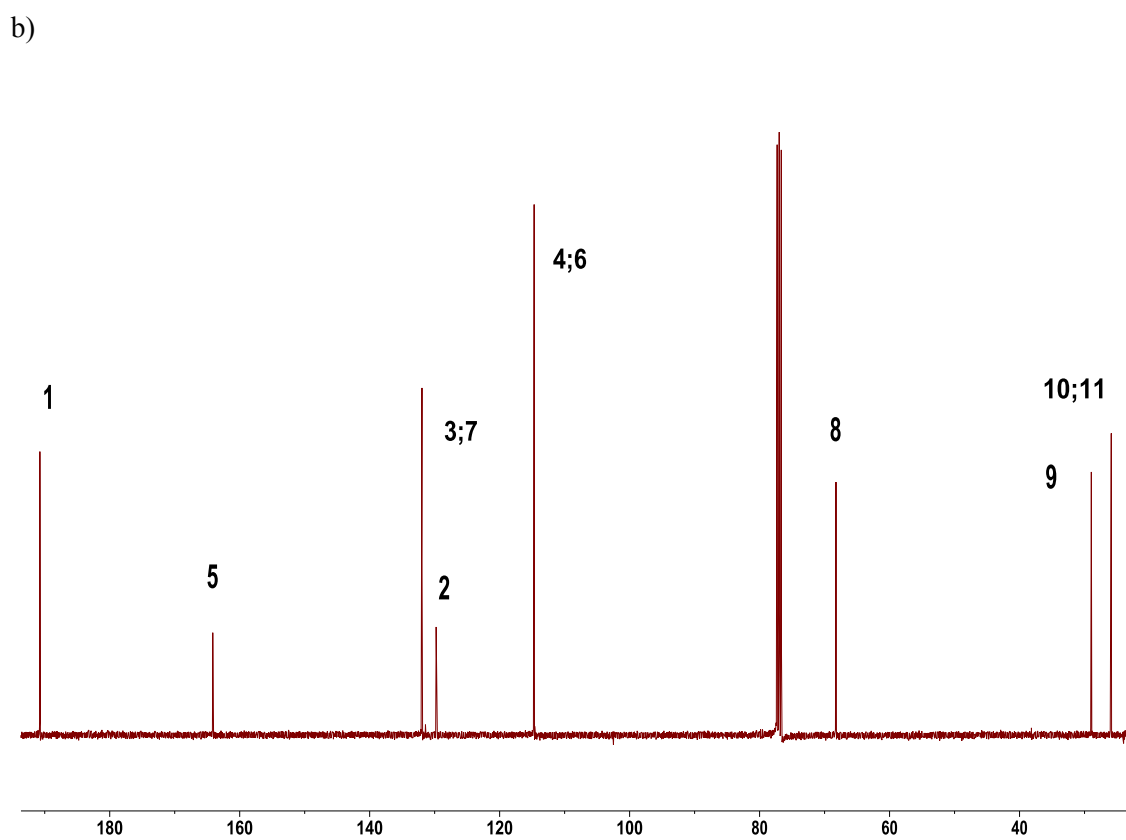
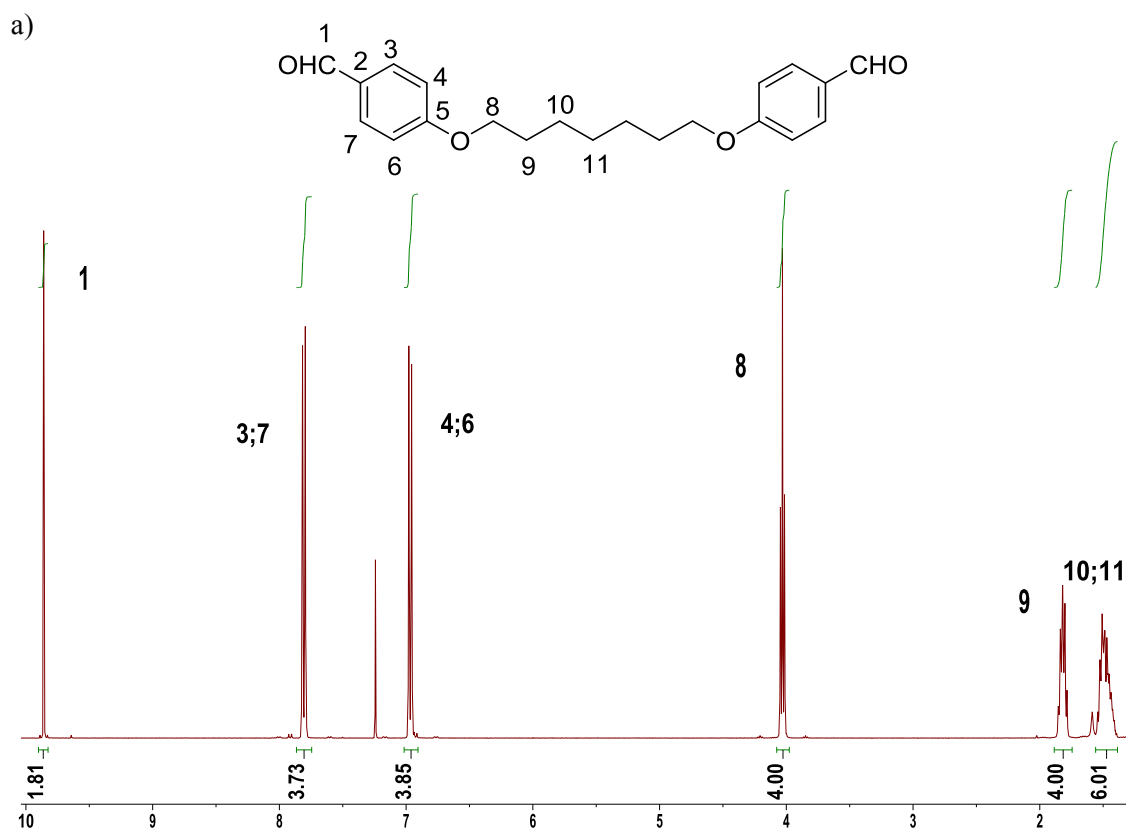


Figura6S(3.3) Espectros de RMN (CDCl_3) de **17bb**:a) ^1H y b) ^{13}C .

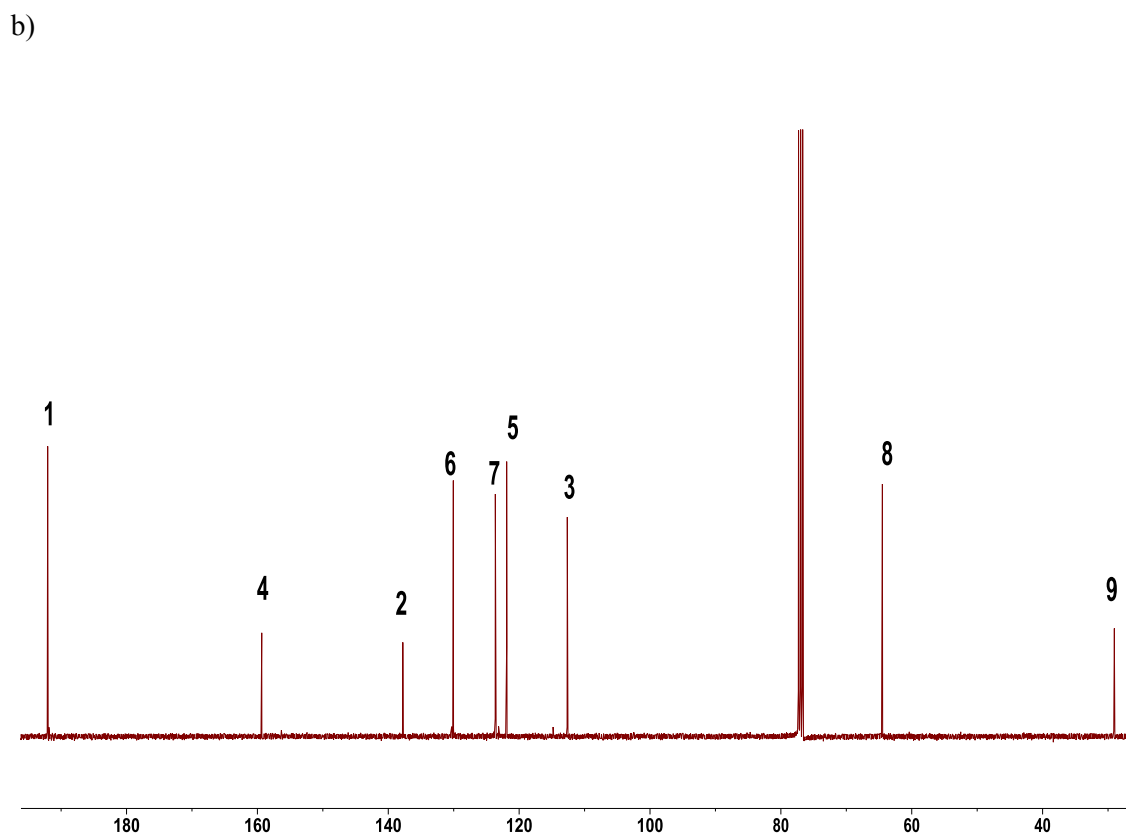
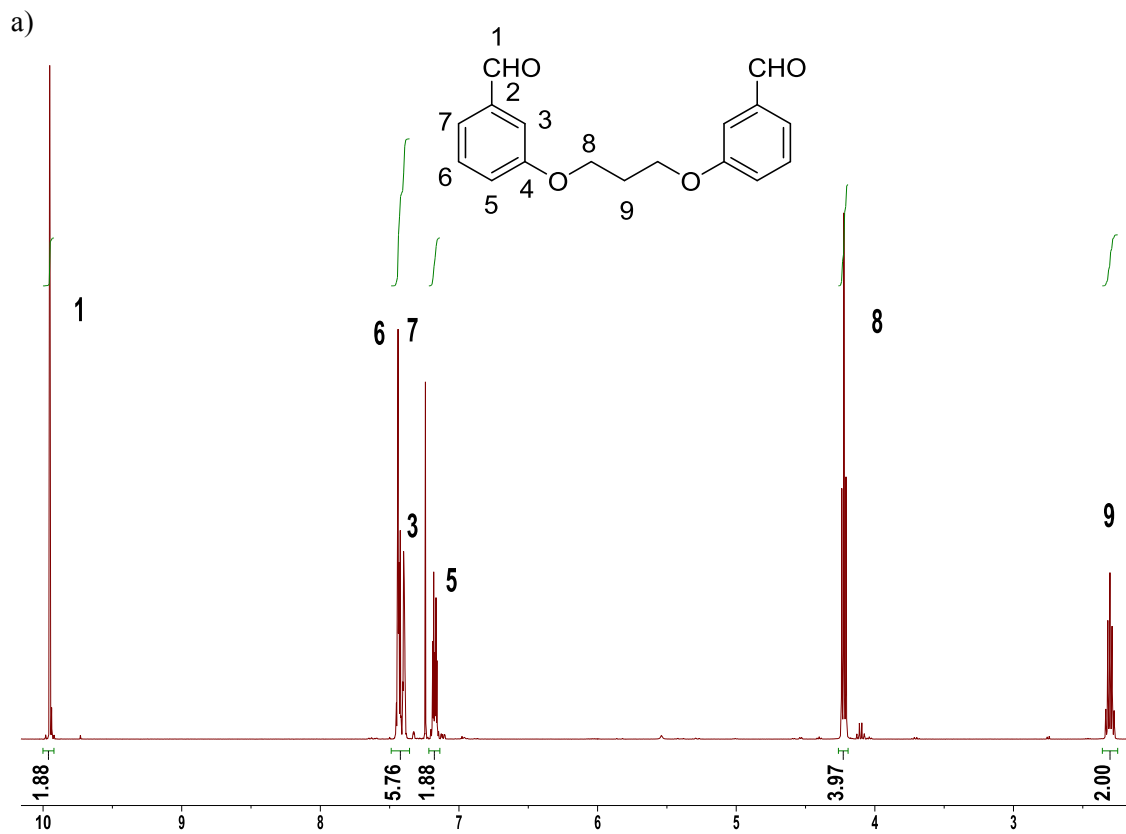


Figura 7S(3.3) Espectros de RMN (CDCl_3) de **17bc**: a) ^1H y b) ^{13}C .

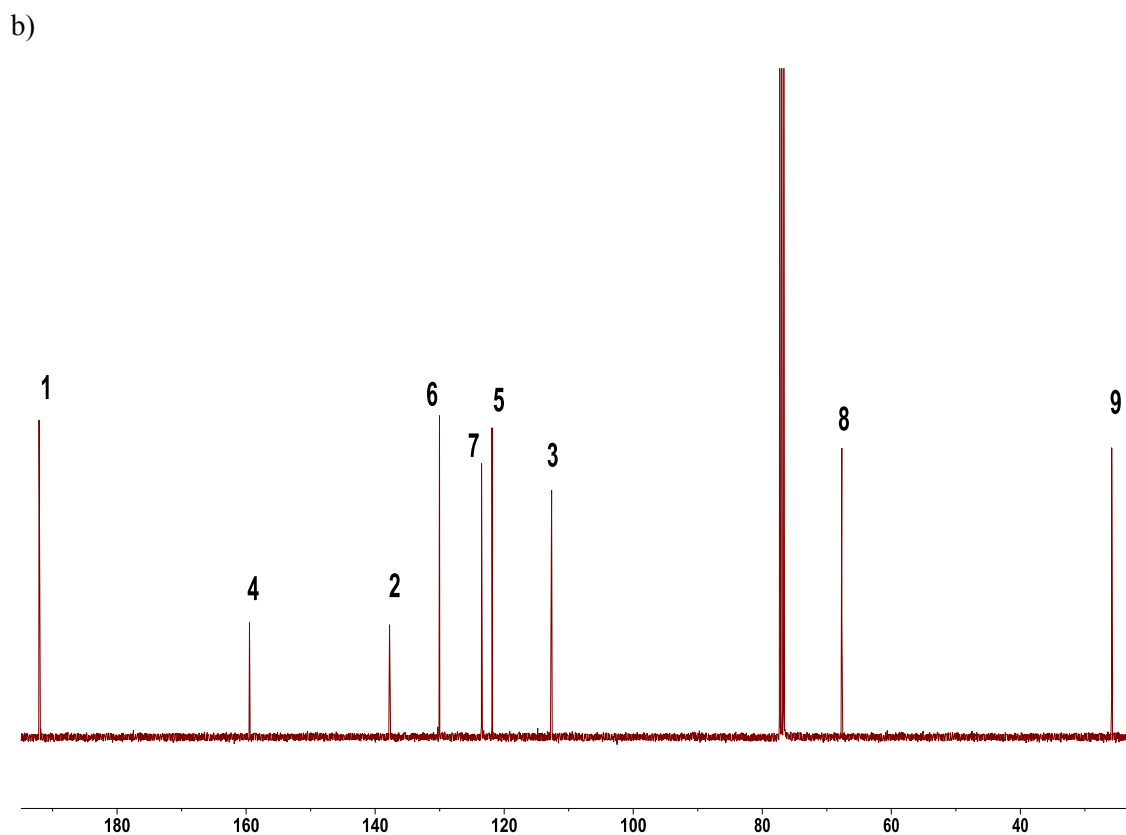
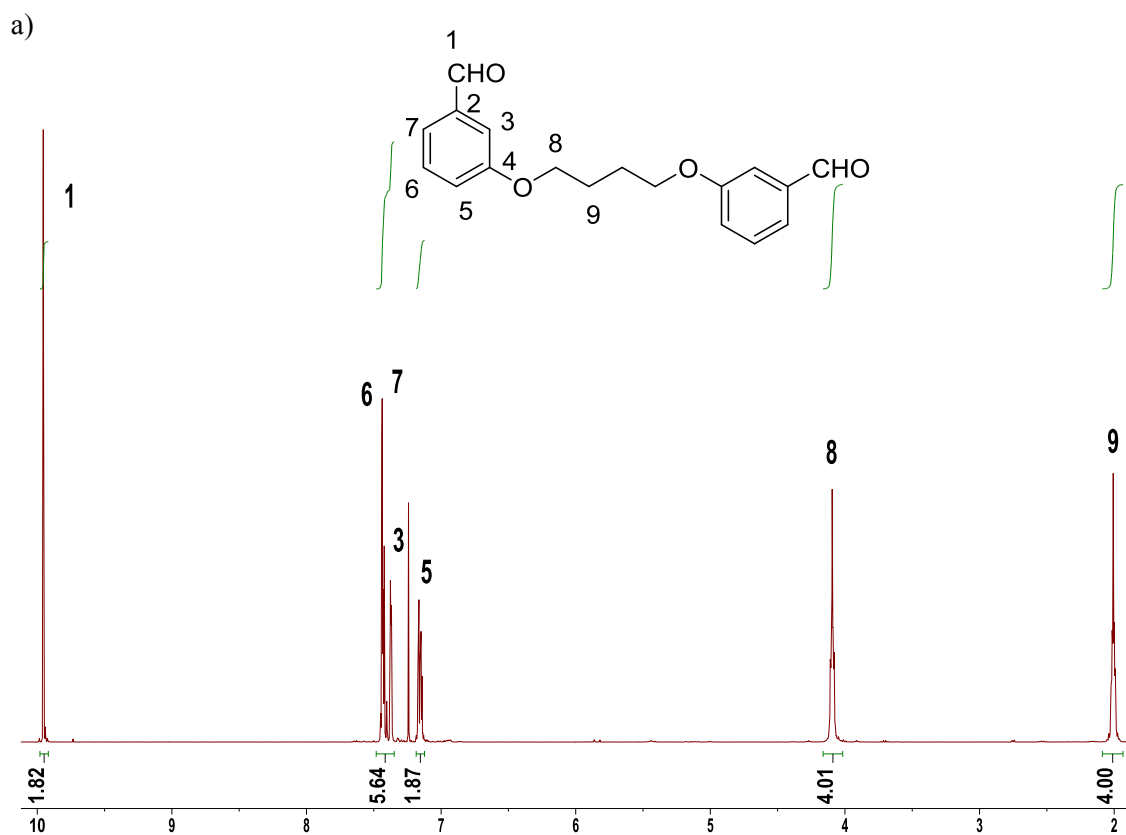


Figura 8S(3.3) Espectros de RMN (CDCl_3) de **17bb** :a) ^1H y b) ^{13}C .

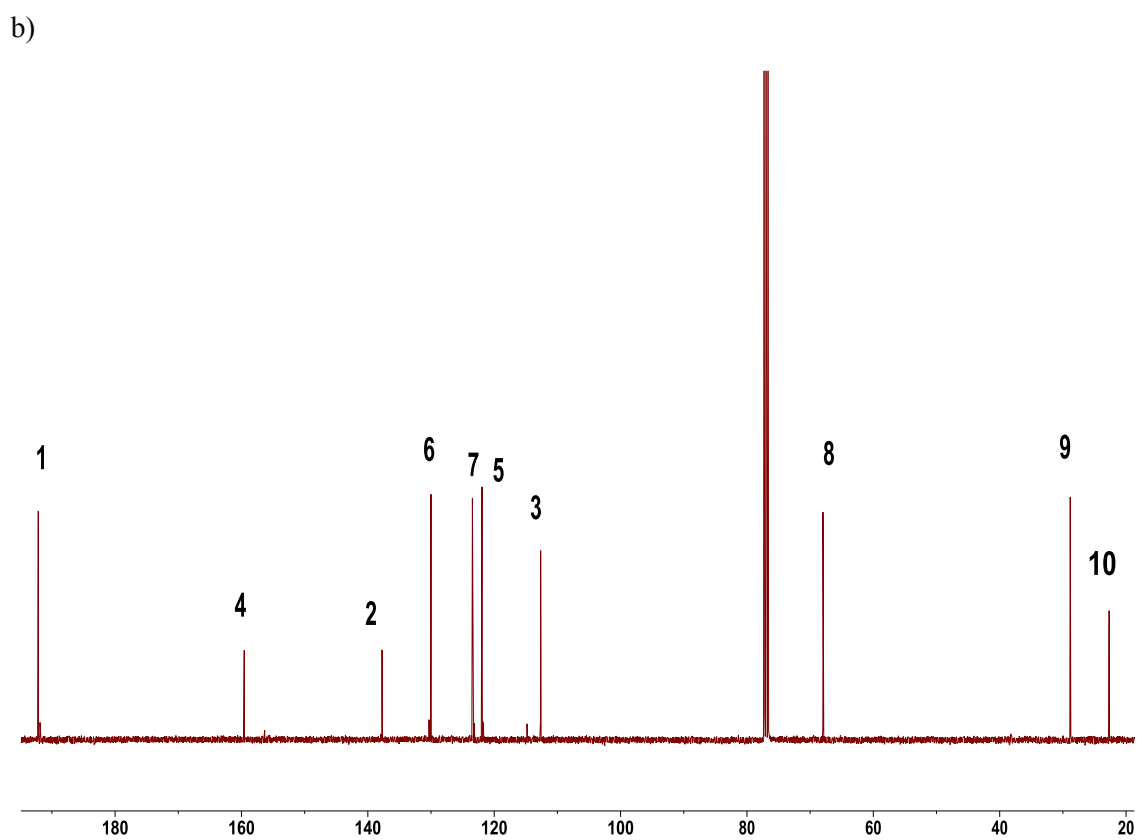
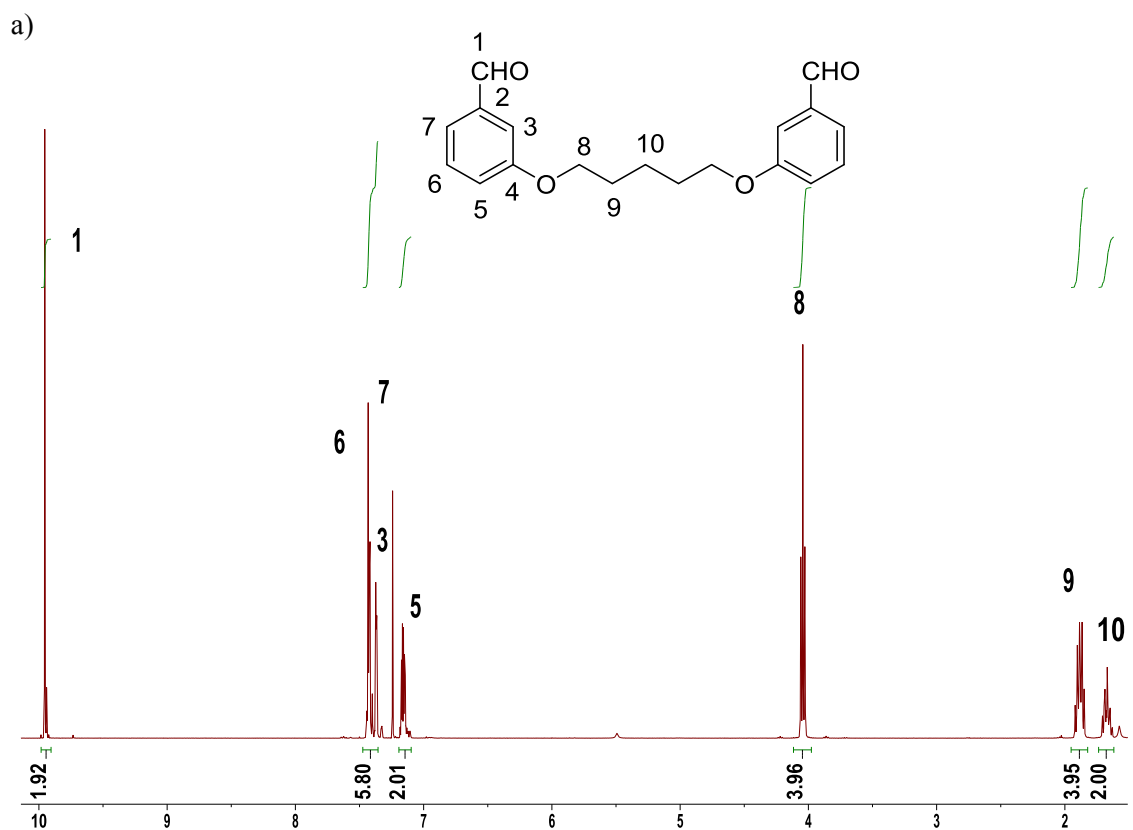


Figura 9S(3.3) Espectros de RMN (CDCl_3) de **17be**: a) ^1H y b) ^{13}C .

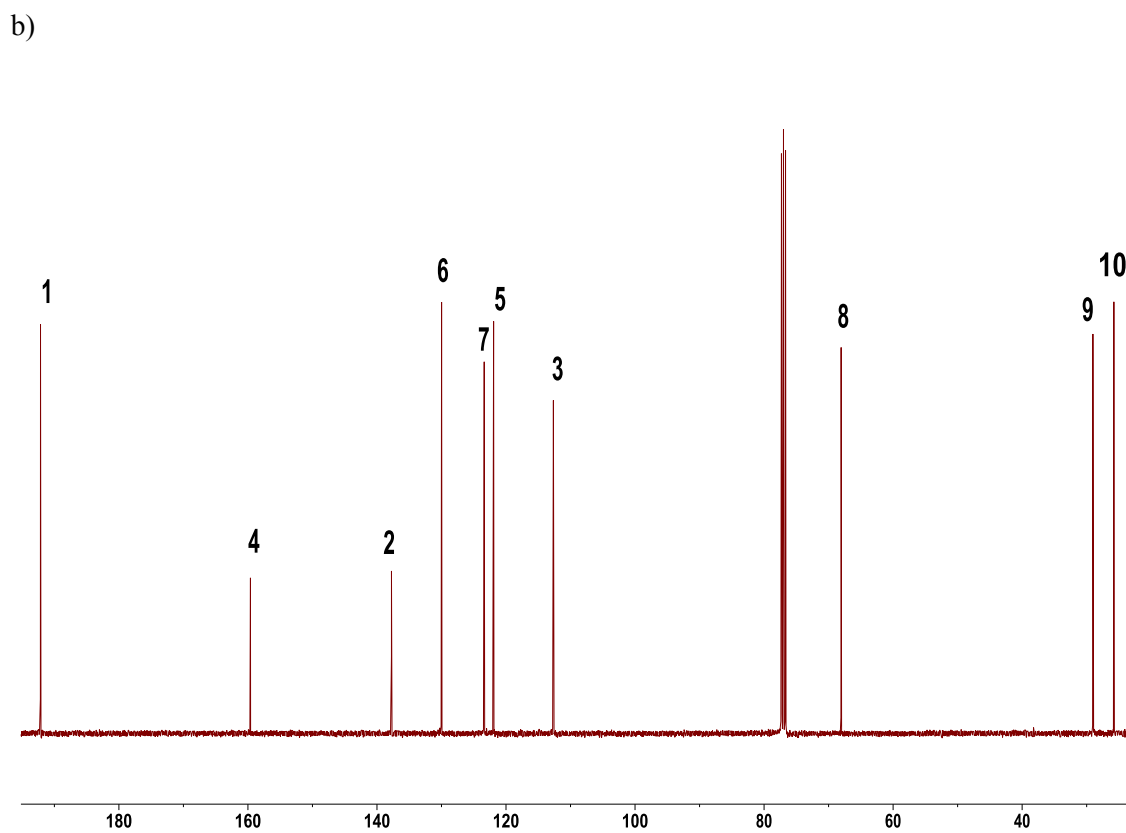
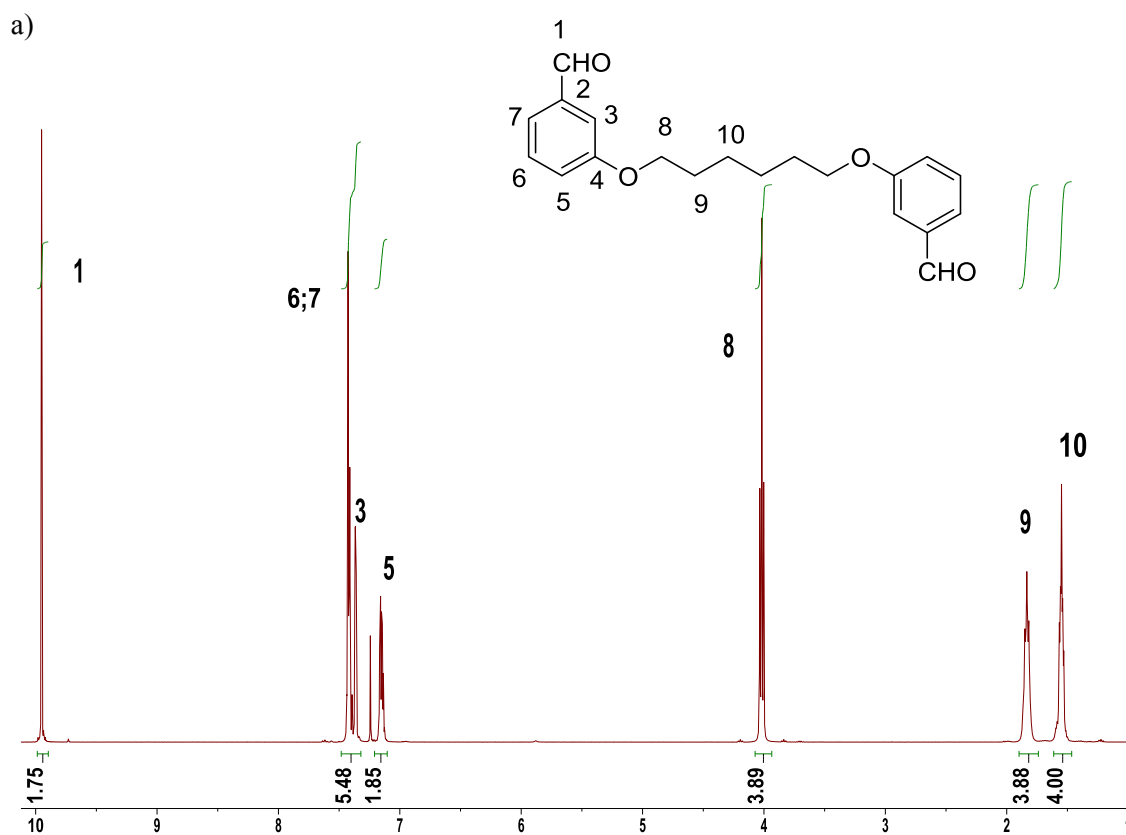


Figura10S(3.3) Espectros de RMN (CDCl₃) de 17ca:a) ¹H y b) ¹³C.

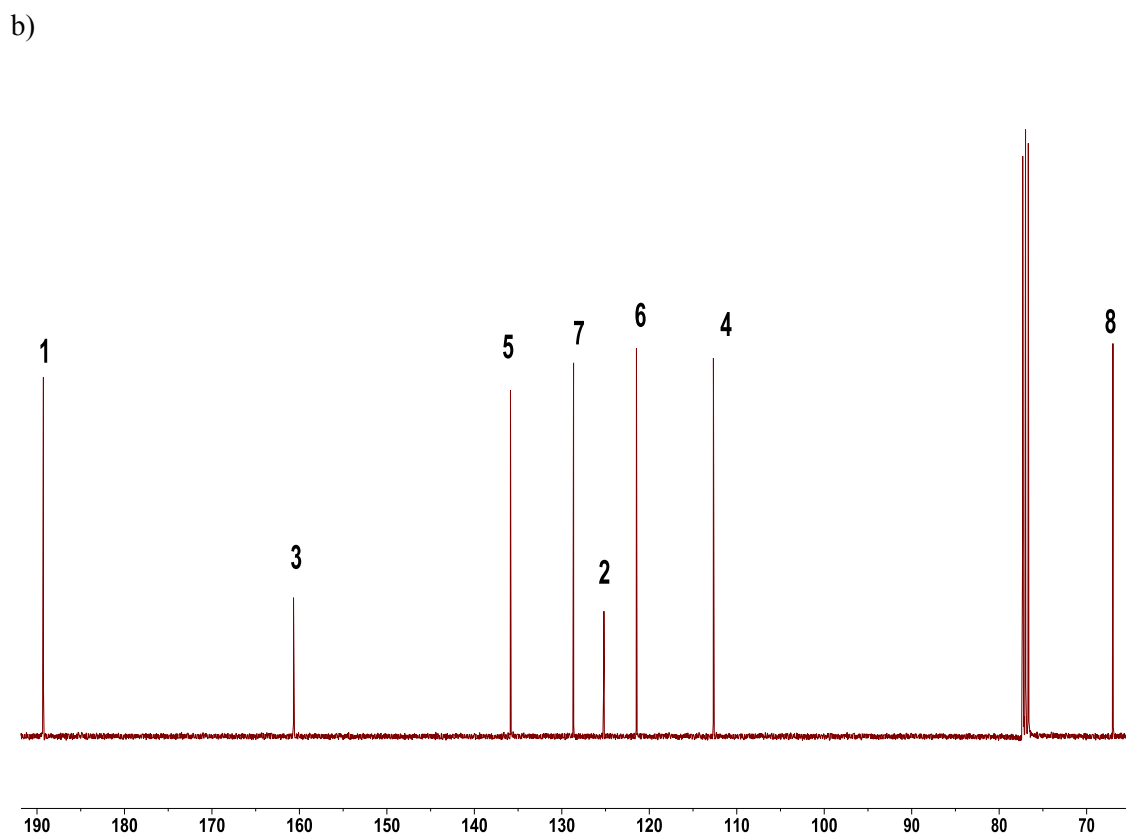
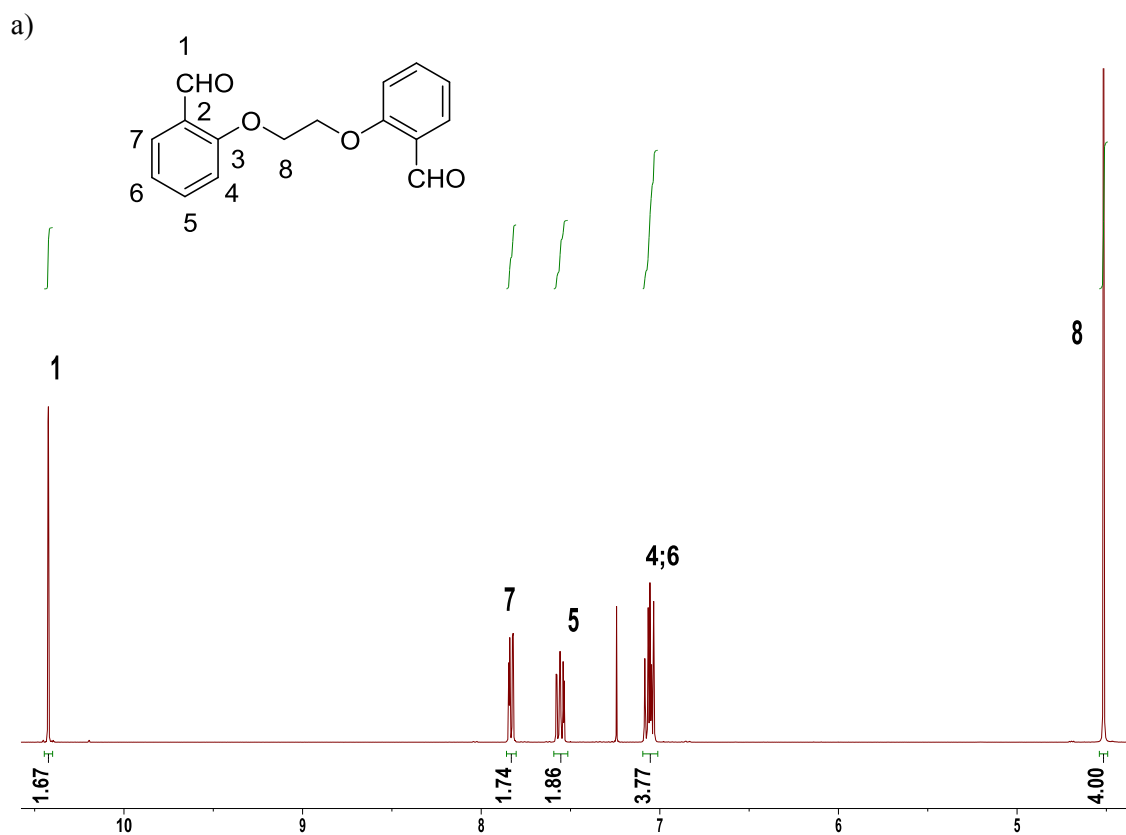


Figura 11S(3.3) Espectros de RMN(CDCl₃) de 17cb:a) ¹H y b) ¹³C.

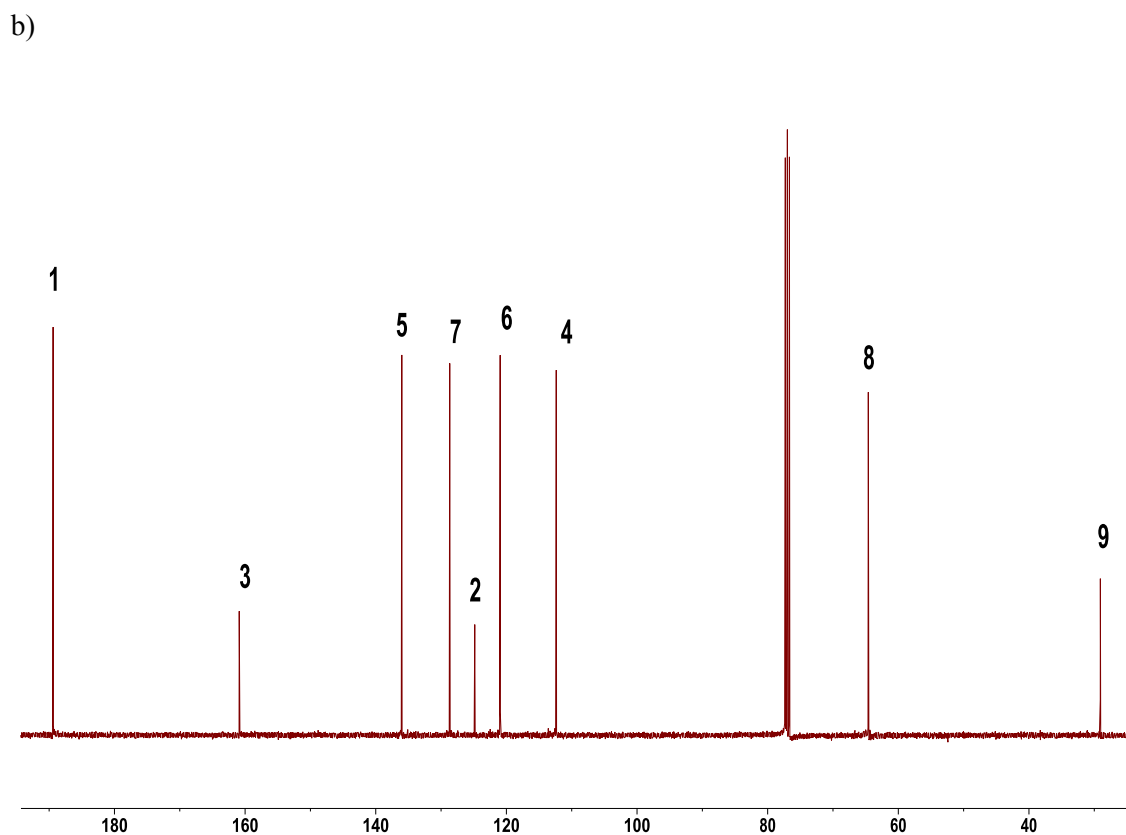
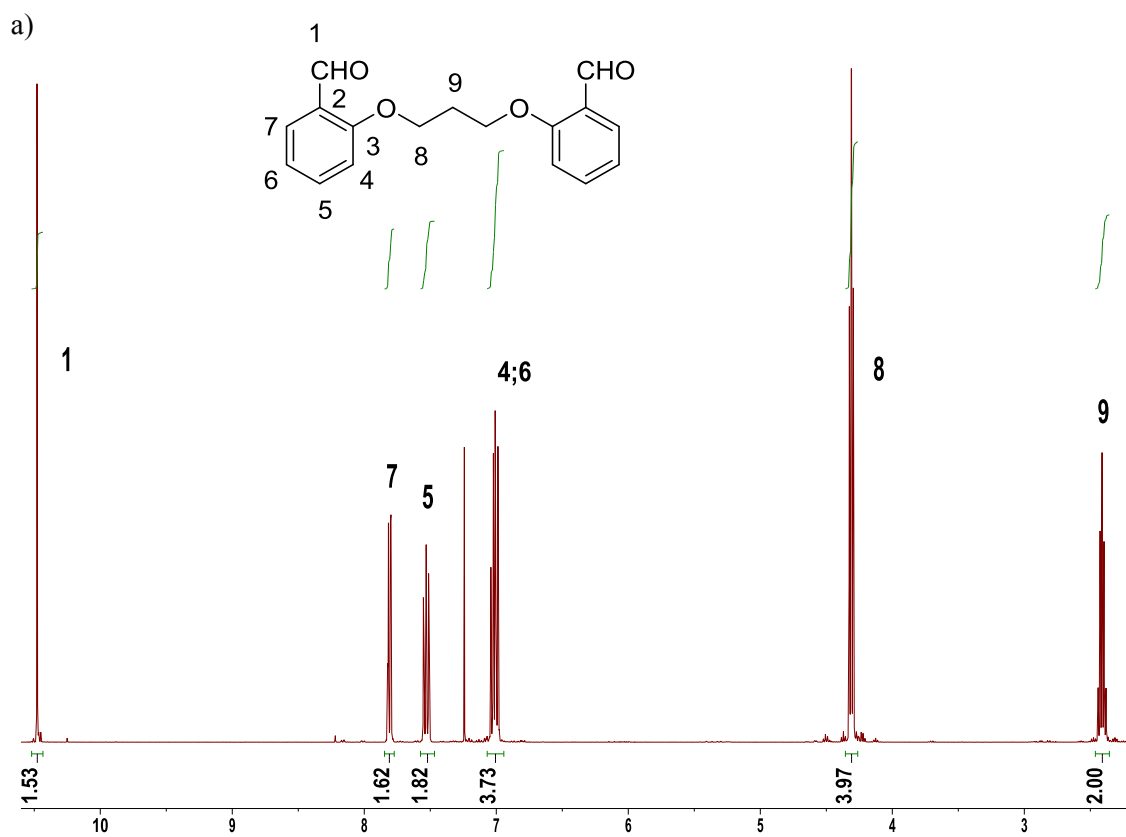


Figura12S(3.3) Espectros de RMN(CDCl₃) de 17cc:a) ¹H y b) ¹³C.

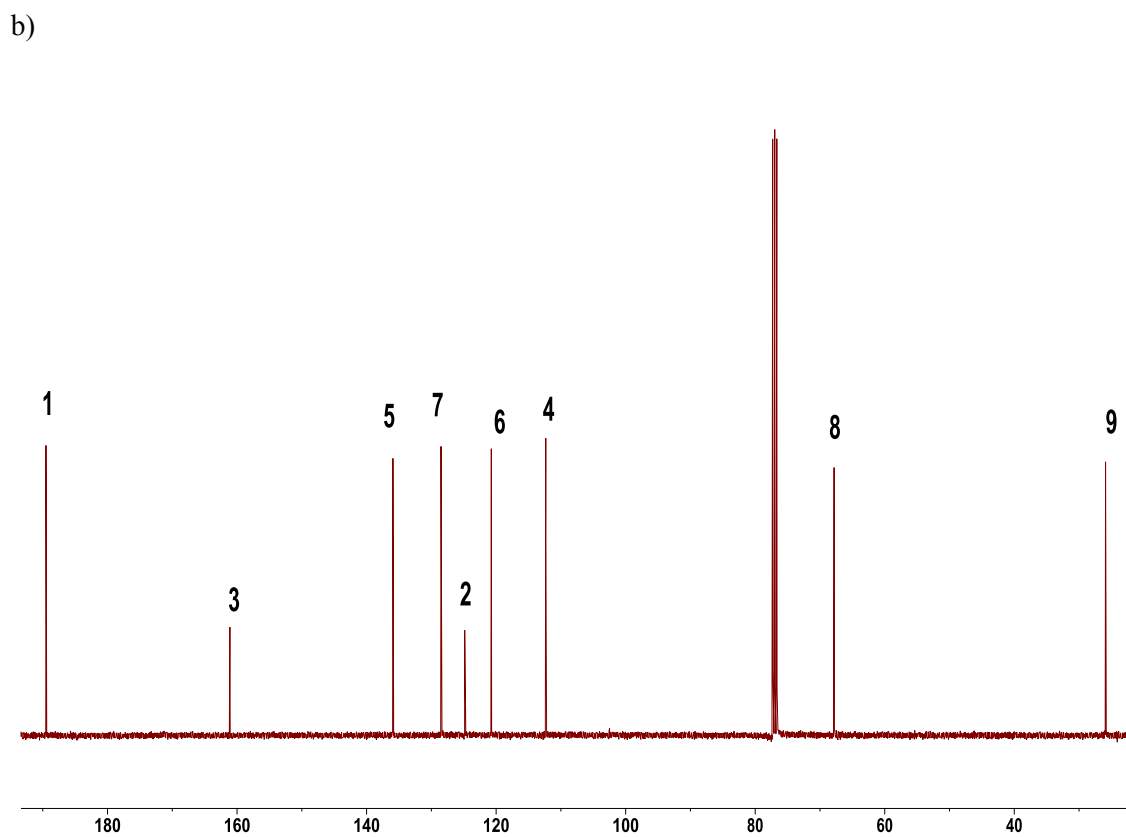
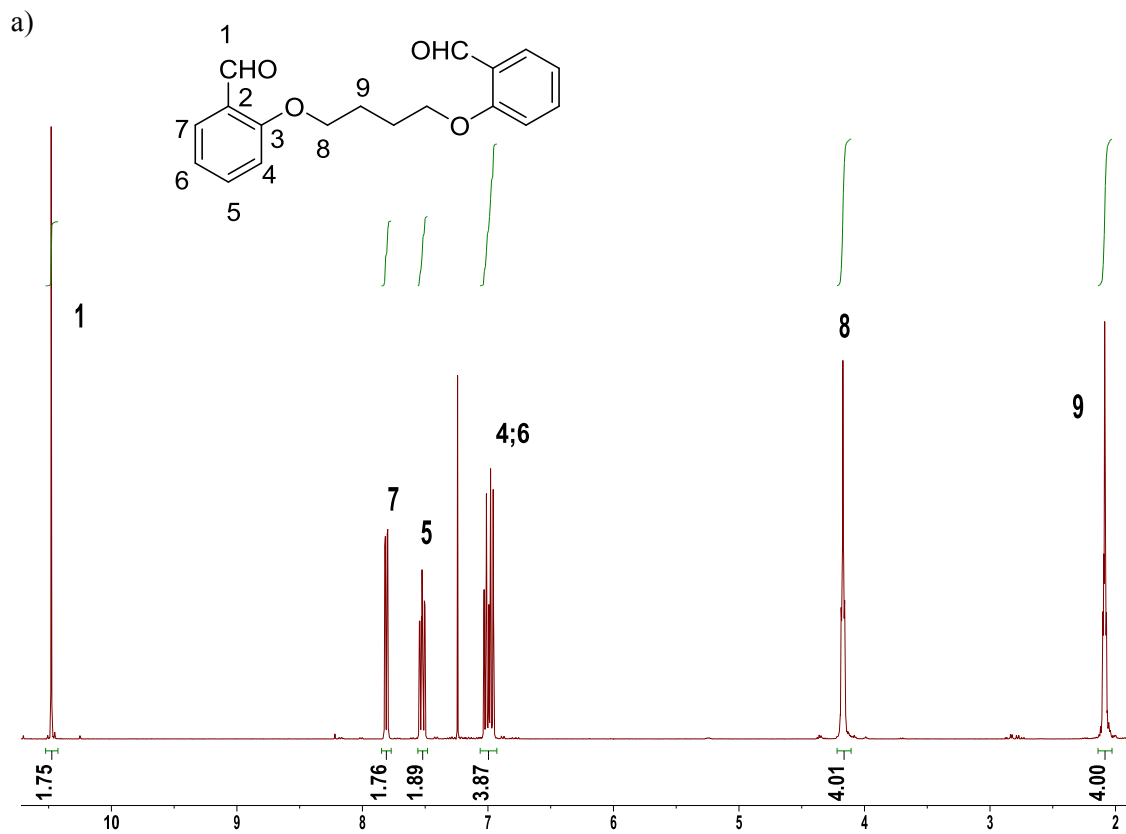
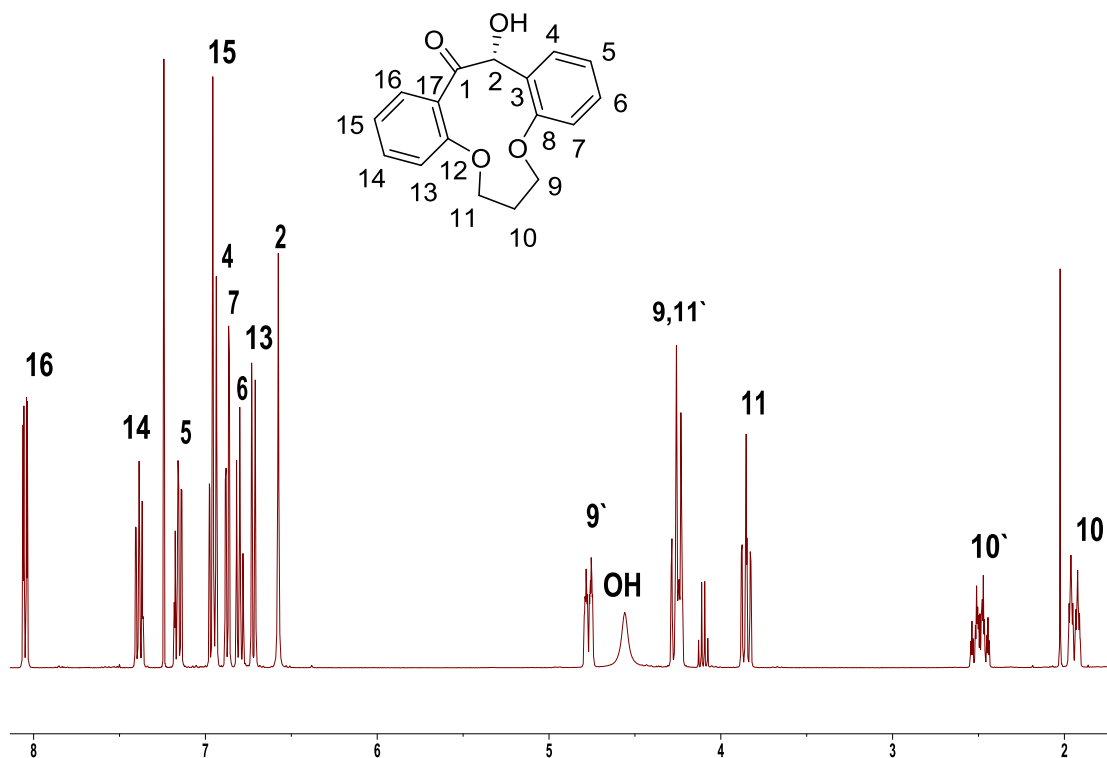
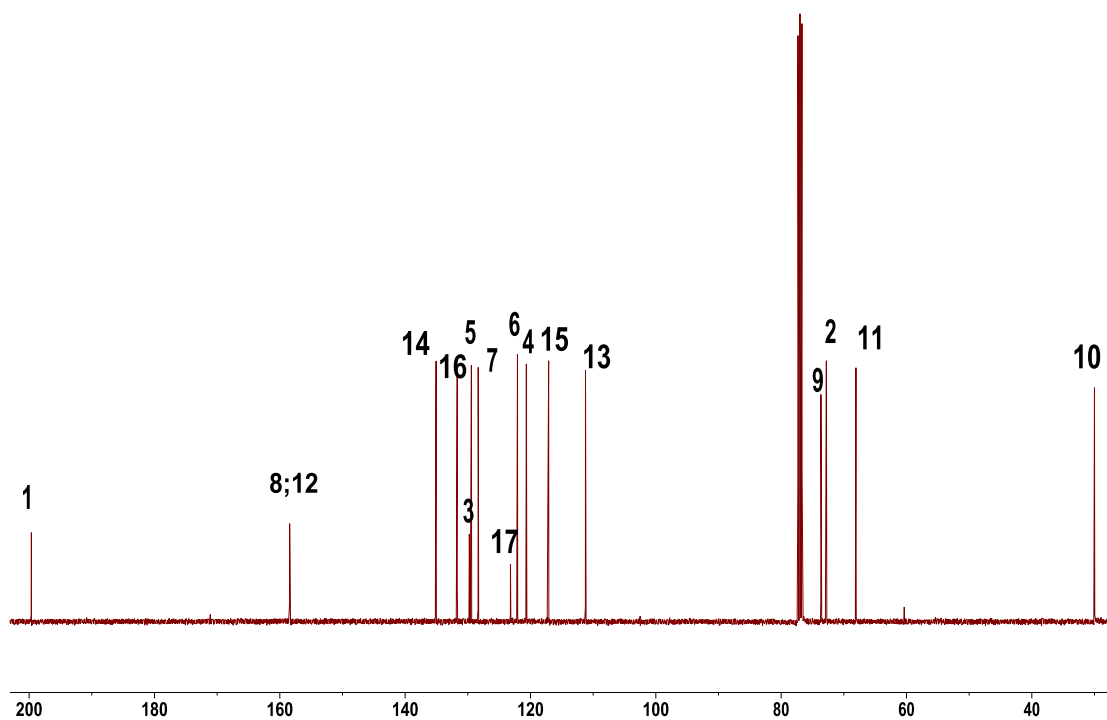


Figura13S(3.3) Espectros de RMN (CDCl_3) de **18cb**: a) ^1H ; b) ^{13}C ; c) 2D ^1H - ^1H COSY; d) HSQC y e) HMBC.

a)



b)



e)

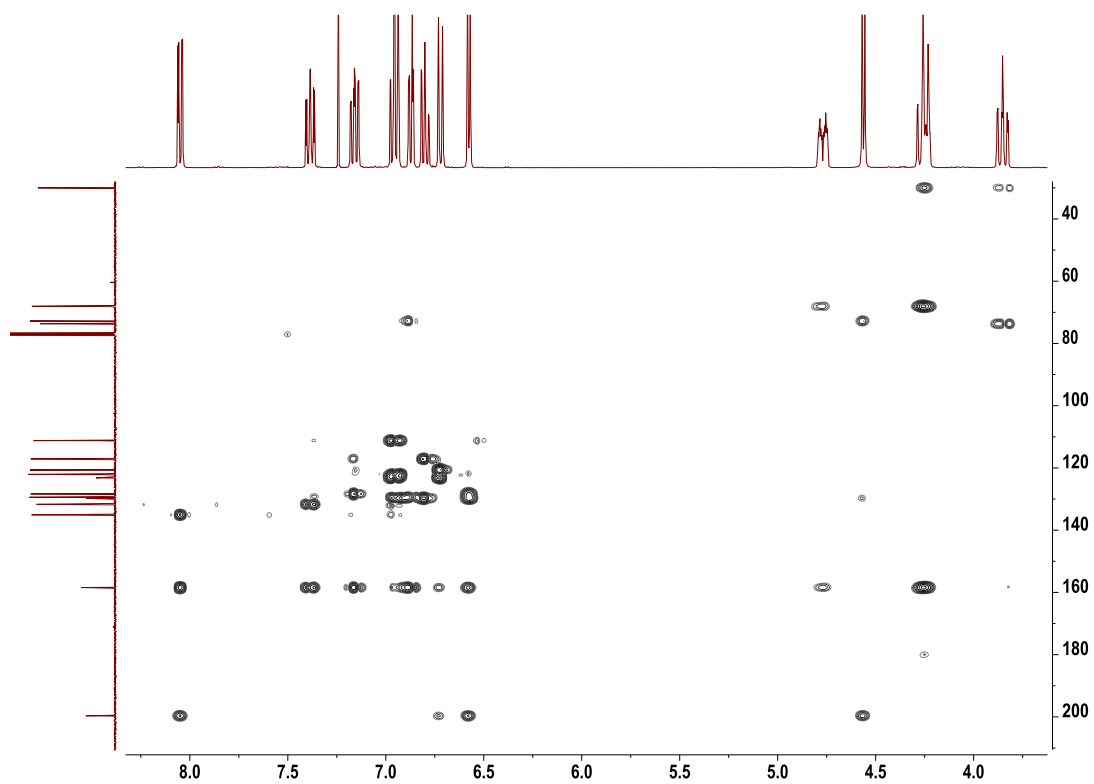
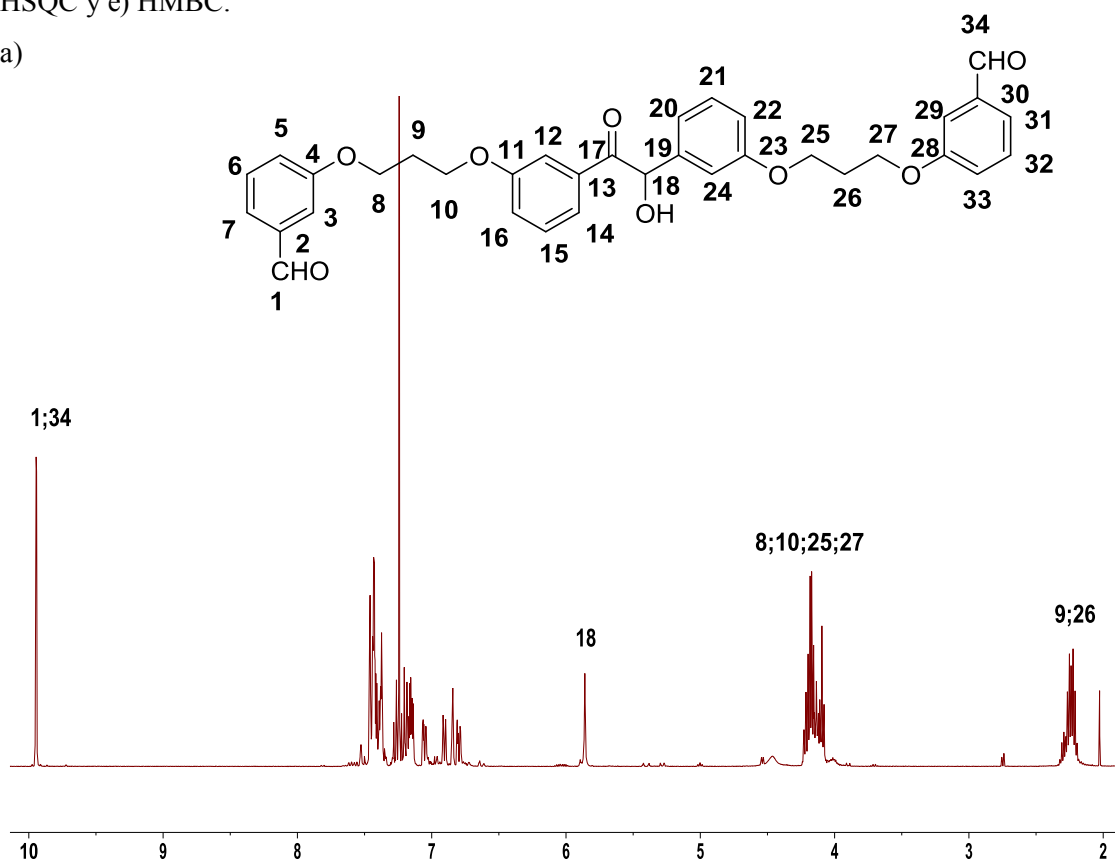
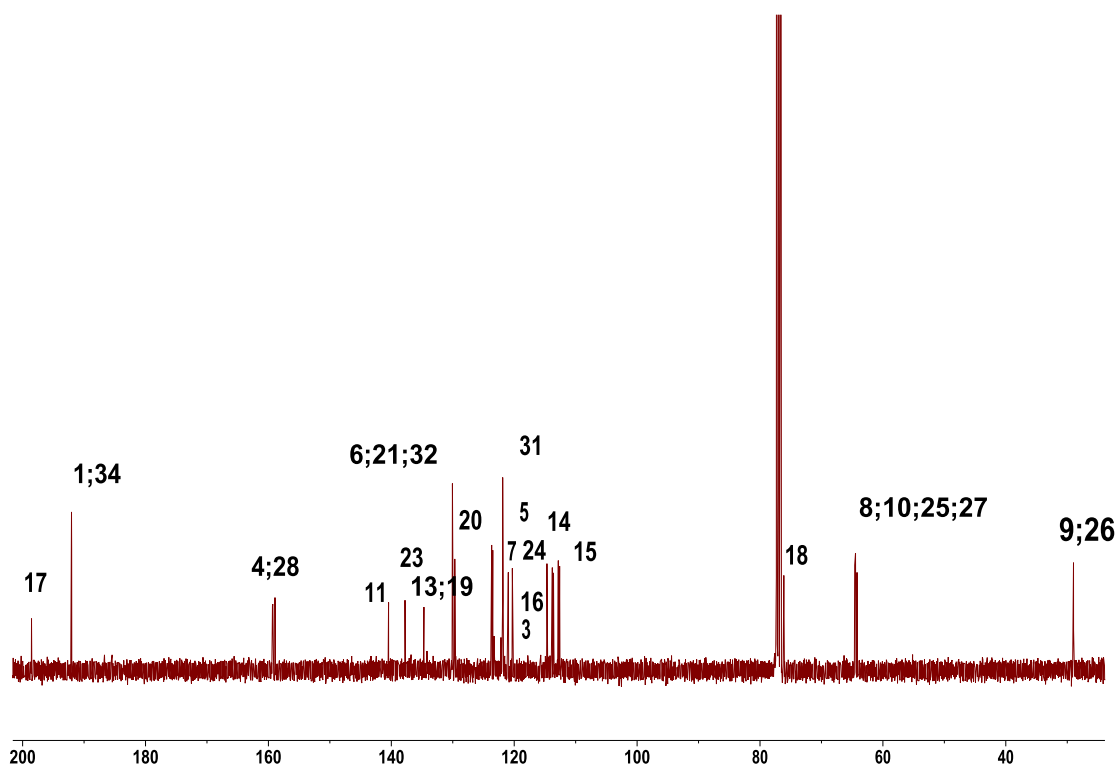


Figura14S(3.3) Espectros de RMN (CDCl₃) de **21bb**: a) ¹H; b) ¹³C; c) 2D ¹H-¹H COSY; d) HSQC y e) HMBC.

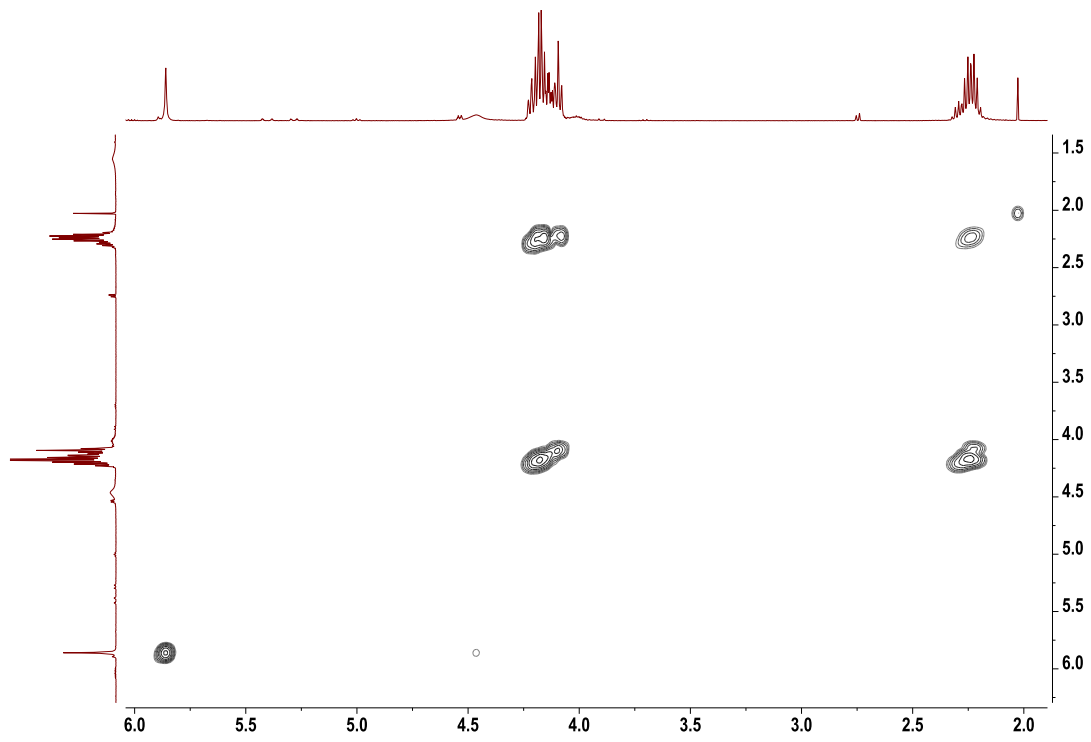
a)



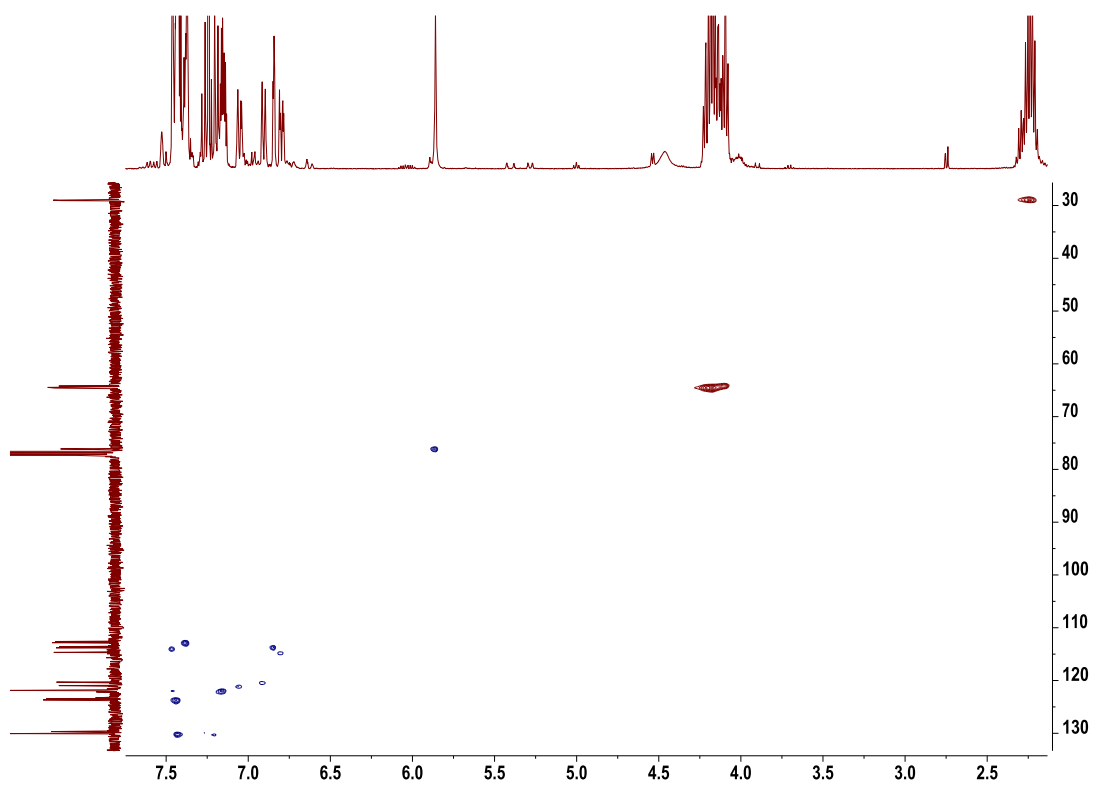
b)



c)



d)



e)

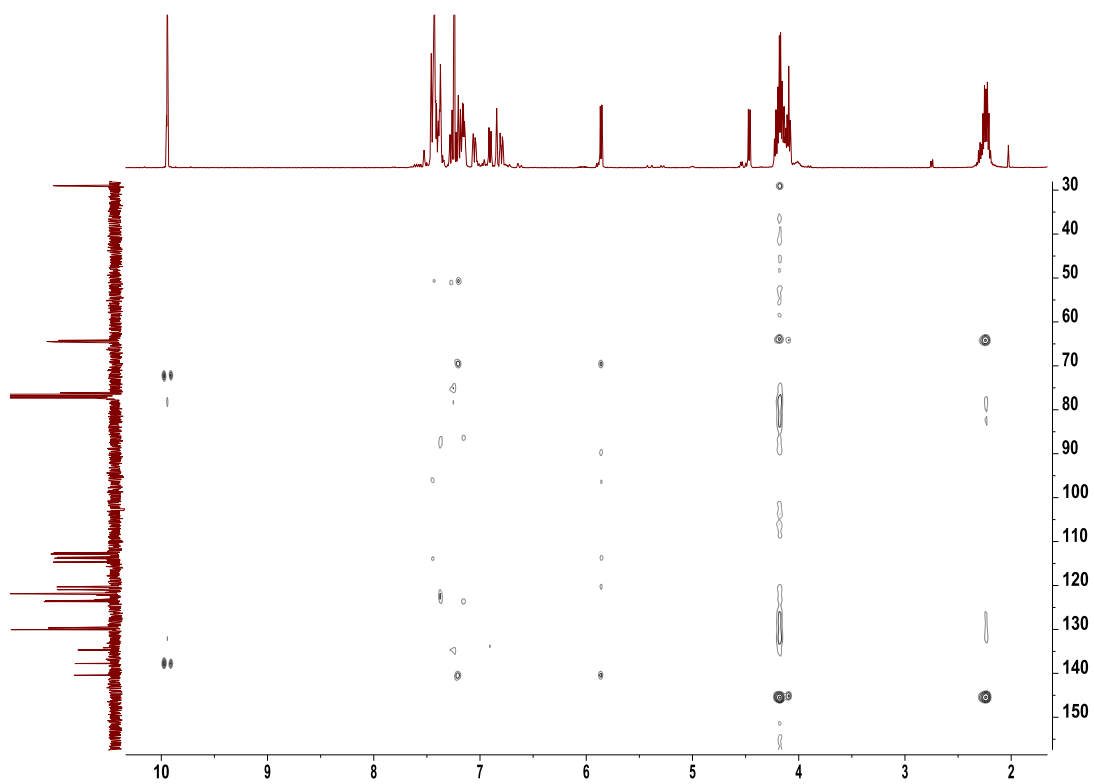
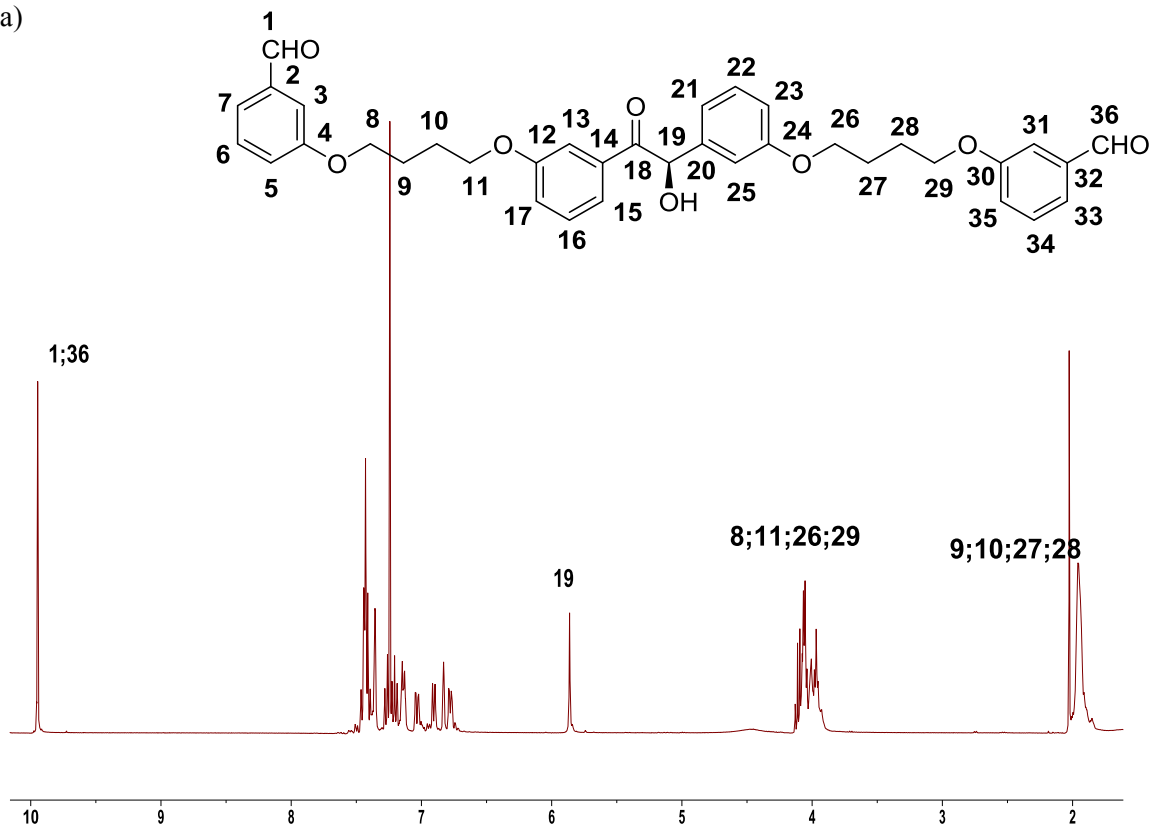
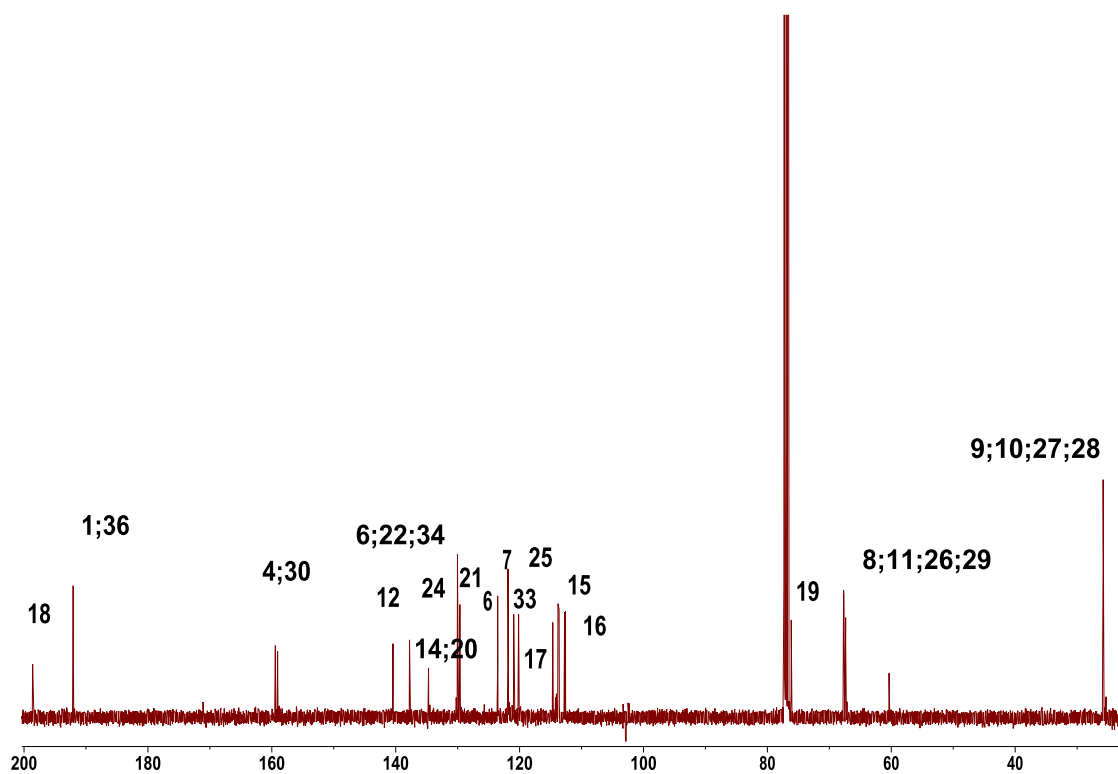


Figura15S(3.3) Espectros de RMN (CDCl₃) de **21bc**: a) ¹H; b) ¹³C; c) 2D ¹H-¹H COSY; d) HSQC y e) HMBC.

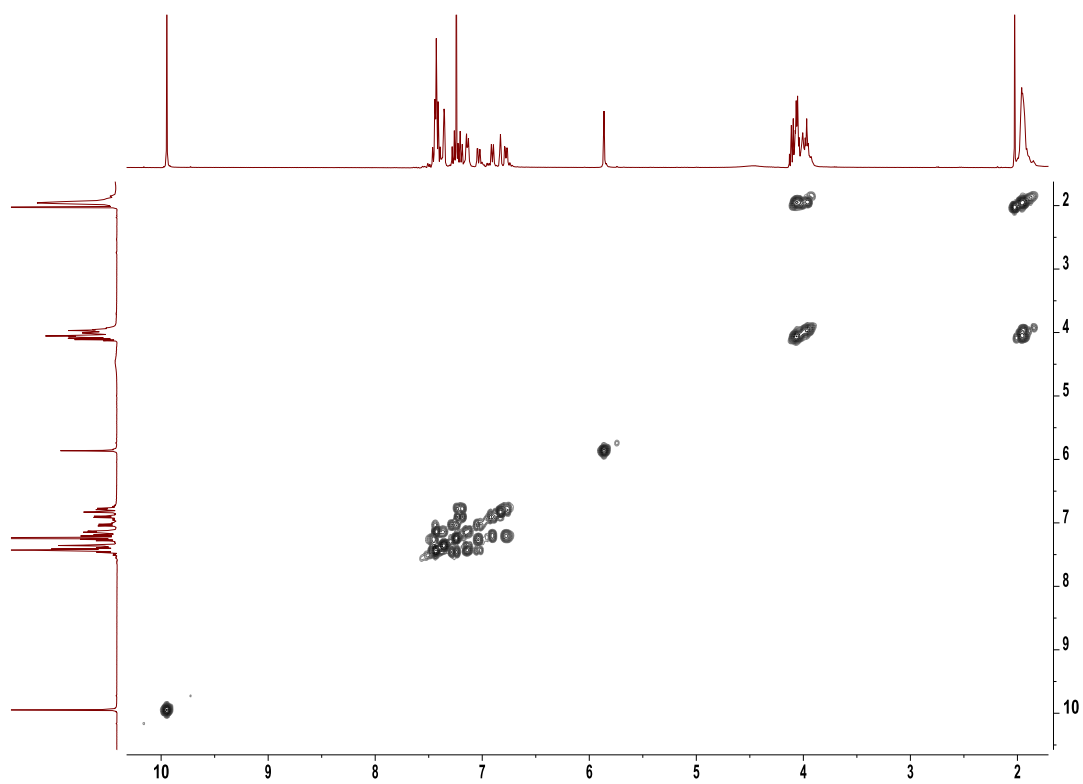
a)



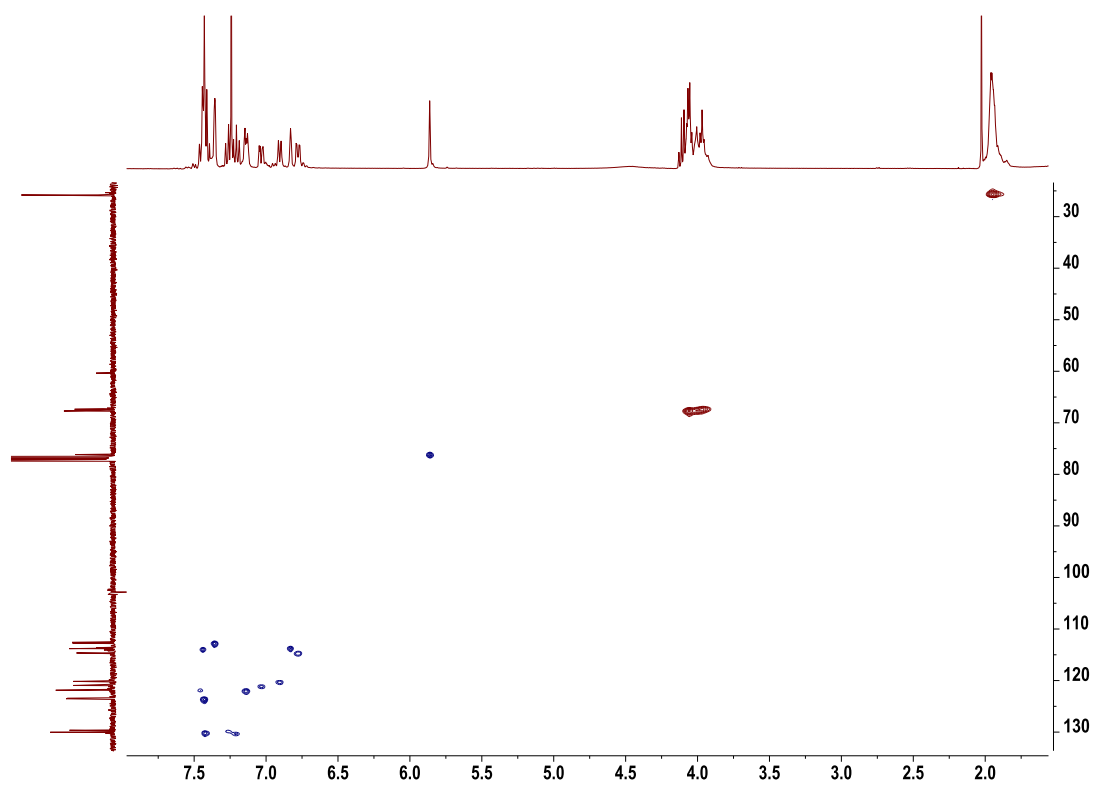
b)



c)



d)



e)

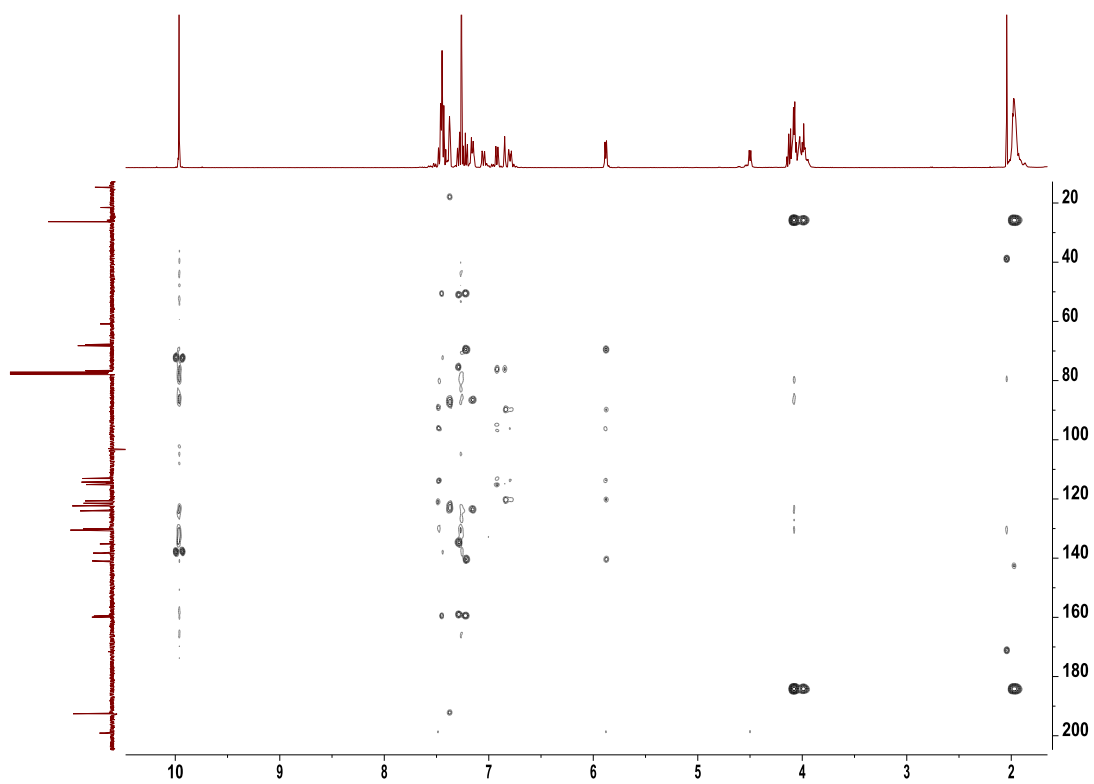
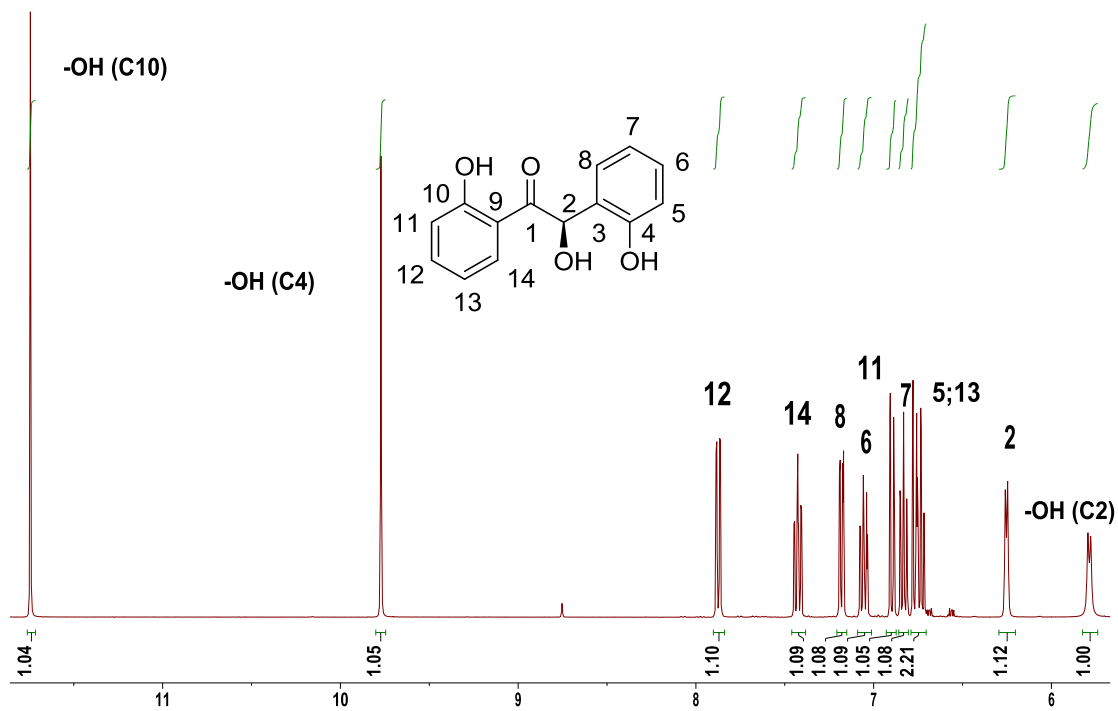


Figura16S(3.3) Espectros de RMN (DMSO- d_6) de **22**: a) ^1H y b) ^{13}C .

a)



b)

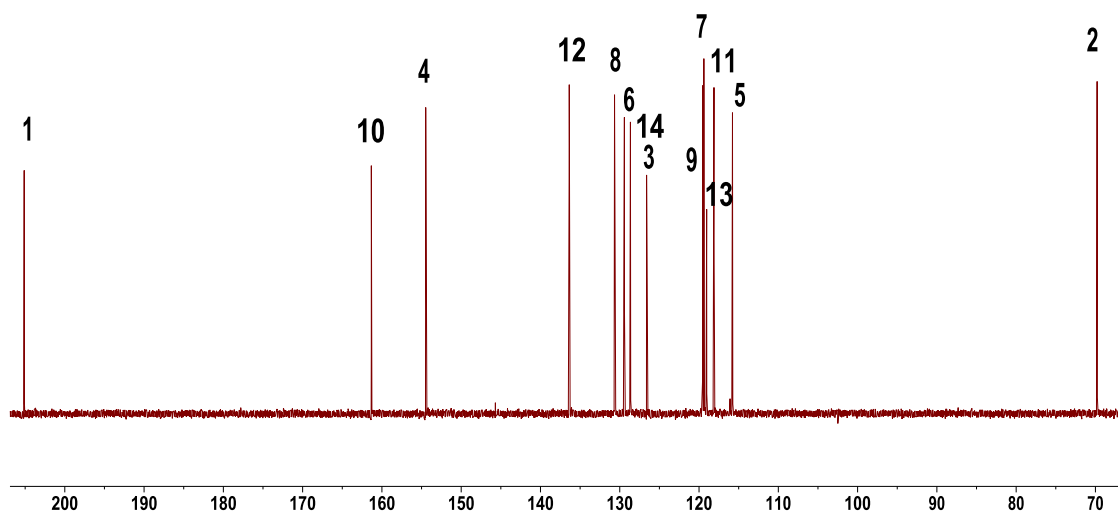
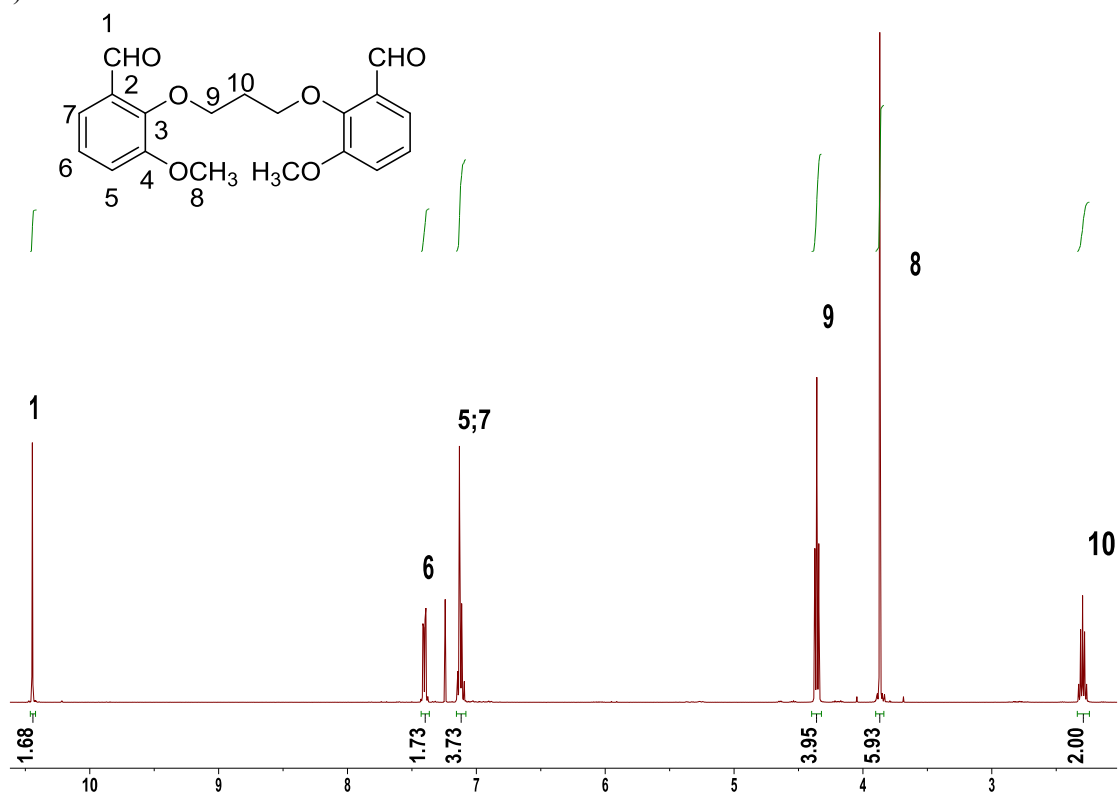


Figura 17S(3.3) Espectros de RMN (CDCl_3) de **24a**: a) ^1H y b) ^{13}C .

a)



b)

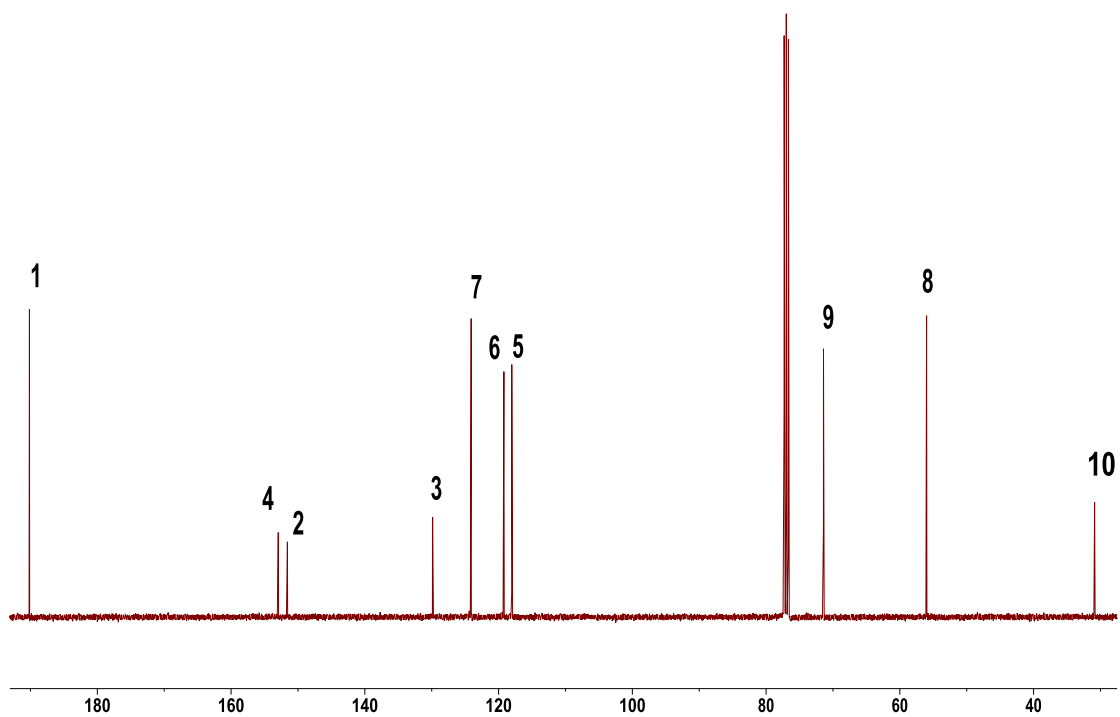
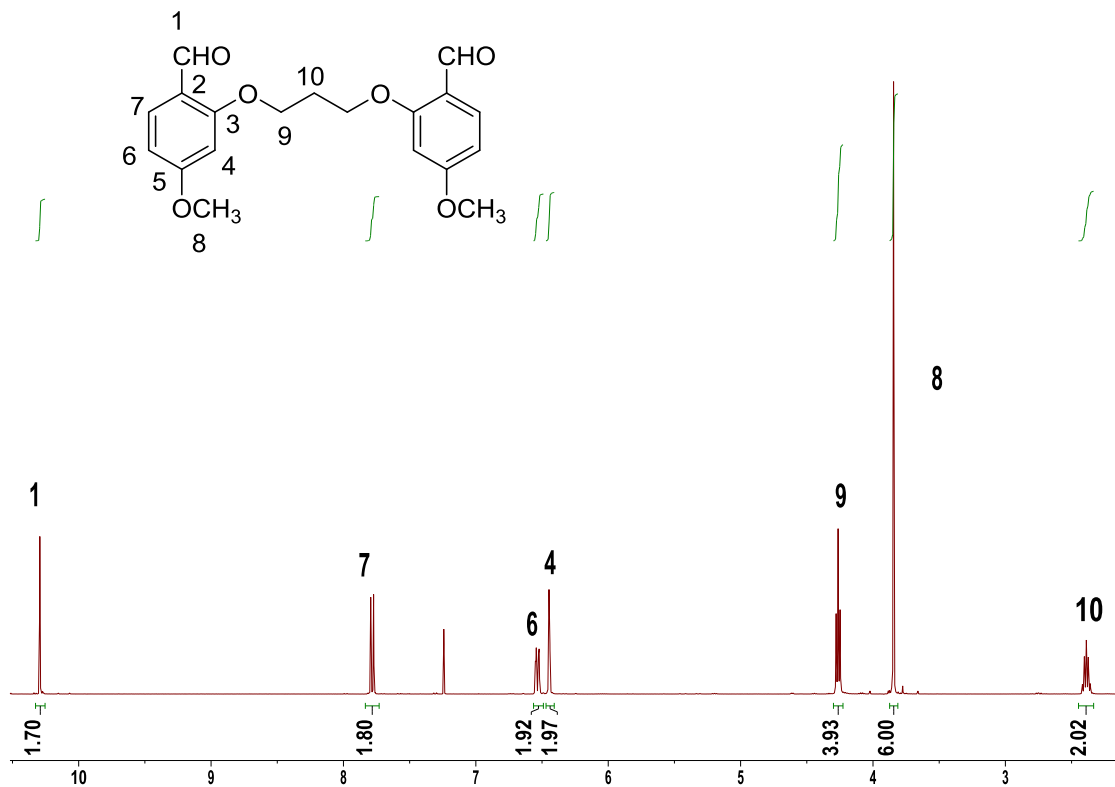


Figura18S(3.3) Espectros de RMN(CDCl₃) de **24b**:a) ¹H y b) ¹³C.

a)



b)

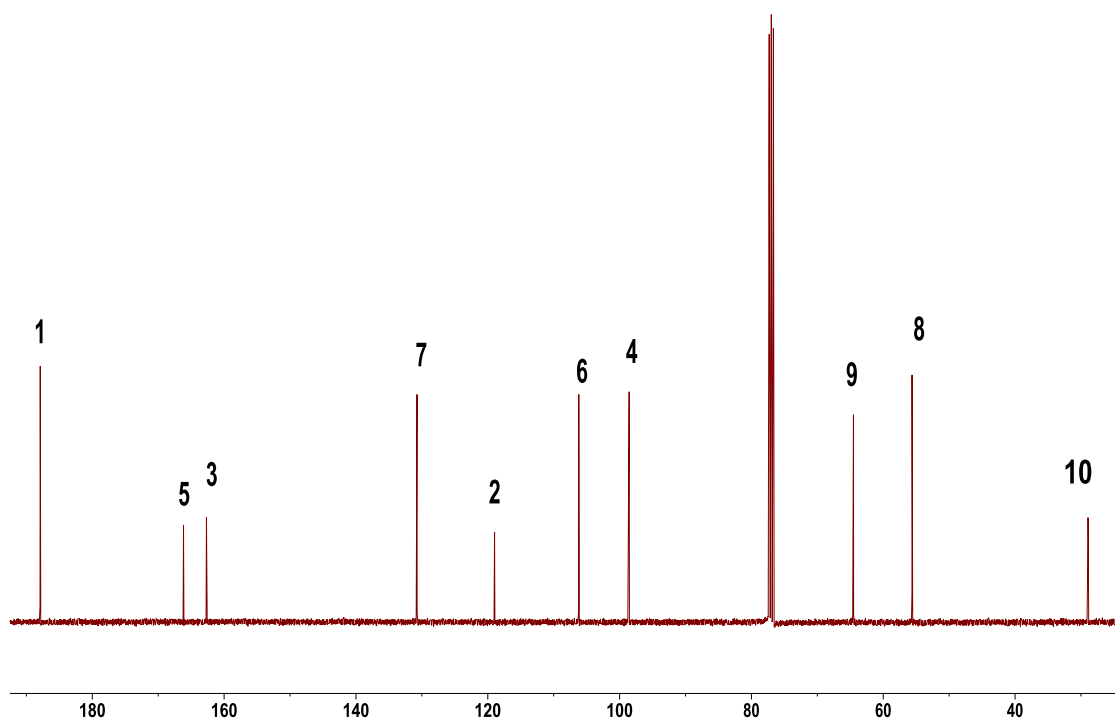
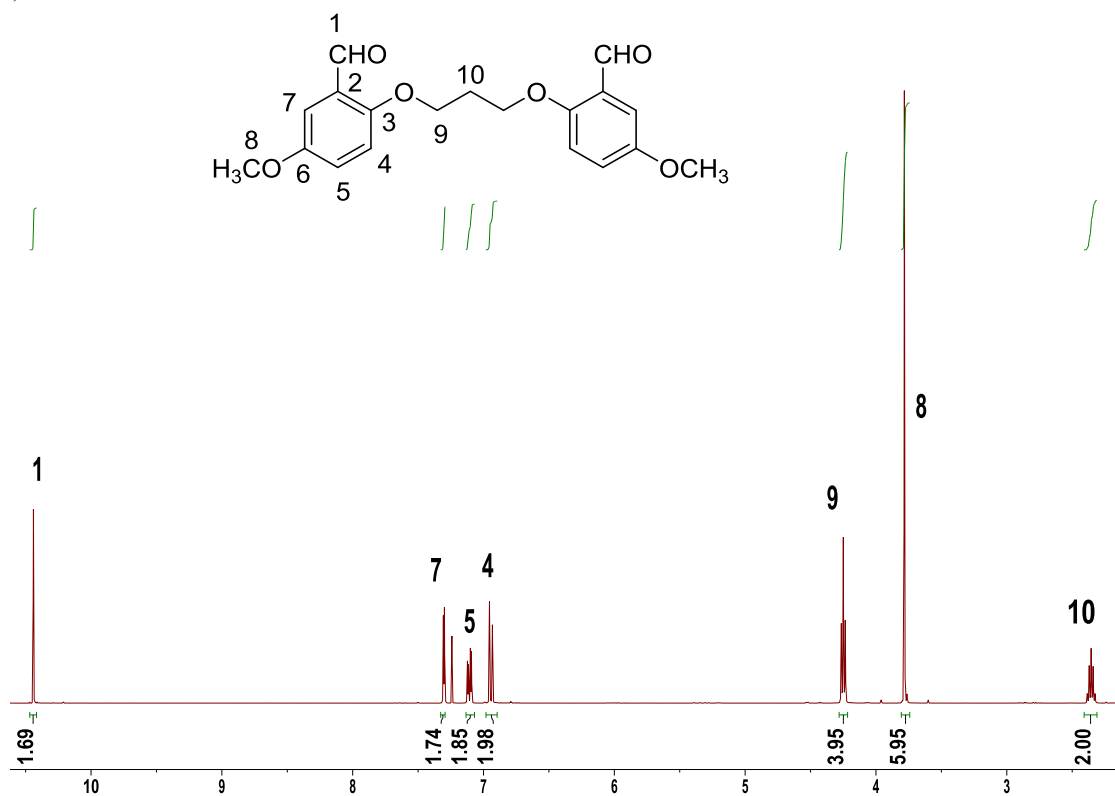


Figura19S(3.3) Espectros de RMN (CDCl₃) de 24c: a) ¹H y b) ¹³C.

a)



b)

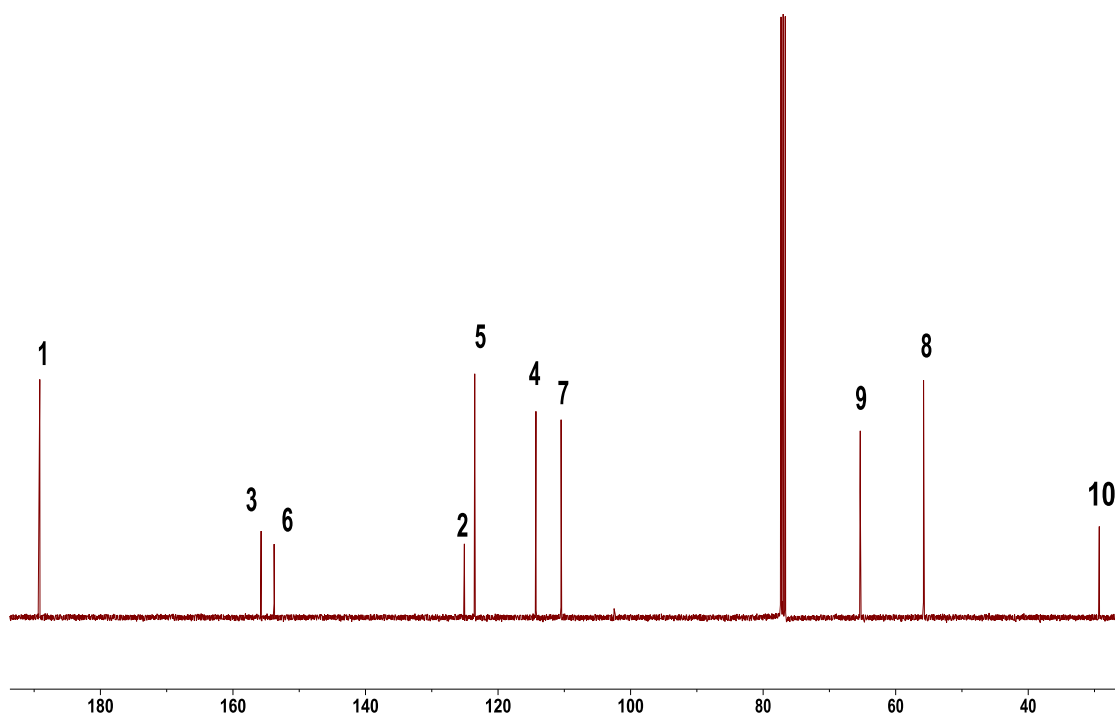
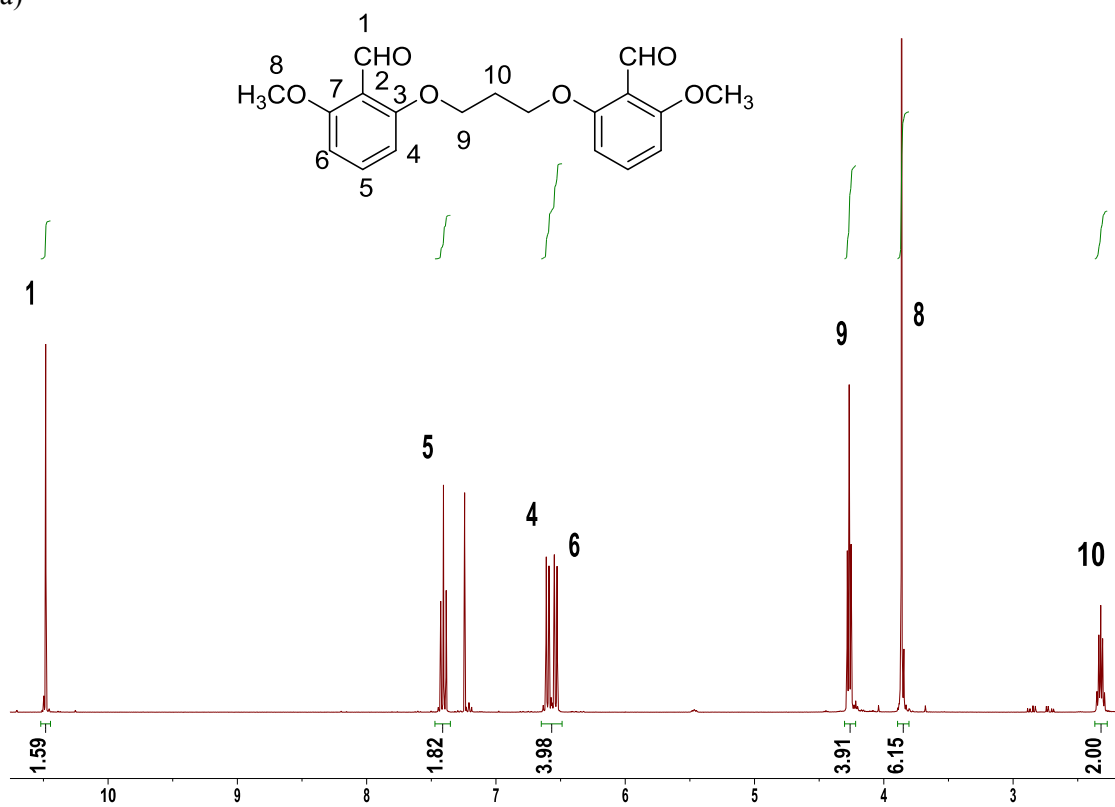


Figura20S(3.3) Espectros de RMN (CDCl₃) de **24d**: a) ¹H y b) ¹³C.

a)



b)

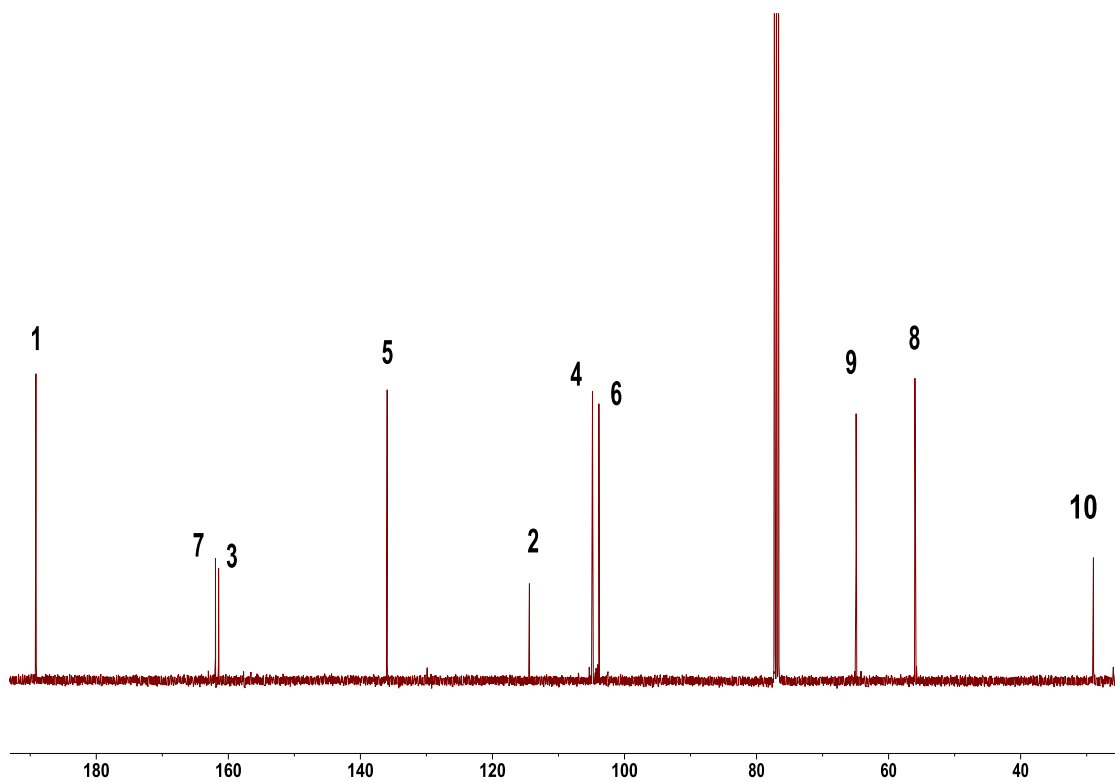
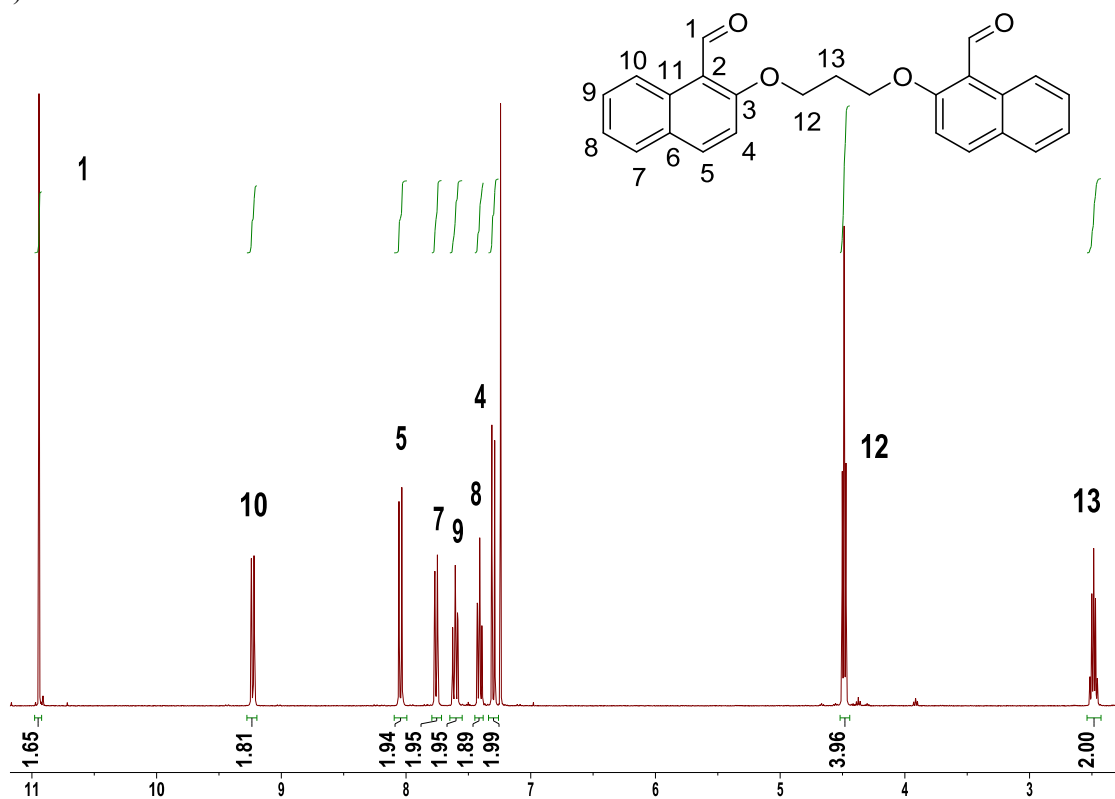


Figura21S(3.3) Espectros de RMN(CDCl₃) de 26: a) ¹H y b) ¹³C.

a)



b)

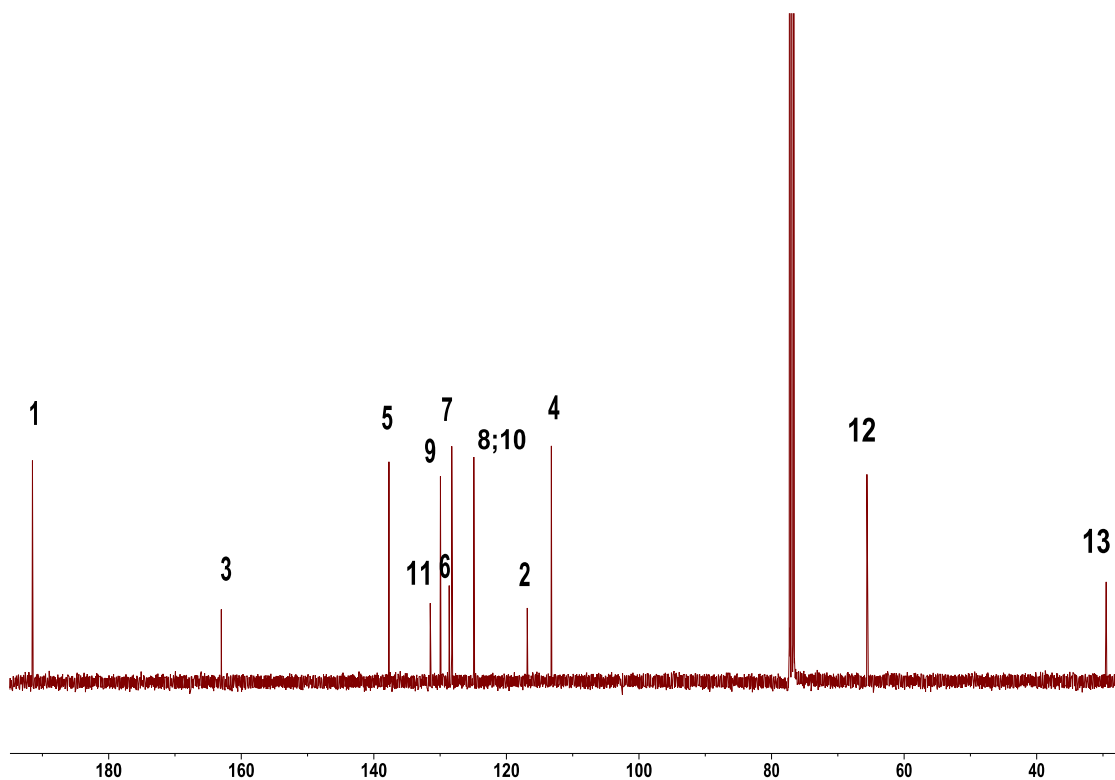
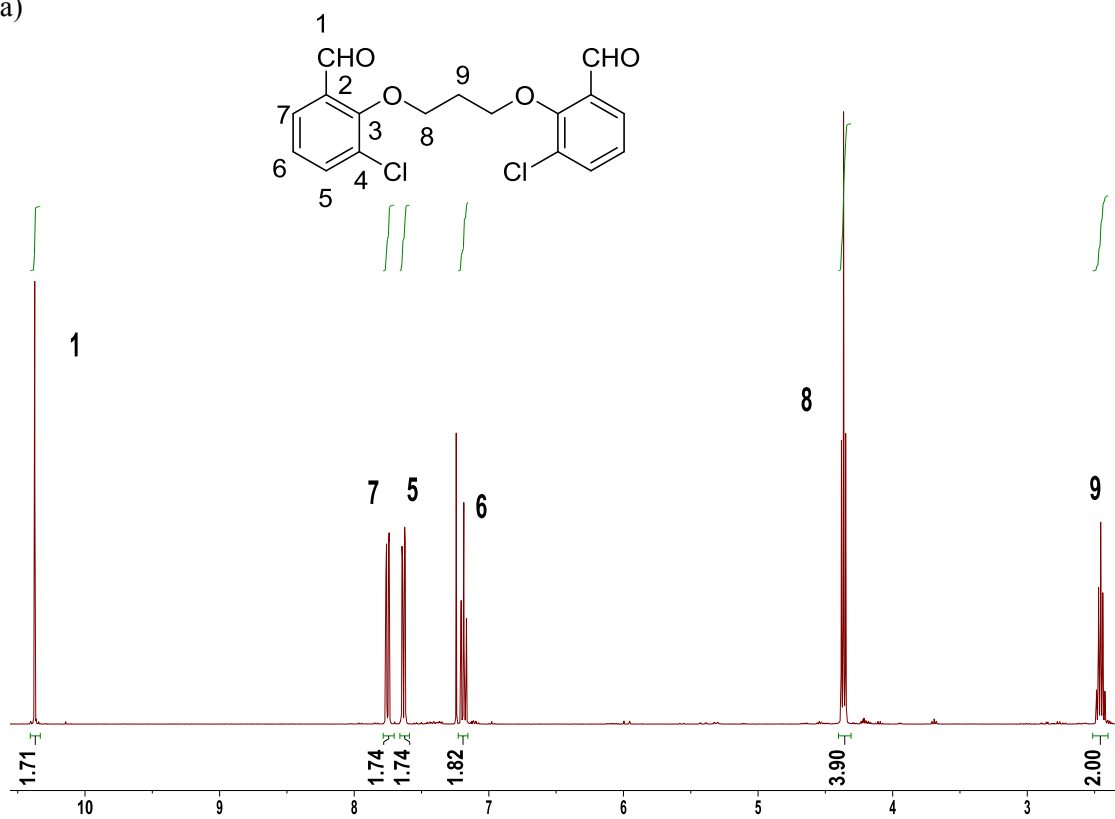


Figura22S(3.3) Espectros de RMN (CDCl₃) de **28**: a) ¹H y b) ¹³C.

a)



b)

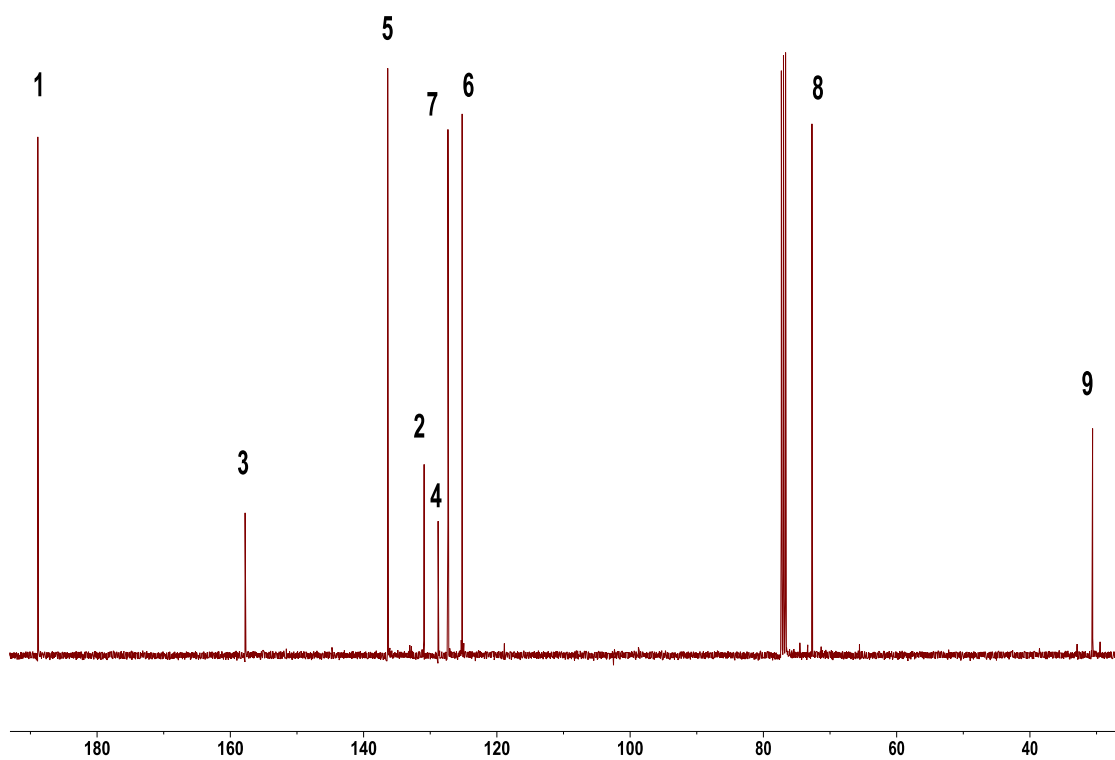
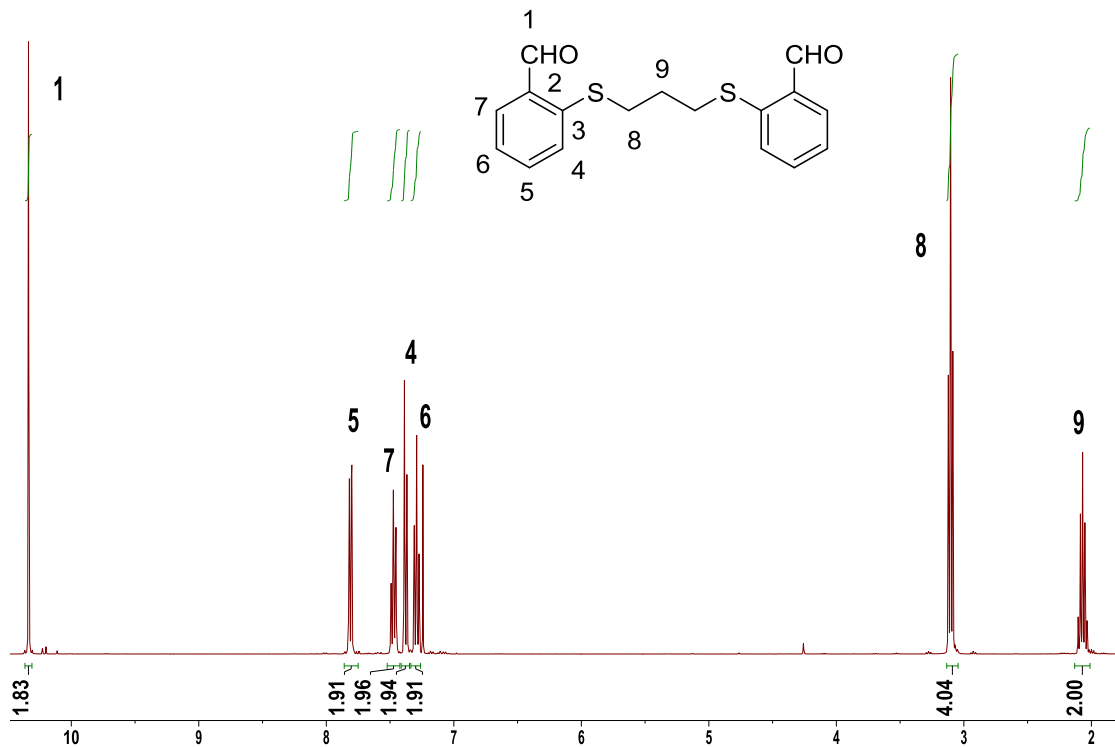


Figura23S(3.3) Espectros de RMN(CDCl₃) de 31: a) ¹H y b) ¹³C.

a)



b)

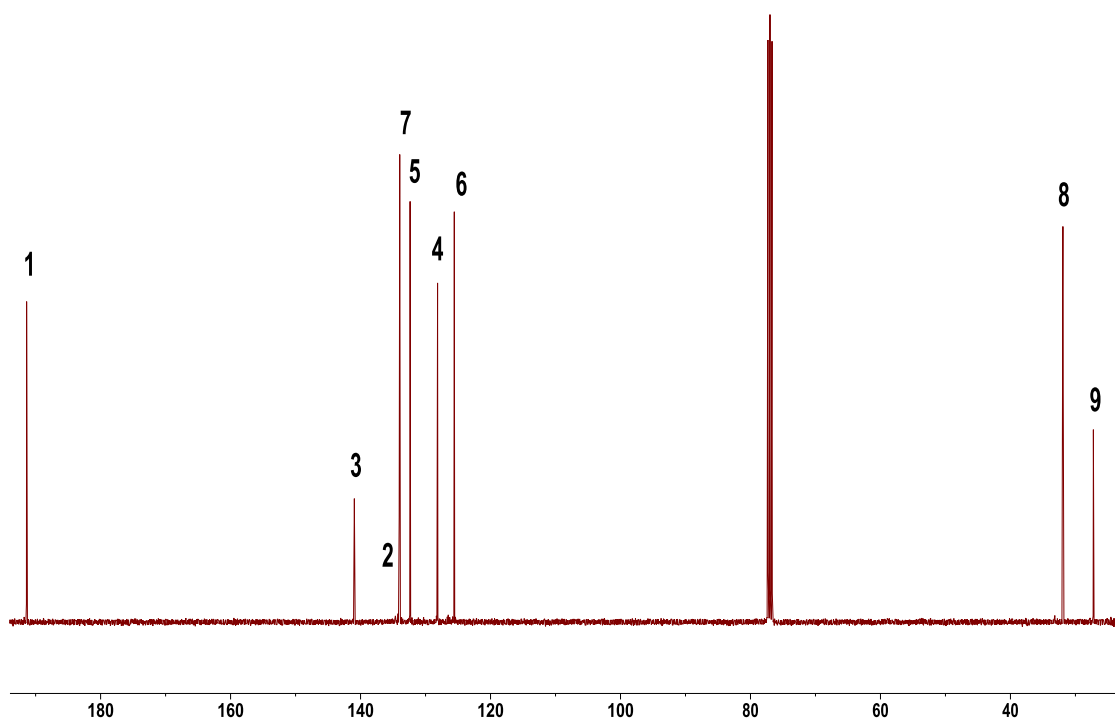


Figura24S(3.3) Espectros de RMN (CDCl₃) de 34: a) ¹H y b) ¹³C.

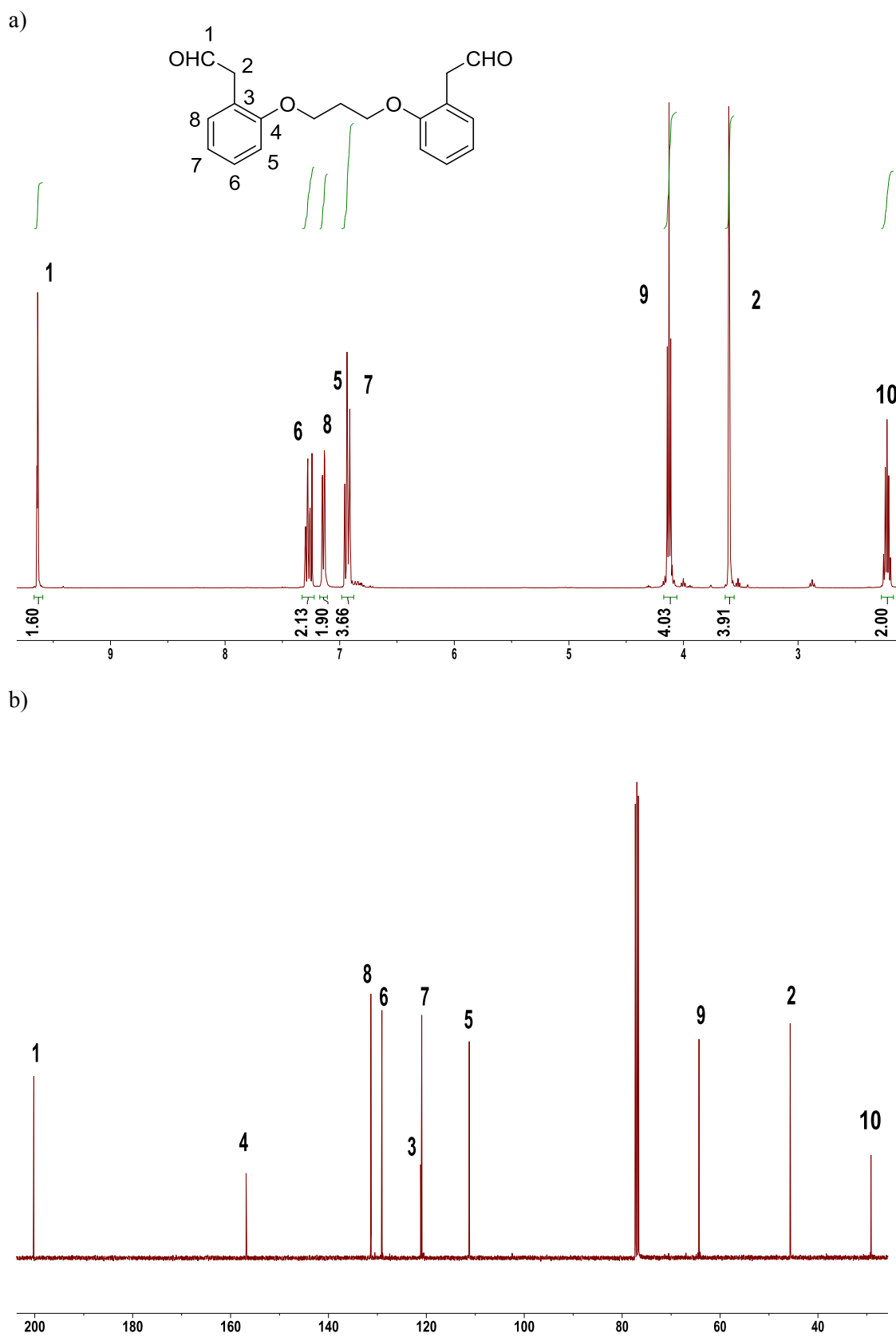
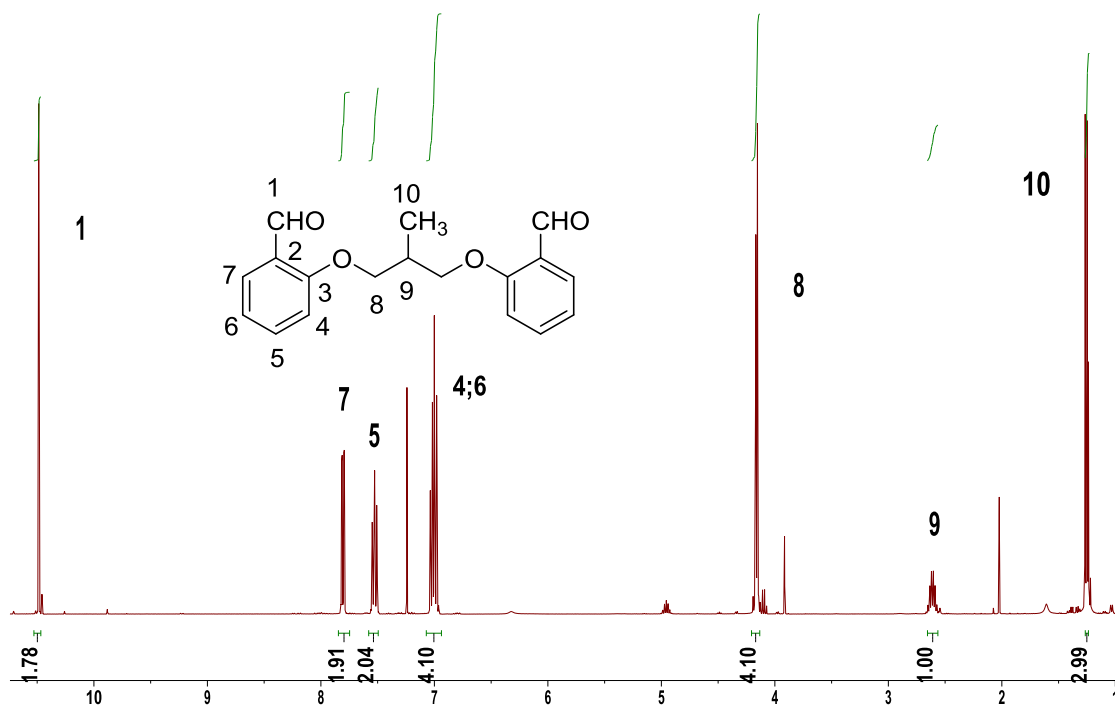


Figura25S(3.3) Espectros de RMN(CDCl₃) de 38: a) ¹H y b) ¹³C.

a)



b)

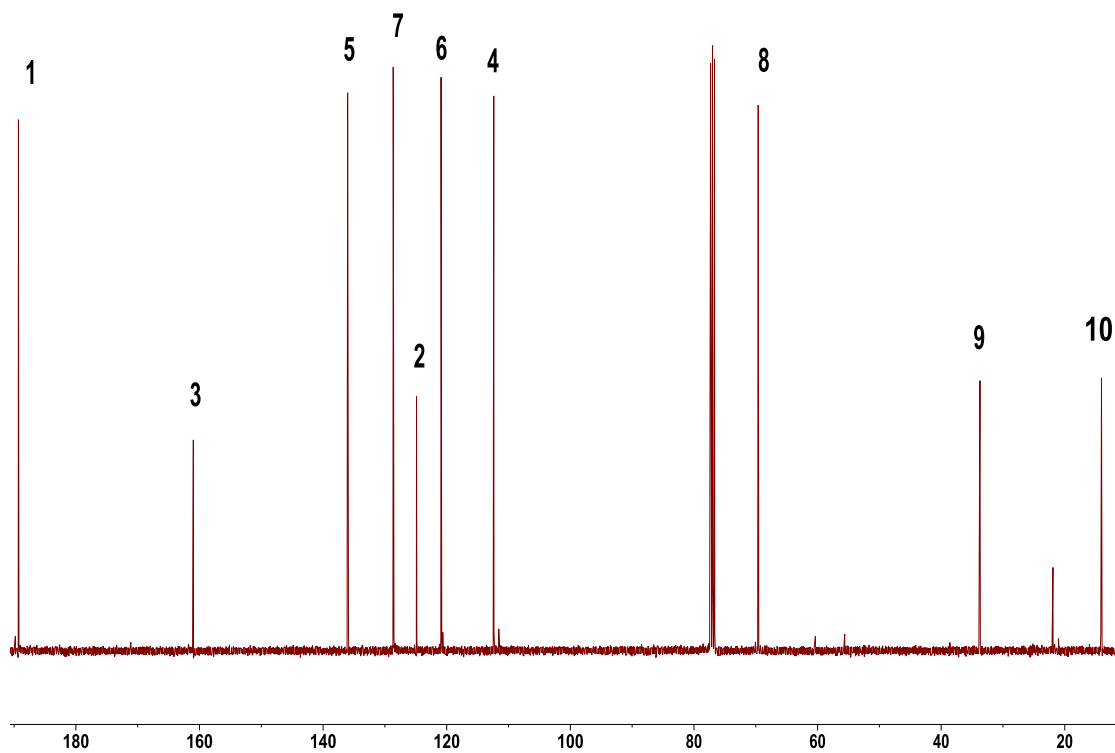
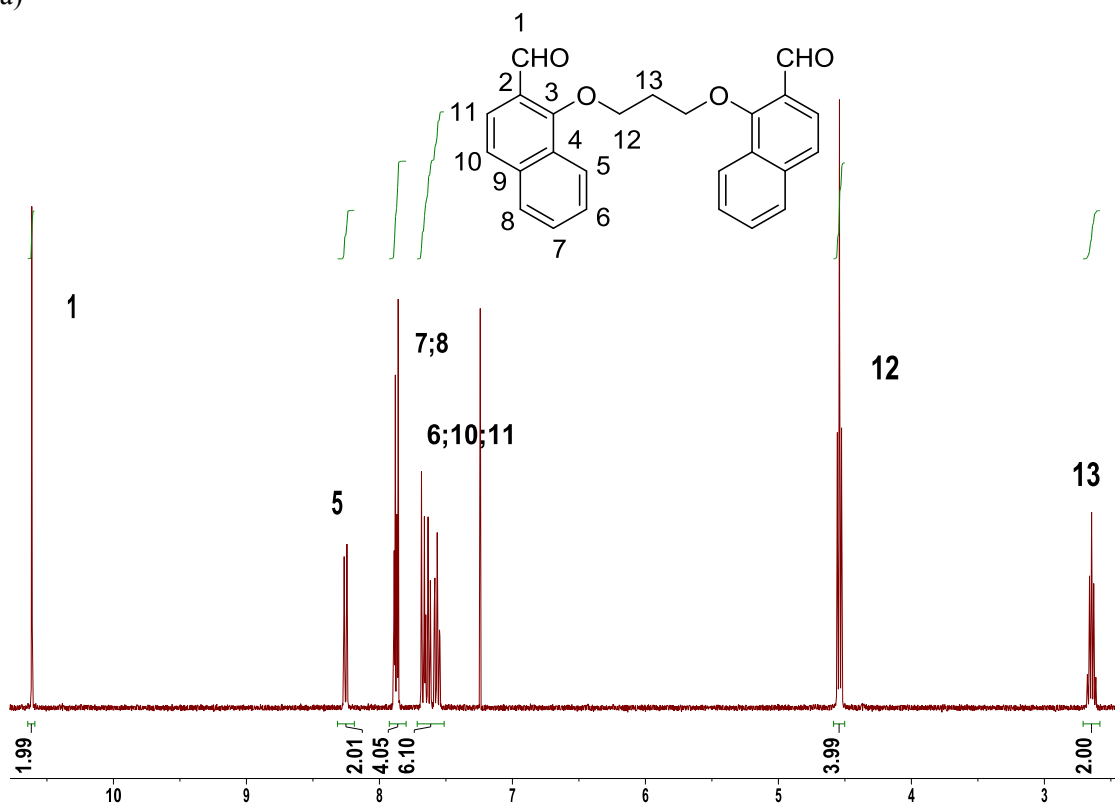


Figura26S(3.3) Espectros de RMN (CDCl₃) de 42: a) ¹H y b) ¹³C.

a)



b)

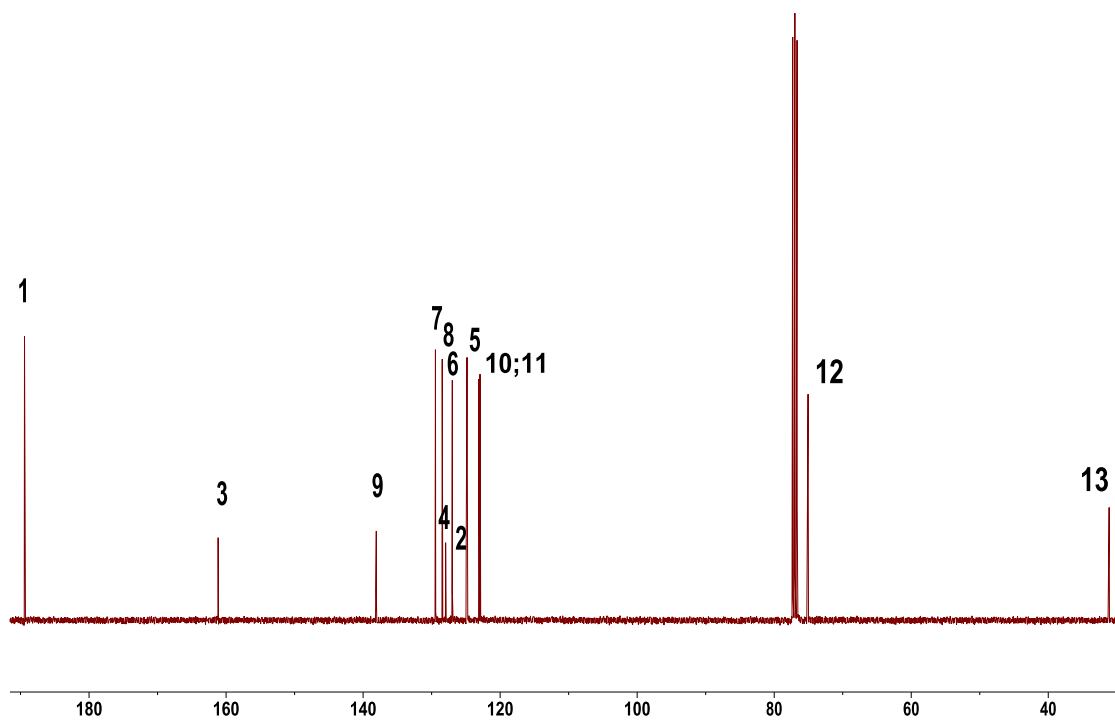
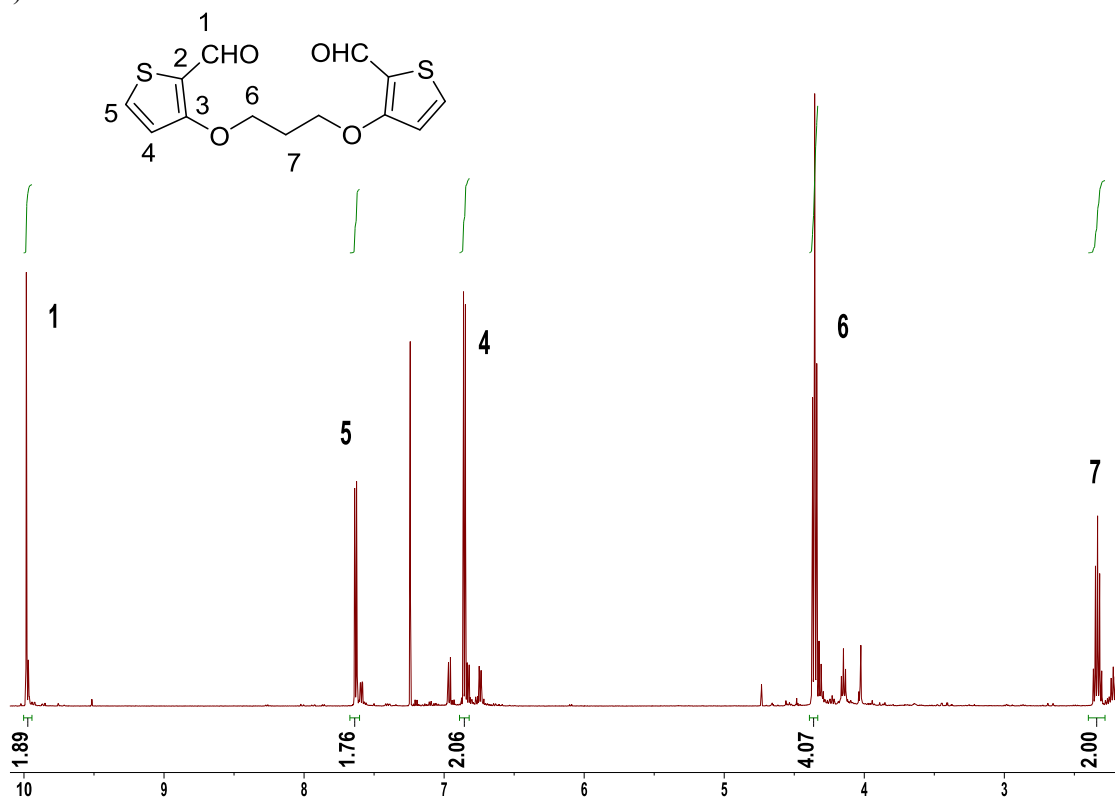


Figura27S(3.3) Espectros de RMN (CDCl₃) de 46: a) ¹H y b) ¹³C.

a)



b)

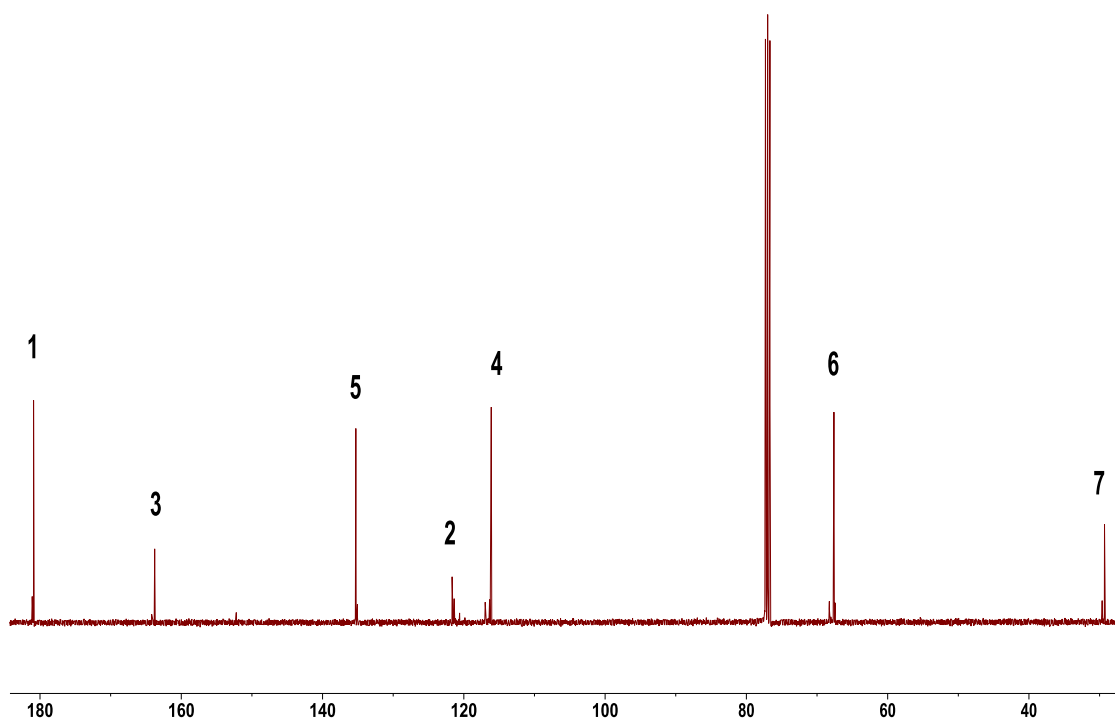
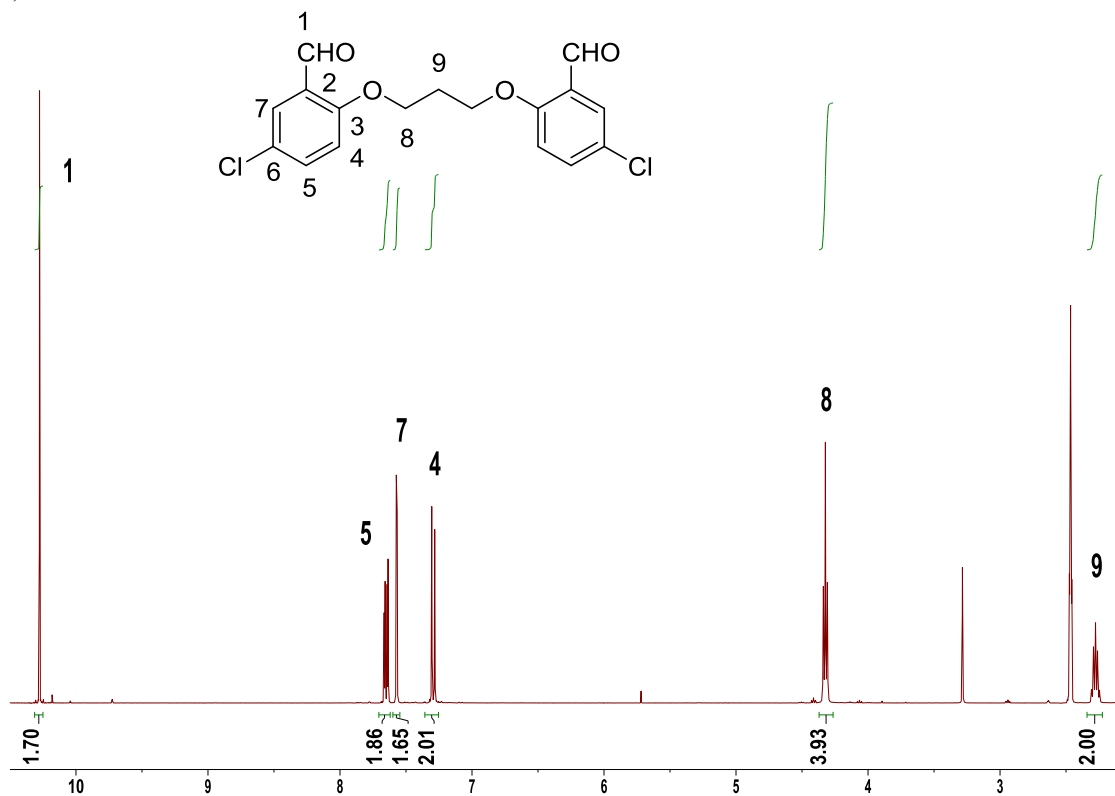


Figura28S(3.3) Espectros de RMN (DMSO- d_6) de **51a**: a) ^1H y b) ^{13}C .

a)



b)

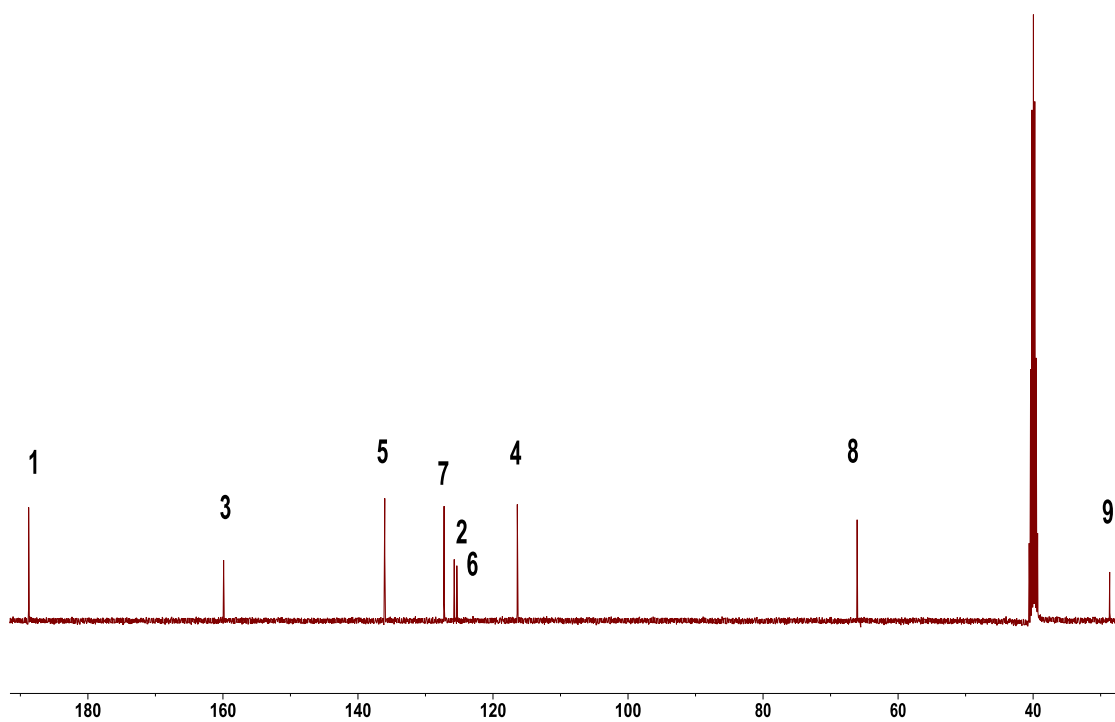
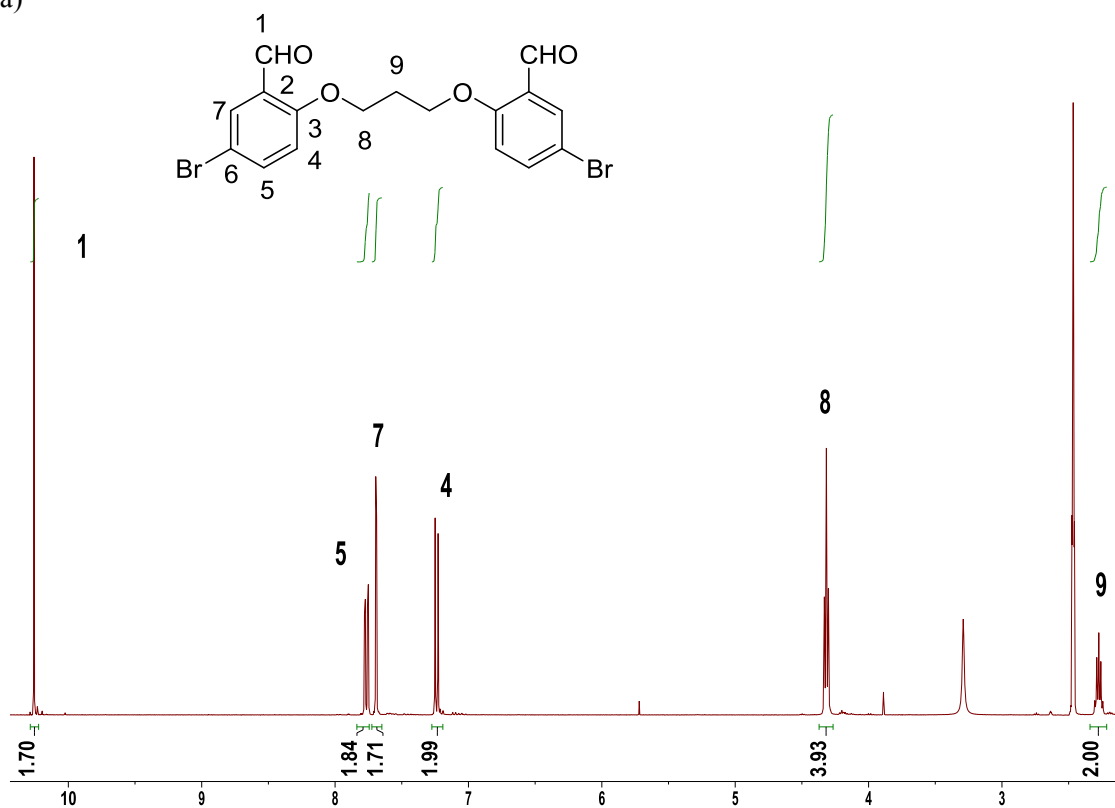


Figura29S(3.3) Espectros de RMN(DMSO- d_6) de **51b**: a) ^1H y b) ^{13}C .

a)



b)

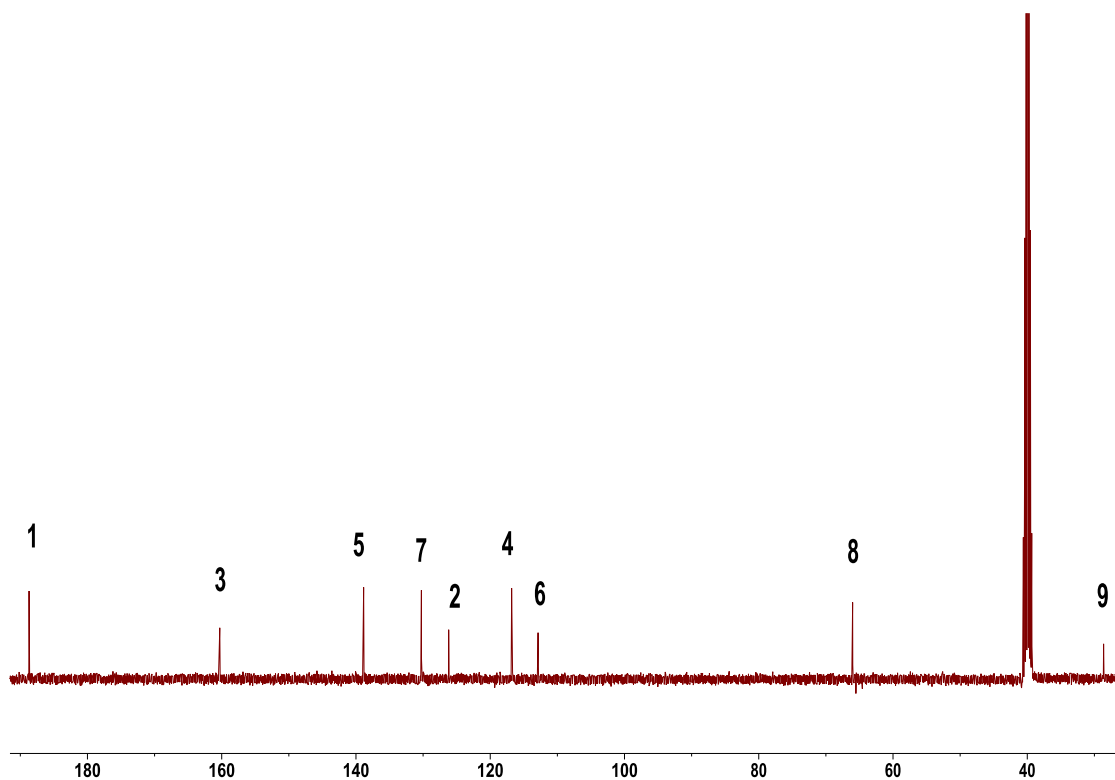


Figura30S(3.3) Espectros de RMN (CDCl₃) de **55**: a) ¹H y b) ¹³C.

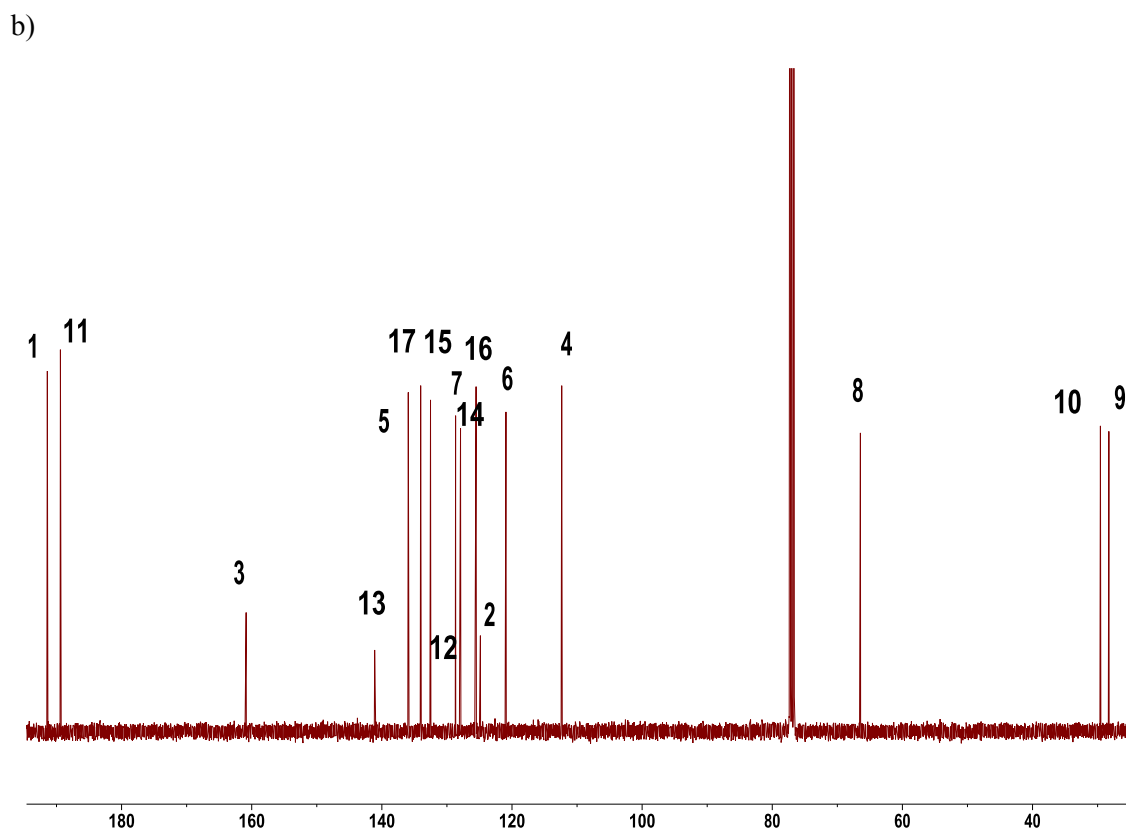
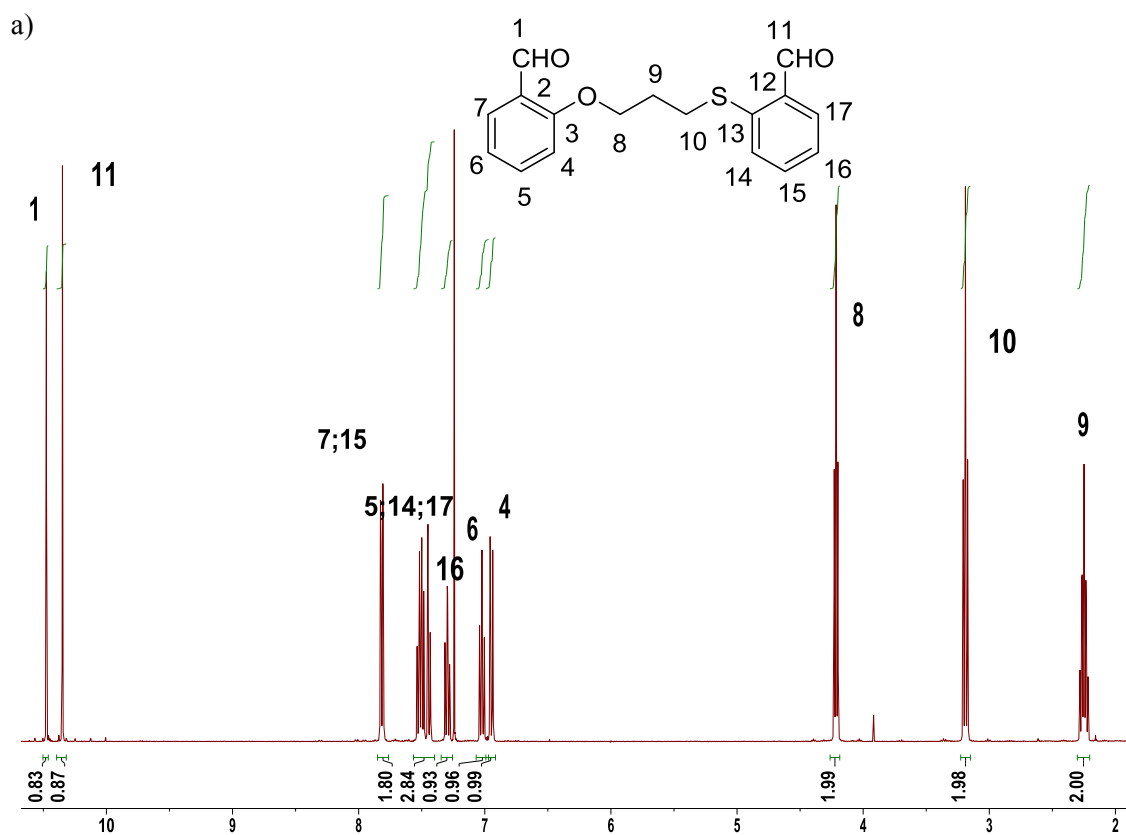


Figura31S(3.3) Espectros de RMN (CDCl₃) de 58: a) ¹H y b) ¹³C.

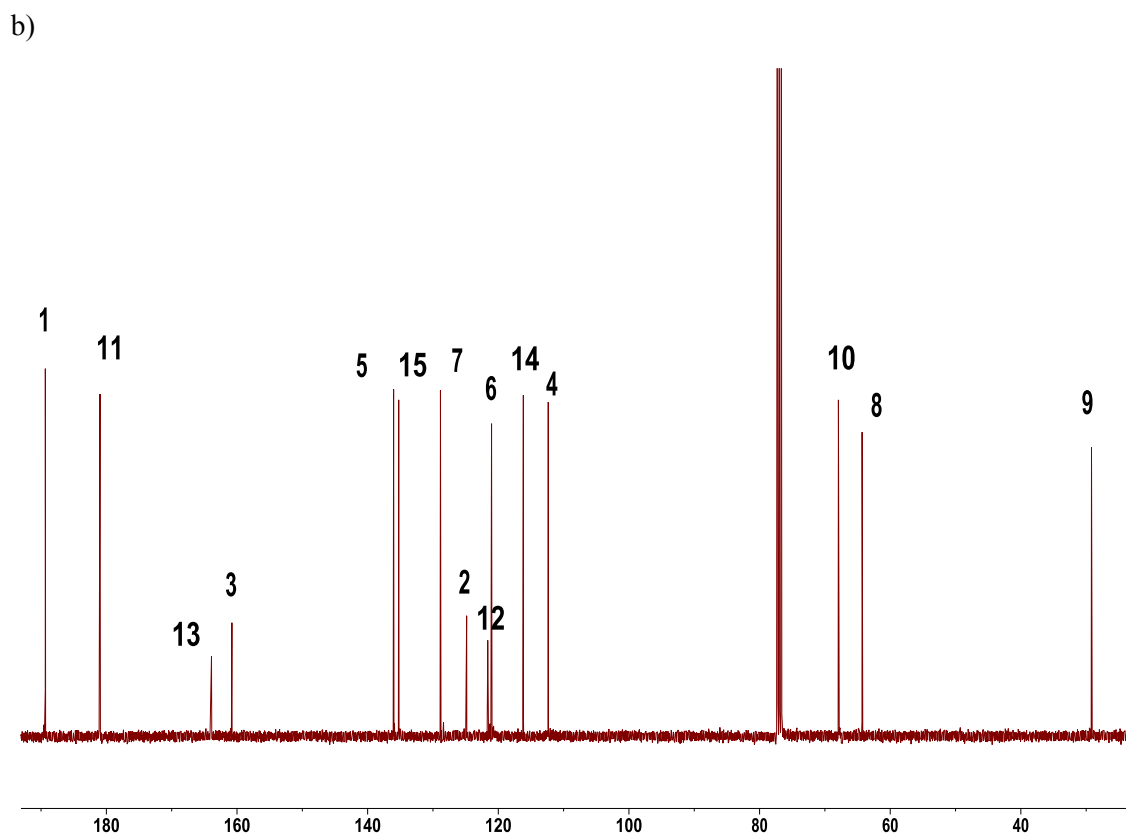
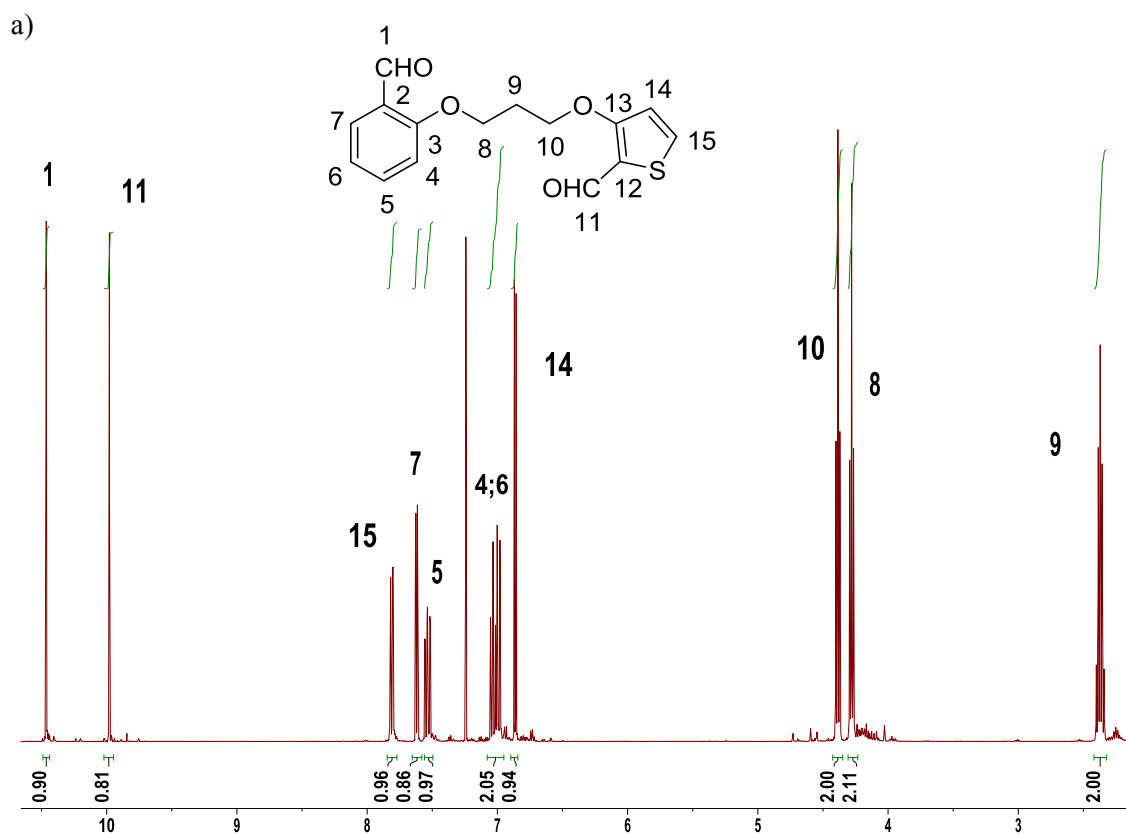


Figura32S(3.3) Espectros de RMN (CDCl₃) de **61a**: a) ¹H y b) ¹³C.

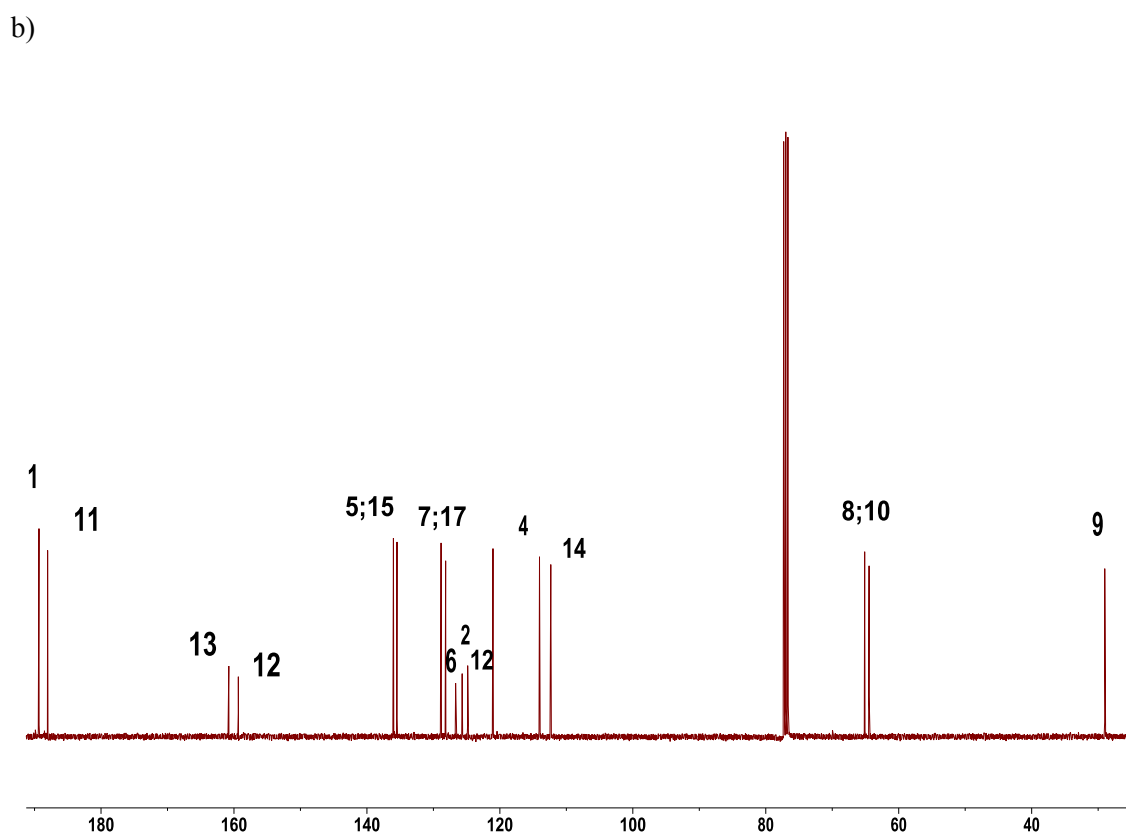
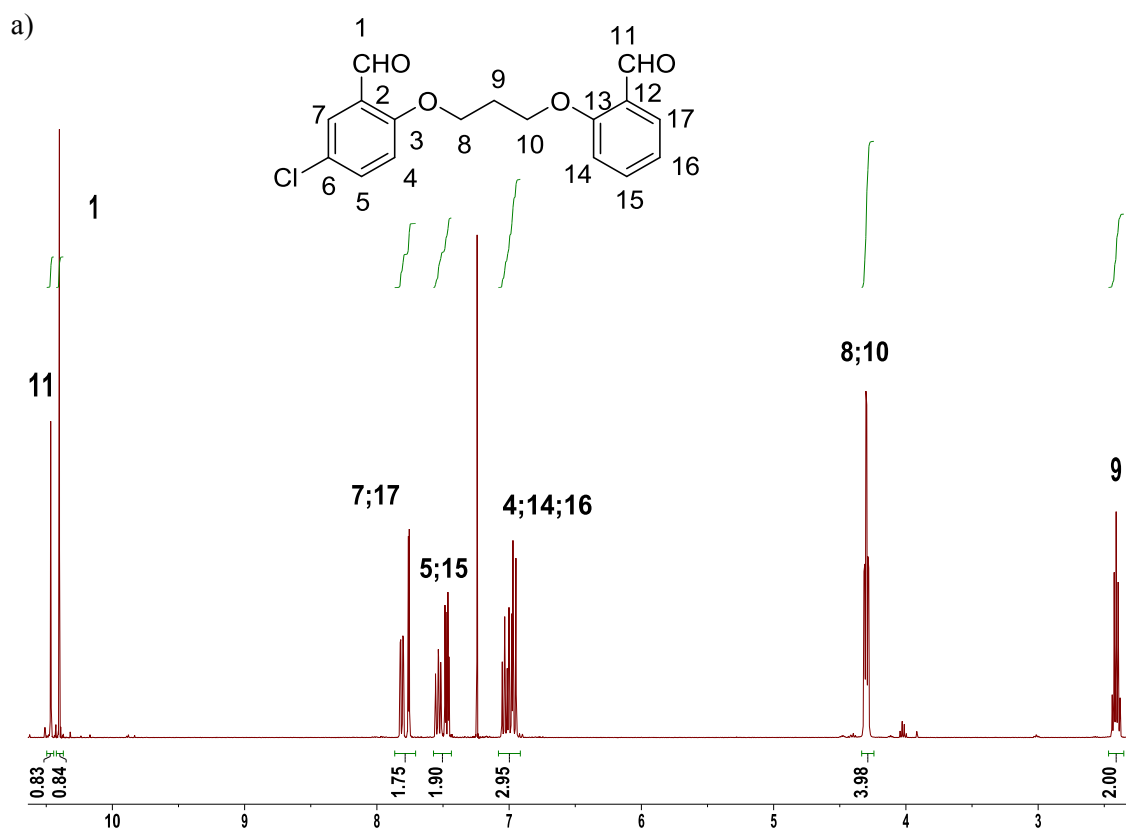


Figura33S(3.3) Espectros de RMN(CDCl₃) de **61b**: a) ¹H y b) ¹³C.

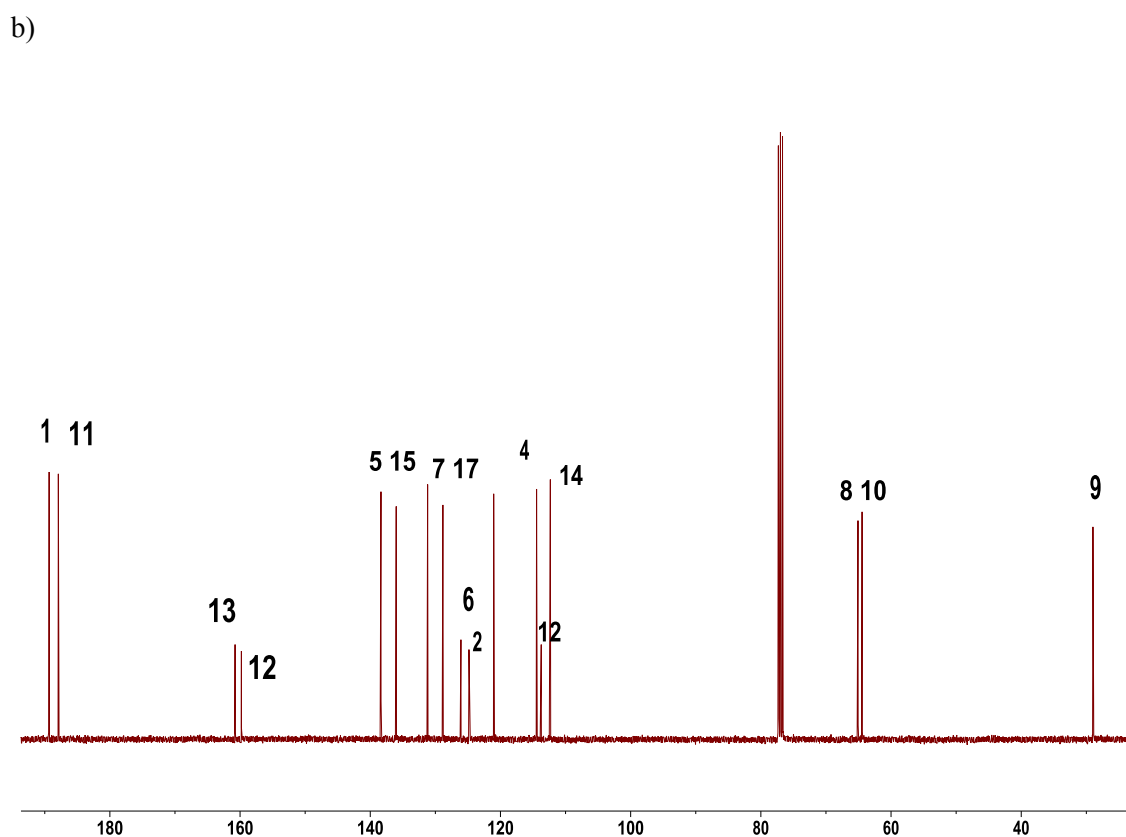
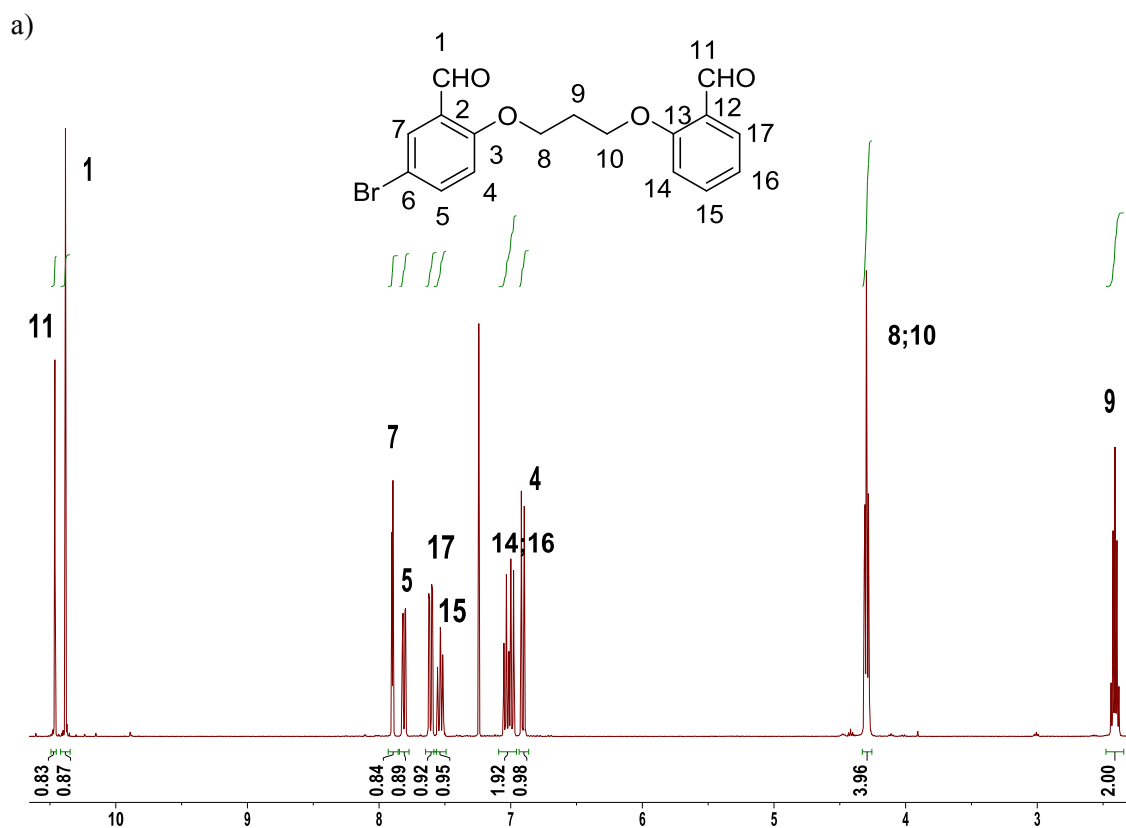


Figura34S(3.3) Espectros de RMN (CDCl₃) de 67: a) ¹H y b) ¹³C.

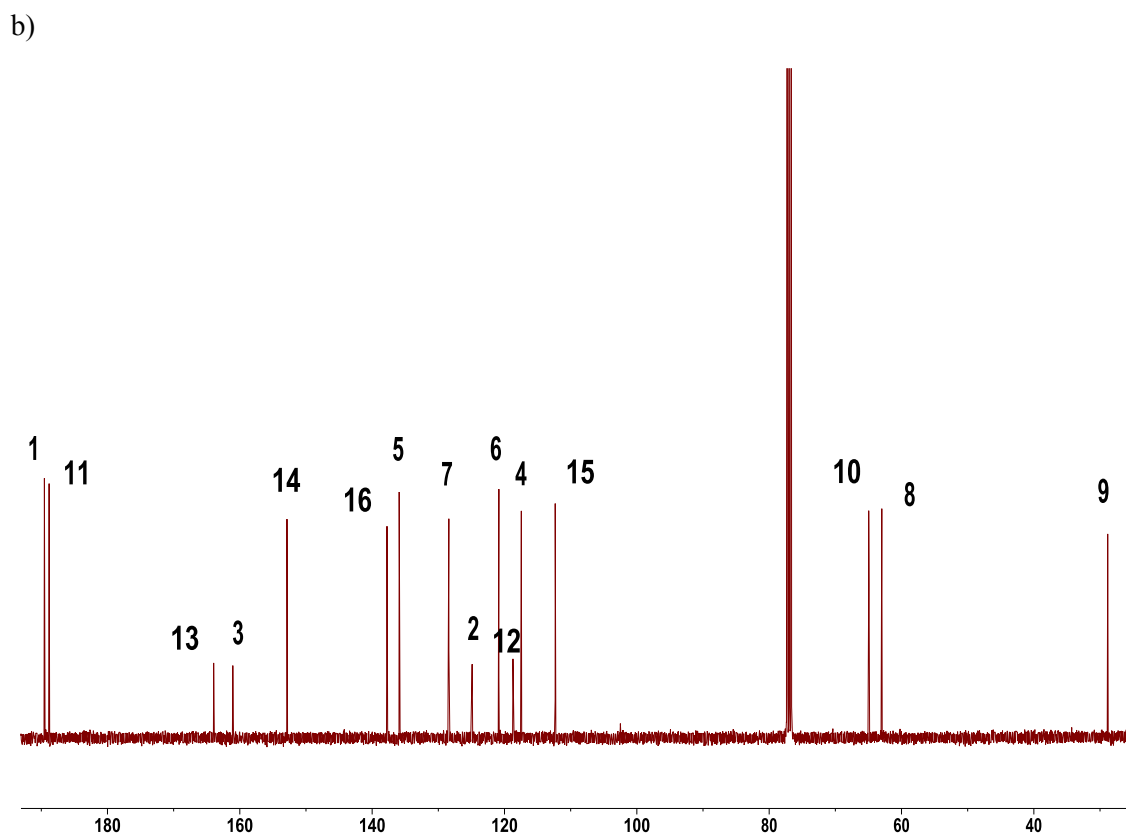
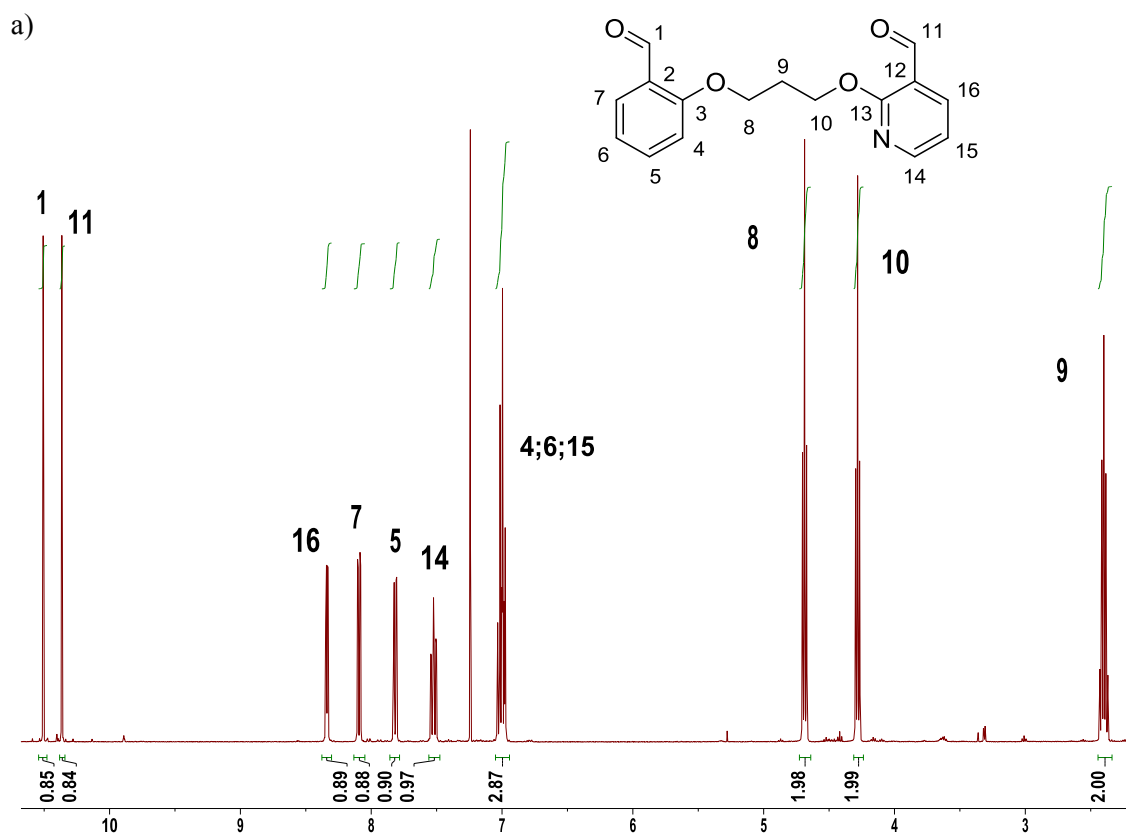
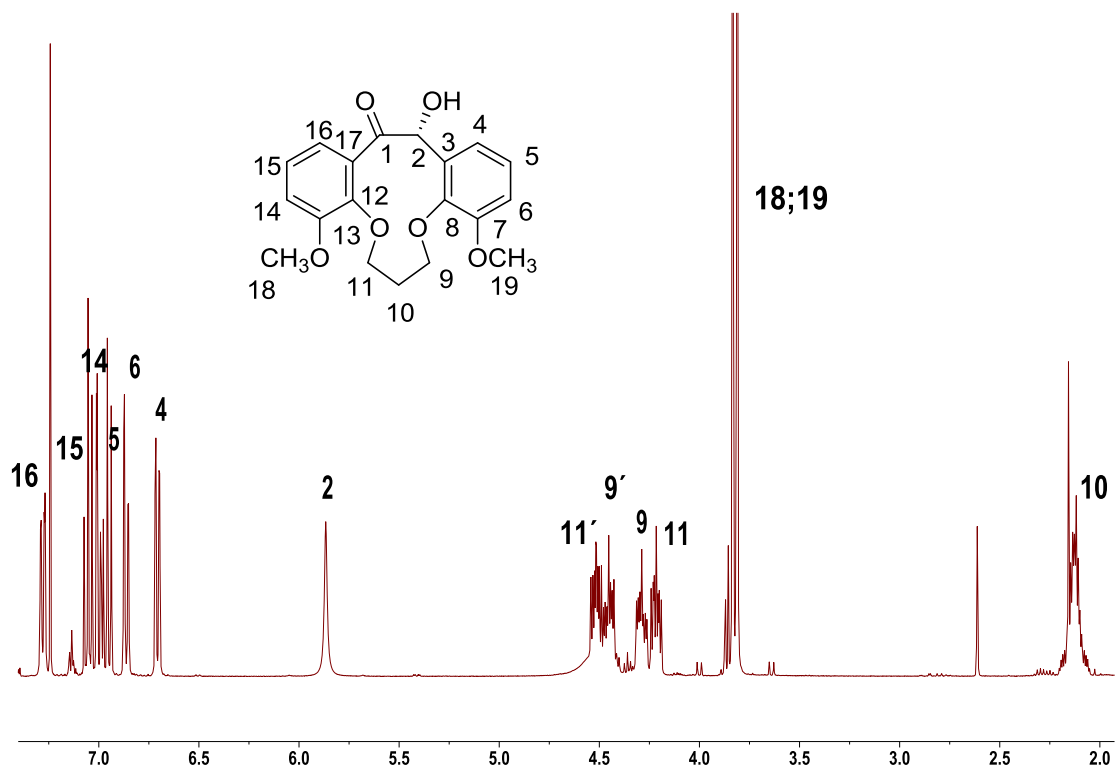
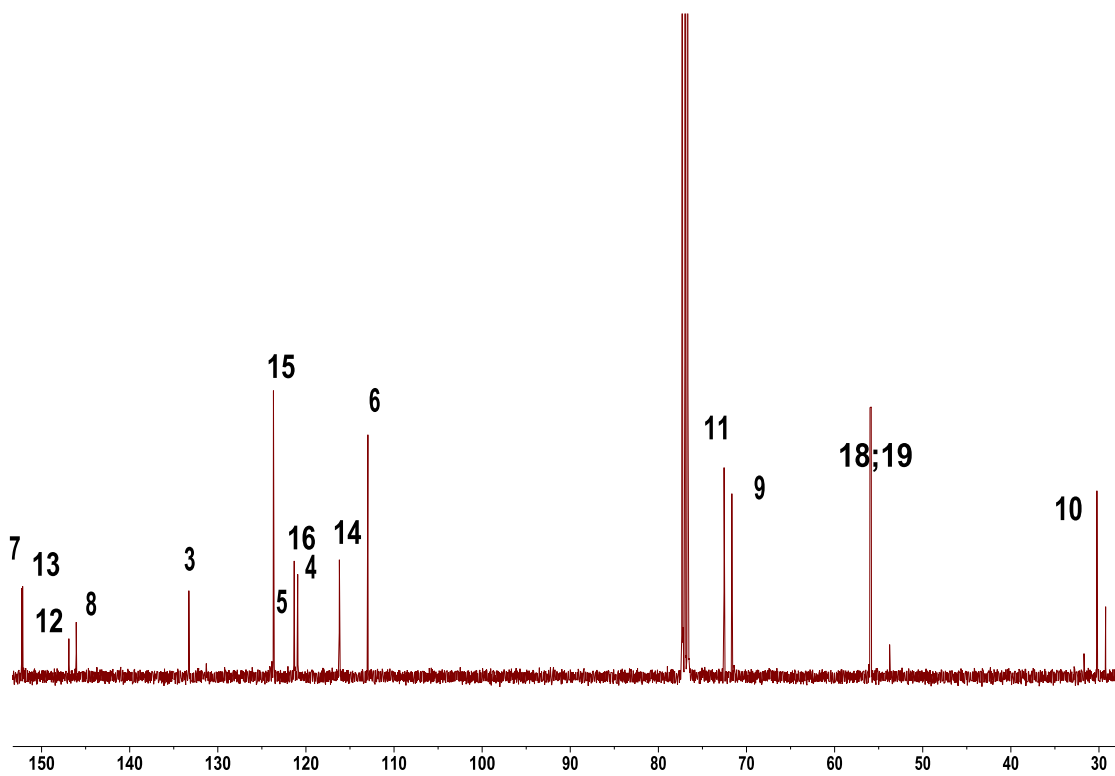


Figura35S(3.3) Espectros de RMN(CDCl₃) de **68**: a) ¹H; b) ¹³C; c) 2D ¹H-¹H COSY; d) HSQC y e) HMBC.

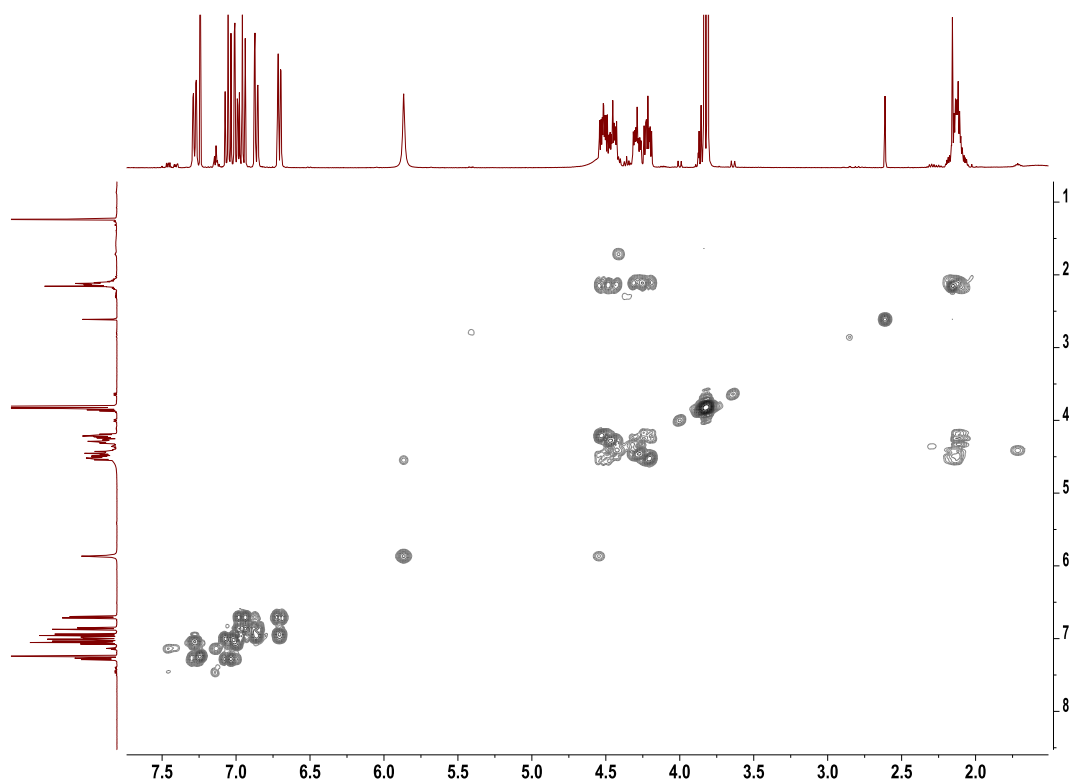
a)



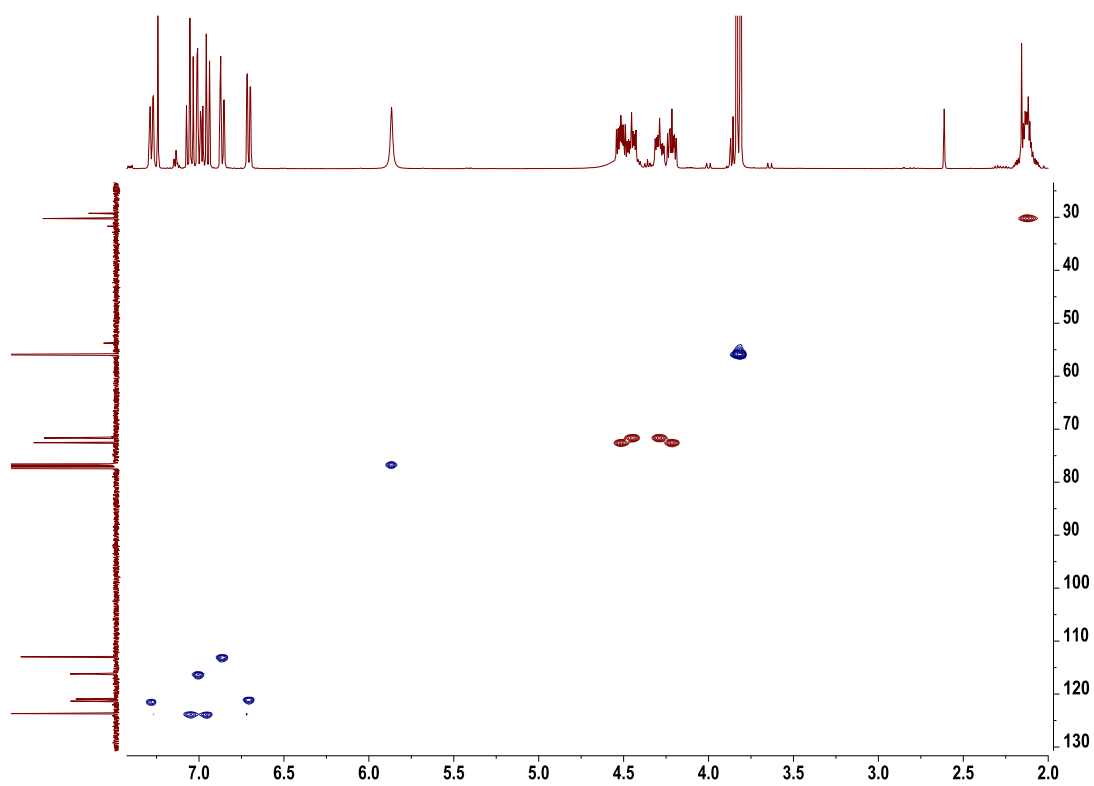
b)



c)



d)



e)

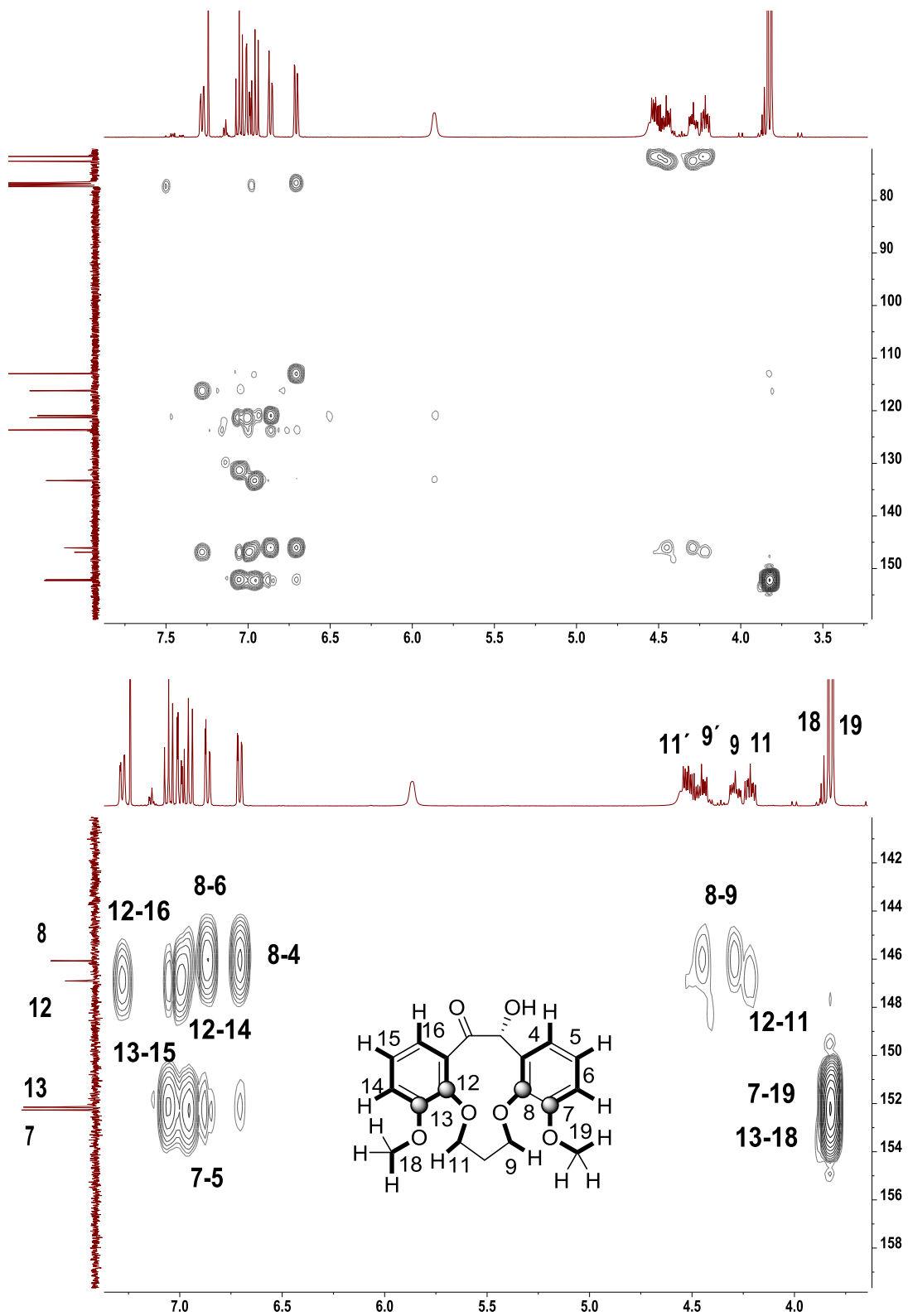
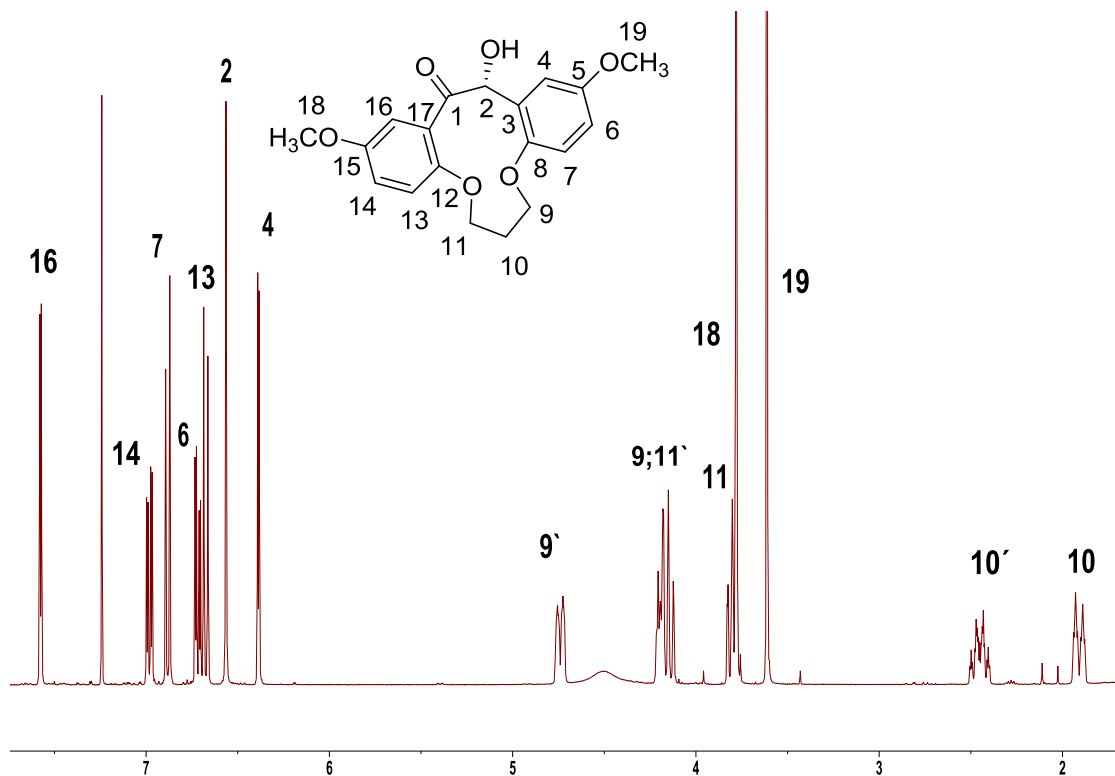
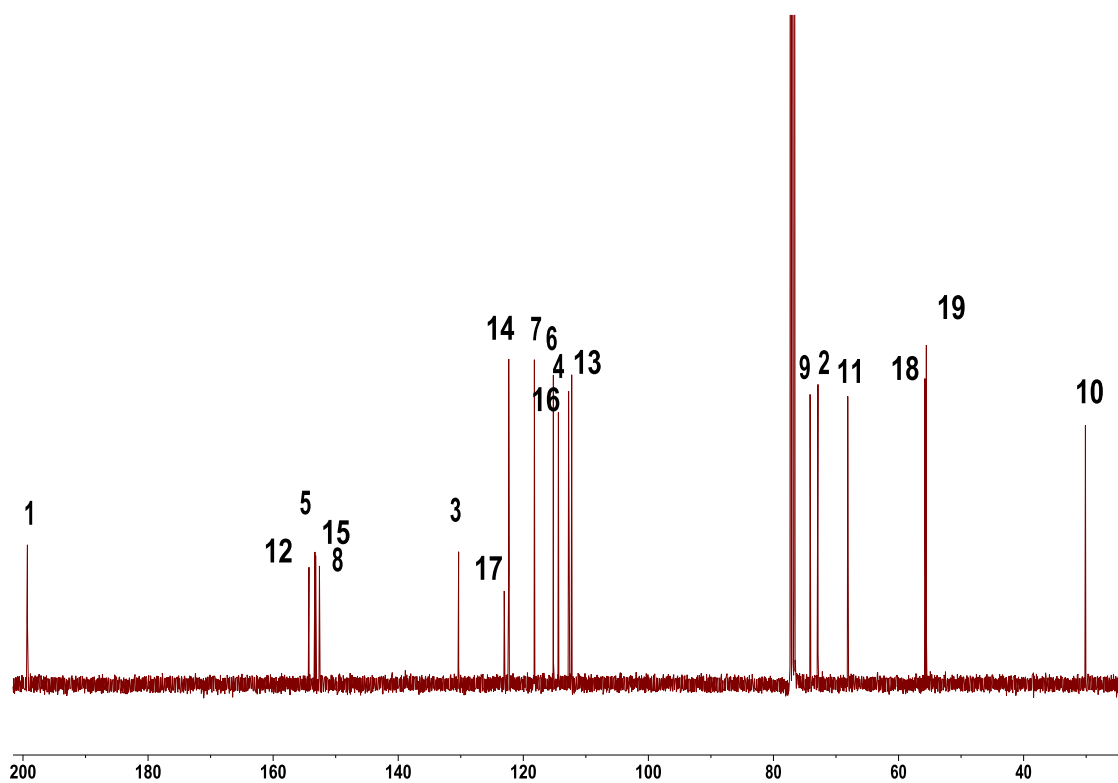


Figura36S(3.3) Espectros de RMN(CDCl₃) de **69**: a) ¹H; b) ¹³C; c) 2D ¹H-¹H COSY; d) HSQC y e) HMBC.

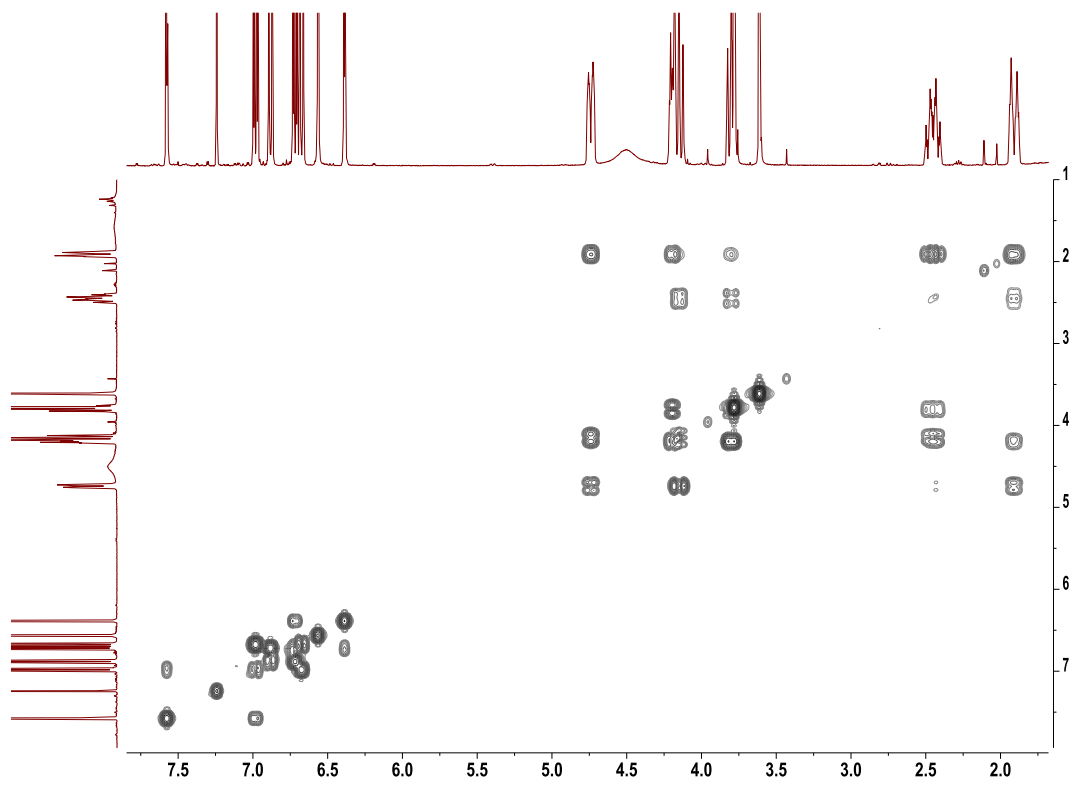
a)



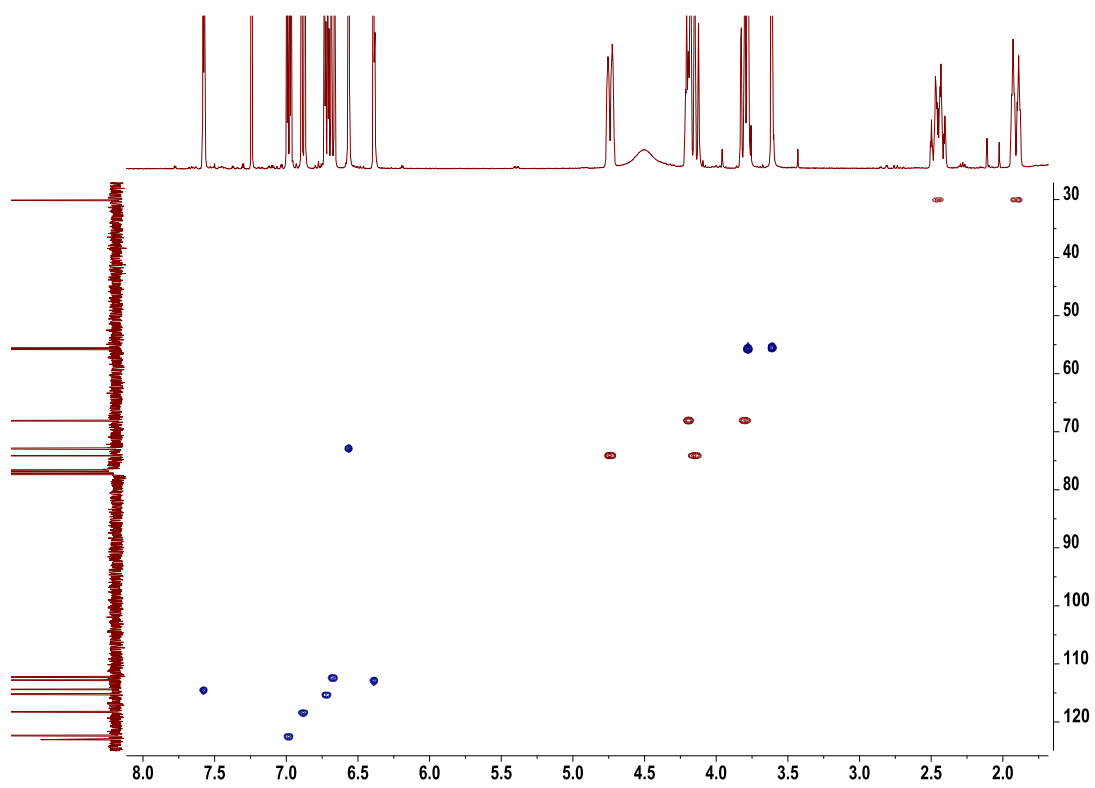
b)



c)



d)



e)

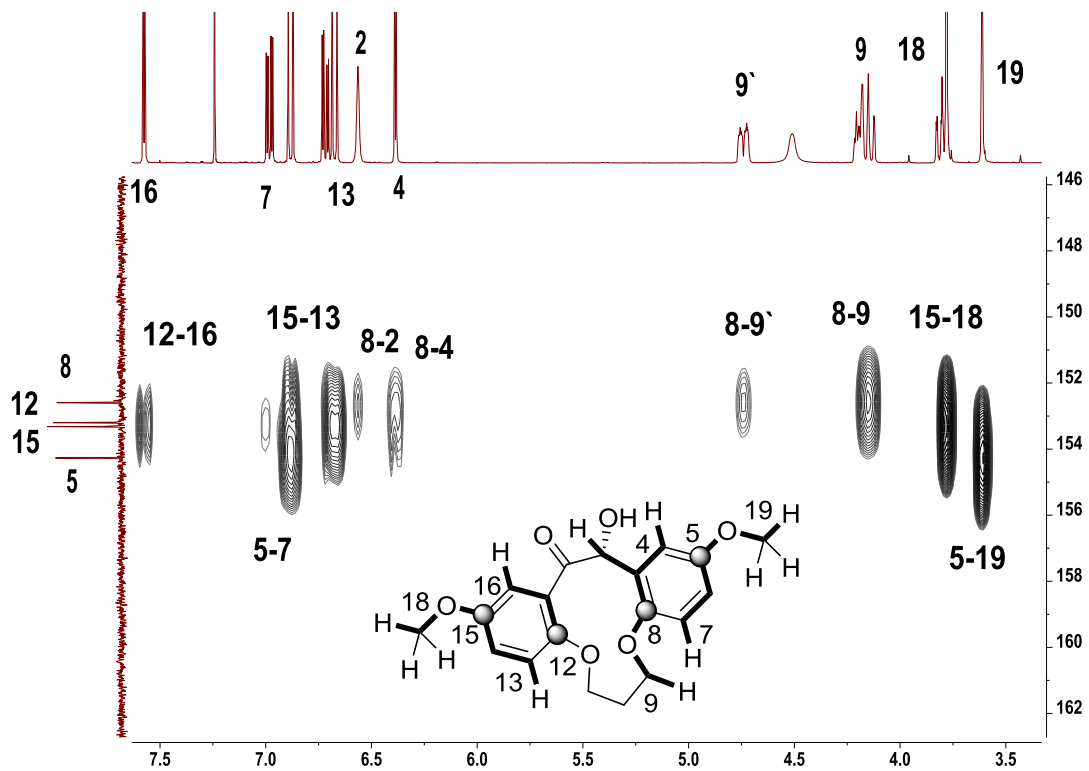
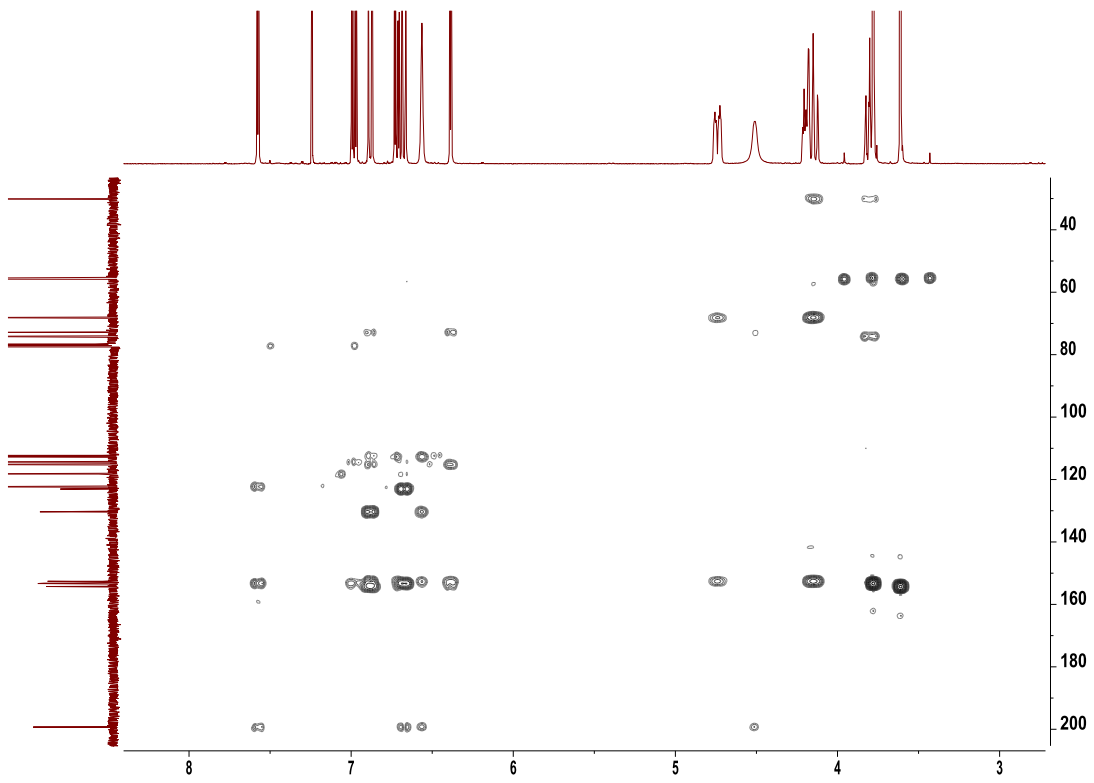
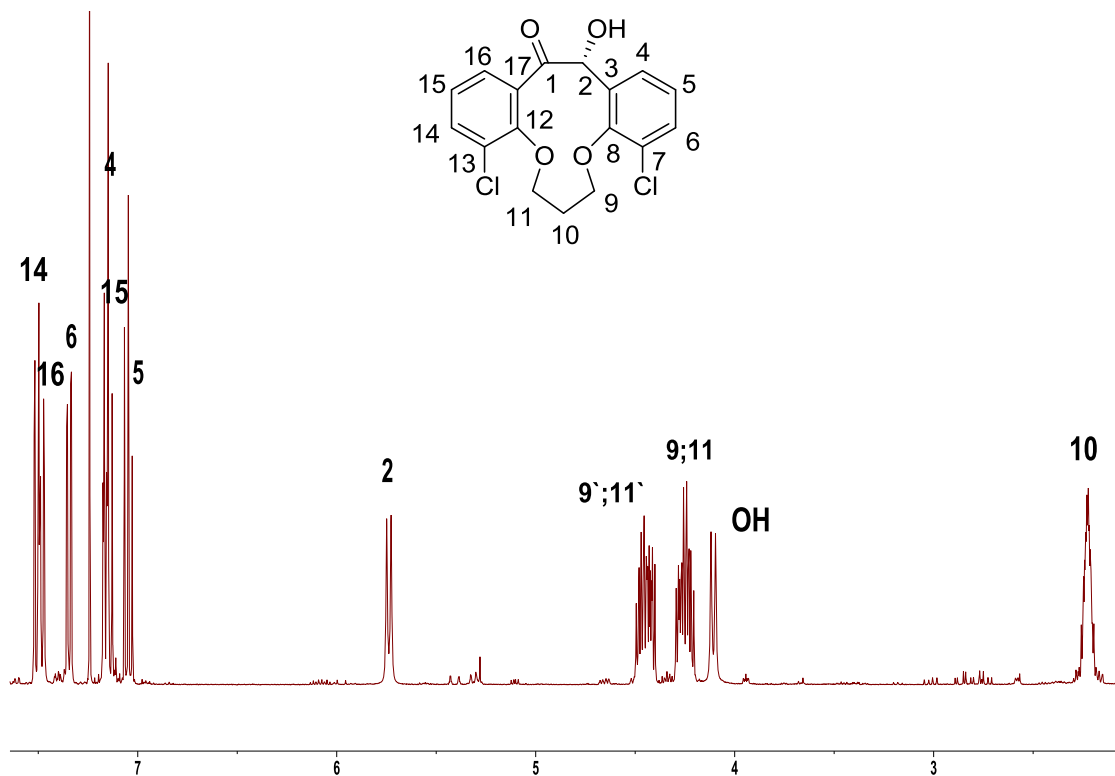
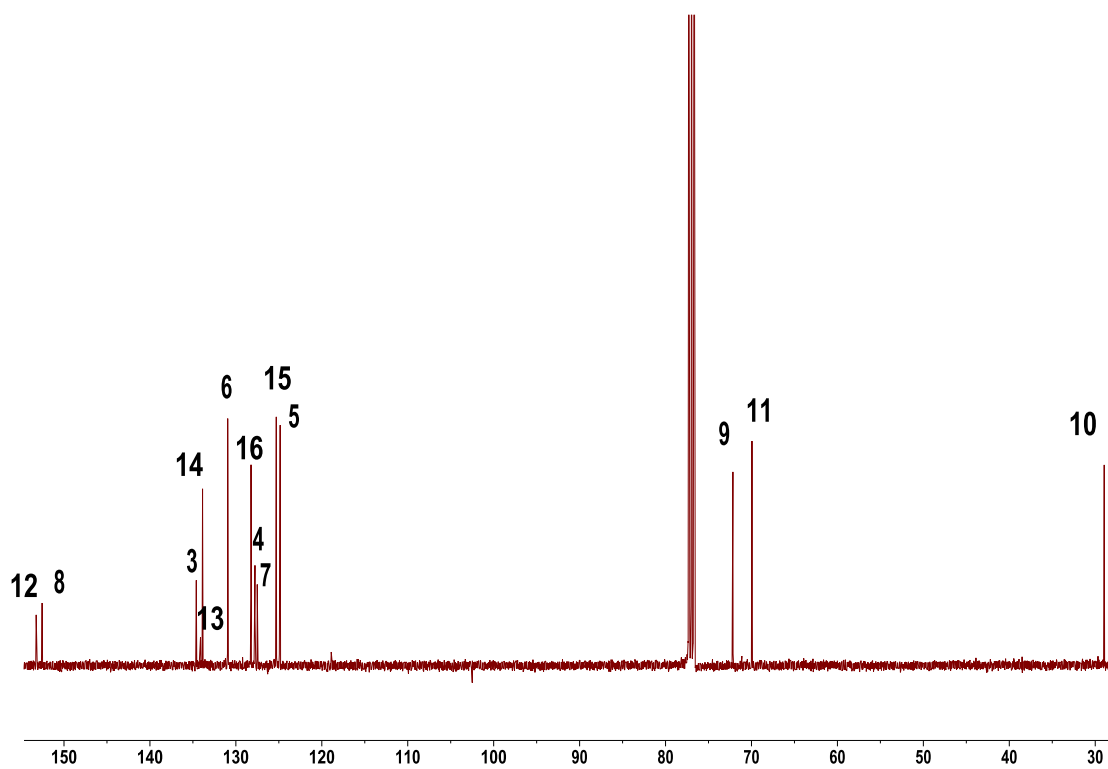


Figura37S(3.3) Espectros de RMN (CDCl₃) de **70**: a) ¹H; b) ¹³C; c) 2D ¹H-¹H COSY; d) HSQC y e) HMBC.

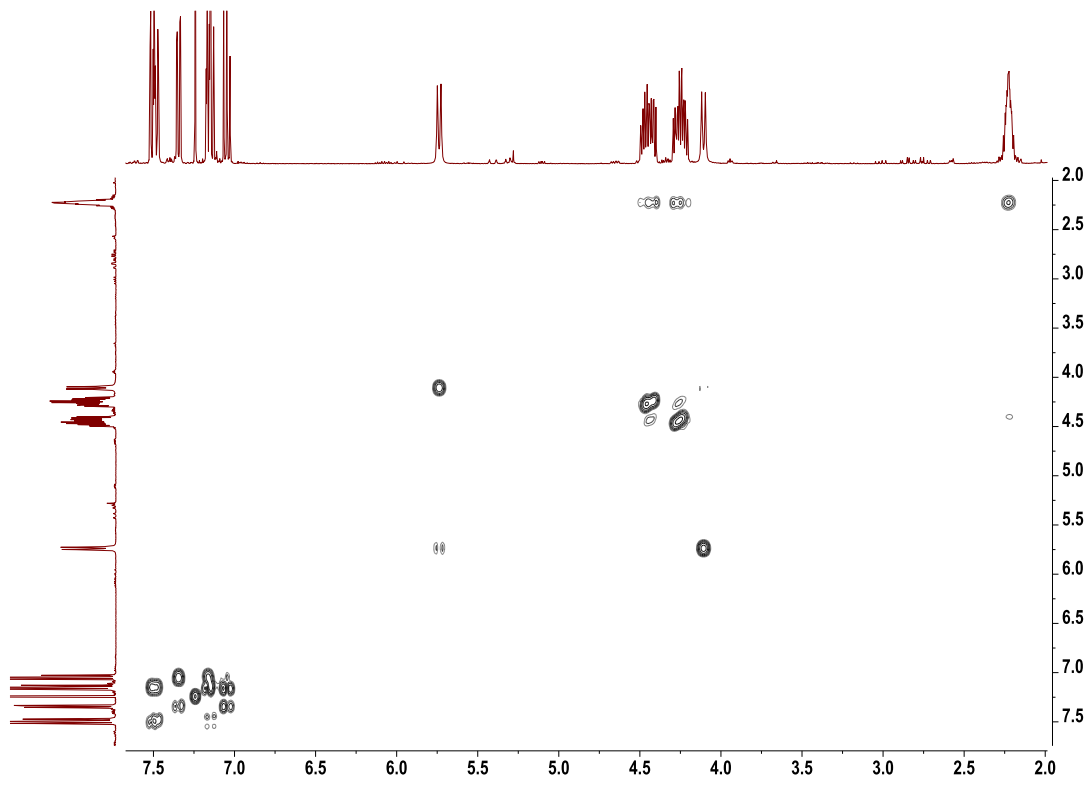
a)



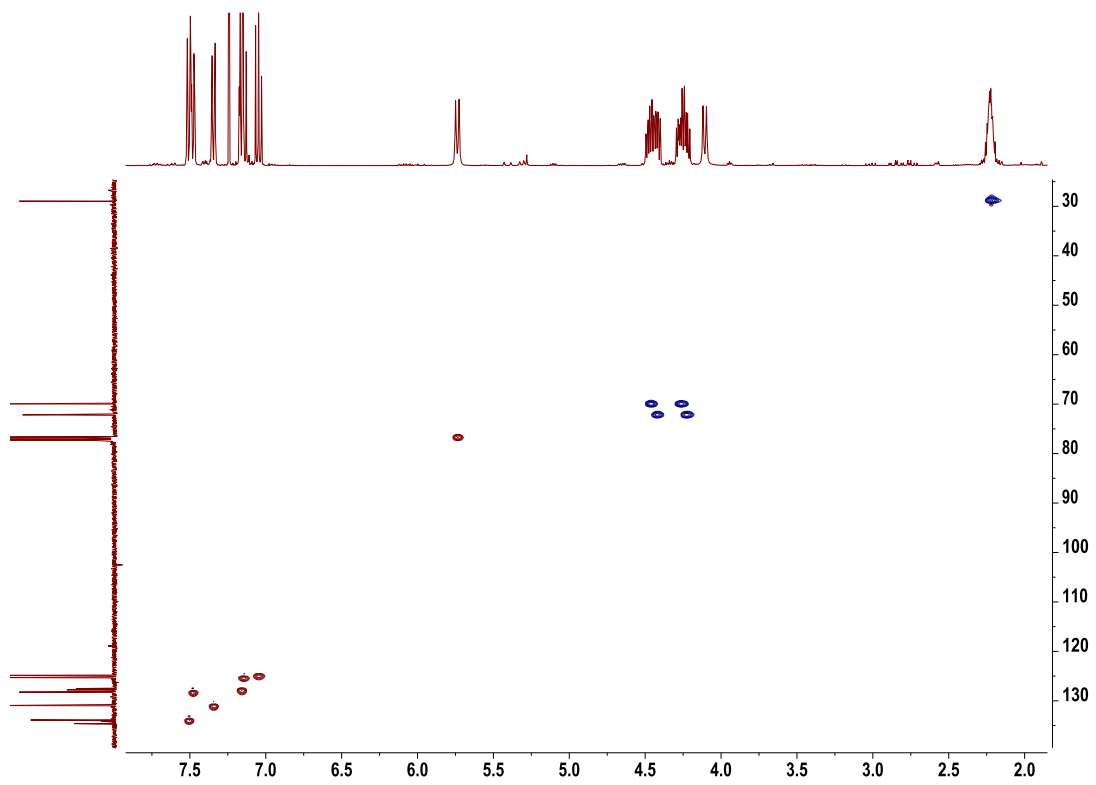
b)



c)



d)



e)

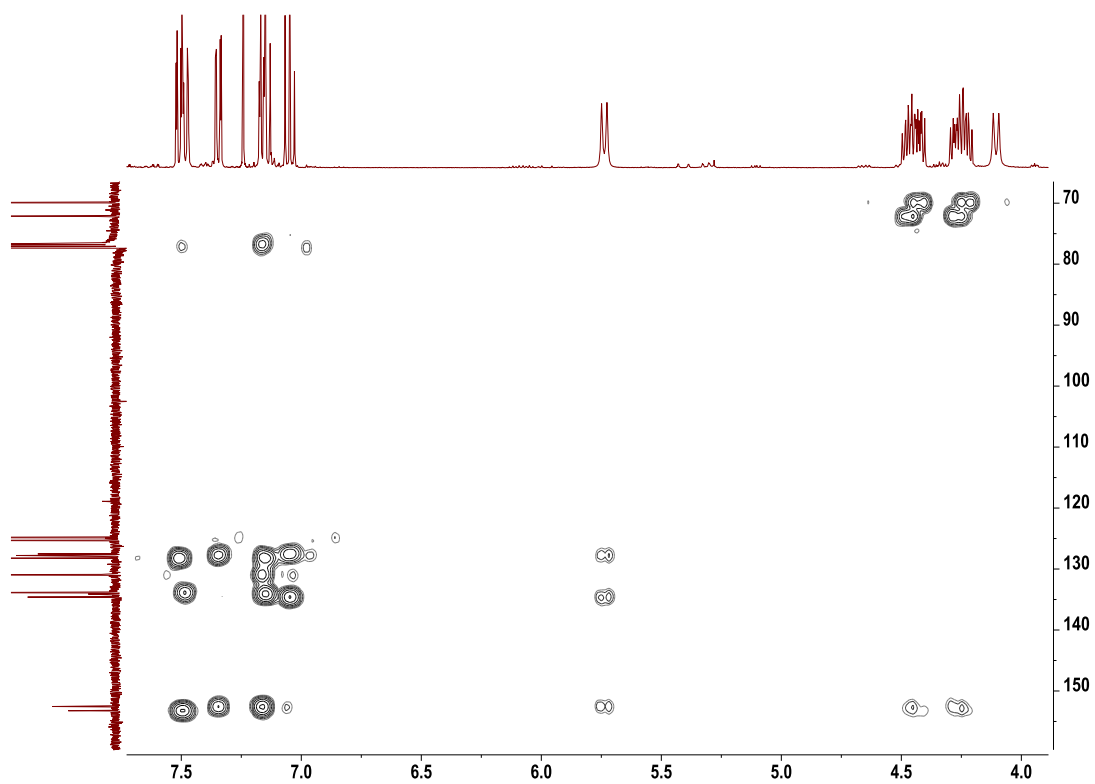
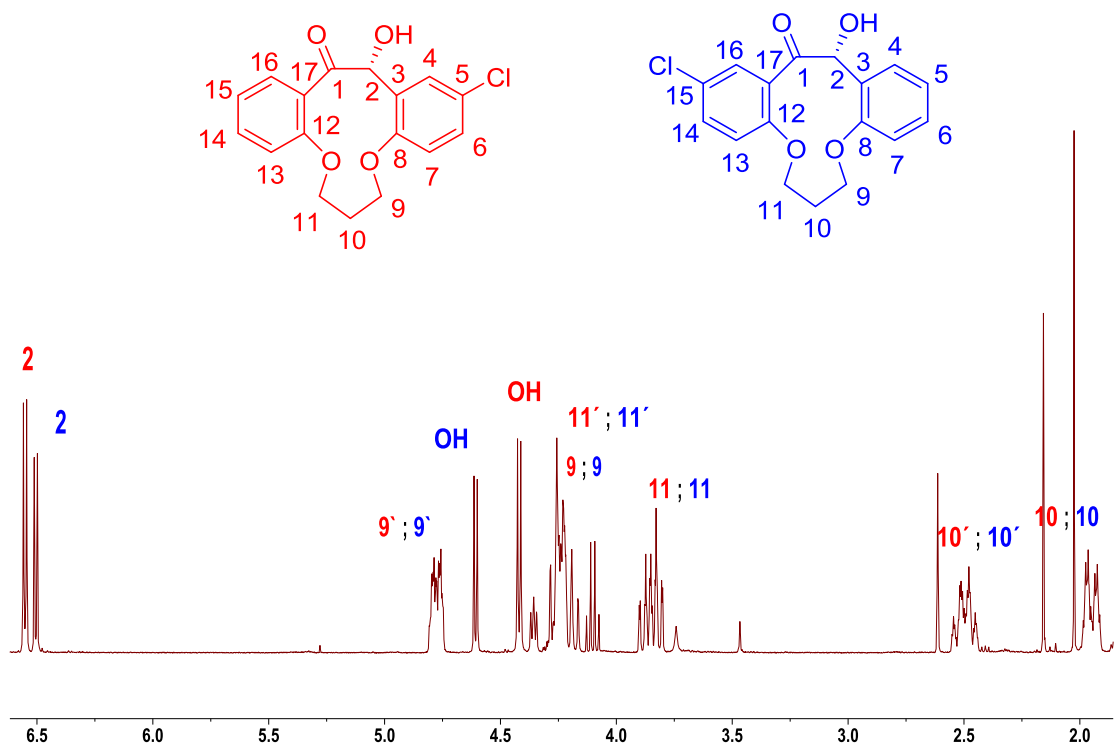
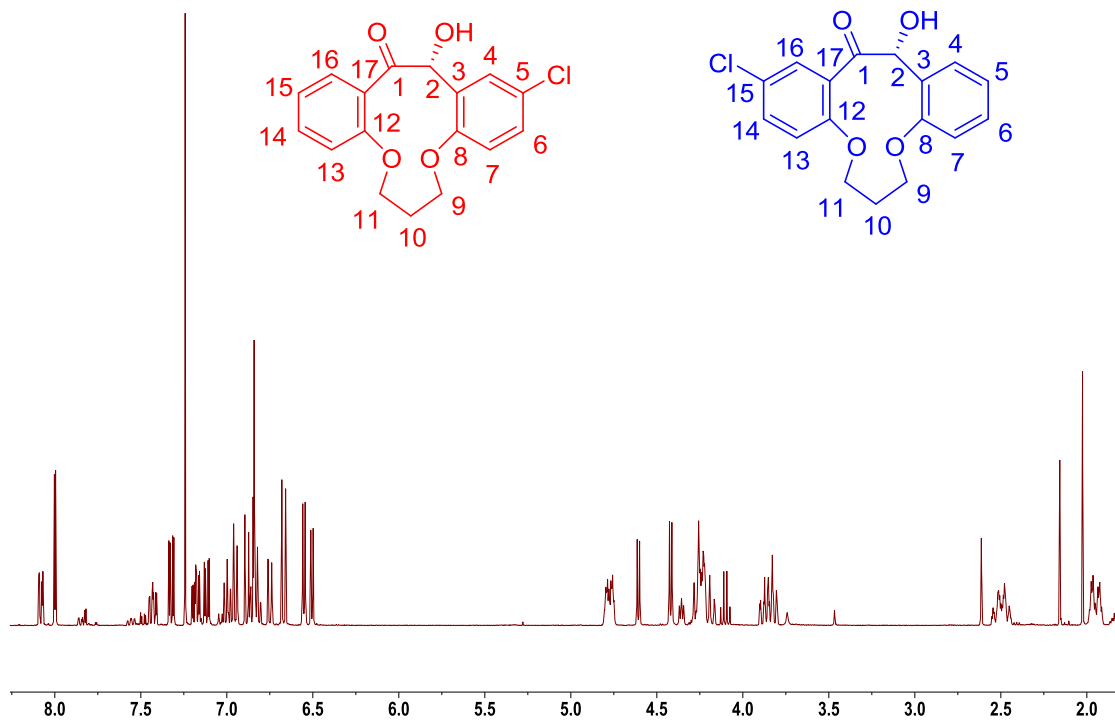
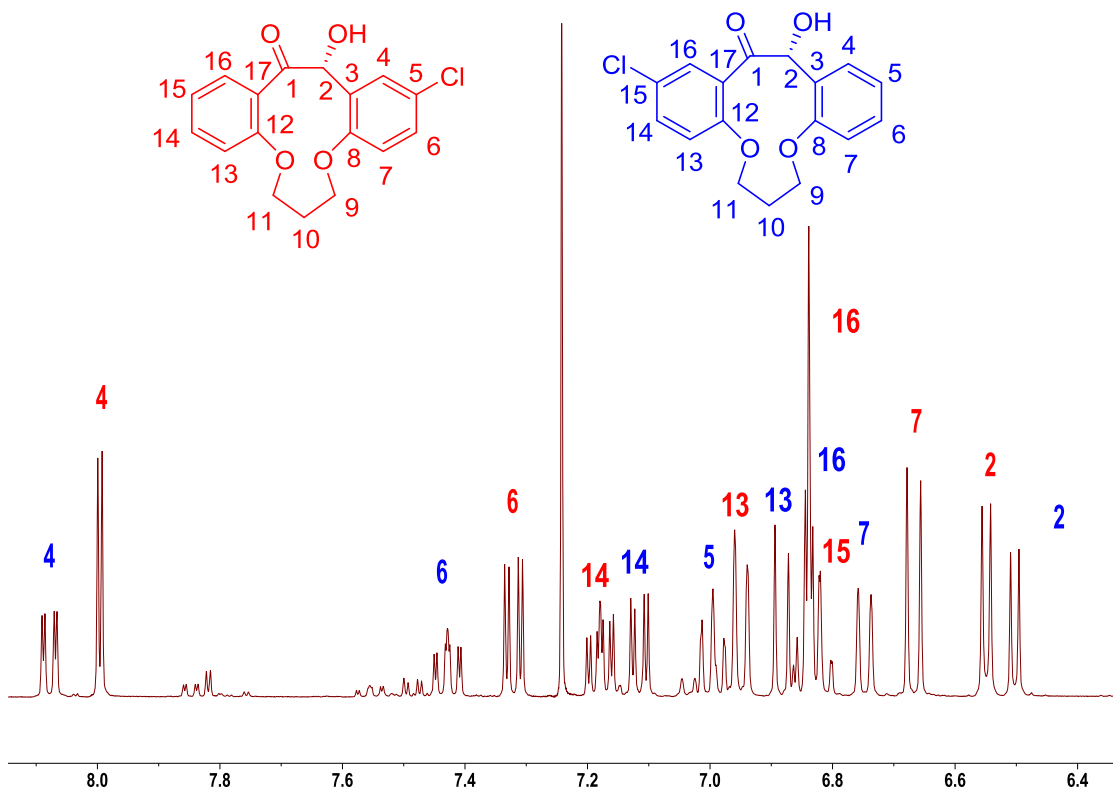


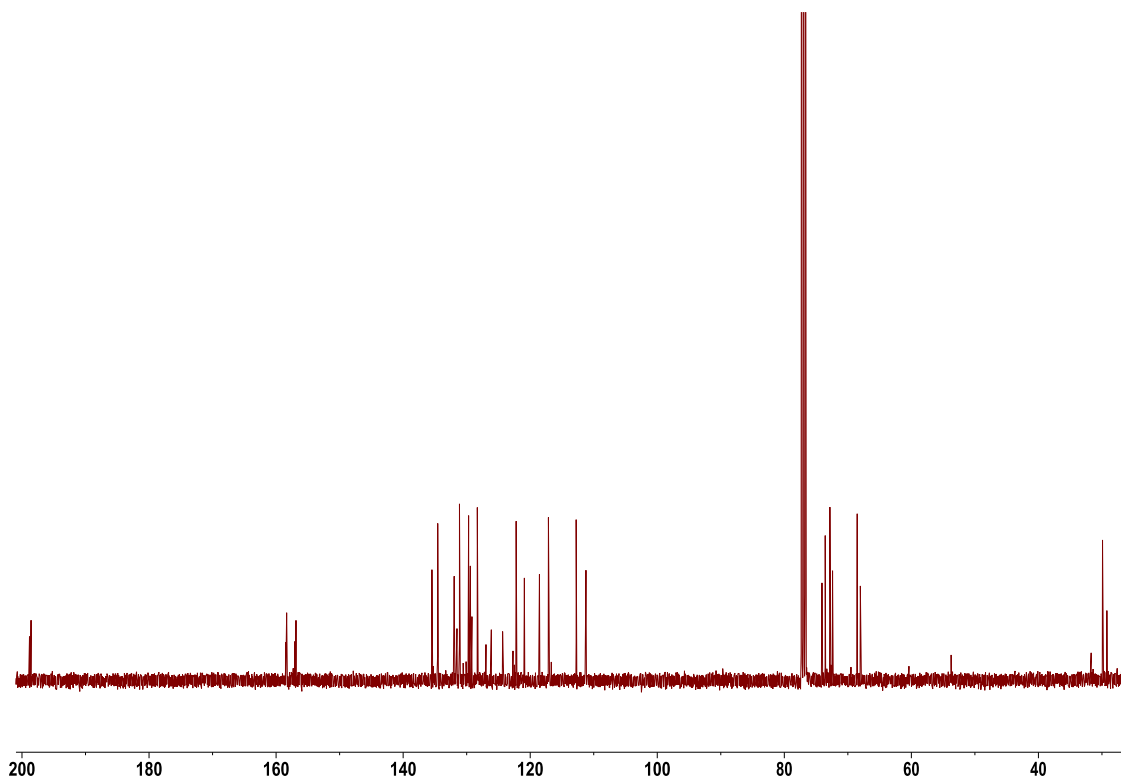
Figura38S(3.3) Espectros de RMN(CDCl₃) de **71e,f**: a) ¹H; b) ¹³C; c) 2D ¹H-¹H COSY; d) HSQC y e) HMBC.

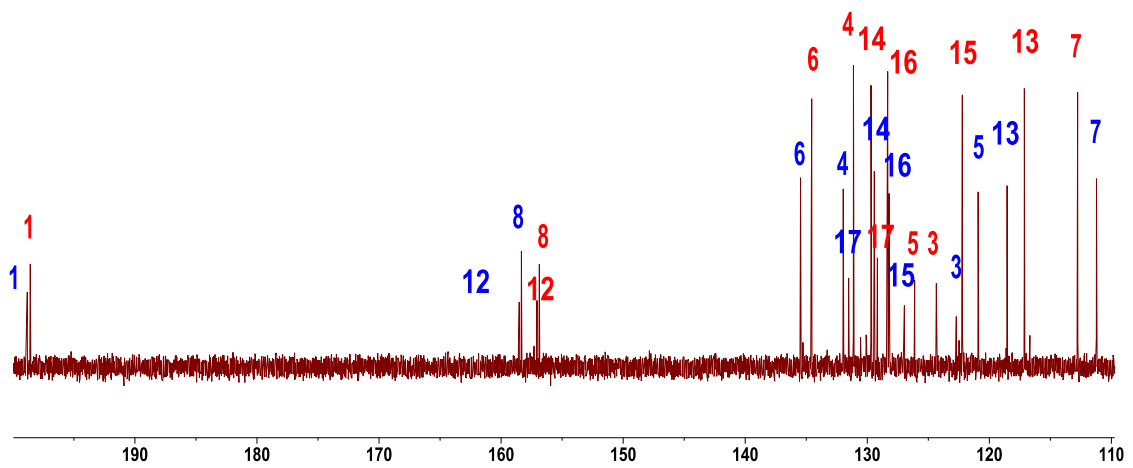
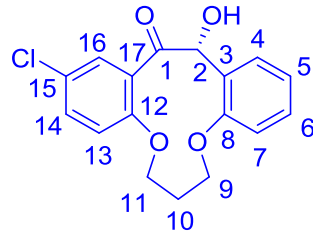
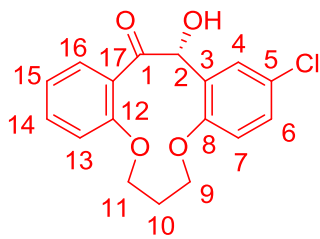
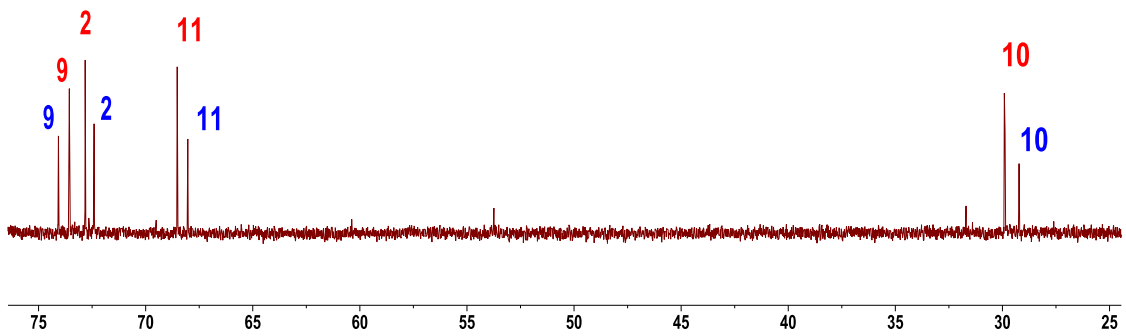
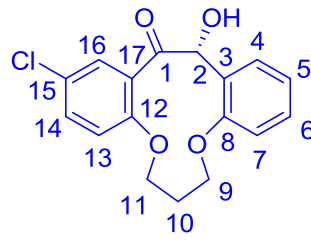
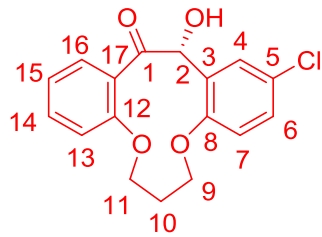
a)



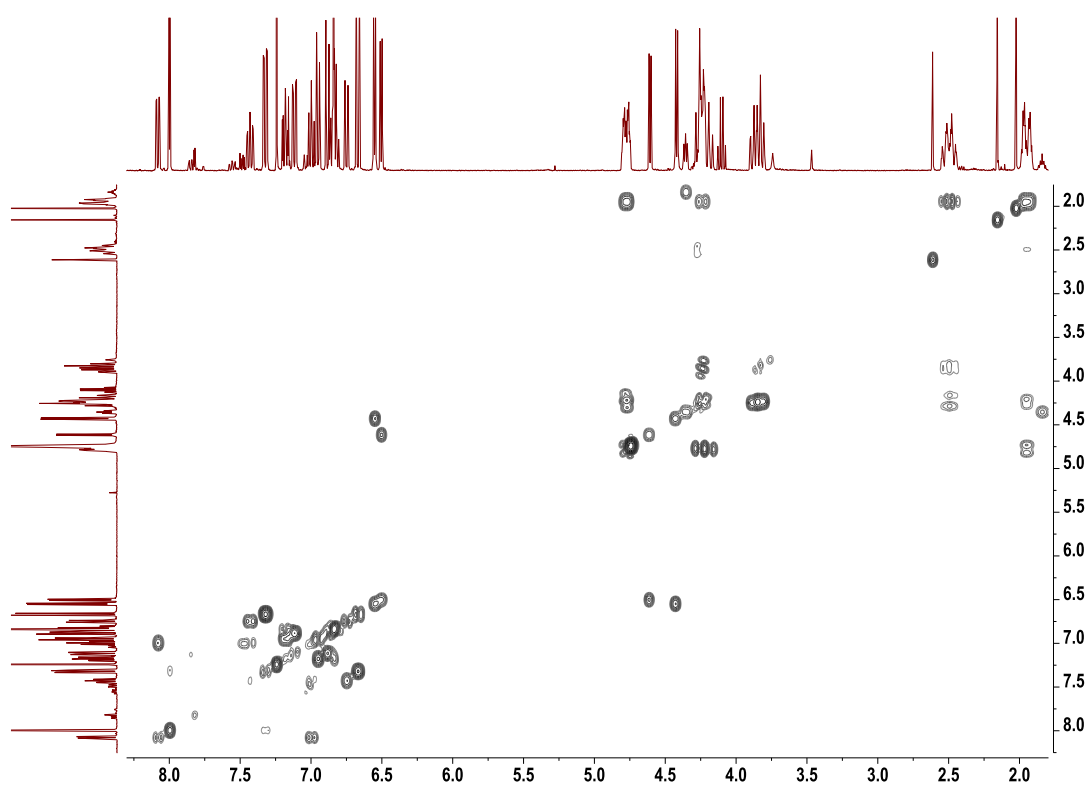


b)

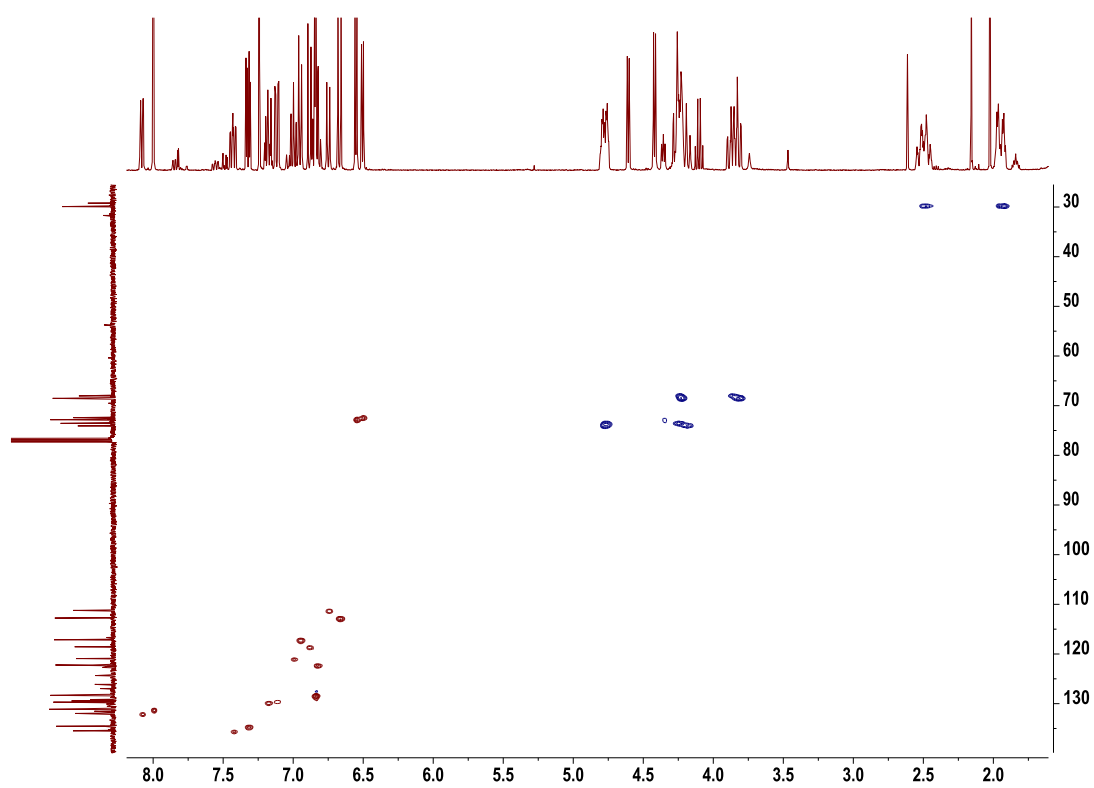




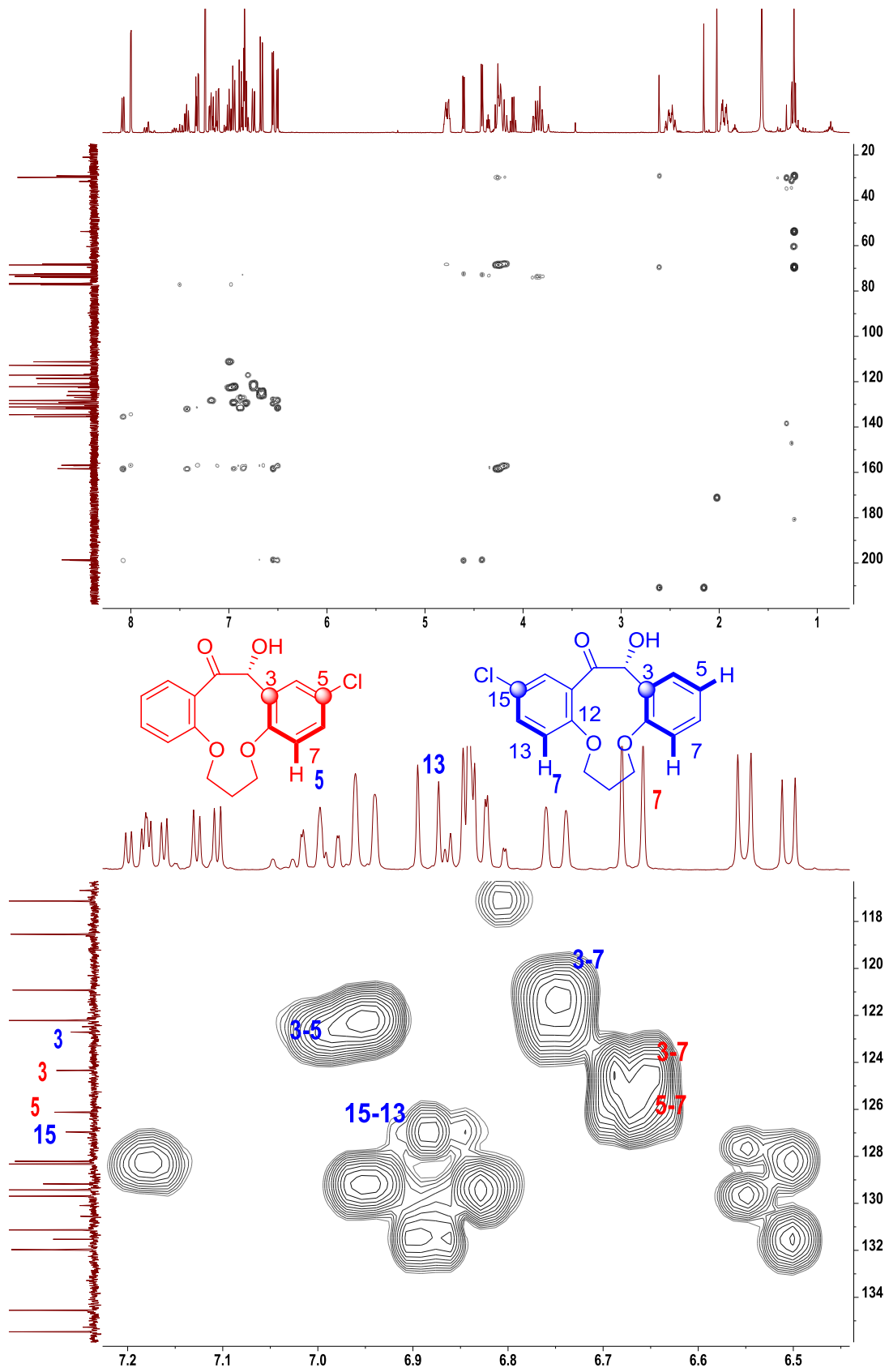
c)



d)



e)



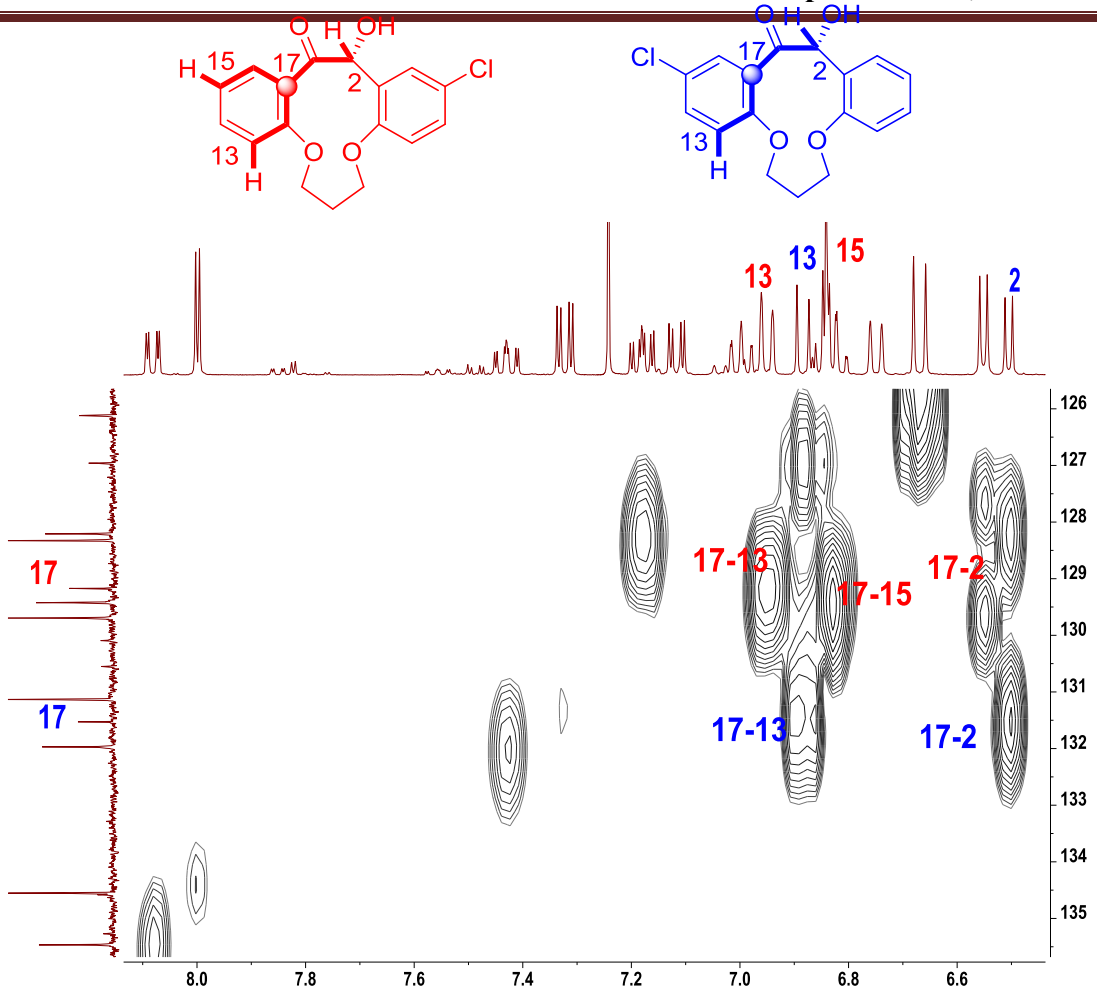
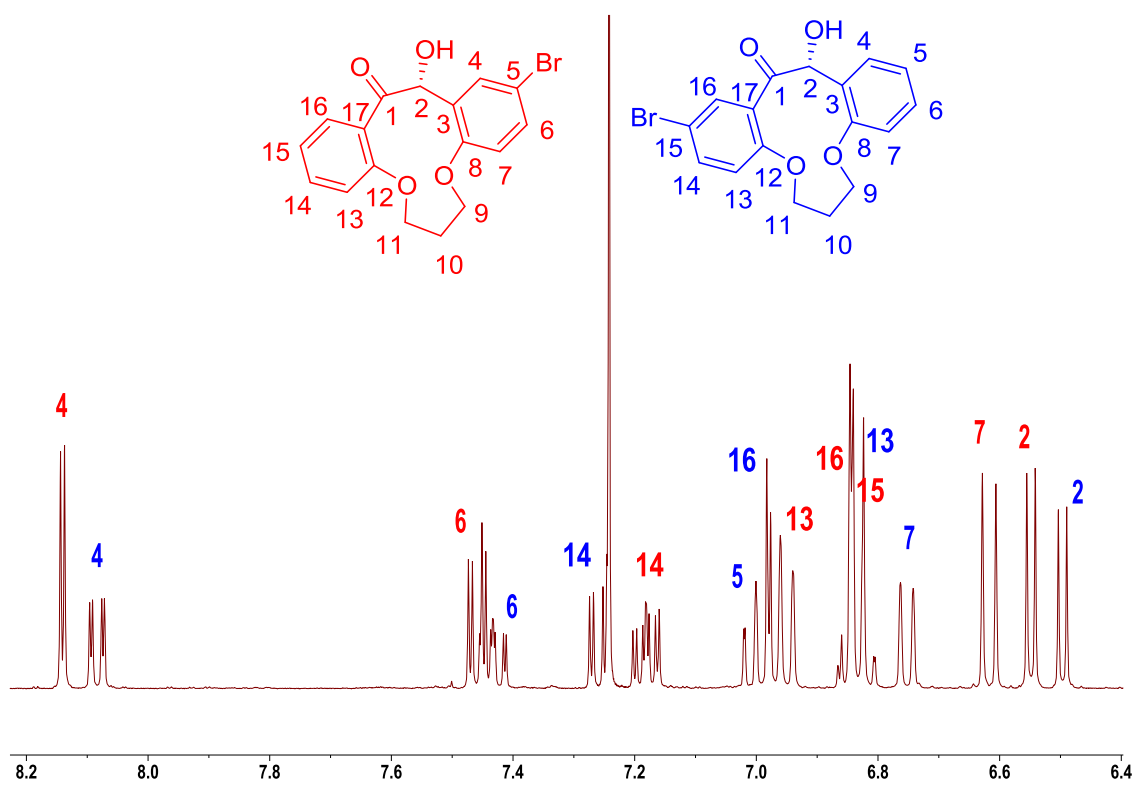
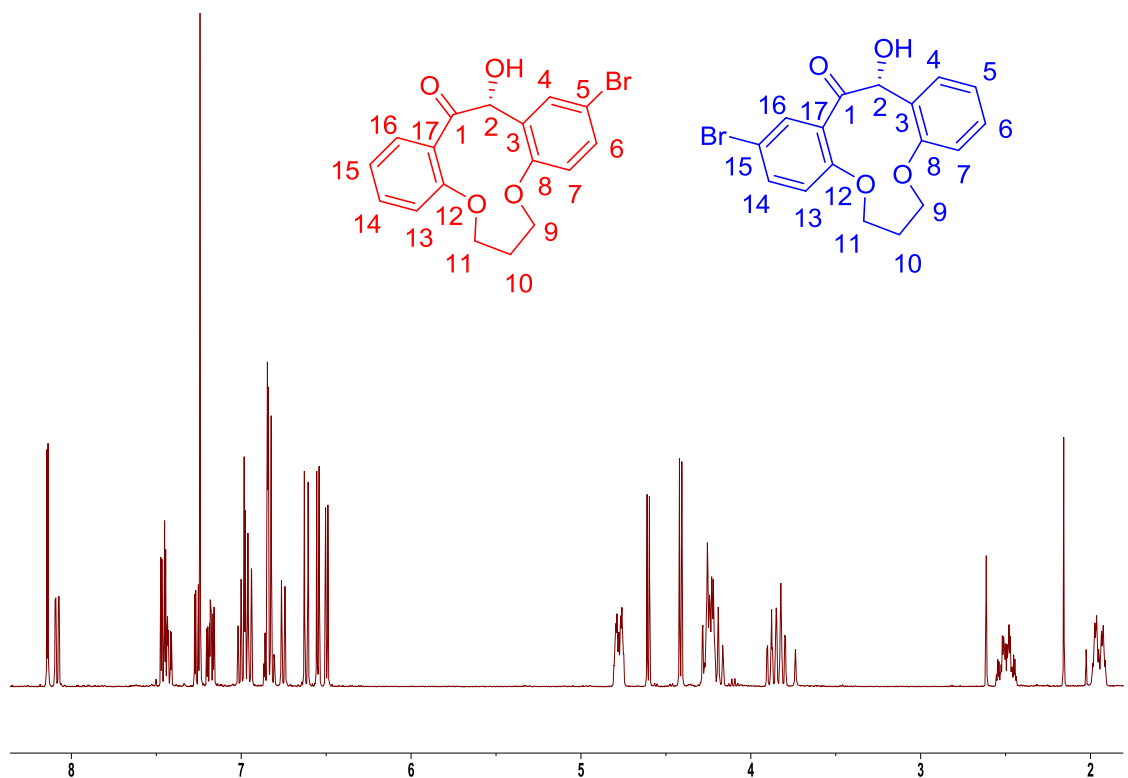
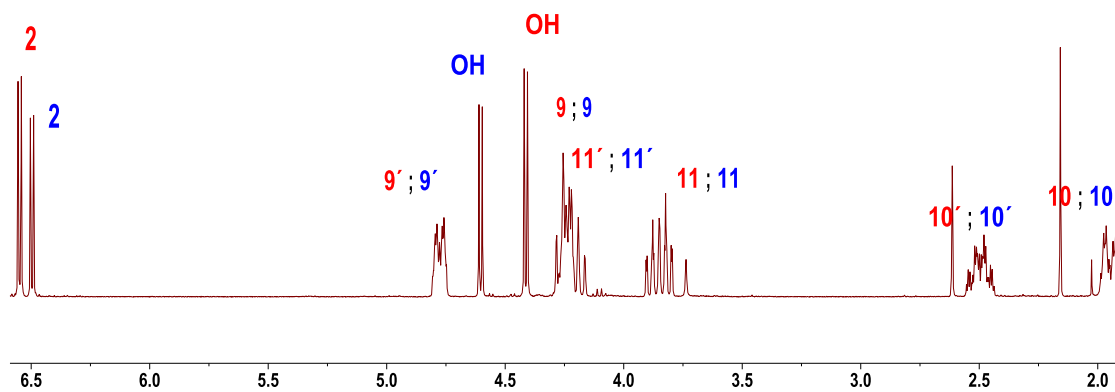
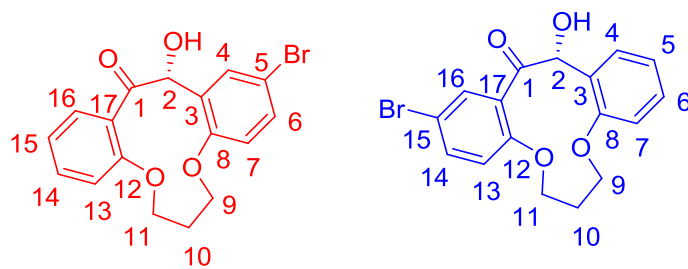


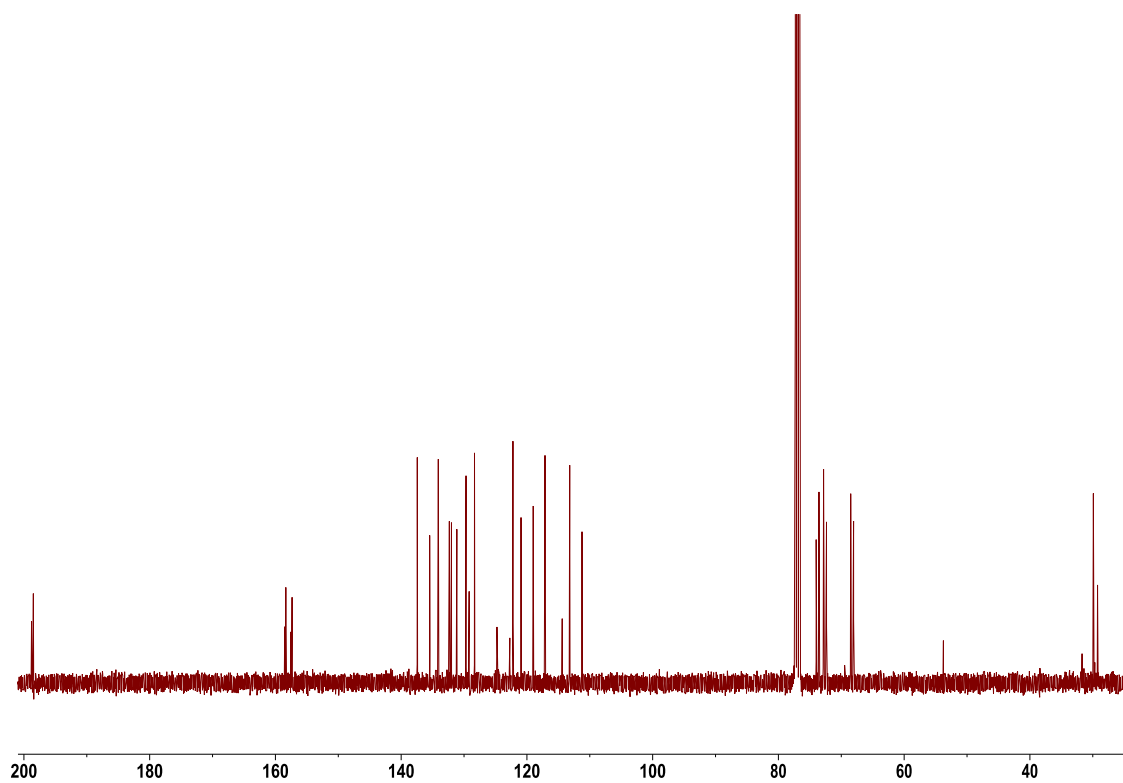
Figura39S(3.3) Espectros de RMN(CDCl₃) de **72e,f**: a) ¹H; b) ¹³C; c) 2D ¹H-¹H COSY; d) HSQC y e) HMBC.

a)

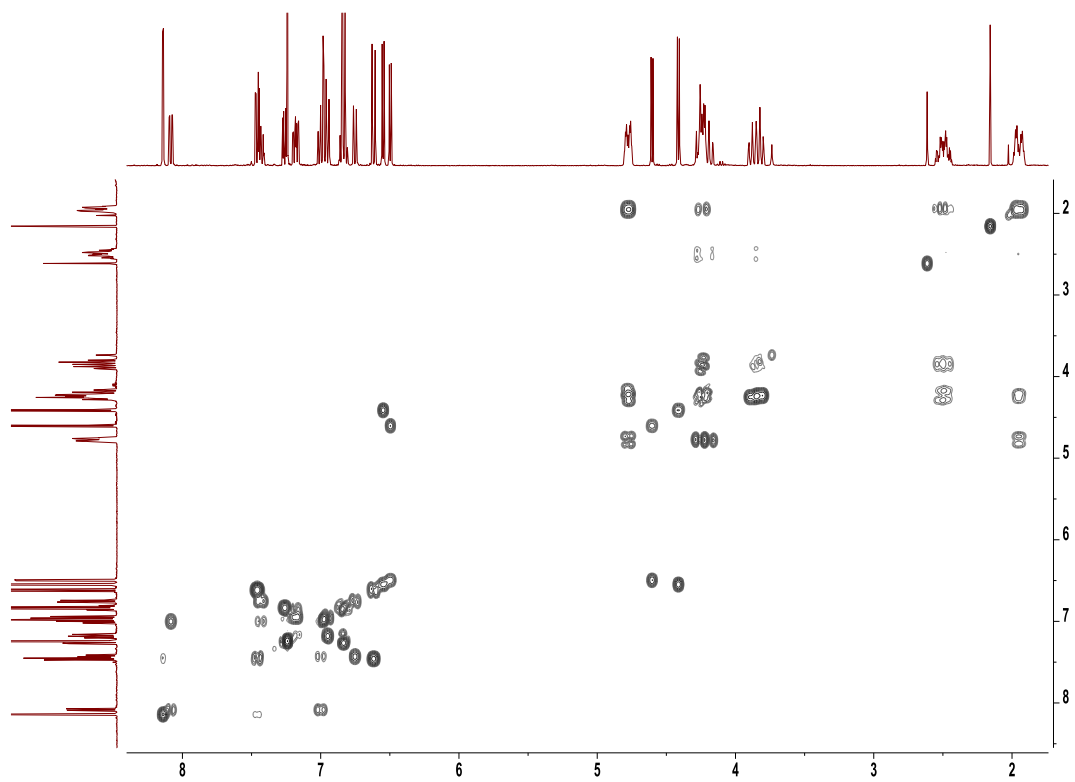




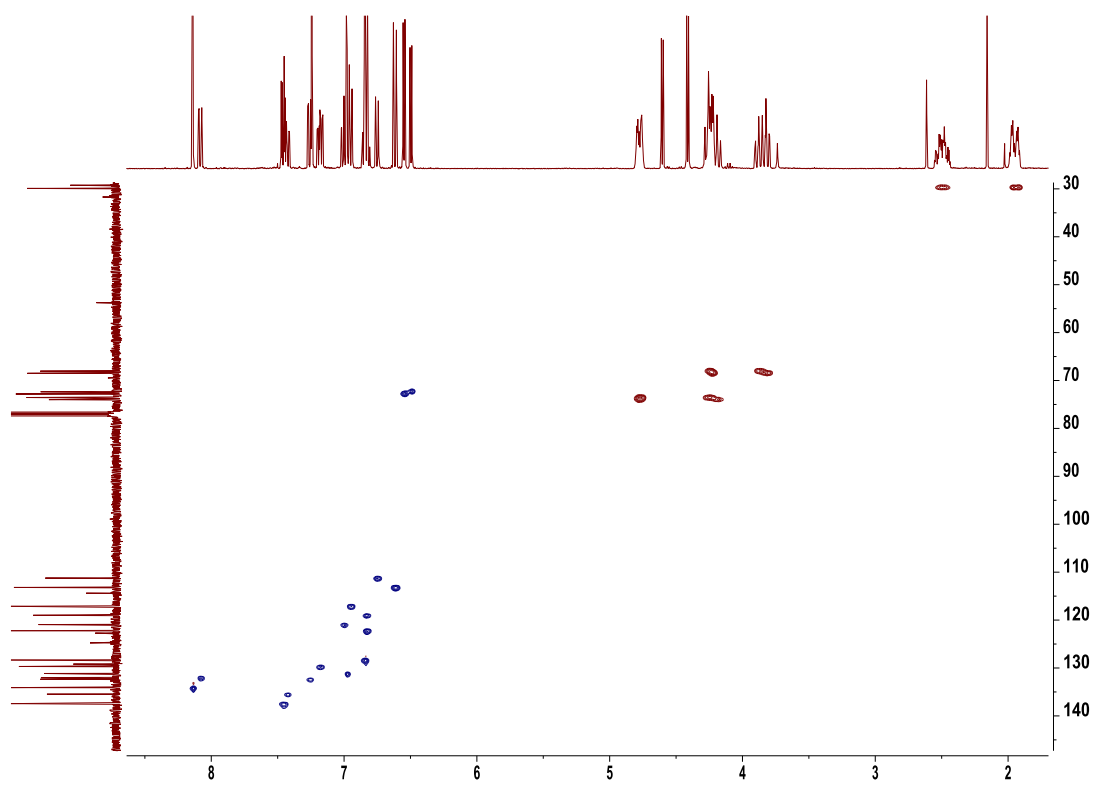
b)



c)



d)



e)

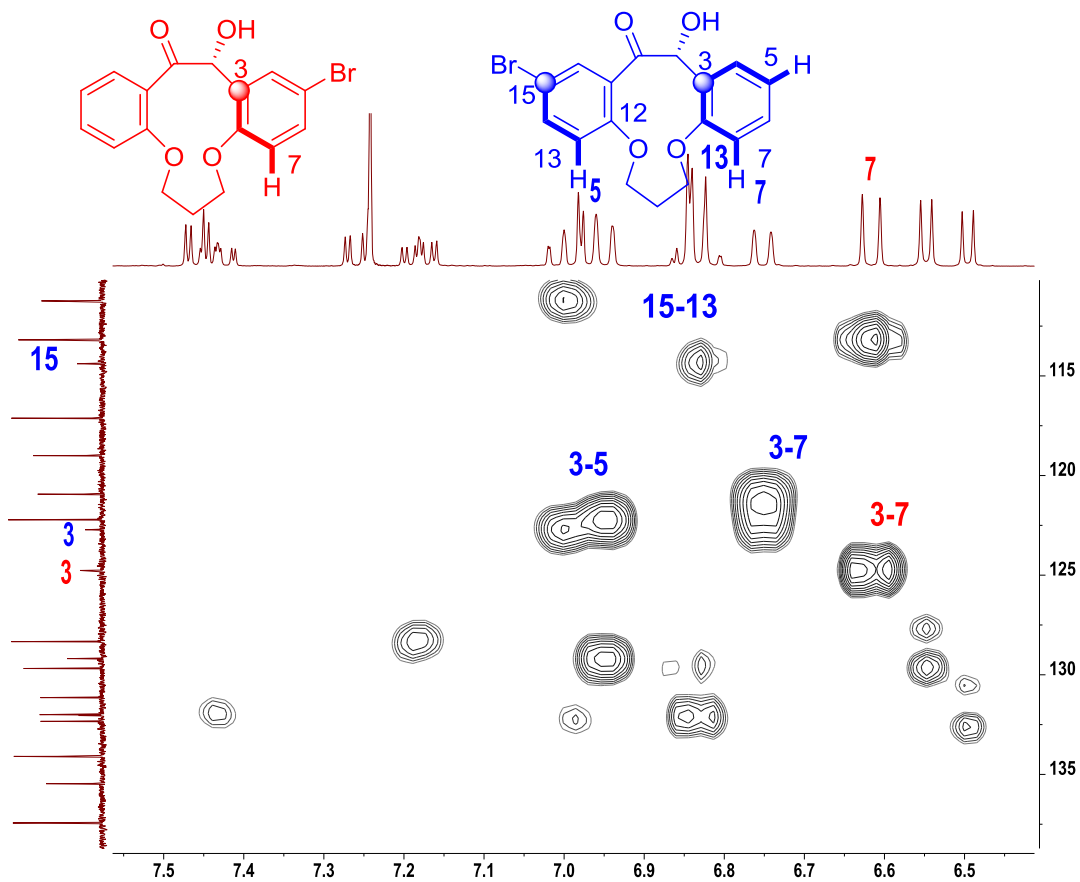
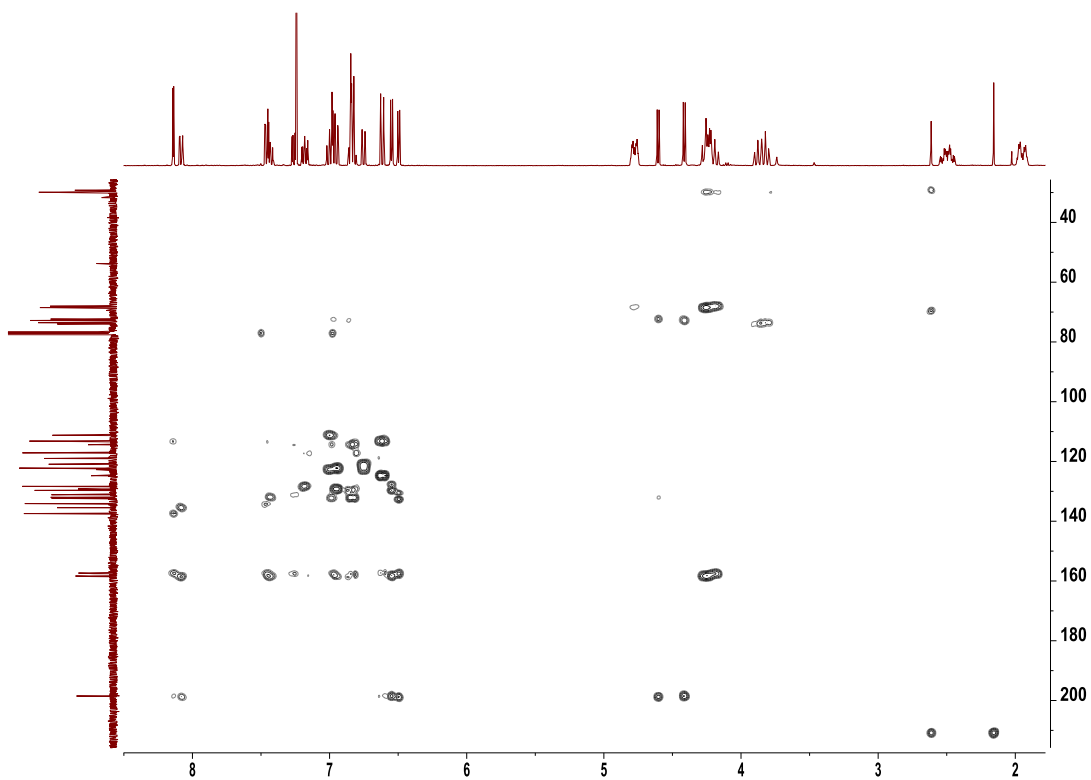
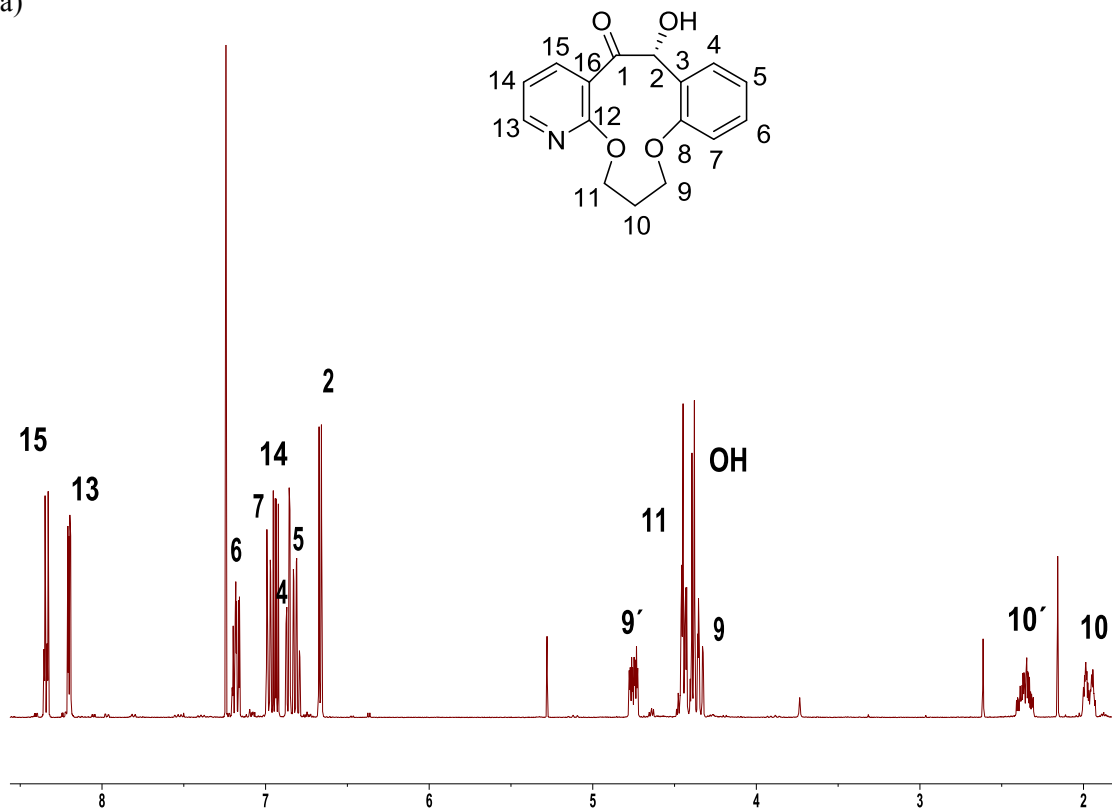
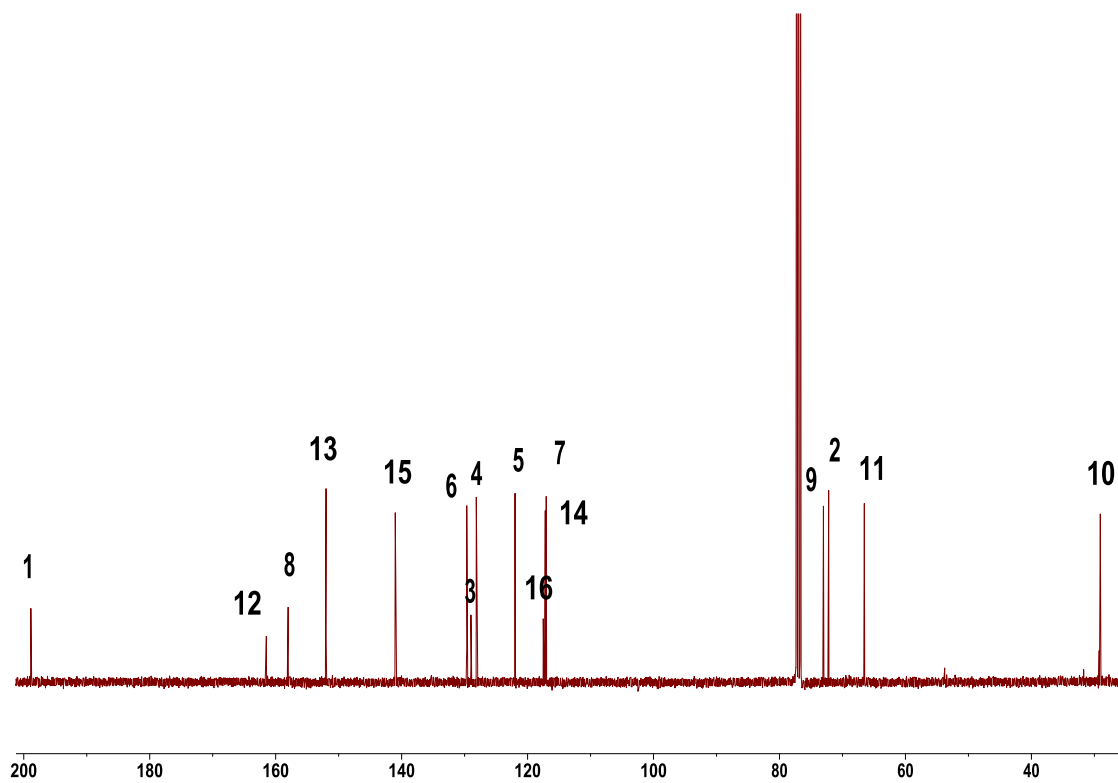


Figura40S(3.3) Espectros de RMN(CDCl₃) de **73e**: a) ¹H; b) ¹³C; c) 2D ¹H-¹H COSY; d) HSQC y e) HMBC.

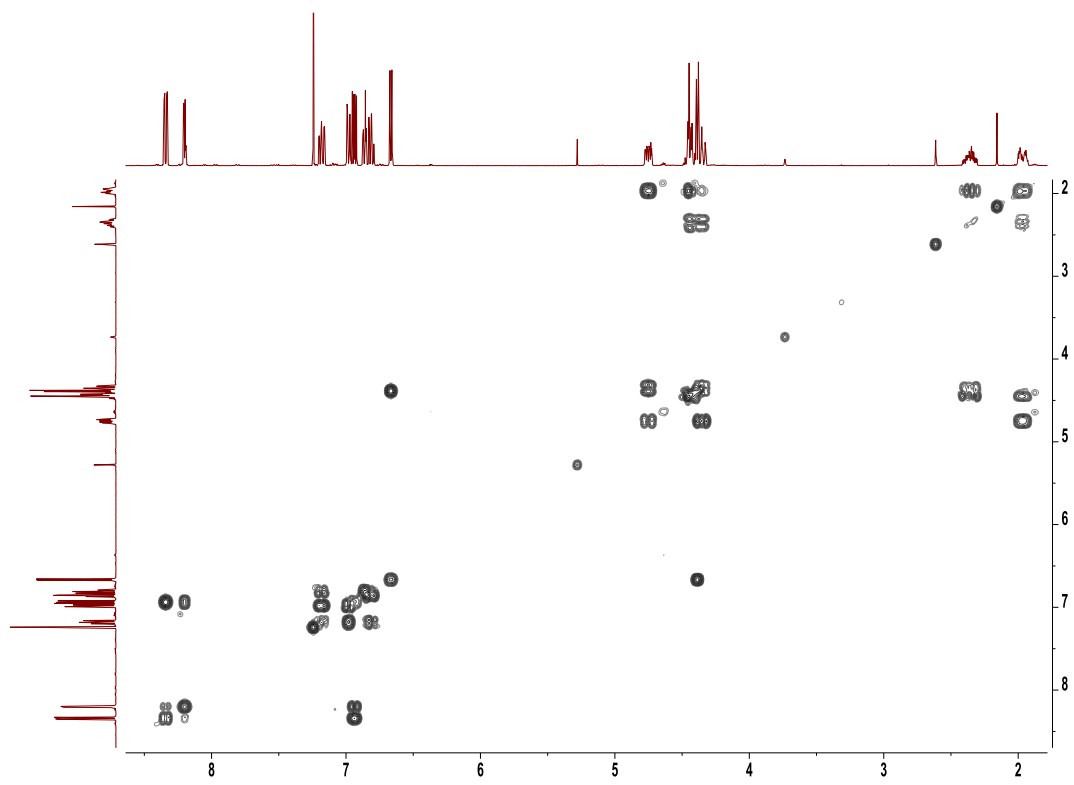
a)



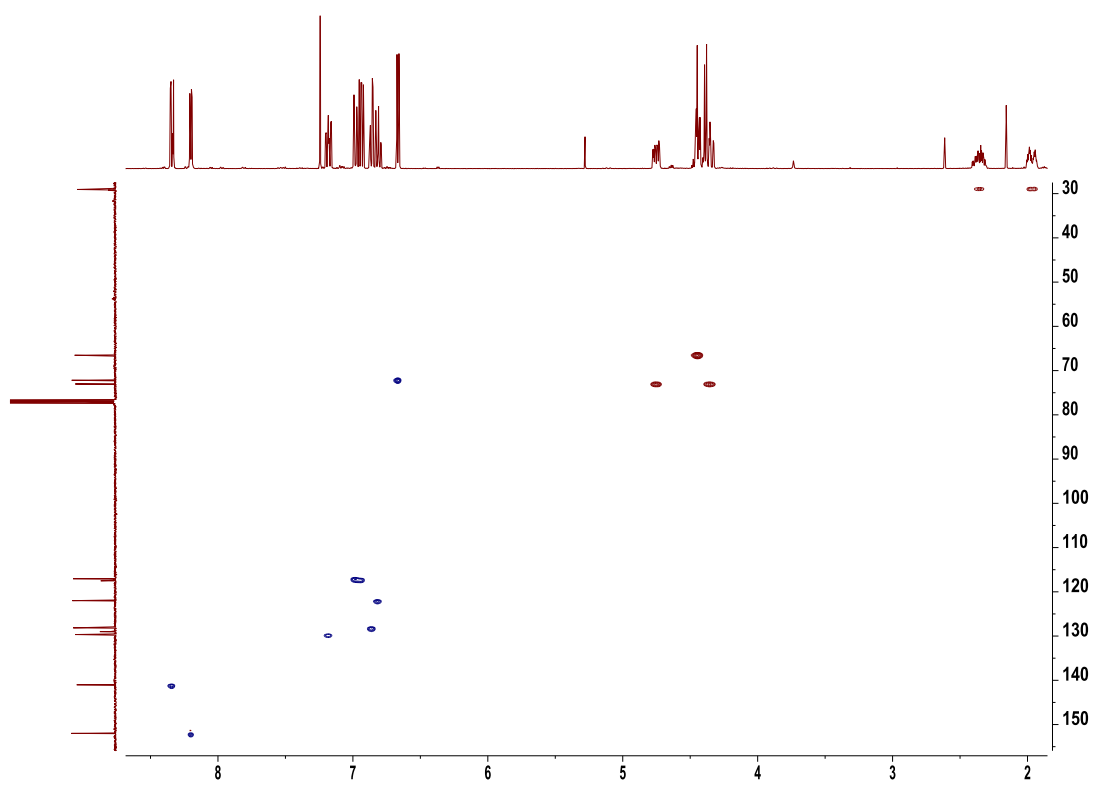
b)



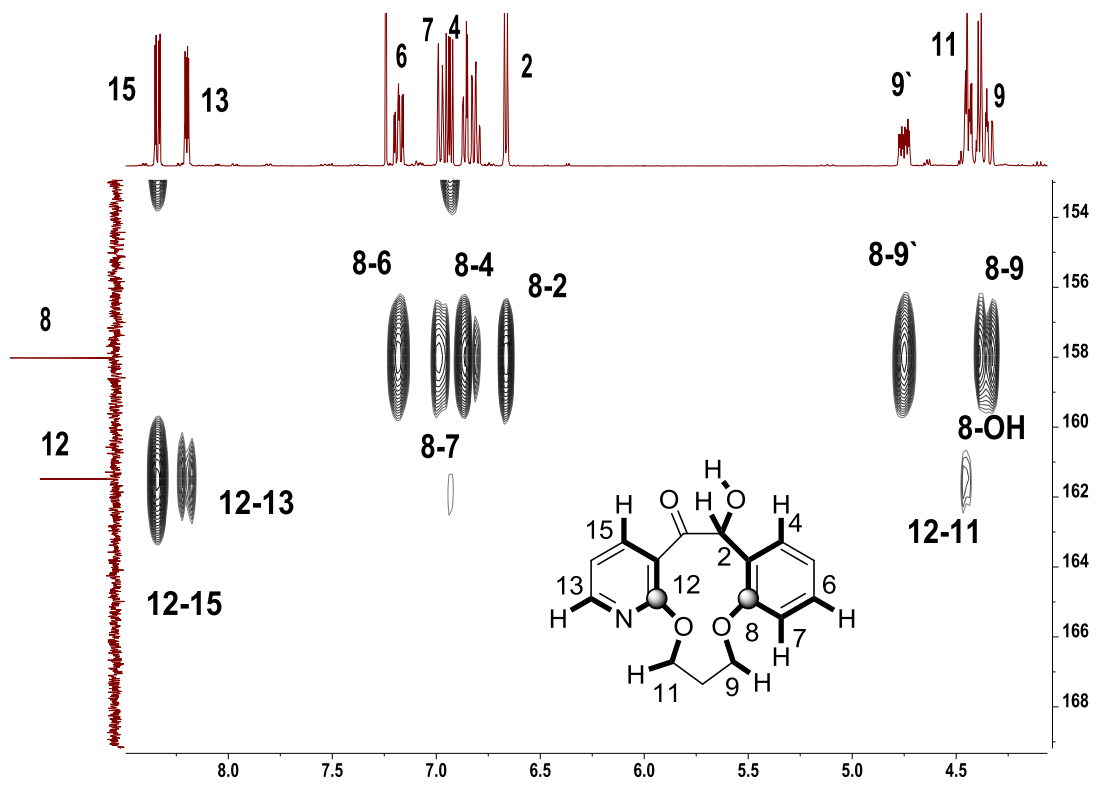
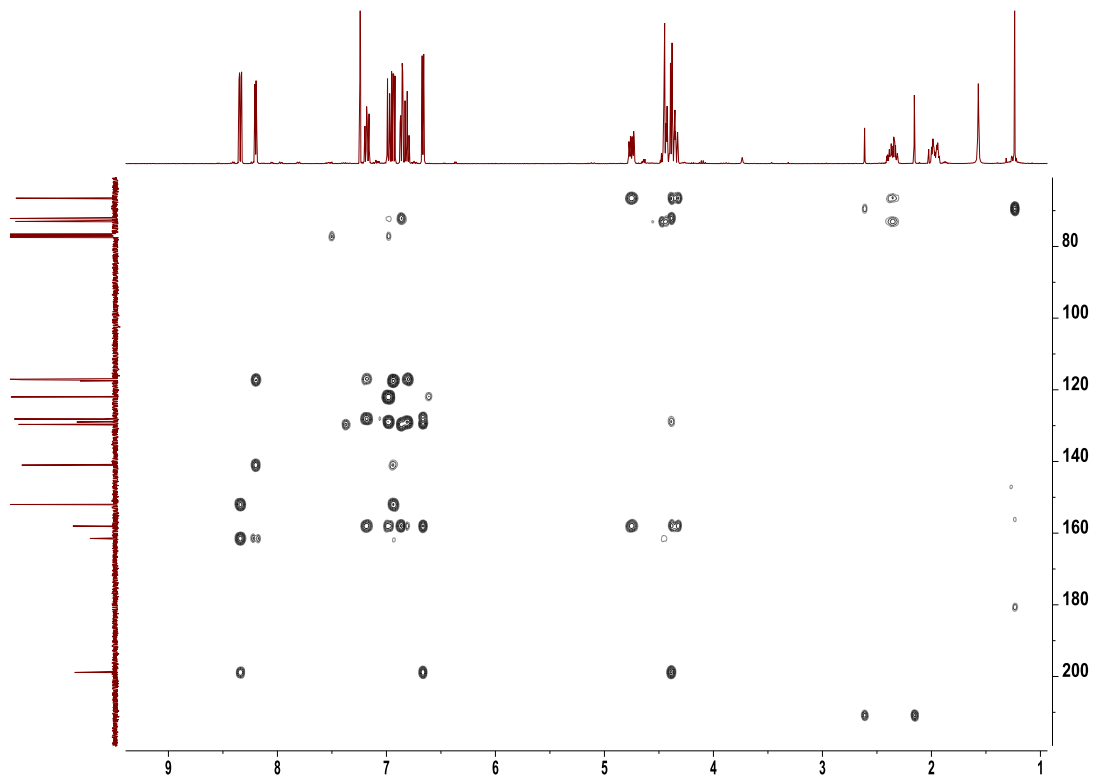
c)



d)



e)



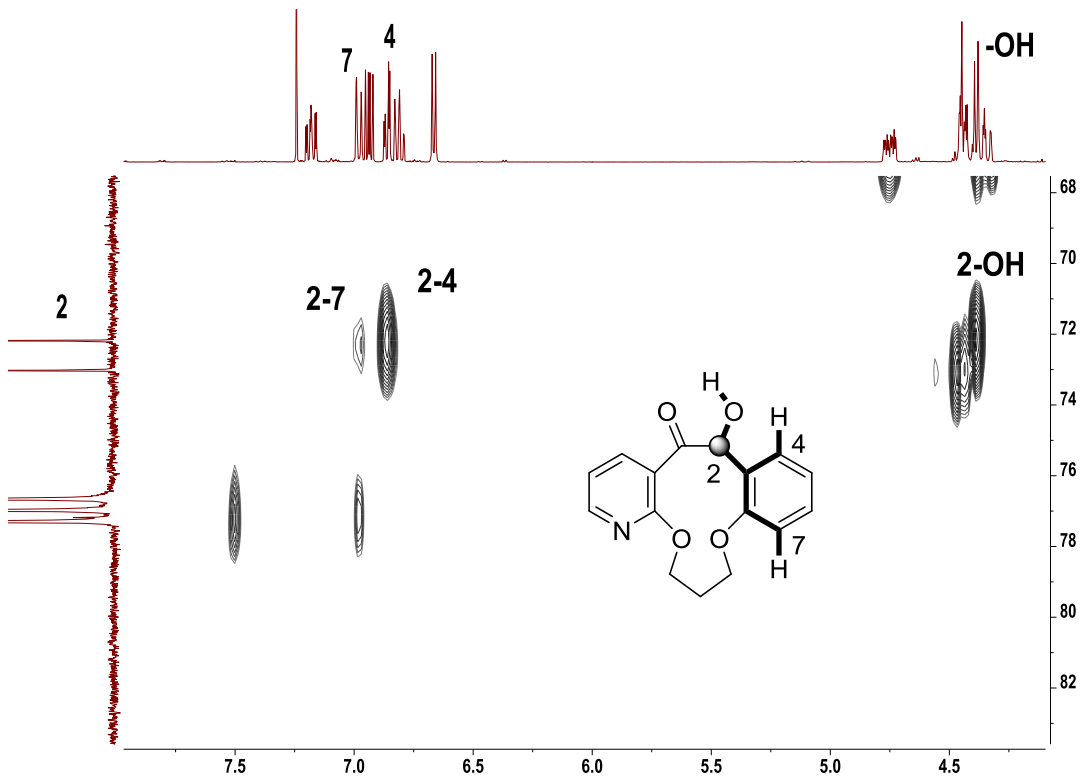
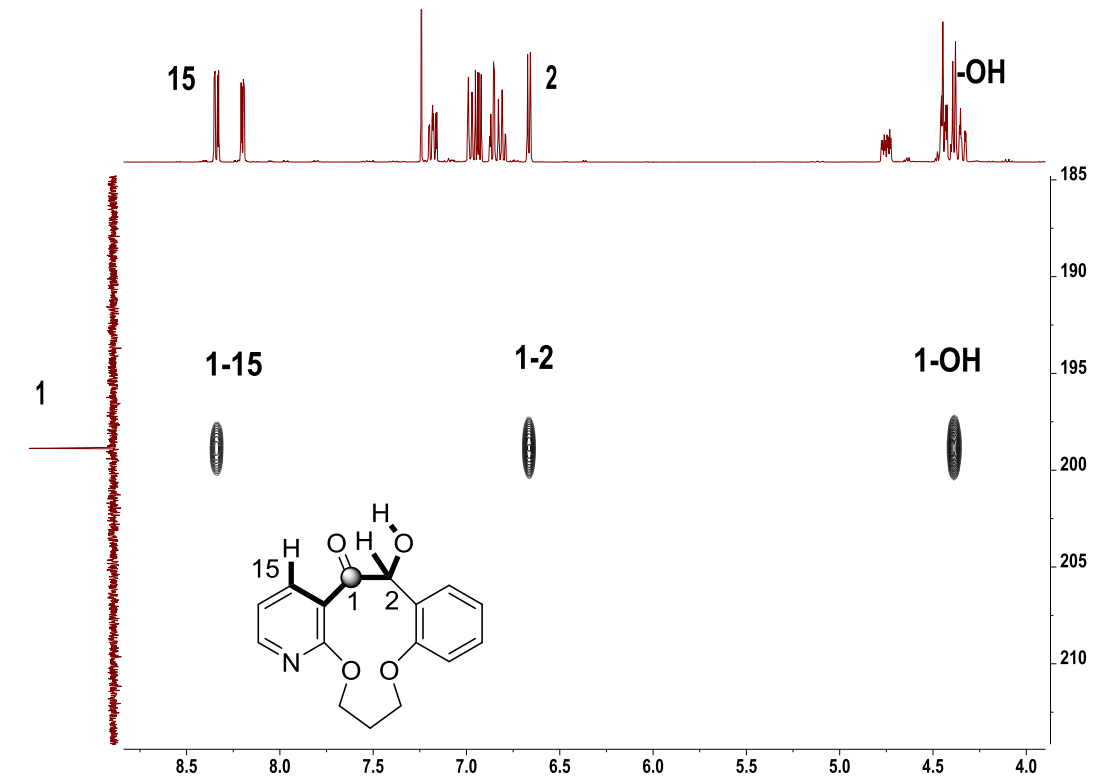
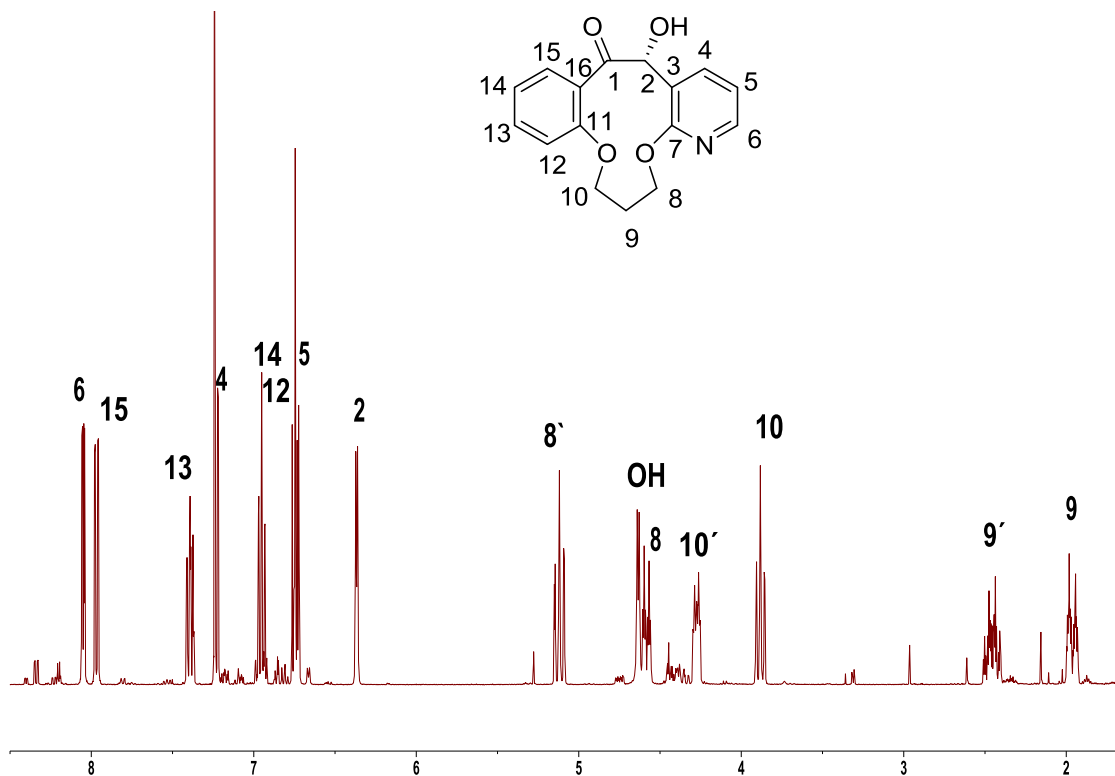
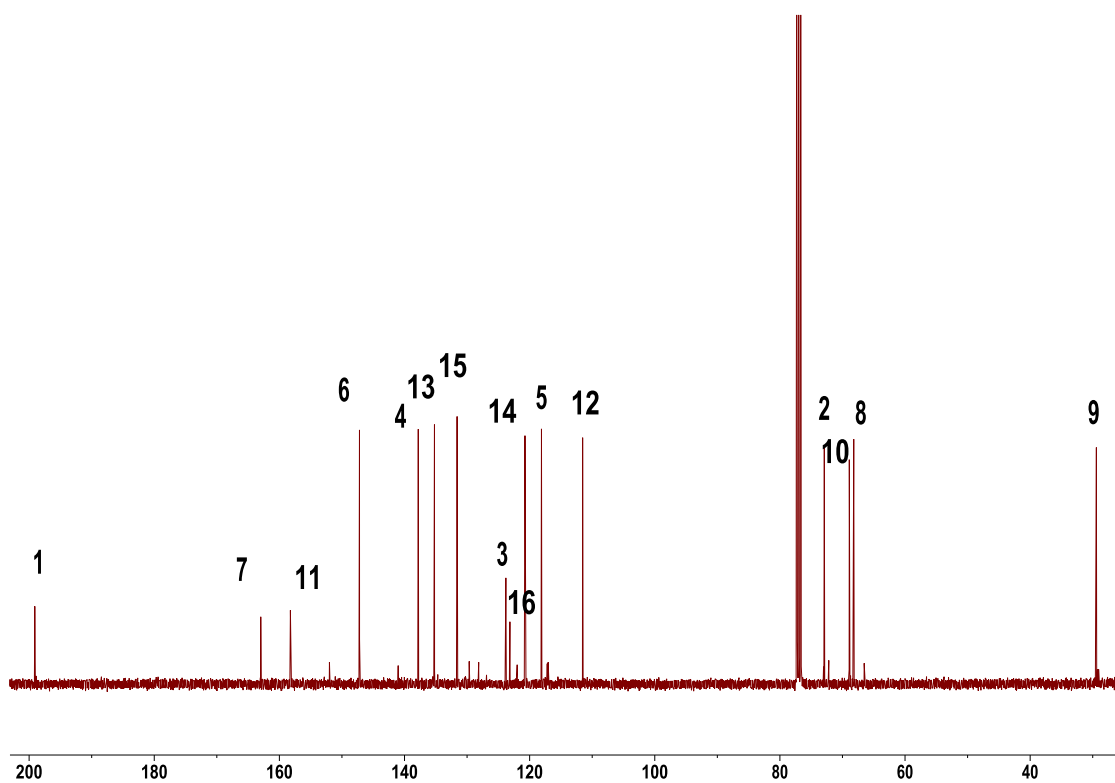


Figura41S(3.3) Espectros de RMN(CDCl₃) de **73f**: a) ¹H; b) ¹³C; c) 2D ¹H-¹H COSY; d) HSQC y e) HMBC.

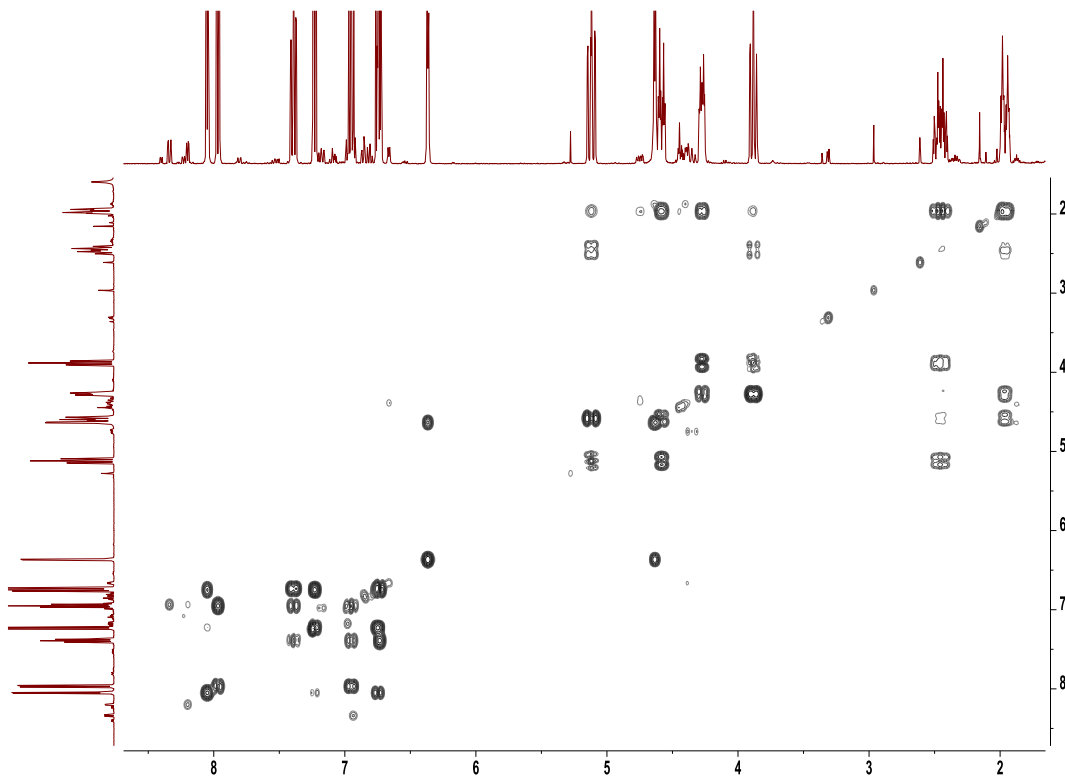
a)



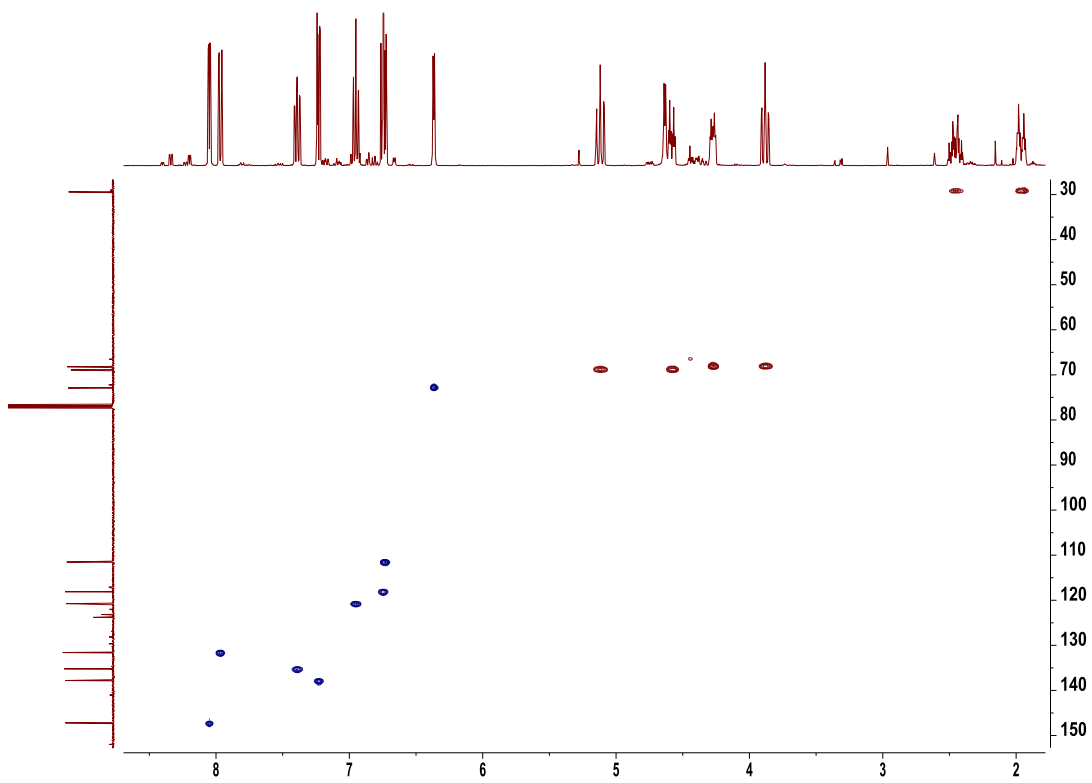
b)



c)



d)



e)

