

Supporting Information

Caffeic Acid Phosphanium Derivatives: Potential Selective Antitumor, Antimicrobial and Antiprotozoal Agents

Miloš Lukáč ¹, Livia Slobodníková ², Martin Mrva ³, Aneta Dušeková ³, Mária Garajová ³, Martin Kello ⁴, Dominika Šebová ⁴, Martin Pisárčik ¹, Marián Kojnok ¹, Andrej Vrták ¹, Elena Kurin ⁵ and Silvia Bittner Fialová ^{5,*}

¹ Department of Chemical Theory of Drugs, Faculty of Pharmacy, Comenius University Bratislava, Odbojárov 10, 832 32 Bratislava, Slovakia; lukac@fpharm.uniba.sk (M.L.); pisarcik@fpharm.uniba.sk (M.P.); mariankojнок219@gmail.com (M.K.); andrej1616@gmail.com (A.V.)

² Institute of Microbiology, Faculty of Medicine, Comenius University Bratislava, University Hospital in Bratislava, Sasinkova 4, 811 08 Bratislava, Slovakia; livia.slobodnikova@fmed.uniba.sk

³ Department of Zoology, Faculty of Natural Sciences, Comenius University Bratislava, Mlynská Dolina, Ilkovičova 6, 842 15 Bratislava, Slovakia; martin.mrva@uniba.sk (M.M.); aneta.dusekova@gmail.com (A.D.); maria.garajova@uniba.sk (M.G.)

⁴ Department of Pharmacology, Faculty of Medicine, P.J. Šafárik University, Trieda SNP 1, 040 11 Košice, Slovakia; martin.kello@upjs.sk (M.K.); dominika.sebova@student.upjs.sk (D.Š.)

⁵ Department of Pharmacognosy and Botany, Faculty of Pharmacy, Comenius University Bratislava, Odbojárov 10, 832 32 Bratislava, Slovakia; elena.kurin@uniba.sk

* Correspondence: fialova@fpharm.uniba.sk; Tel.: +421-250-117-206

Table of Contents

Figure S1. Chemical structure of CAP 6 (n = 3), CAP 8 (n = 4), CAP 10 (n = 5), CAP 12 (n = 6).....	3
Figure S2. ¹³ C NMR data of CAP 6 (in CDCl ₃)	4
Figure S3. ¹ H NMR data of CAP 6 (in CDCl ₃)	5
Figure S4. ³¹ P NMR data of CAP 6 (in CDCl ₃)	6
Figure S5. ¹³ C NMR data of CAP 8 (in CDCl ₃)	7
Figure S6. ¹ H NMR data of CAP 8 (in CDCl ₃)	8
Figure S7. ³¹ P NMR data of CAP 8 (in CDCl ₃)	9
Figure S8. ¹³ C NMR data of CAP 10 (in CDCl ₃)	10
Figure S9. ¹ H NMR data of CAP 10 (in CDCl ₃)	11
Figure S10. ³¹ P NMR data of CAP 10 (in CDCl ₃)	12
Figure S11. ¹³ C NMR data of CAP 12 (in CDCl ₃)	13
Figure S12. ¹ H NMR data of CAP 12 (in CDCl ₃)	14
Figure S13. ³¹ P NMR data of CAP 12 (in CDCl ₃)	15
Figure S14. ¹³ C NMR data of CAP 6 ester (in CDCl ₃)	16
Figure S15. ¹ H NMR data of CAP 6 ester (in CDCl ₃)	17
Figure S16. ¹³ C NMR data of CAP 8 ester (in CDCl ₃)	18
Figure S17. ¹ H NMR data of CAP 8 ester (in CDCl ₃)	19
Figure S18. ¹³ C NMR data of CAP 10 ester (in CDCl ₃)	20
Figure S19. ¹ H NMR data of CAP 10 ester (in CDCl ₃)	21
Figure S20. ¹³ C NMR data of CAP 12 ester (in CDCl ₃)	22
Figure S21. ¹ H NMR data of CAP 12 ester (in CDCl ₃)	23
Figure S22. HPLC-DAD data of CAP 6 (60% H ₂ O + 0.05% TFA/40% ACN + 0.05% TFA) at λ = 254 nm	24
Figure S23. HPLC-DAD data of CAP 8 (60% H ₂ O + 0.05% TFA/40% ACN + 0.05% TFA) at λ = 254 nm	25
Figure S24. HPLC-DAD data of CAP 10 (60% H ₂ O + 0.05% TFA/40% ACN + 0.05% TFA) at λ = 254 nm	26
Figure S25. HPLC-DAD data of CAP 12 (60% H ₂ O + 0.05% TFA/40% ACN + 0.05% TFA) at λ = 254 nm	27

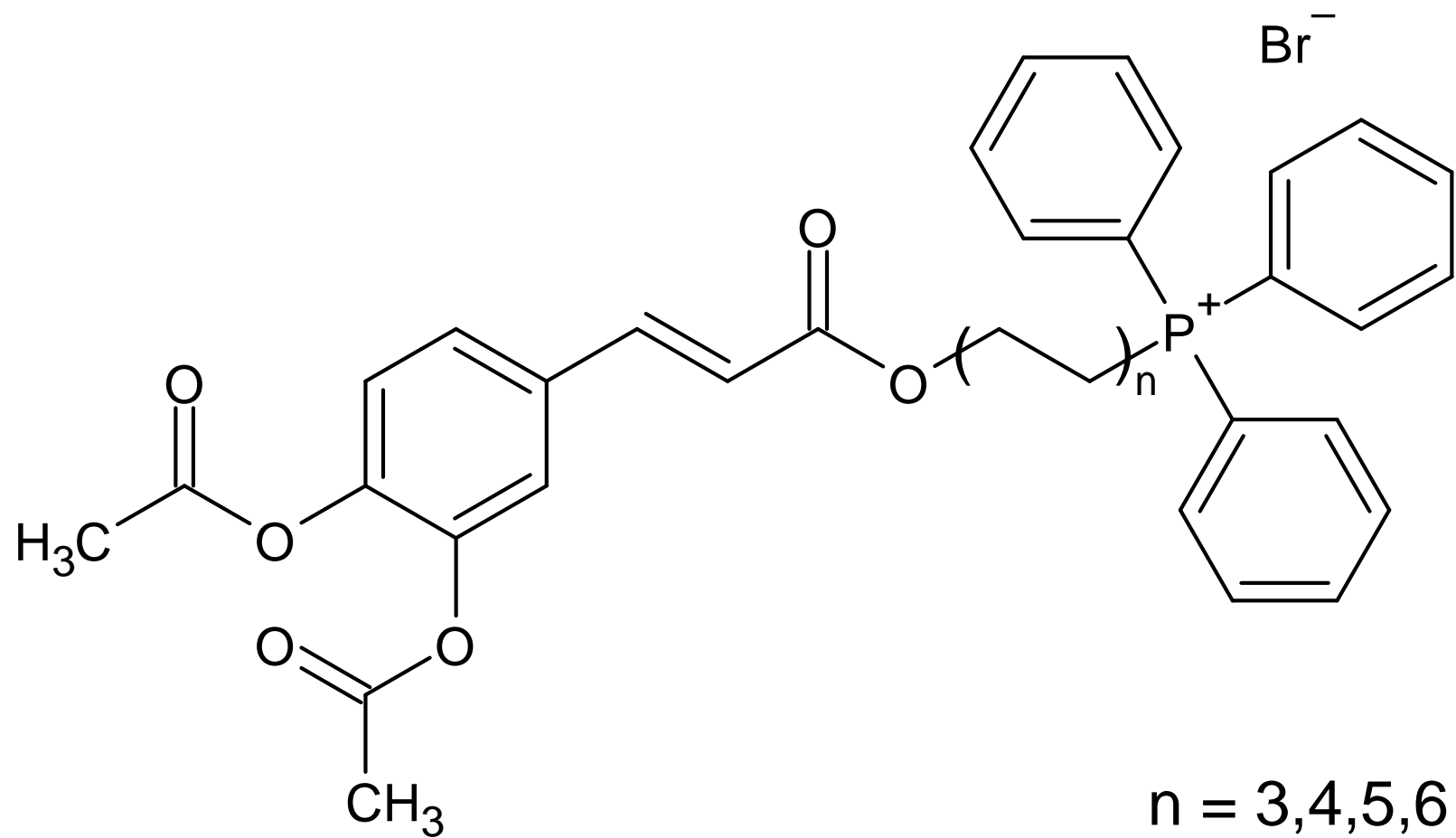


Figure S1. Chemical structure of CAP 6 ($n = 3$), CAP 8 ($n = 4$), CAP 10 ($n = 5$), CAP 12 ($n = 6$)

¹³C NMR, 100 MHz, AutoX_DB
AVMK-6TPP
CDCl₃
02 Aug 2019

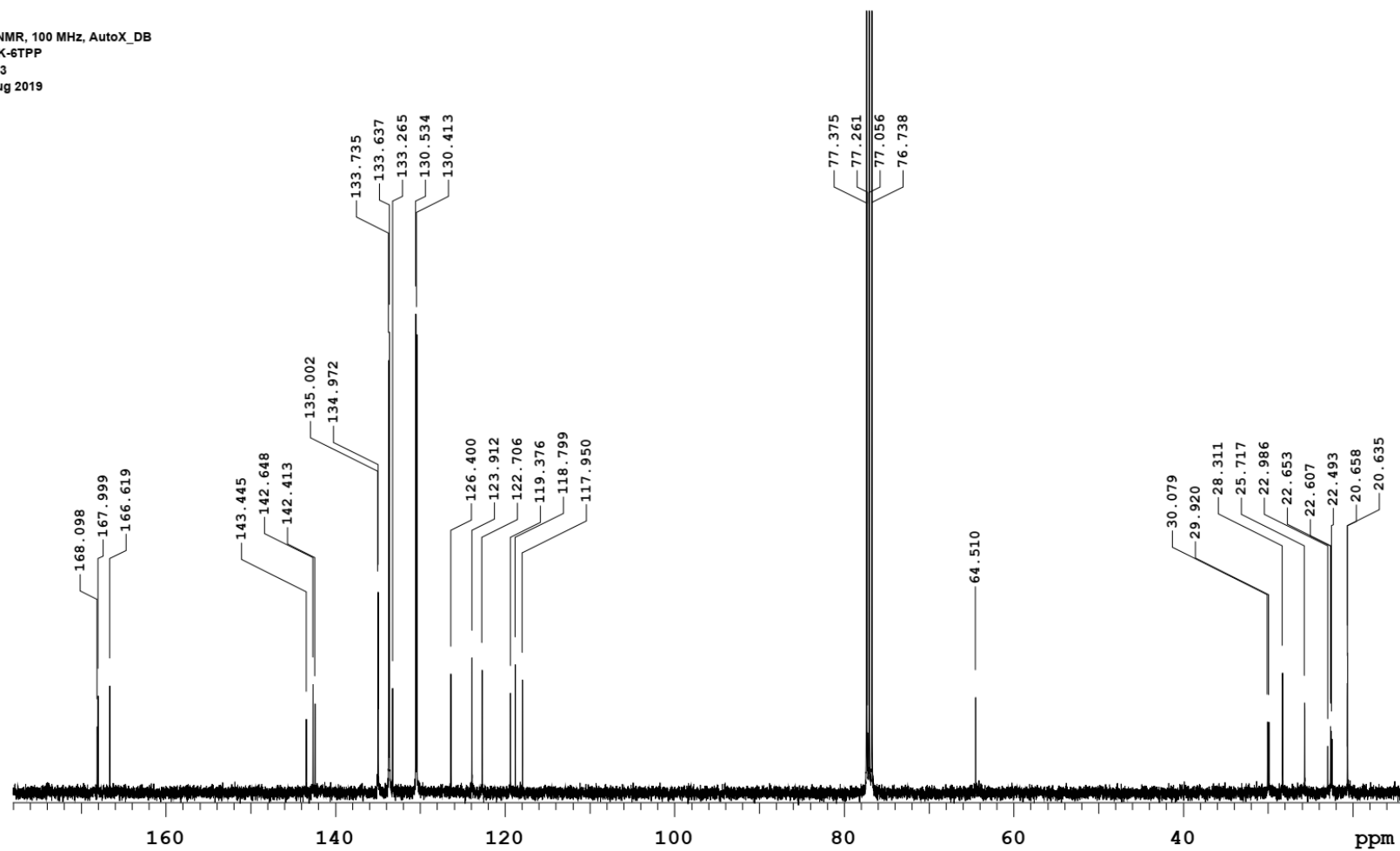


Figure S2. ¹³C NMR data of CAP 6 (in CDCl₃)

1H NMR, 400 MHz, AutoX_DB
AVMK-6TPP
CDCl₃
02 Aug 2019

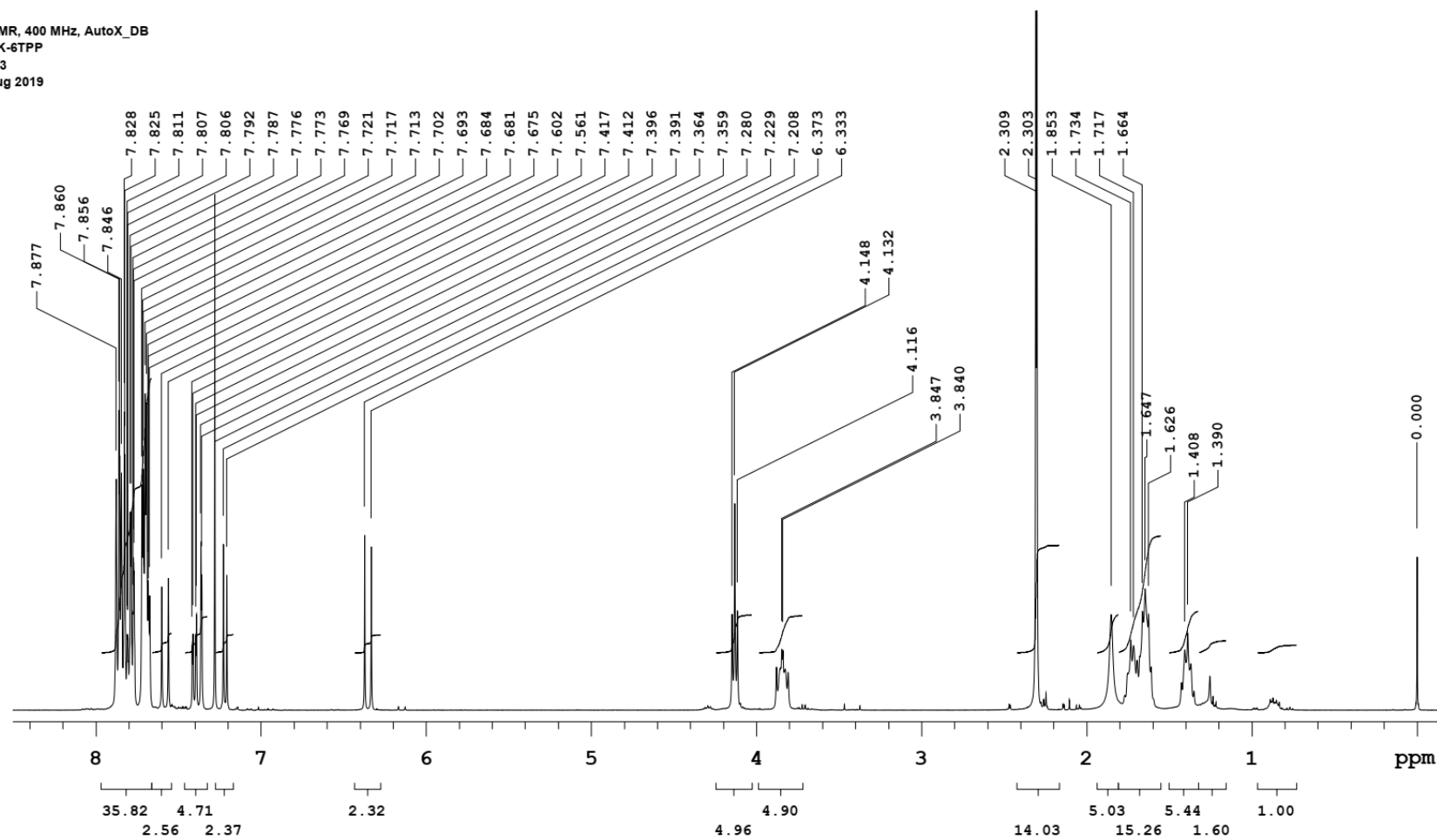


Figure S3. ¹H NMR data of CAP 6 (in CDCl₃)

31P NMR, 162 MHz, AutoX_DB
AVMK-6TPP
CDCl₃
02 Aug 2019

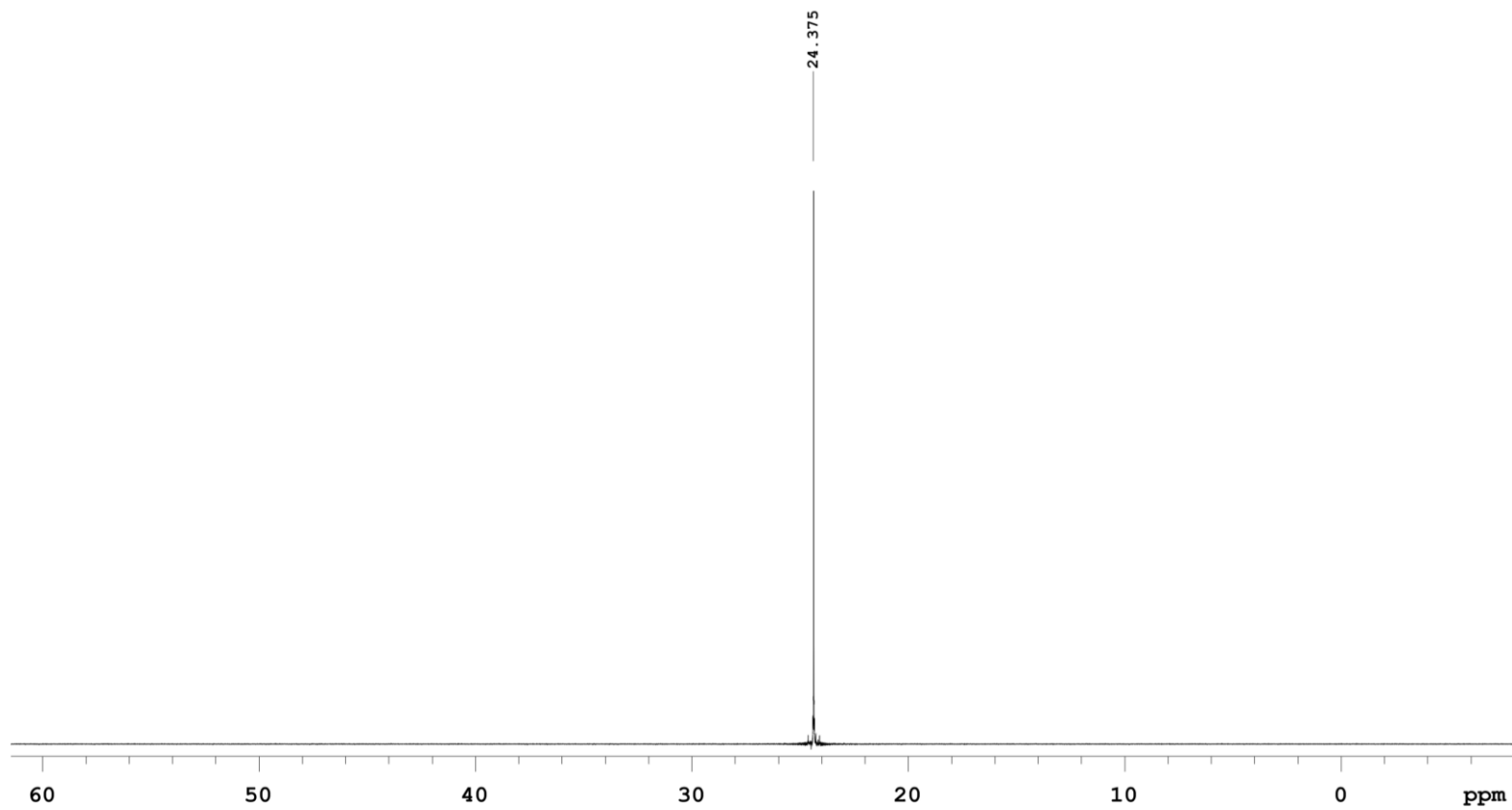


Figure S4. ³¹P NMR data of CAP 6 (in CDCl₃)

¹³C NMR, 75 MHz
AVMK-8TPP
CDCl₃
20 Jul 2018

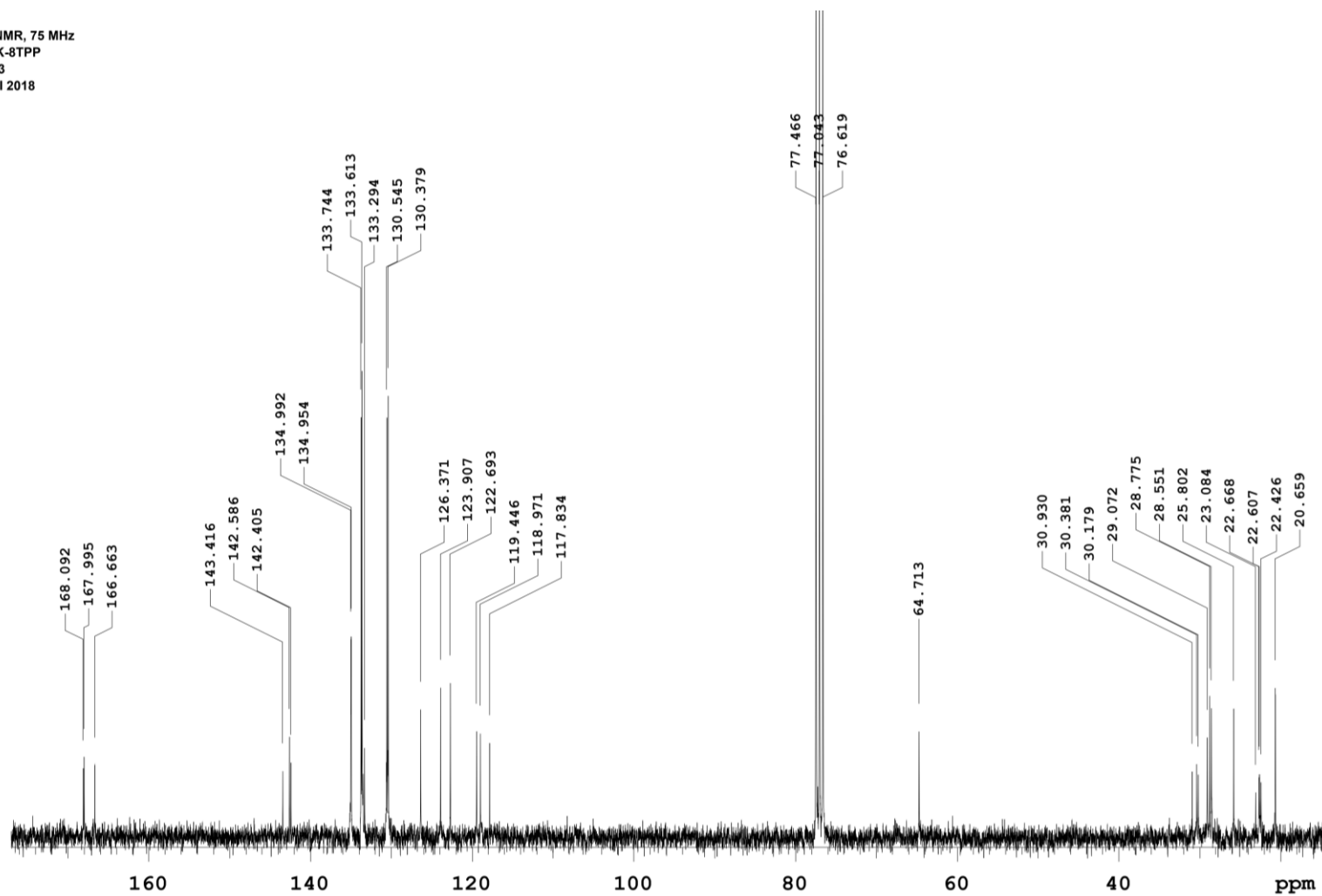


Figure S5. ¹³C NMR data of CAP 8 (in CDCl₃)

¹H NMR, 300 MHz
 AVMK-8TPP
 CDCl₃
 20 Jul 2018

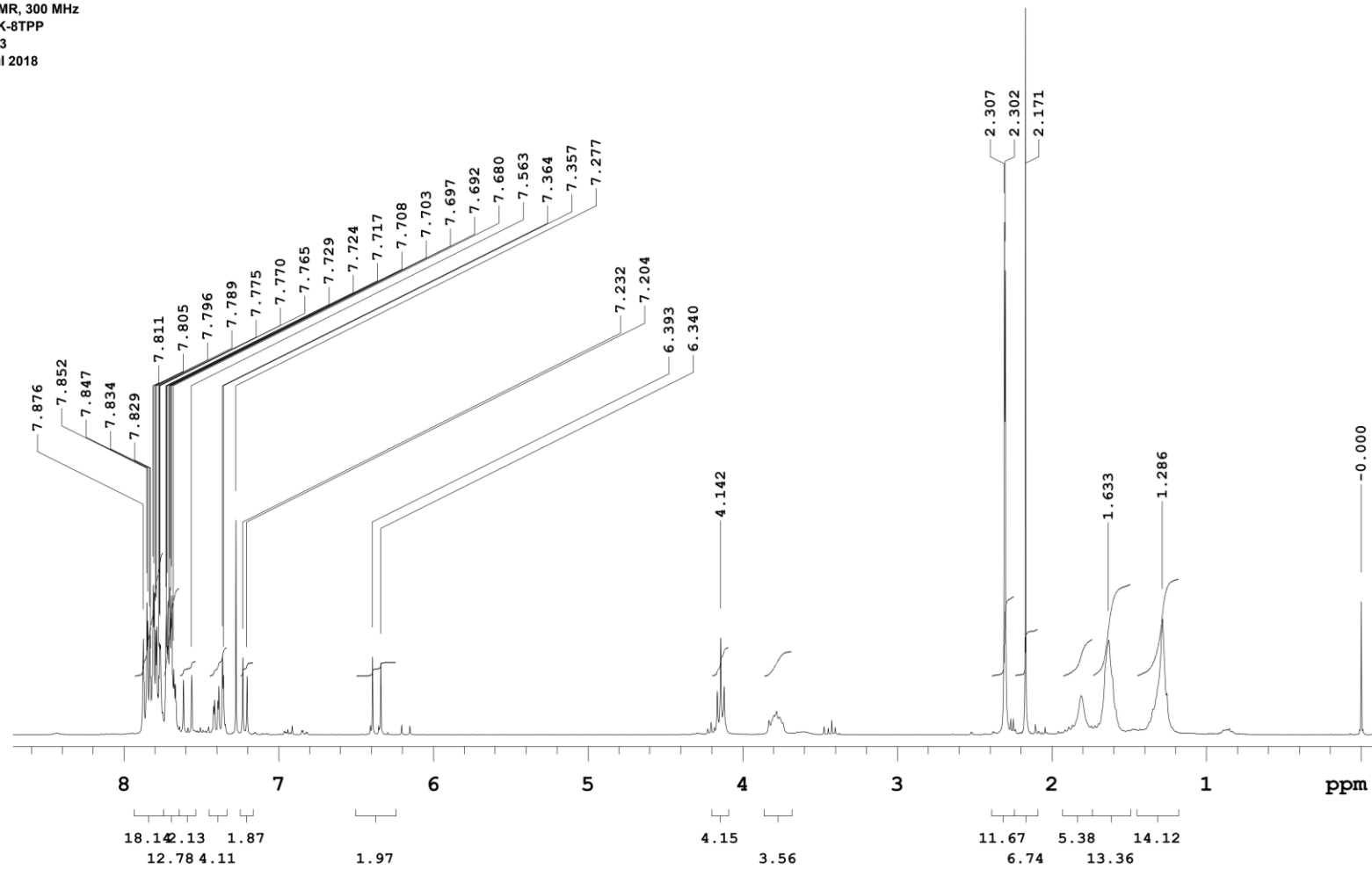


Figure S6. ¹H NMR data of CAP 8 (in CDCl₃)

31P NMR, 121.47 MHz
AVMK-8TPP
CDCl₃
20 Jul 2018

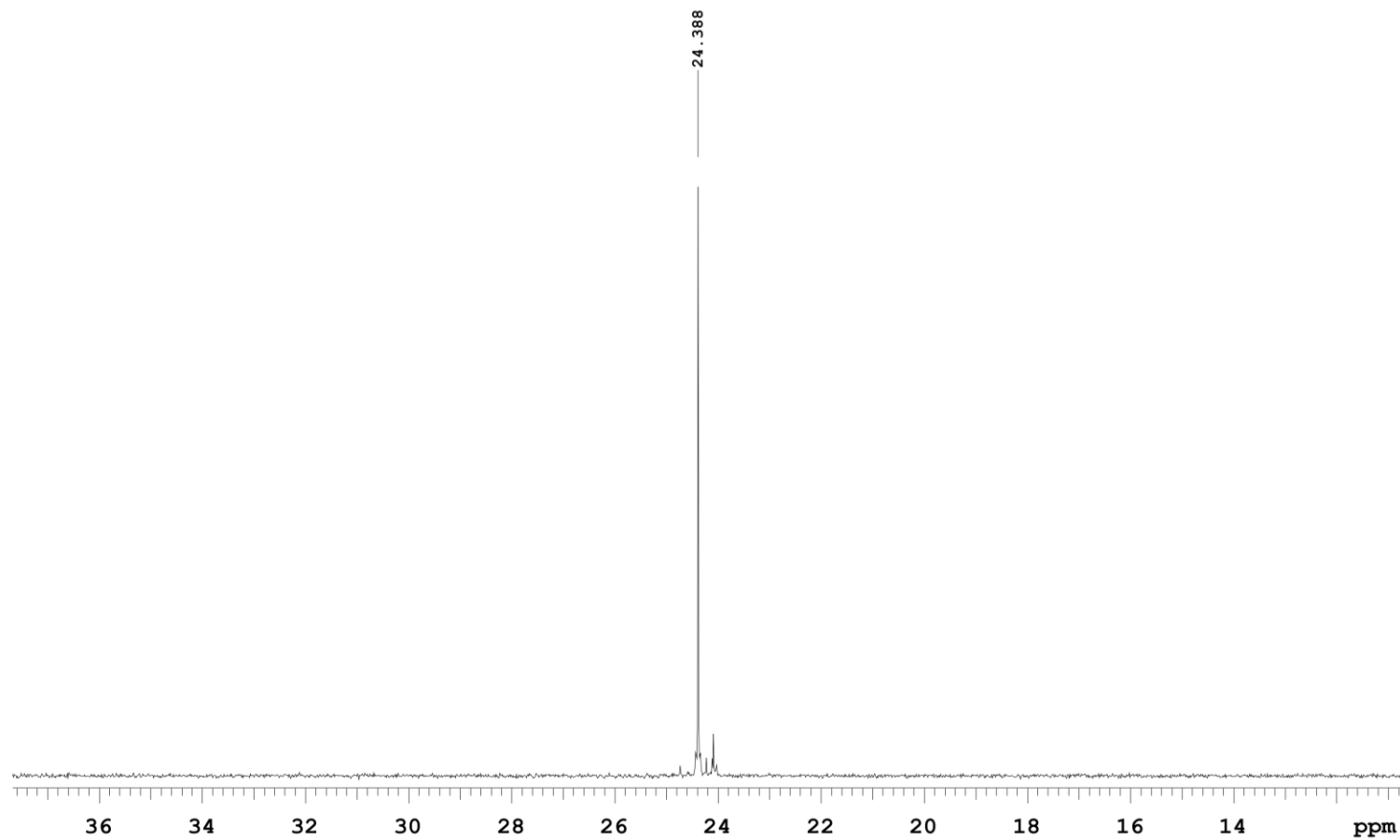


Figure S7. ³¹P NMR data of CAP 8 (in CDCl₃)

¹³C NMR, 75 MHz
AVMK10P
CDCl₃
25 Jun 2018

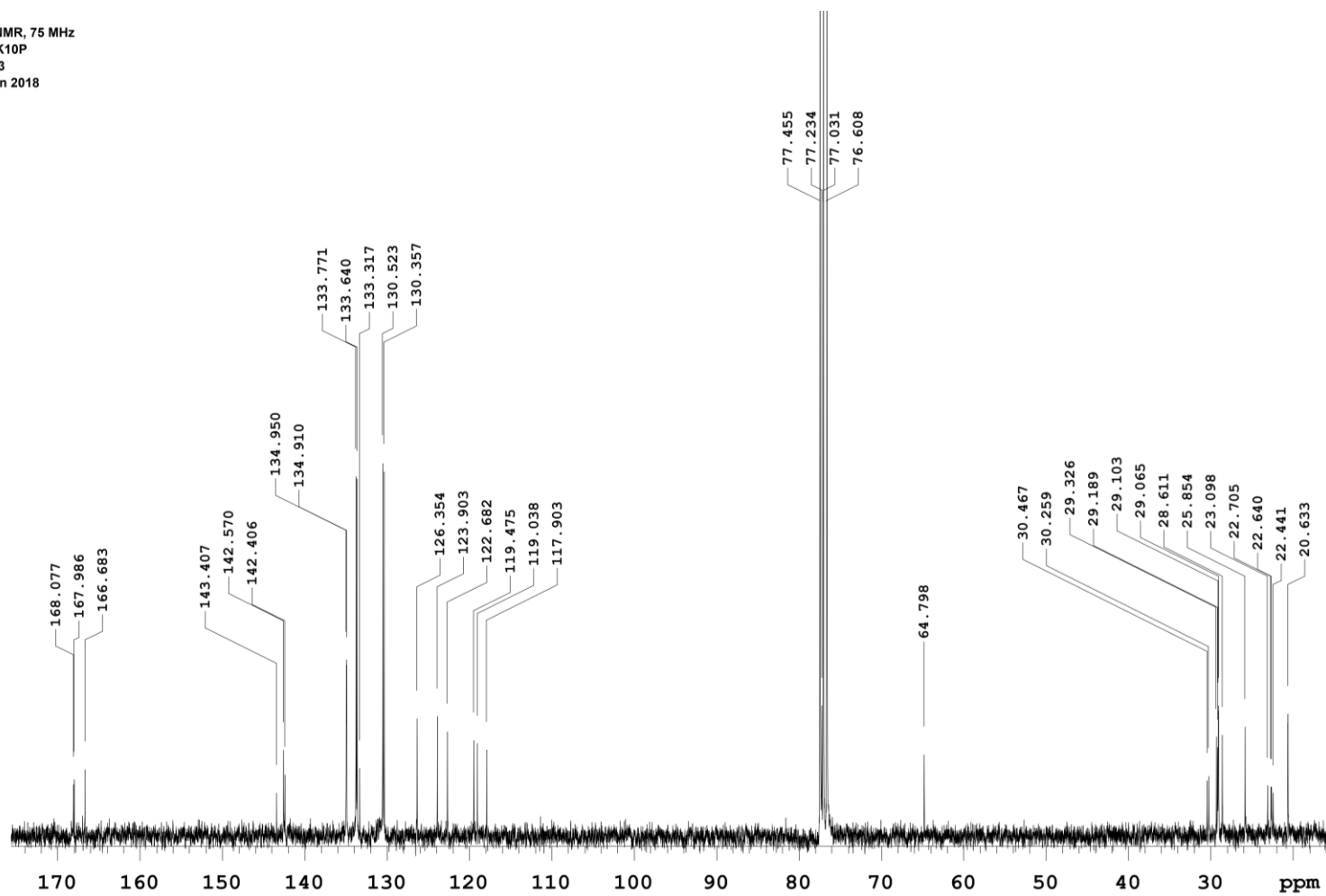


Figure S8. ¹³C NMR data of CAP 10 (in CDCl₃)

¹H NMR, 300 MHz
 AVMK10P
 CDCl₃
 25 Jun 2018

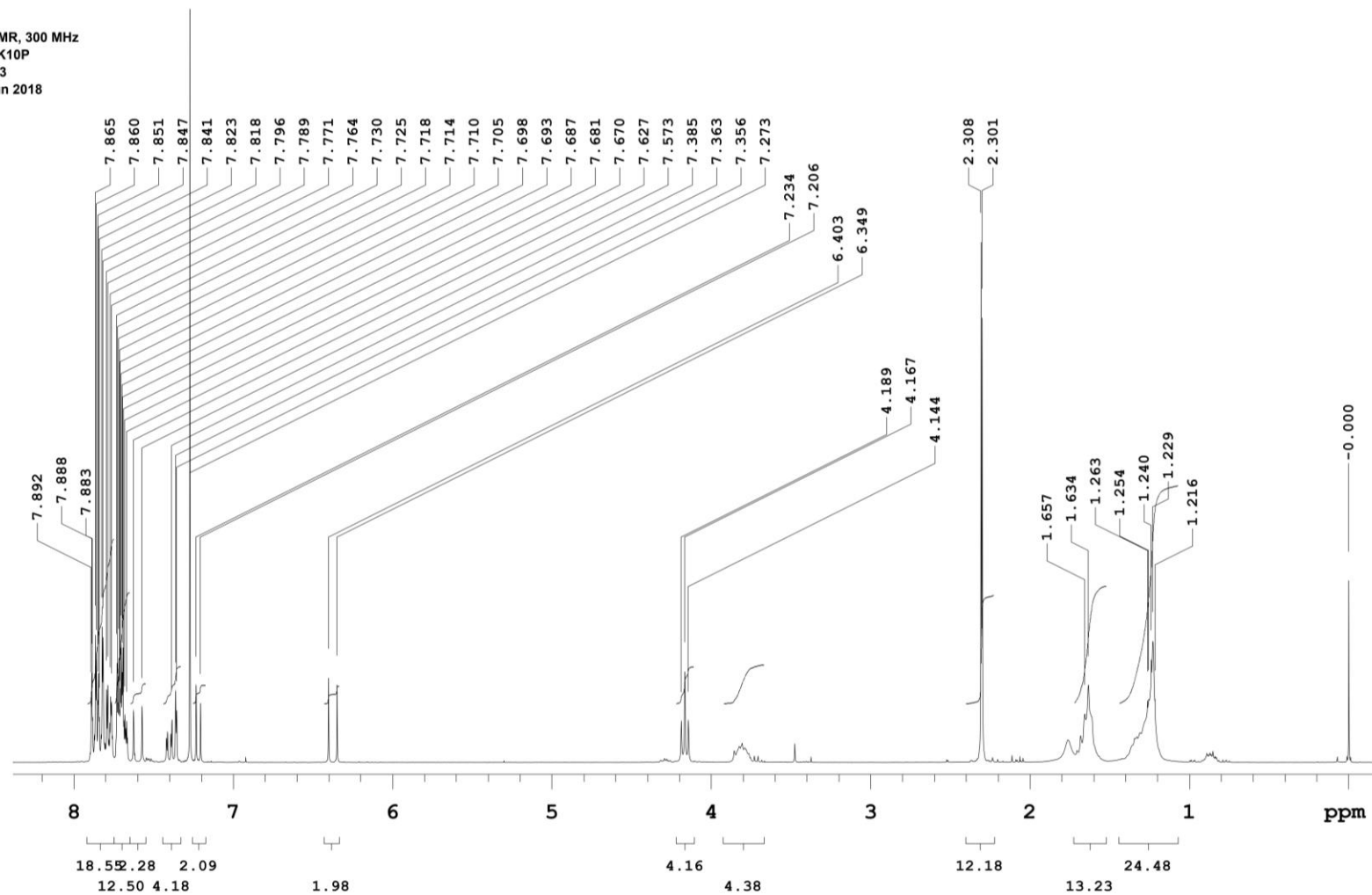


Figure S9. ¹H NMR data of CAP 10 (in CDCl₃)

31P NMR, 121.47 MHz
AVMK10P
CDCl₃
25 Jun 2018

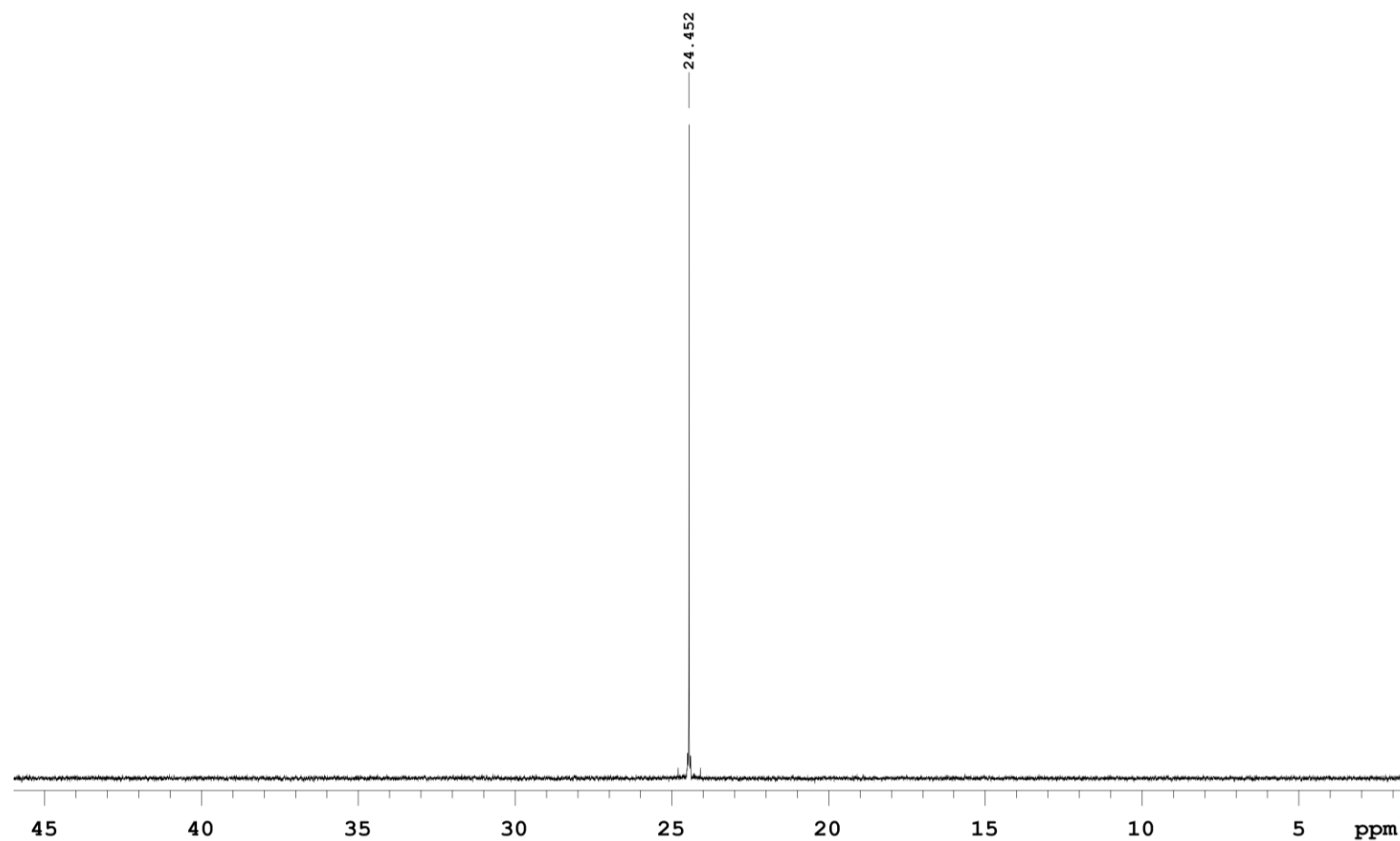


Figure S10. ³¹P NMR data of CAP 10 (in CDCl₃)

¹³C NMR, 100 MHz, AutoX_DB
AVMK-12TPP
CDCl₃
01 Aug 2019

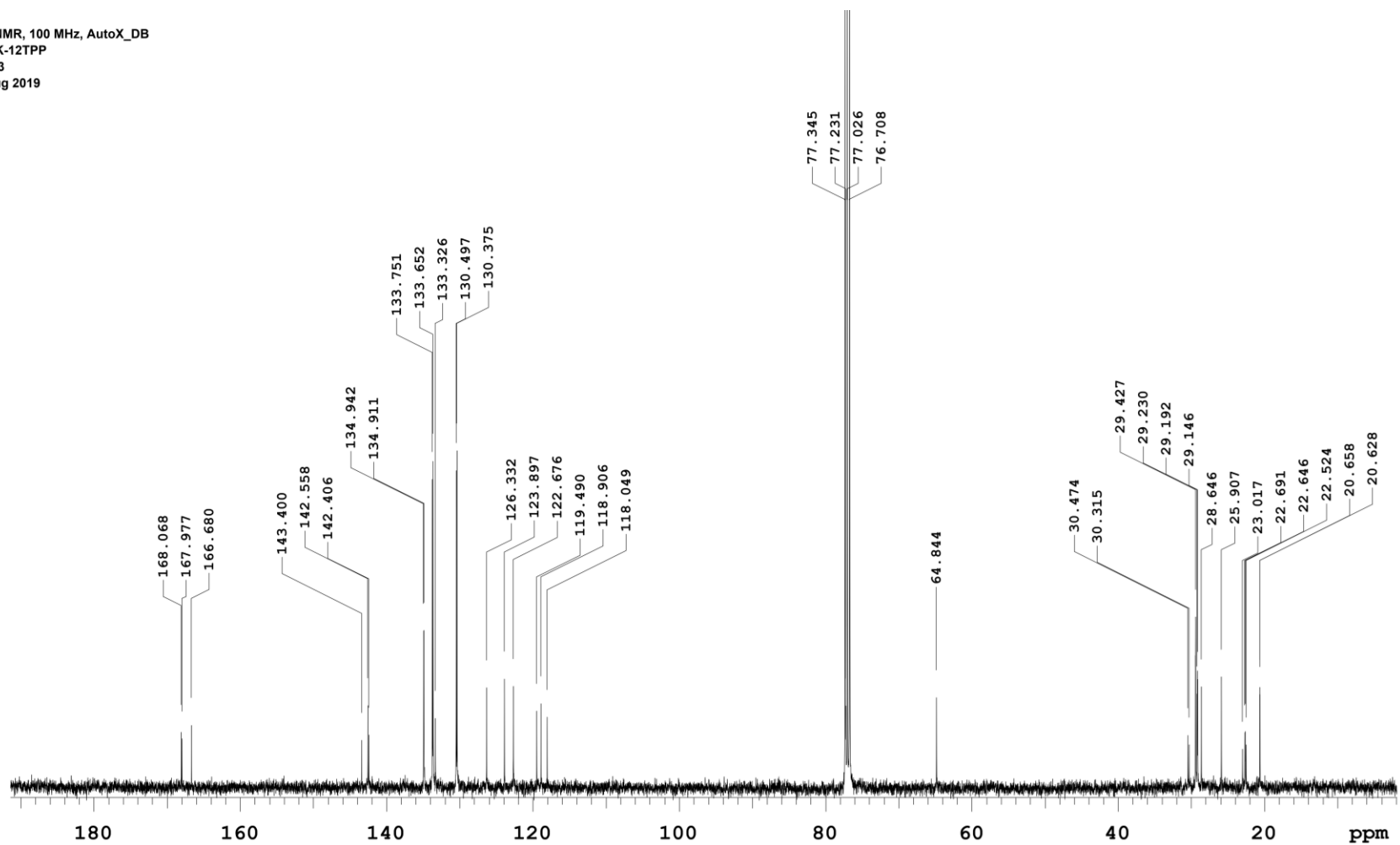


Figure S11. ¹³C NMR data of CAP 12 (in CDCl₃)

¹H NMR, 400 MHz, AutoX_DB
AVMK-12TPP
CDCl₃
01 Aug 2019

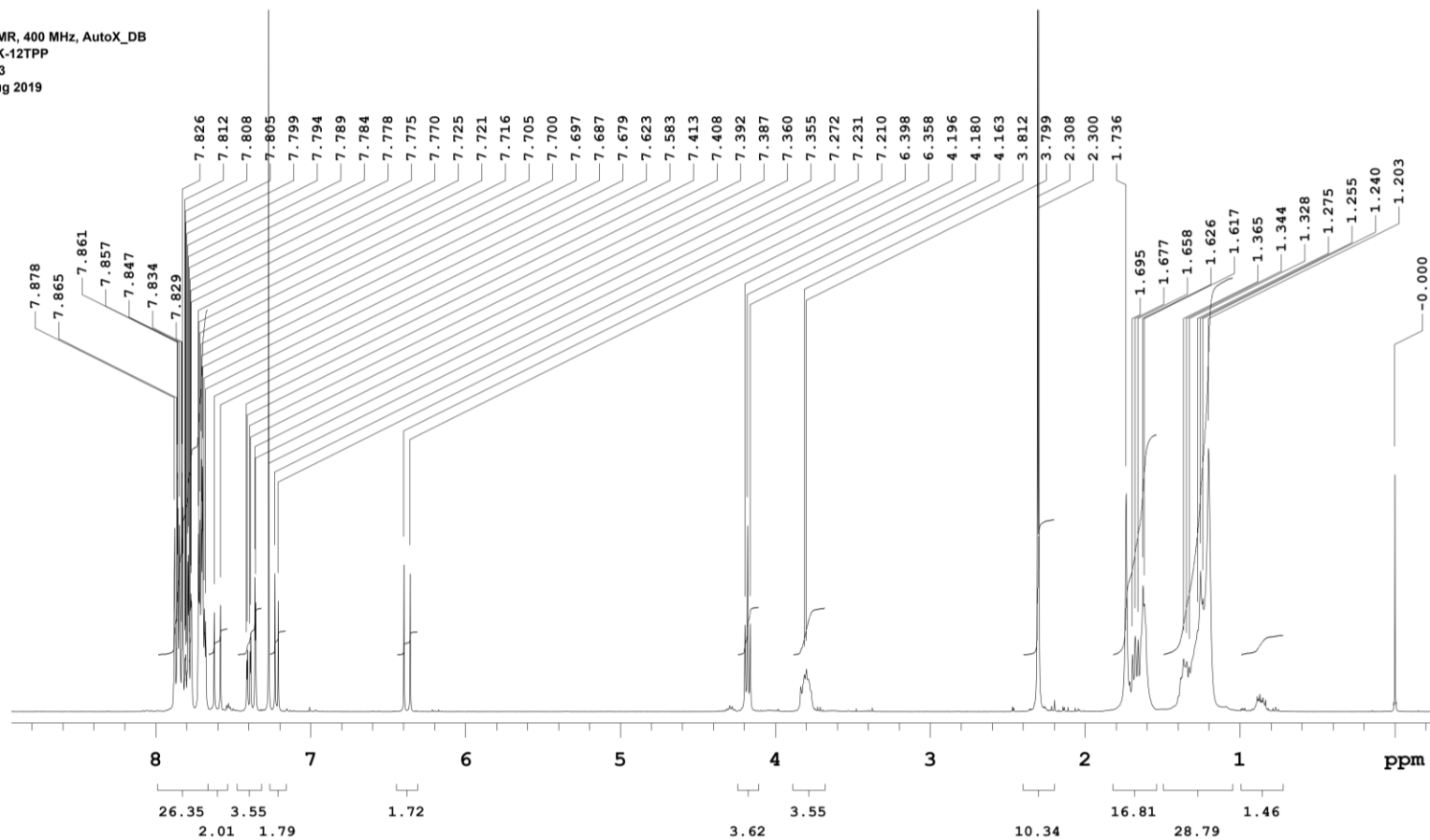


Figure S12. ¹H NMR data of CAP 12 (in CDCl₃)

31P NMR, 162 MHz, AutoX_DB
AVMK-12TPP
CDCl3
01 Aug 2019

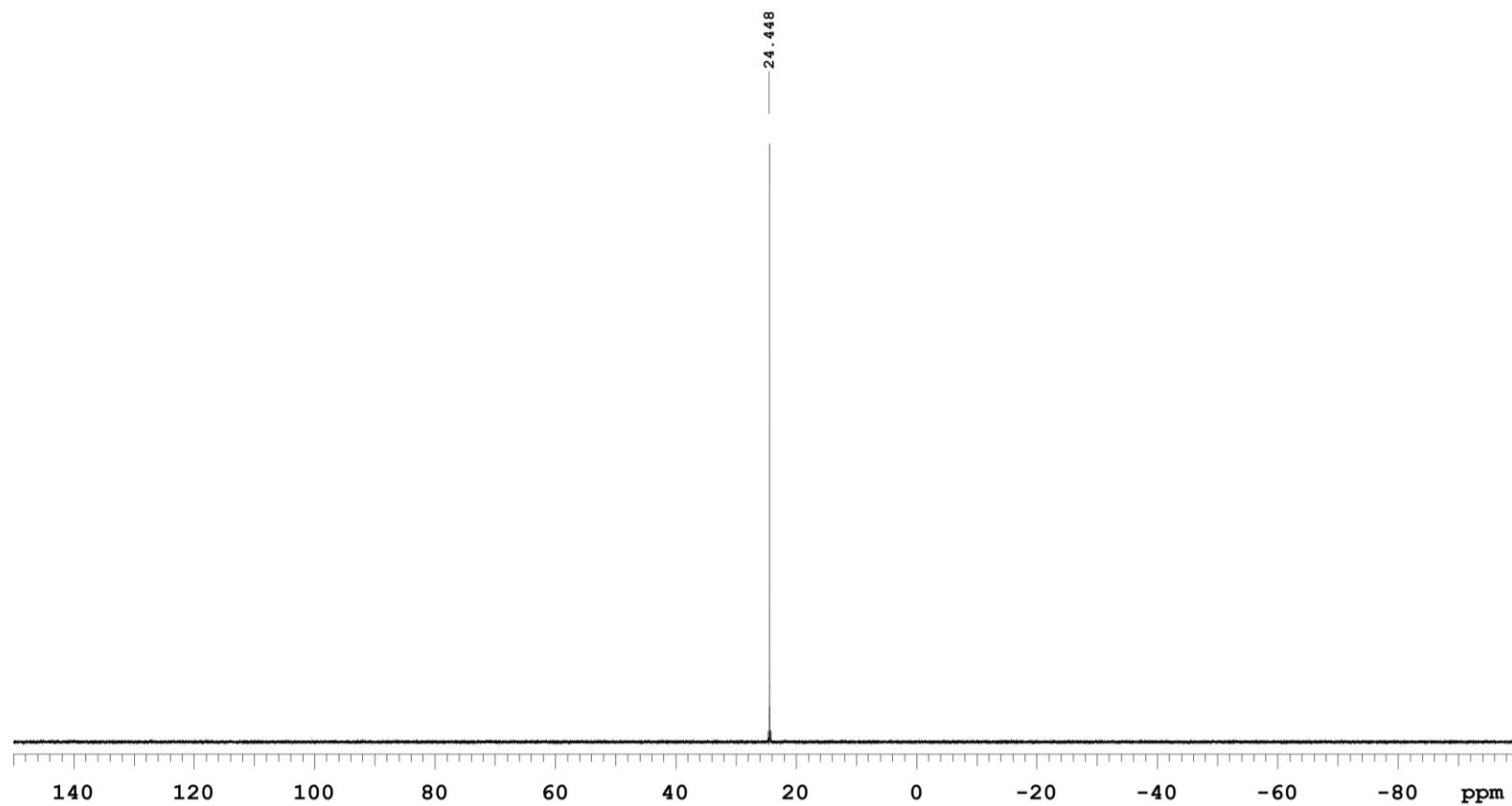


Figure S13. ³¹P NMR data of CAP 12 (in CDCl₃)

¹³C NMR, 75 MHz
AVMK6A
CDCl₃
19 Jun 2018

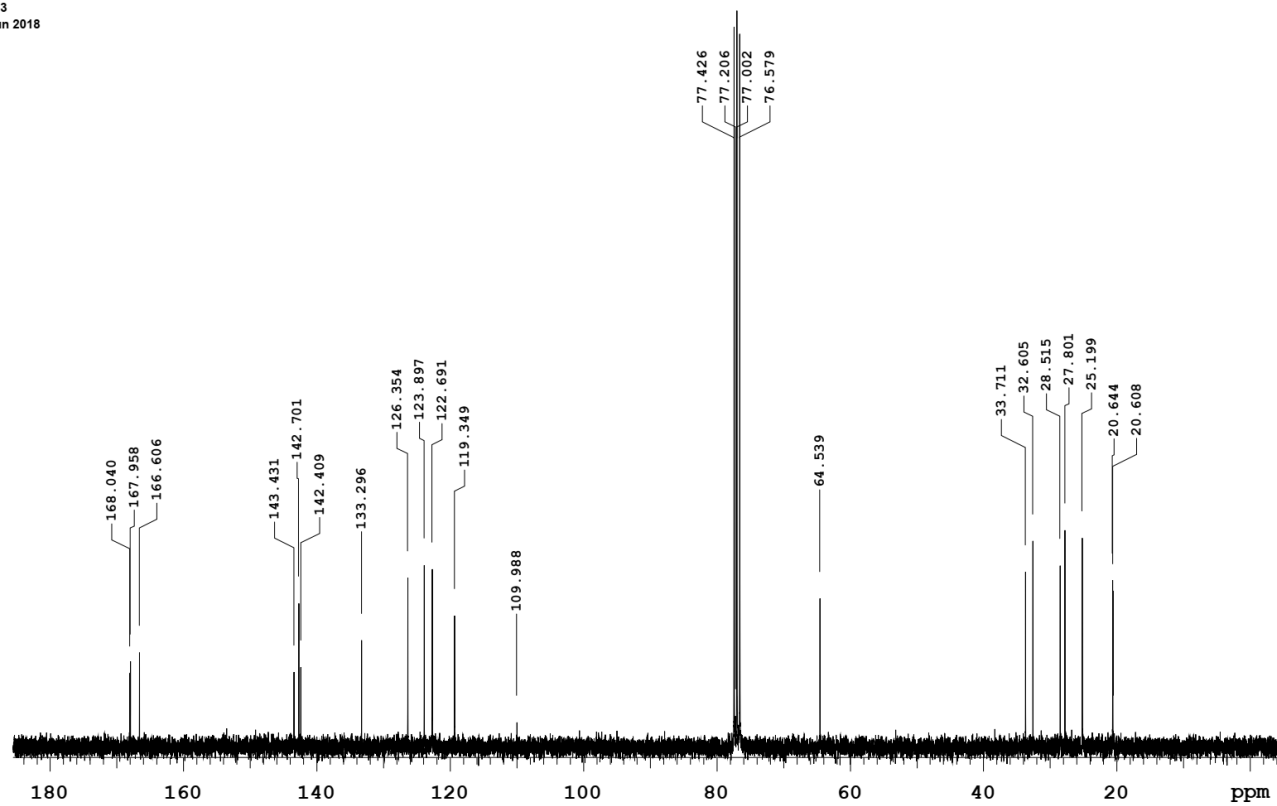


Figure S14. ¹³C NMR data of CAP 6 ester (in CDCl₃)

¹H NMR, 300 MHz
AVMK6A
CDCl₃
19 Jun 2018

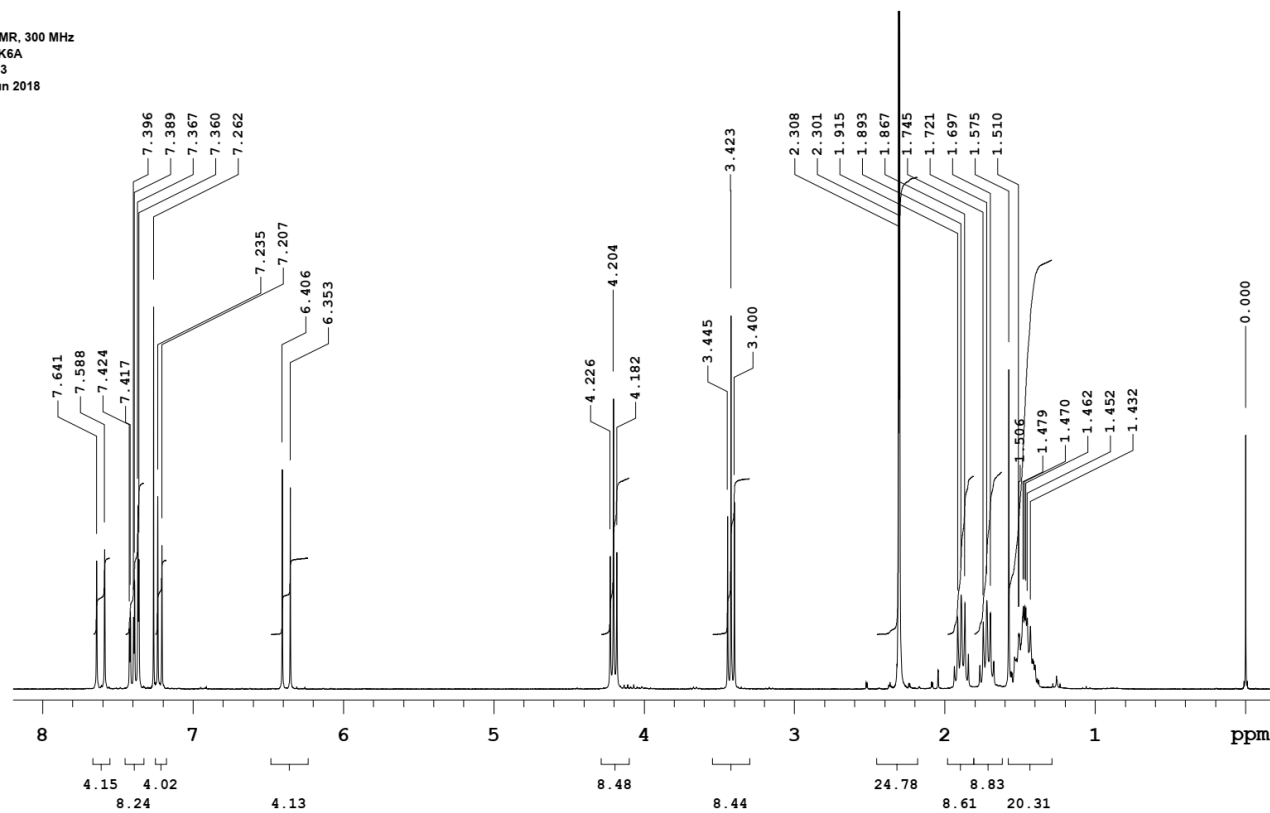


Figure S15. ¹H NMR data of CAP 6 ester (in CDCl₃)

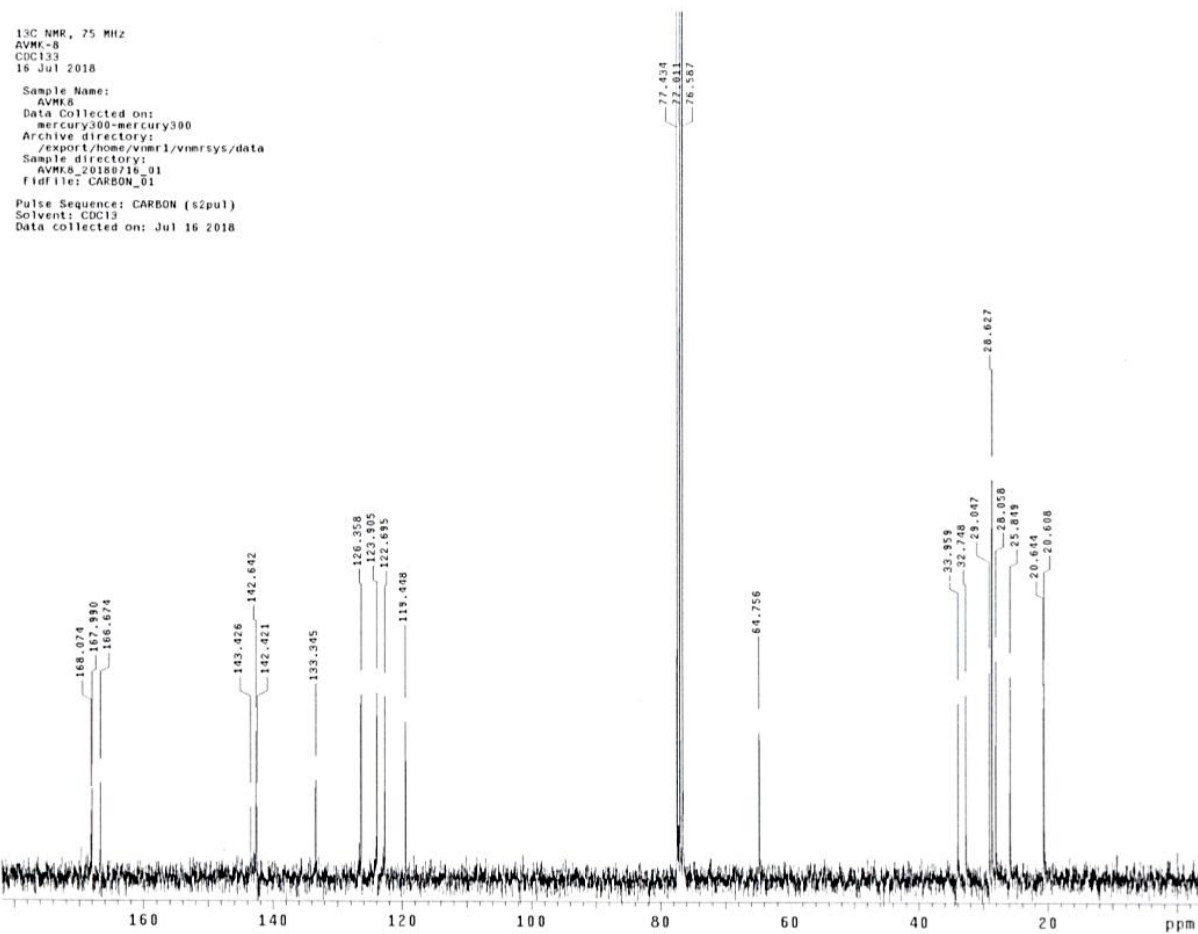


Figure S16. ¹³C NMR data of CAP 8 ester (in CDCl₃)

¹H NMR, 300 MHz
 AVMK-8
 CDC133
 16 Jul 2018
 Sample Name:
 AVMK8
 Data Collected on:
 mercury300-mercury300
 Archive directory:
 /export/home/vnmr1/vnmrsys/data
 Sample directory:
 AVMK8_20180716_01
 FIDfile: PROTON_01
 Pulse Sequence: PROTON (s2pu1)
 Solvent: CDCl3
 Data collected on: Jul 16 2018

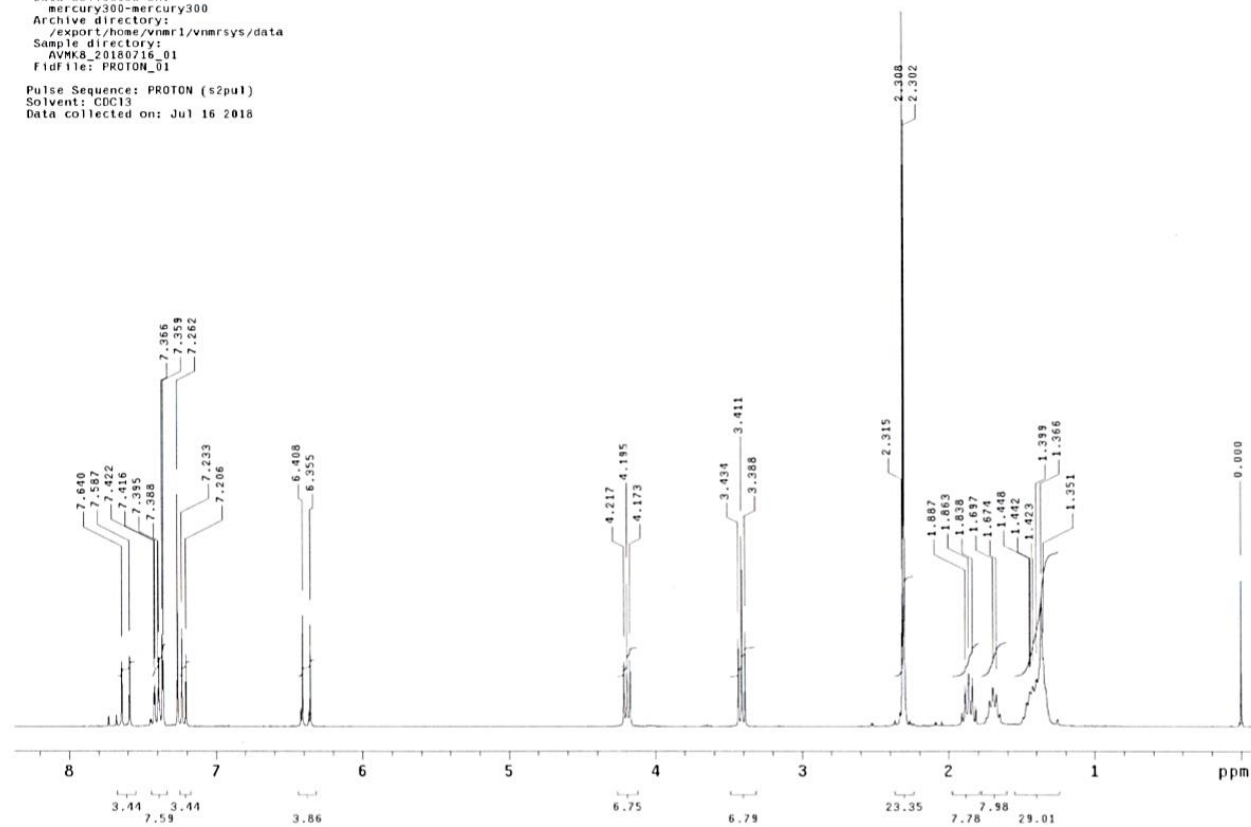


Figure S17. ¹H NMR data of CAP 8 ester (in CDCl₃)

¹³C NMR, 75 MHz
AVMK-10
CDCl₃
11 Jun 2018

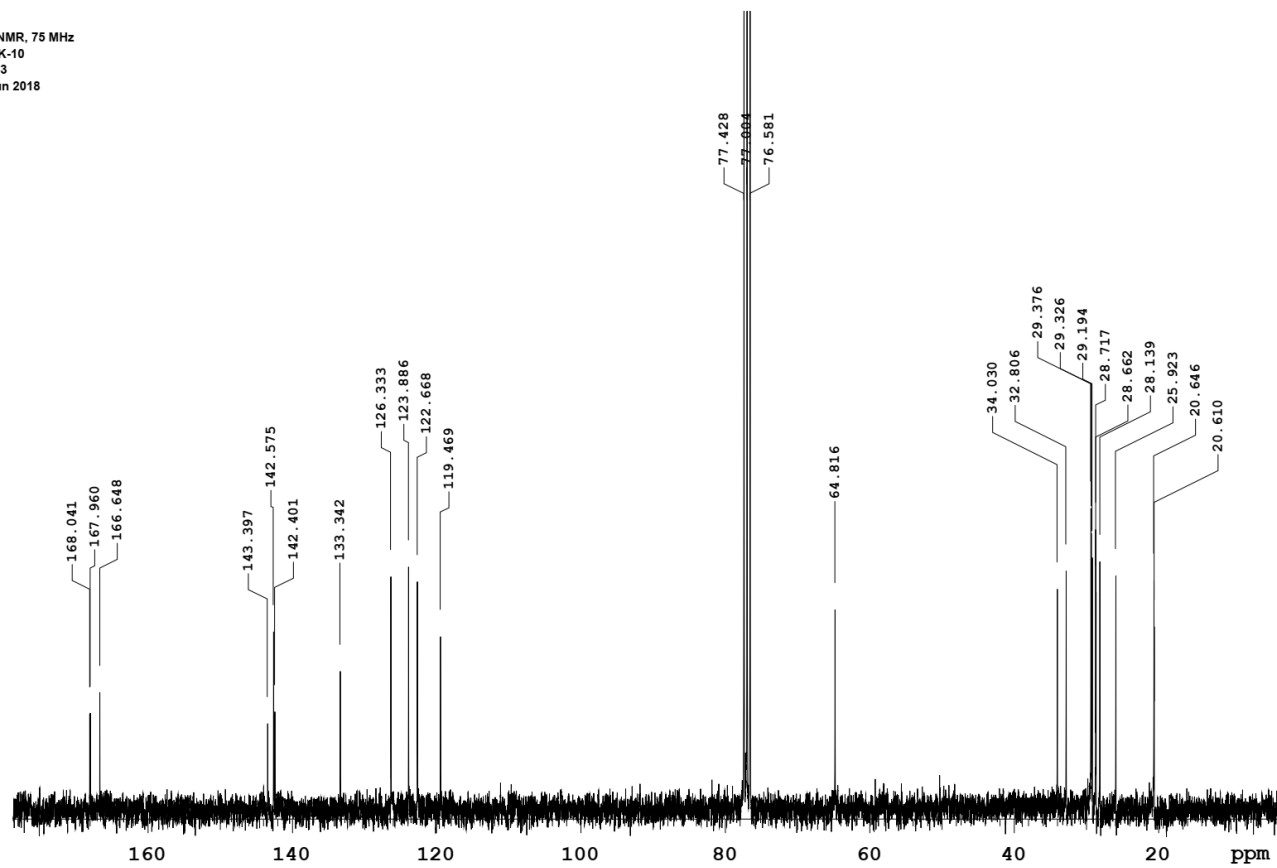


Figure S18. ¹³C NMR data of CAP 10 ester (in CDCl₃)

¹H NMR, 300 MHz
AVMK-10
CDCl₃
11 Jun 2018

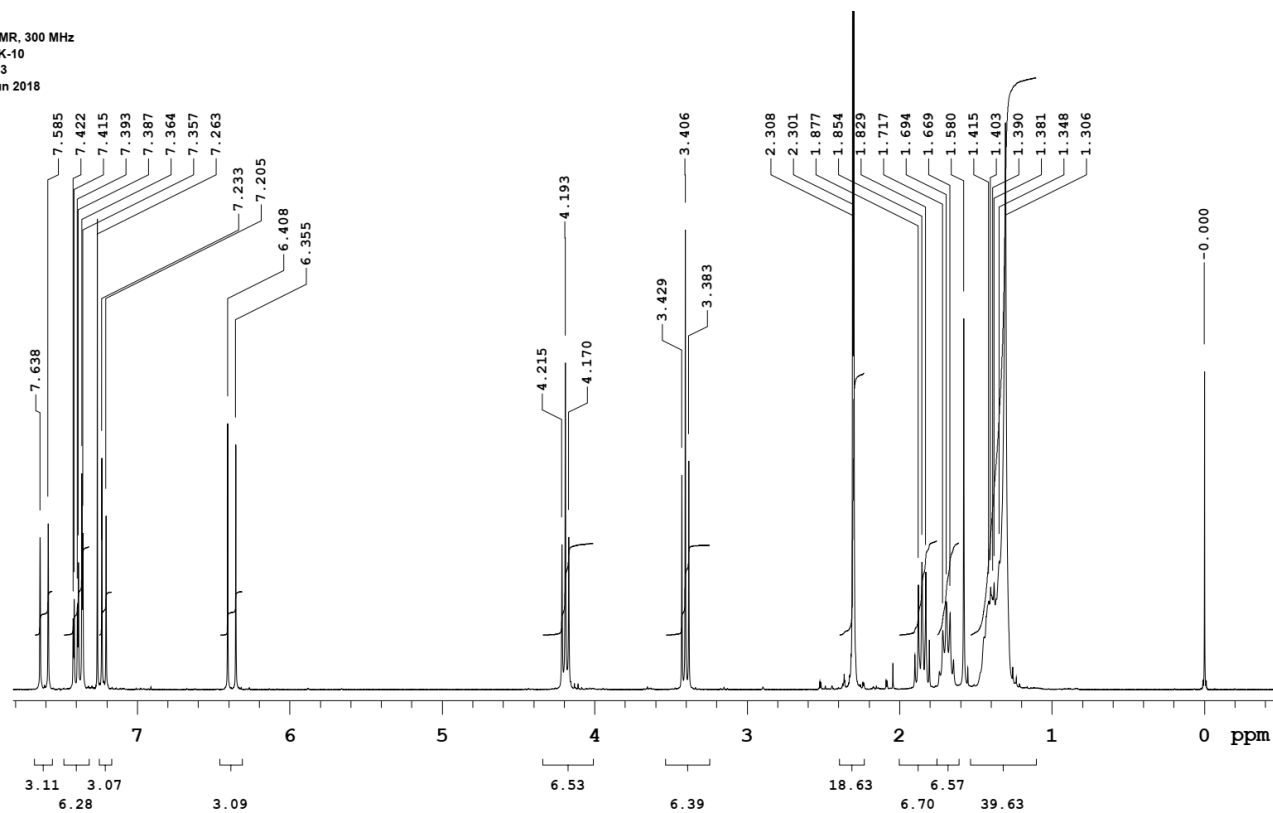


Figure S19. ¹H NMR data of CAP 10 ester (in CDCl₃)

¹³C NMR, 75 MHz
AVMK-12
CDC13
23 Jul 2018
Sample Name:
AVMK-12
Data Collected on:
mercury300-mercury300
Archive directory:
/export/home/vnmr1/vnmrsys/data
Sample directory:
AVMK-12_20180723_01
Fidfile: CARBON
Pulse Sequence: CARBON (s2pu1)
Solvent: CDC13
Data collected on: Jul 23 2018

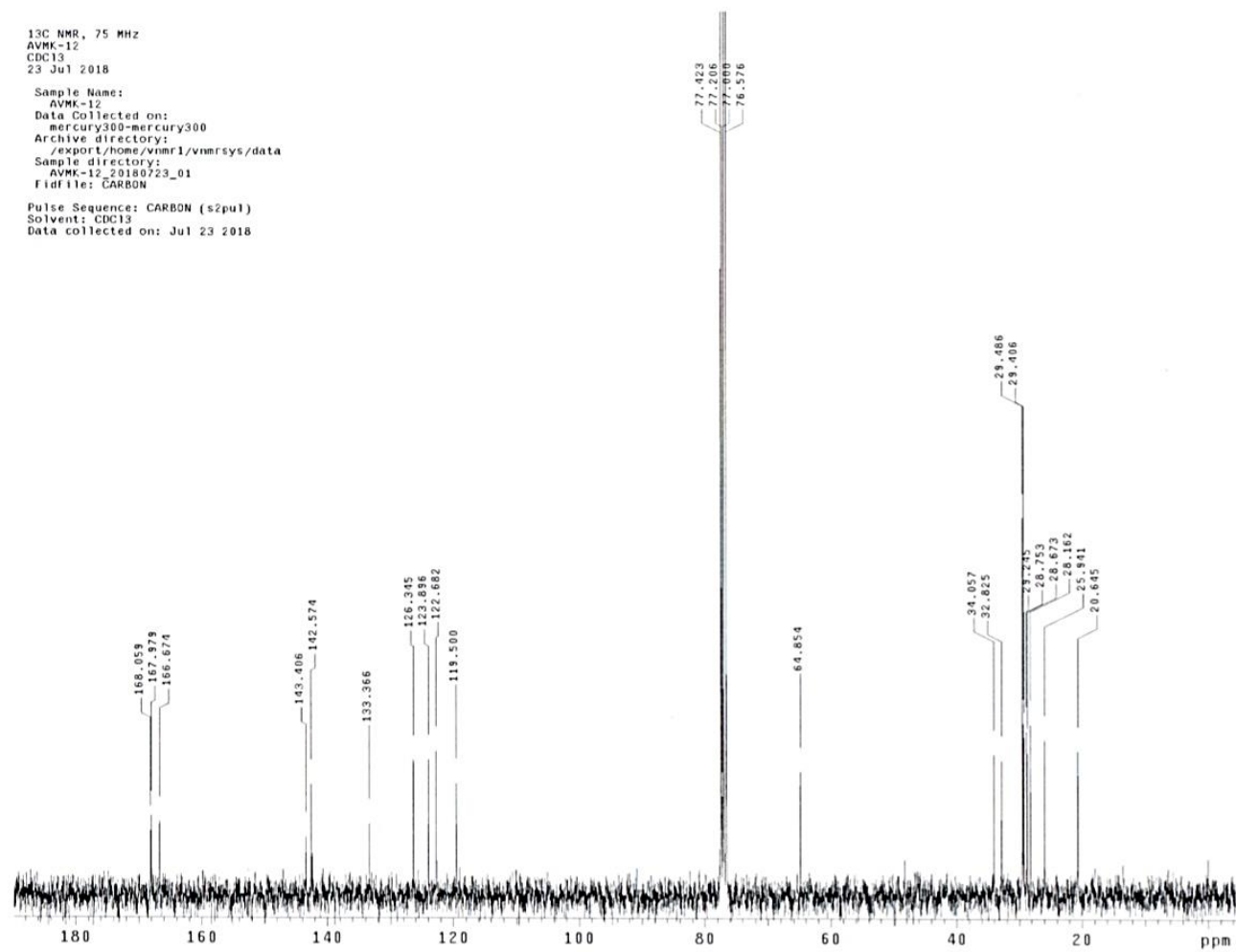


Figure S20. ¹³C NMR data of CAP 12 ester (in CDCl₃)

¹H NMR, 300 MHz
 AVMK-12
 CDC13
 23 Jul 2018
 Sample Name:
 AVMK-12
 Data Collected on:
 mercury300-mercury300
 Archive directory:
 /export/home/vnmr1/vnmrsys/data
 Sample directory:
 AVMK-12_20180723_01
 FIDfile: PROTON_01
 Pulse Sequence: PROTON (s2pul)
 Solvent: CDC13
 Data collected on: Jul 23 2018

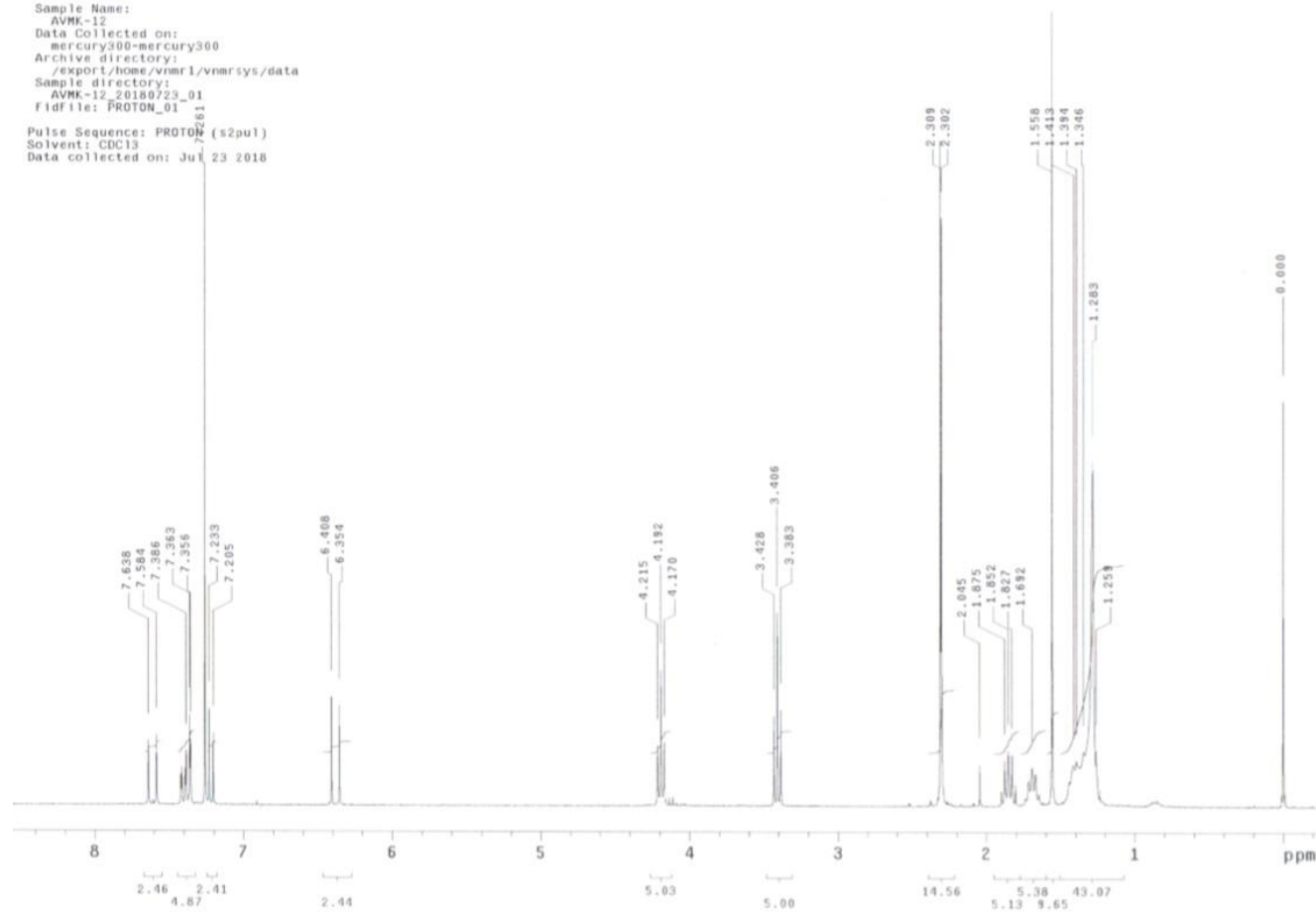
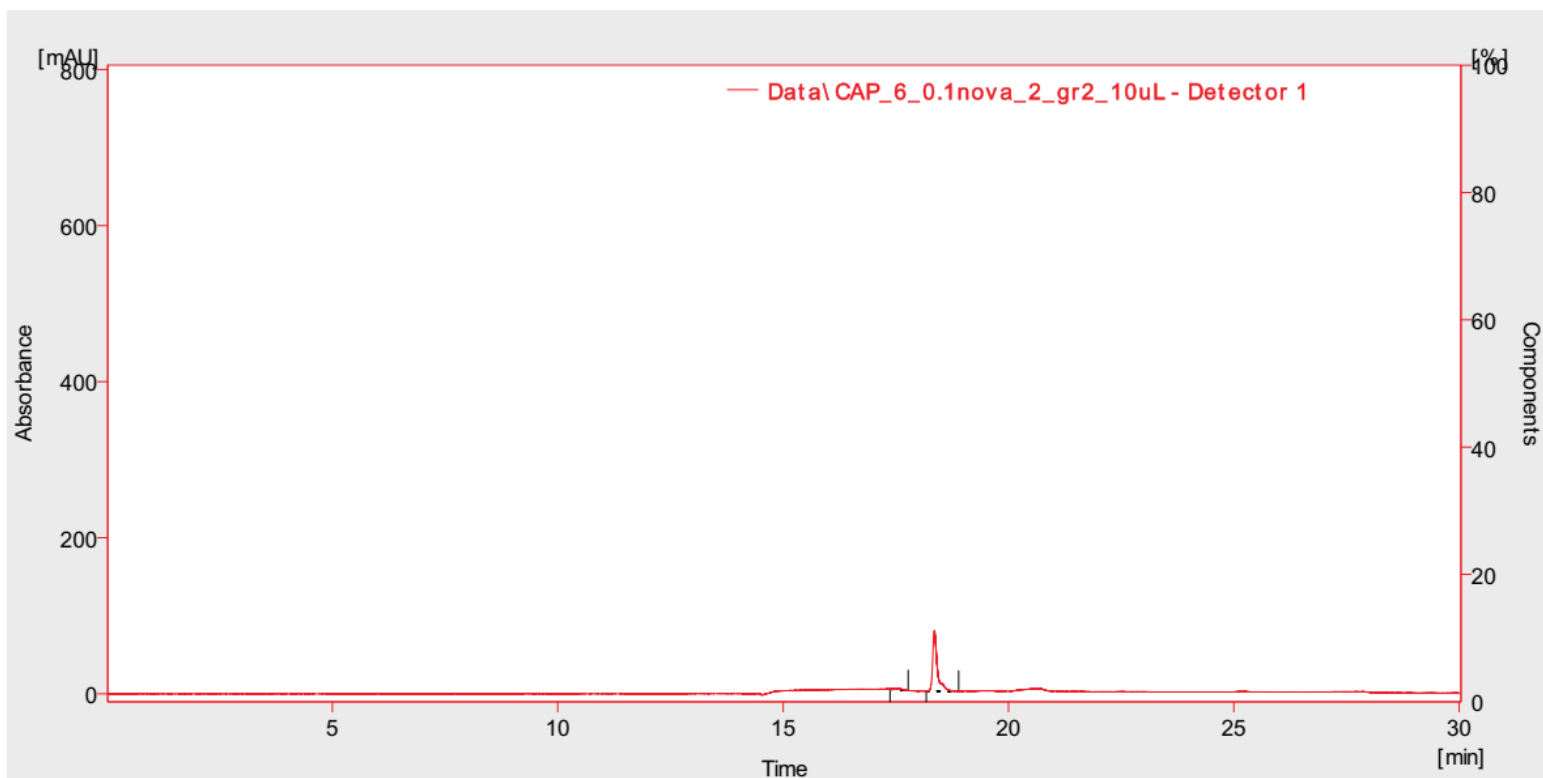


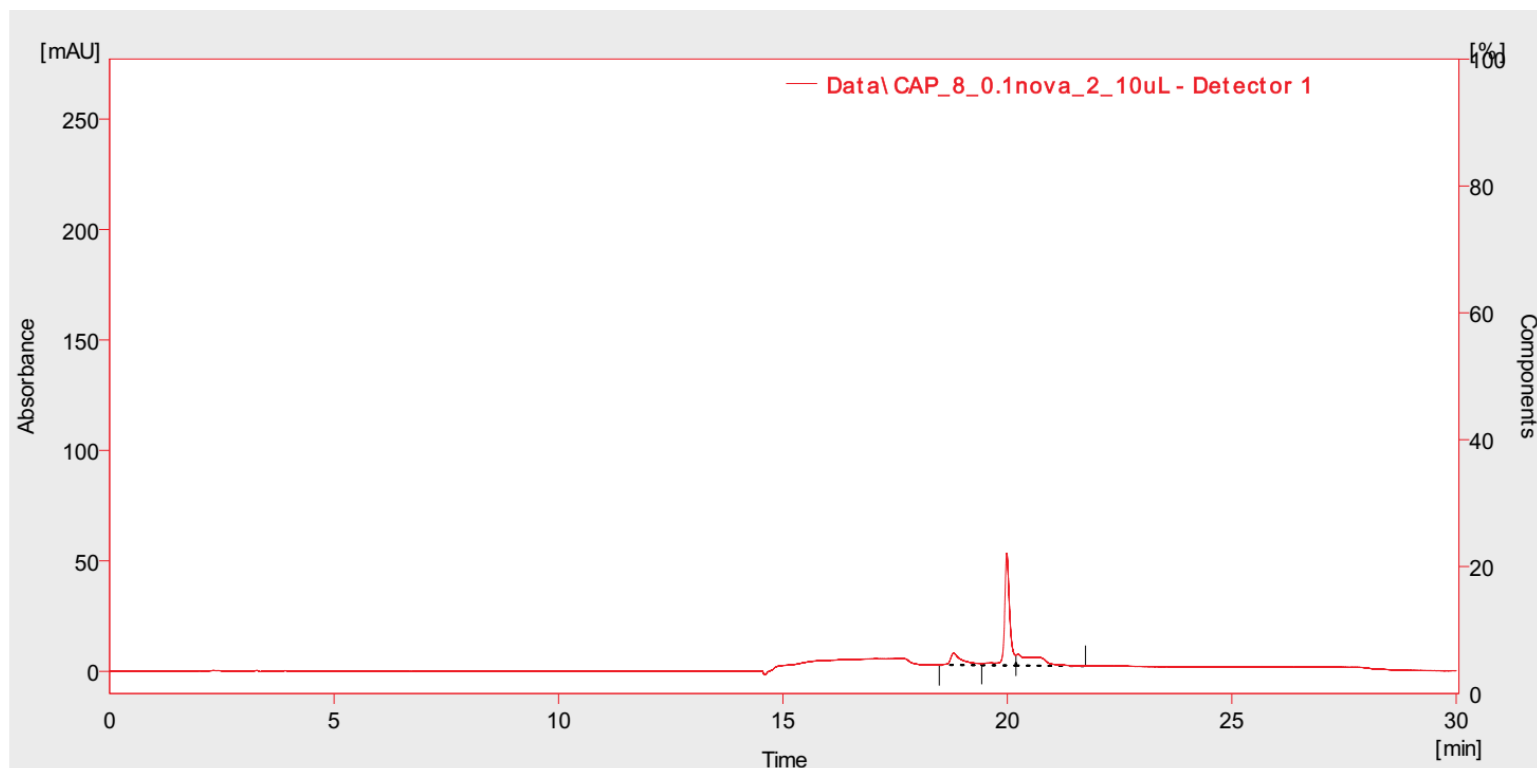
Figure S21. ¹H NMR data of CAP 12 ester (in CDCl₃)



Result Table (Uncal - Data\CAP_6_0.1nova_2_gr2_10uL - Detector 1)

	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	PDA Peak Purity	Compound Name
1	17,463	18,987	1,039	3,3	1,3	0,22	1000	
2	18,357	554,007	77,056	96,7	98,7	0,09	988	
	Total	572,994	78,096	100,0	100,0			

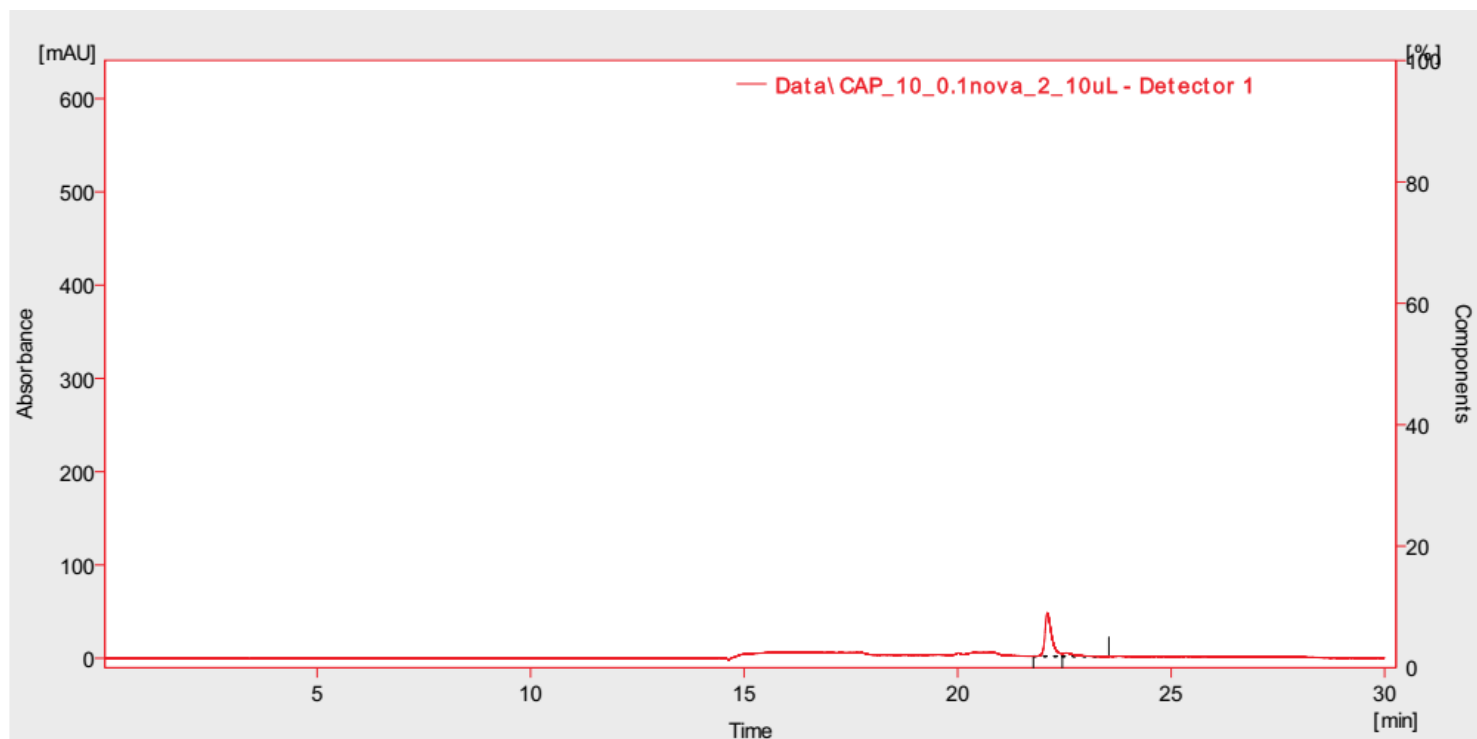
Figure S22. HPLC-DAD data of CAP 6 (60% H₂O + 0.05% TFA/40% ACN + 0.05% TFA) at λ = 254 nm



Result Table (Uncal - Data\CAP_8_0.1nova_2_10uL - Detector 1)

	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	PDA Peak Purity	Compound Name
1	18,804	102,112	5,413	14,7	8,8	0,22	990	
2	19,989	415,533	50,786	59,9	82,8	0,11	986	
3	20,237	176,178	5,120	25,4	8,4	0,65	995	
	Total	693,824	61,320	100,0	100,0			

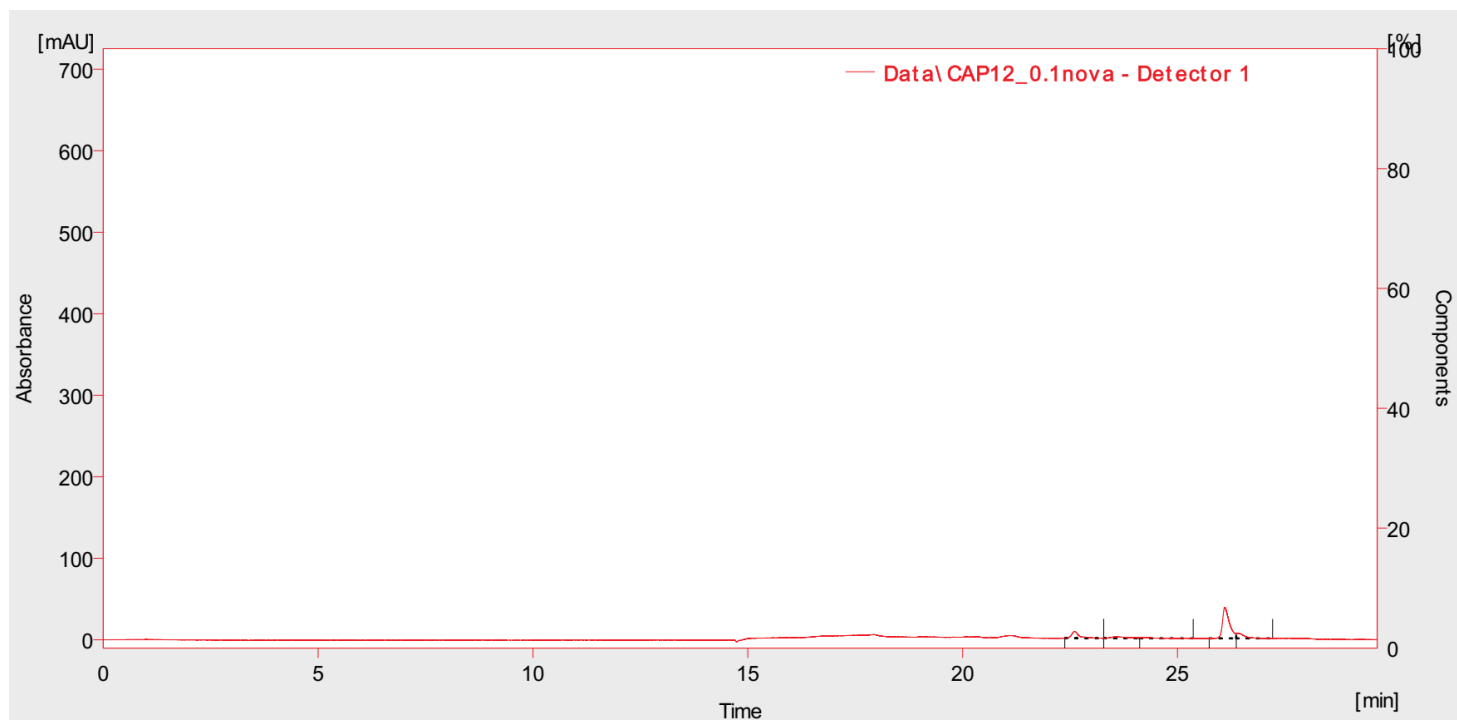
Figure S23. HPLC-DAD data of CAP 8 (60% H₂O + 0.05% TFA/40% ACN + 0.05% TFA) at λ = 254 nm



Result Table (Uncal - Data\CAP_10_0.1nova_2_10uL - Detector 1)

	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	PDA Peak Purity	Compound Name
1	22,105	514,811	46,736	88,3	92,8	0,15	984	
2	22,561	68,292	3,617	11,7	7,2	0,25	997	
	Total	583,103	50,353	100,0	100,0			

Figure S24. HPLC-DAD data of CAP 10 (60% H₂O + 0.05% TFA/40% ACN + 0.05% TFA) at $\lambda = 254$ nm



Result Table (Uncal - Data\CAP12_0.1nova - Detector 1)

	Reten. Time [min]	Area [mAU.s]	Height [mAU]	Area [%]	Height [%]	W05 [min]	PDA Peak Purity	Compound Name
1	22,604	102,228	8,380	14,9	15,1	0,15	987	
2	23,583	48,823	1,725	7,1	3,1	0,44	998	
3	24,273	21,812	0,918	3,2	1,7	0,26	999	
4	26,100	431,825	38,151	62,8	68,8	0,16	993	
5	26,429	83,343	6,269	12,1	11,3	0,18	991	
	Total	688,031	55,444	100,0	100,0			

Figure S25. HPLC-DAD data of CAP 12 (60% H₂O + 0.05% TFA/40% ACN + 0.05% TFA) at λ = 254 nm