Imidazole and Imidazolium Bioactive Drugs Derived from Amino Acids

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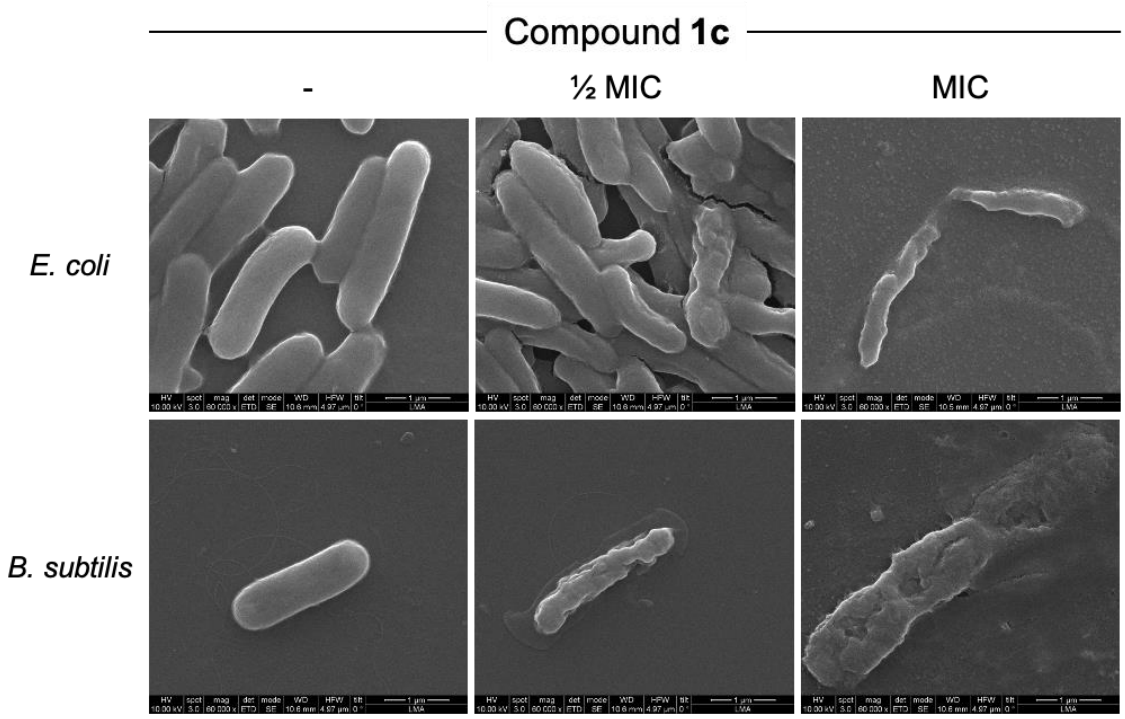


Fig. S1. Scanning Electron Microscopy (SEM) images of *E. coli* and *B. subtilis* bacteria without treatment (-) and after incubation with compound **1c** at its ½ MIC and MIC (60000 x).

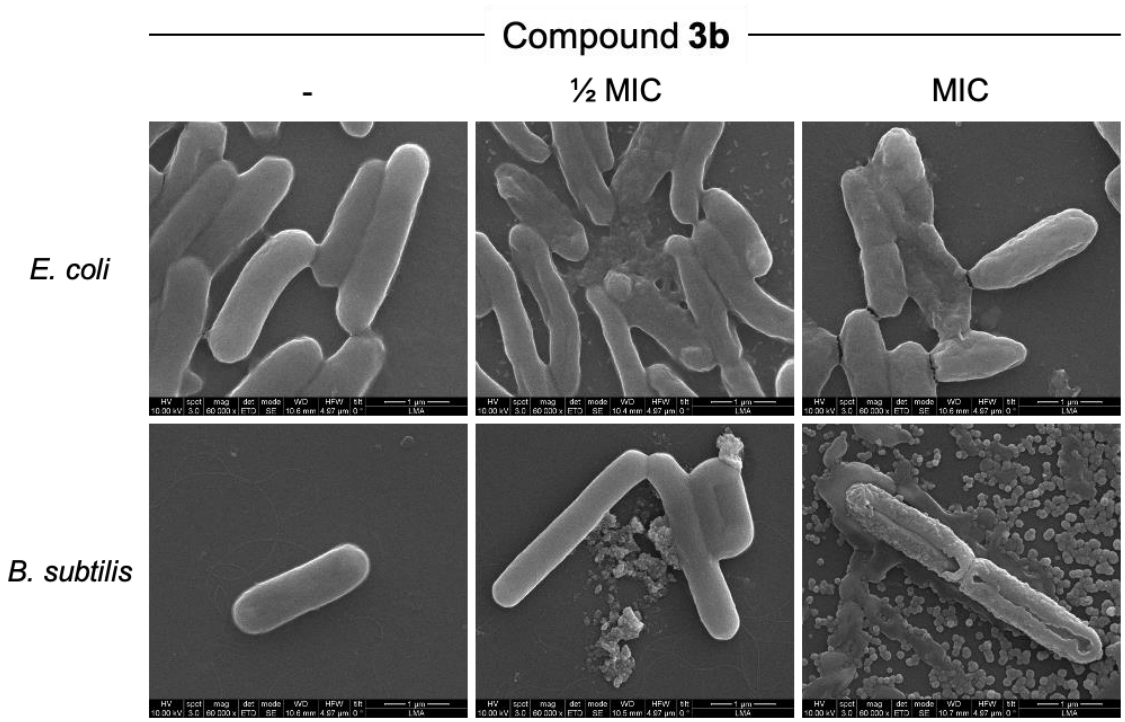


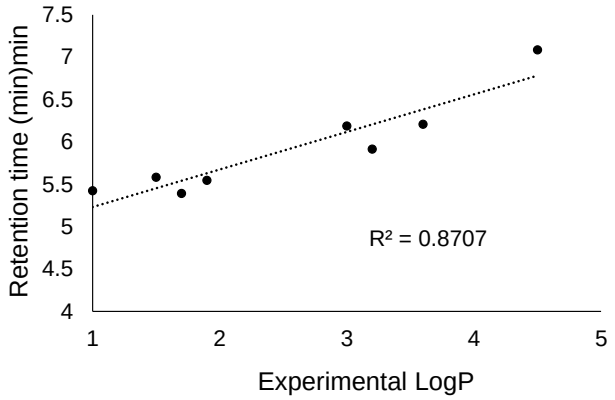
Fig S2. Scanning Electron Microscopy (SEM) images of *E. coli* and *B. subtilis* bacteria without treatment (-) and after incubation with compound **3b** at its ½ MIC and MIC (60000 x).

Table S1. Minimum Inhibitory Concentration (MIC, μM), Minimal Bactericidal Concentration (MBC, μM), the half maximal inhibitory concentration IC_{50} (μM) values

Entry	Compound	*E. coli*		*B. subtilis*		HEK-293
		MIC[a] μM	MBC[a] μM	MIC[a] μM	MBC[a] μM	IC_{50} μM
1	**1a**	>6000	>6000	48	48	9.6 ± 1.6
2	**1b**	288	581	9	18	1.8 ± 0.4
3	**1c**	269	269	19	34	19 ± 4
4	**2a**	>9000	>9000	>9000	>9000	>200
5	**2b**	>5000	>5000	2591	2591	>200
6	**2c**	1444	>2900	180	361	>200
7	**3a**	2662	>5000	42	42	19 ± 3
8	**3b**	57	229	7	7	109 ± 10
9	**3c**	1986	1986	62	62	36 ± 5

[a] Mode – most frequent value - of MIC and MBC values from at least three experiments (when obtaining the same values) or at least five experiments (when the values obtained are different).

a)



Retention time	log P	Compound
5.392	1.7	Acetophenone
6.188	3	Bromobenzene
5.916	3.2	Benzophenone
6.208	3.6	Naphtalene
7.088	4.5	Phenanthrene
5.424	1	Acetanilide
5.583	1.5	Phenol
5.546	1.9	Benzoic acid

b)

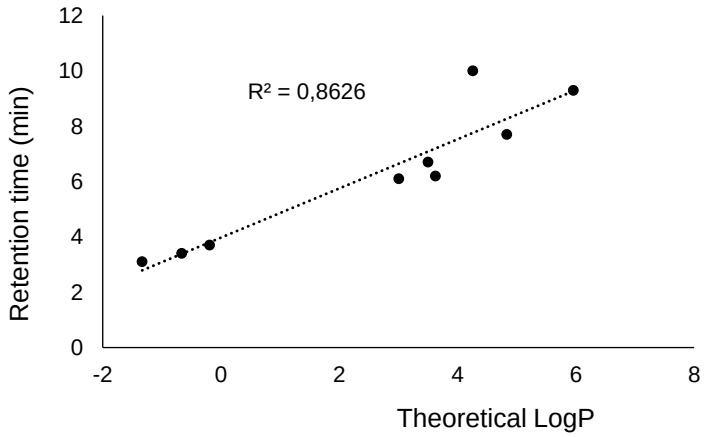
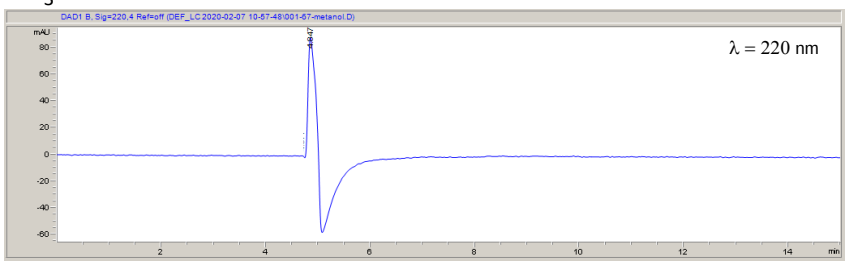
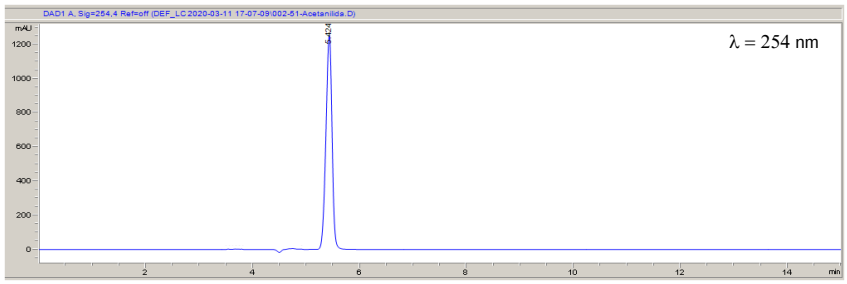


Fig. S3. a) Correlation between experimental LogP values and experimental retention time for different commercial compounds **b)** Correlation between LogP and the retention time for the different compounds **1a-c**, **2a-c**, **3a-c.**

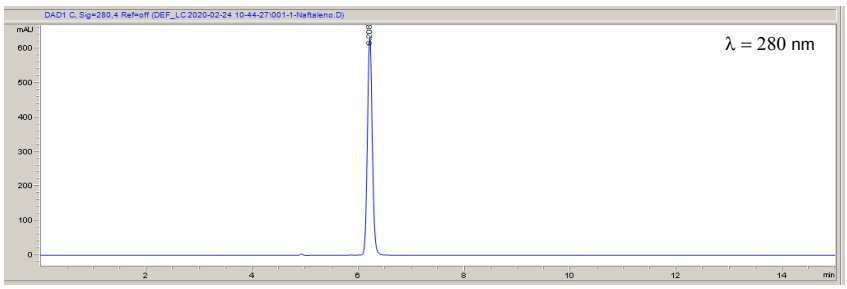
CH_3OH



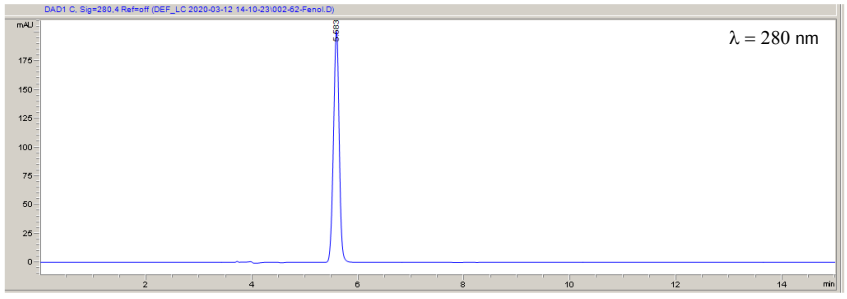
Acetanilide



Naphtalene



Phenol



Benzoic acid

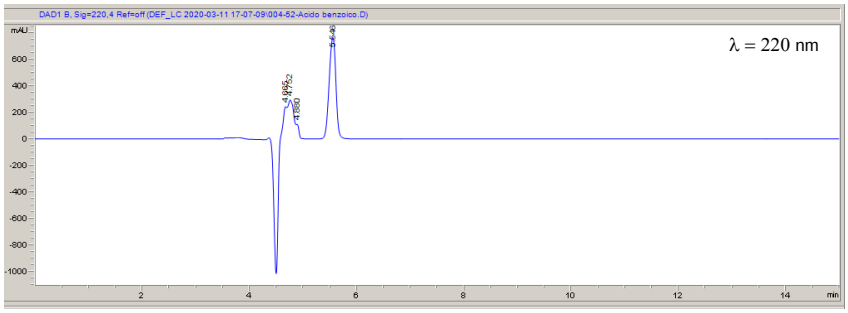
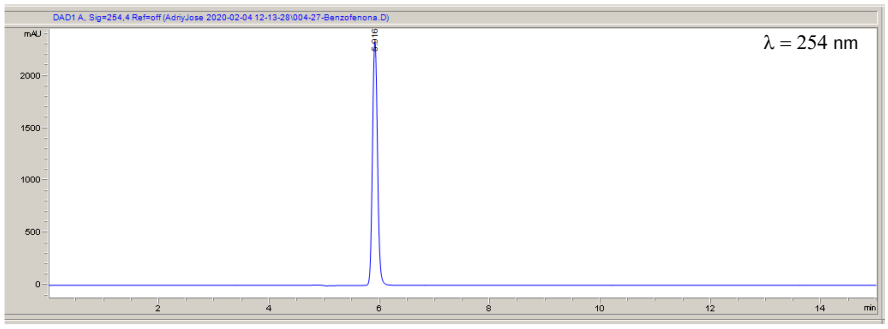
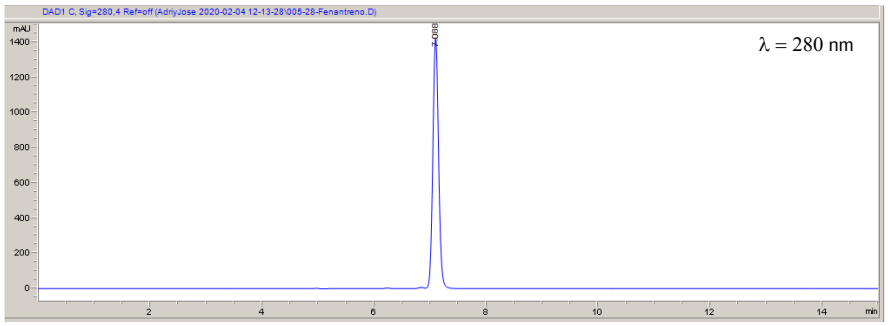


Fig. S4. HPLC chromatograms for methanol, acetanilide, naphthalene, phenol and benzoic acid. Mobile phase water/CH_3CN 30/70 (0.1% HCO_2H), 25°C and flow 0.2 mL/min.

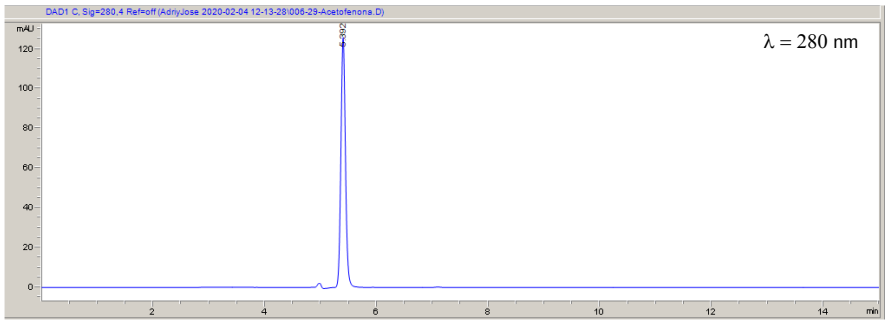
Benzophenone



Phenantrene



Acetophenone



Bromobenzene

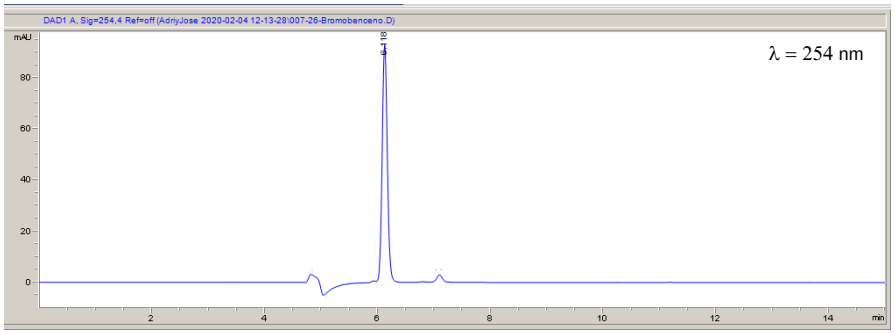
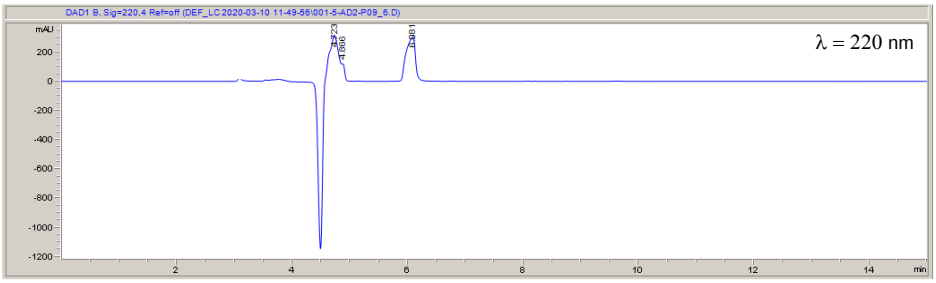
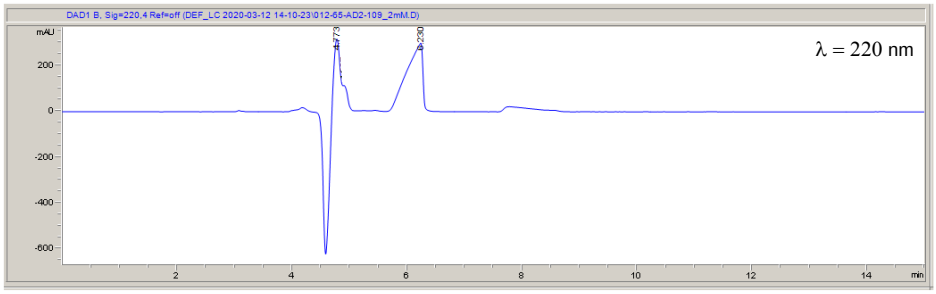


Fig. S5. HPLC chromatograms for benzophenone, phenantrene, acetophenone and bromobenzene. Mobile phase water/CH_3CN 30/70 (0.1% HCO_2H), 25 °C and flow 0.2 mL/min.

1a



1b



1c

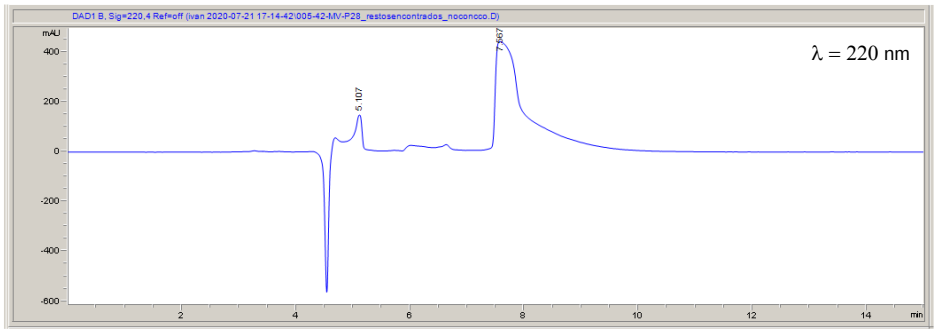
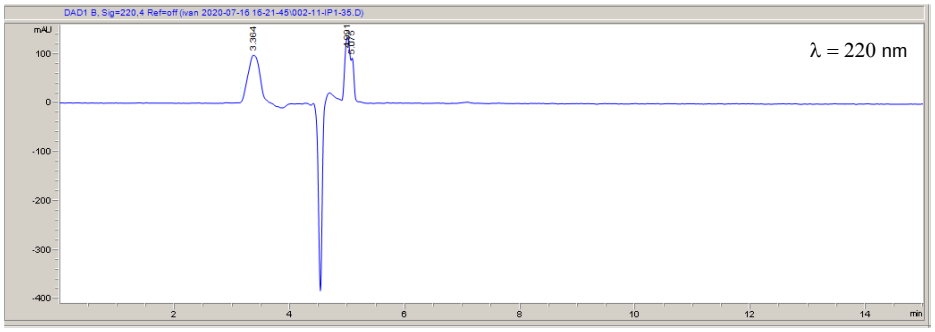
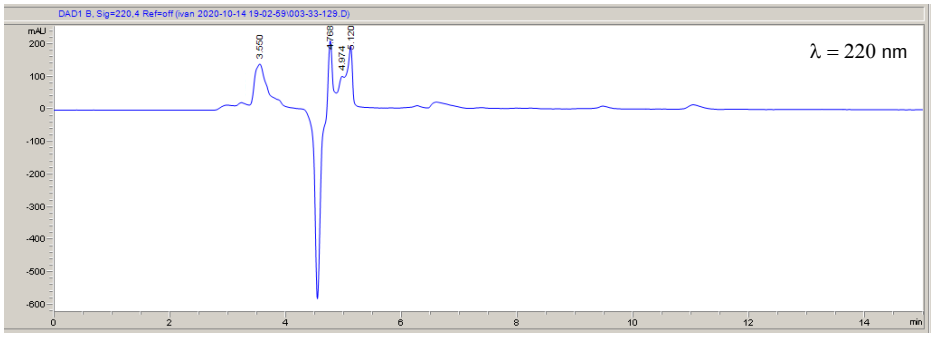


Fig. S6. HPLC chromatograms for compounds **1a-c**. Mobile phase water/CH_3CN 30/70 (0.1% HCO_2H), 25 °C and flow 0.2 mL/min.

2a



2b



2c

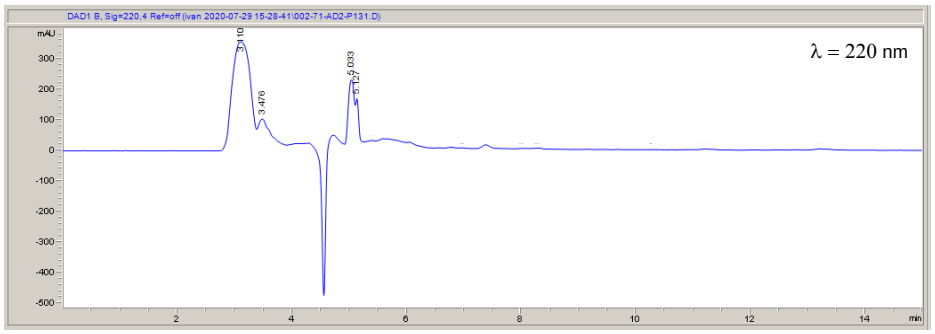
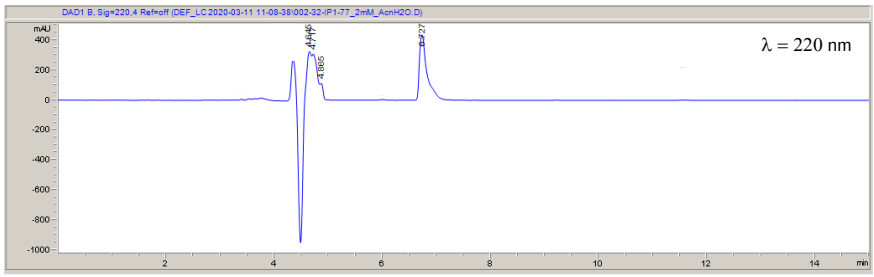
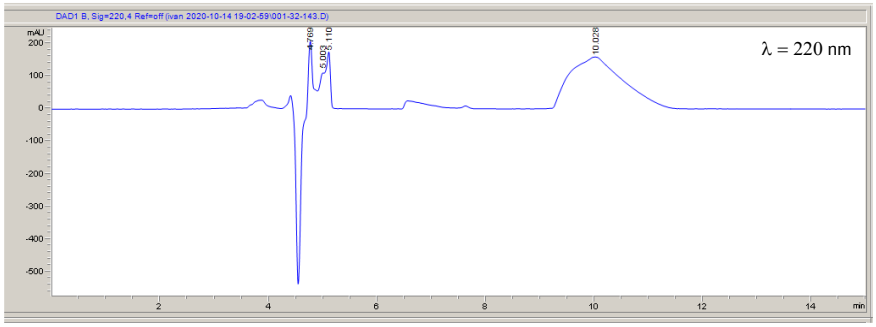


Fig. S7. HPLC chromatograms for compounds **2a-c**. Mobile phase water/CH_3CN 30/70 (0.1% HCO_2H), 25 °C and flow 0.2 mL/min.

3a



3b



3c

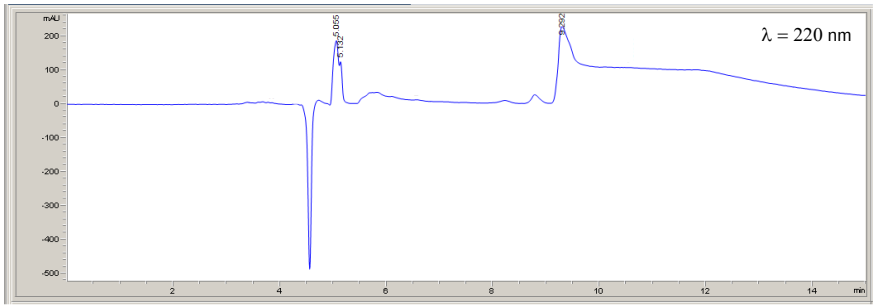


Fig. S8. HPLC chromatograms for compounds **3a-c**. Mobile phase water/CH_3CN 30/70 (0.1% HCO_2H), 25 °C and flow 0.2 mL/min.

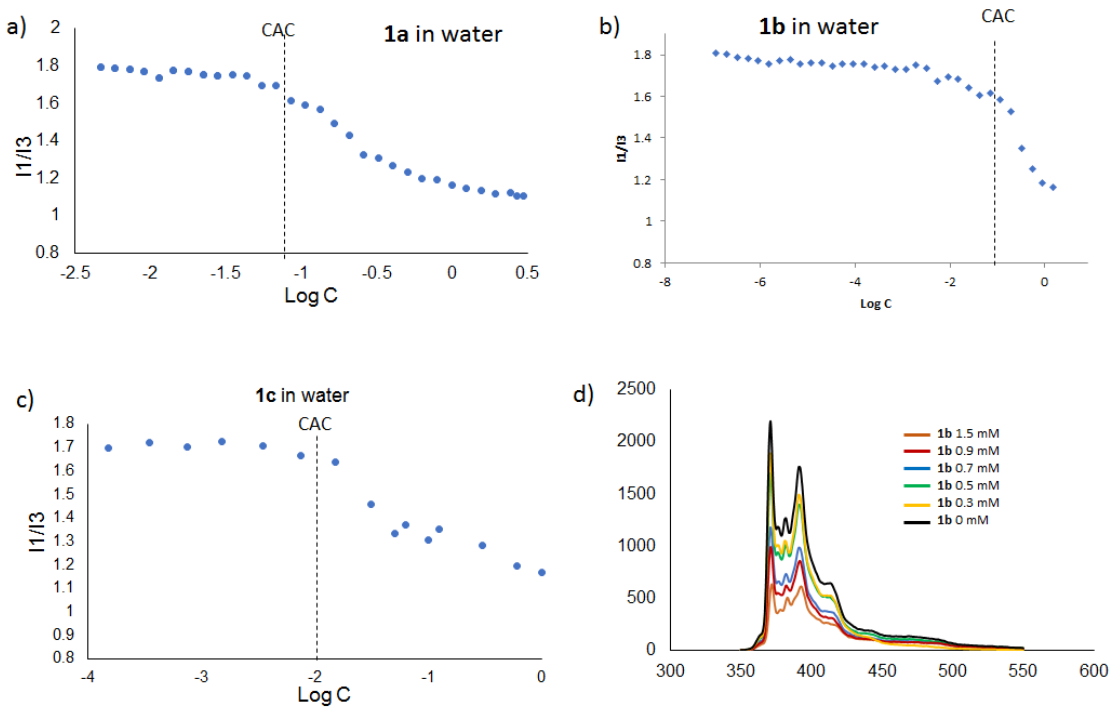


Fig. S9. a) - c) Plots of the I_1/I_3 ratios *v* log C for **1a-1c** in H_2O at 25 °C. d) Emission spectra of pyrene in H_2O at 25 °C in the presence of different amounts of **1b**.

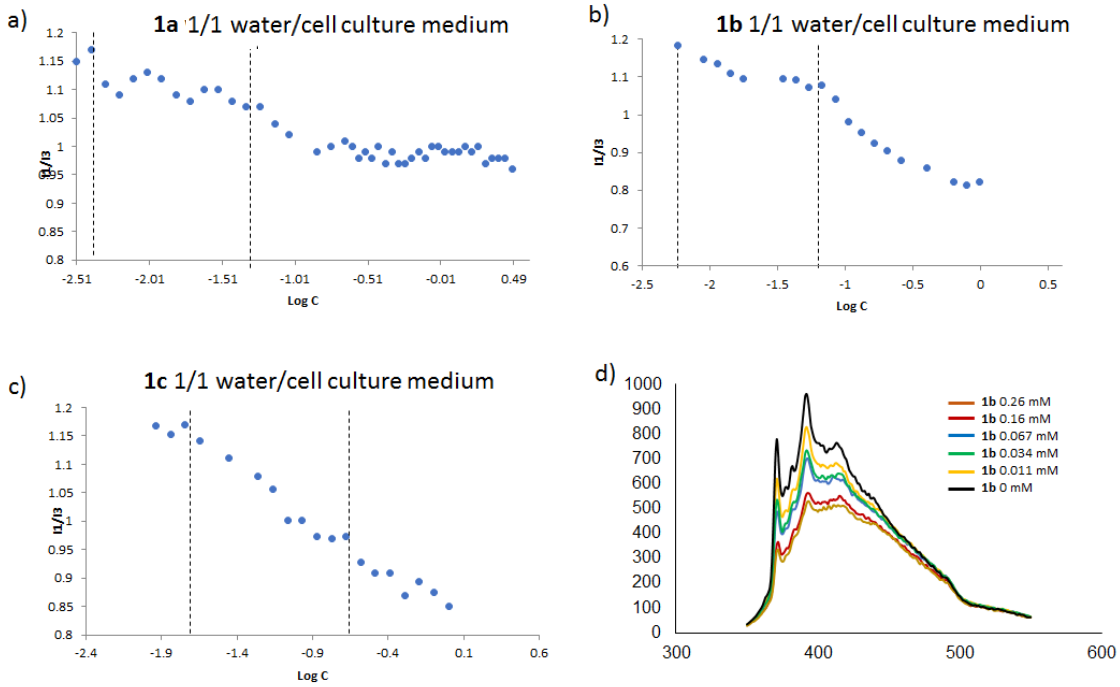


Fig. S10. a) - c) Plots of the I_1/I_3 ratios *v* log C for **1a-1c** in 1/1 water/bacterial cell culture medium at 25 °C. d) Emission spectra of pyrene in 1/1 water/bacterial cell culture medium at 25 °C in the presence of different amounts of **1b**.

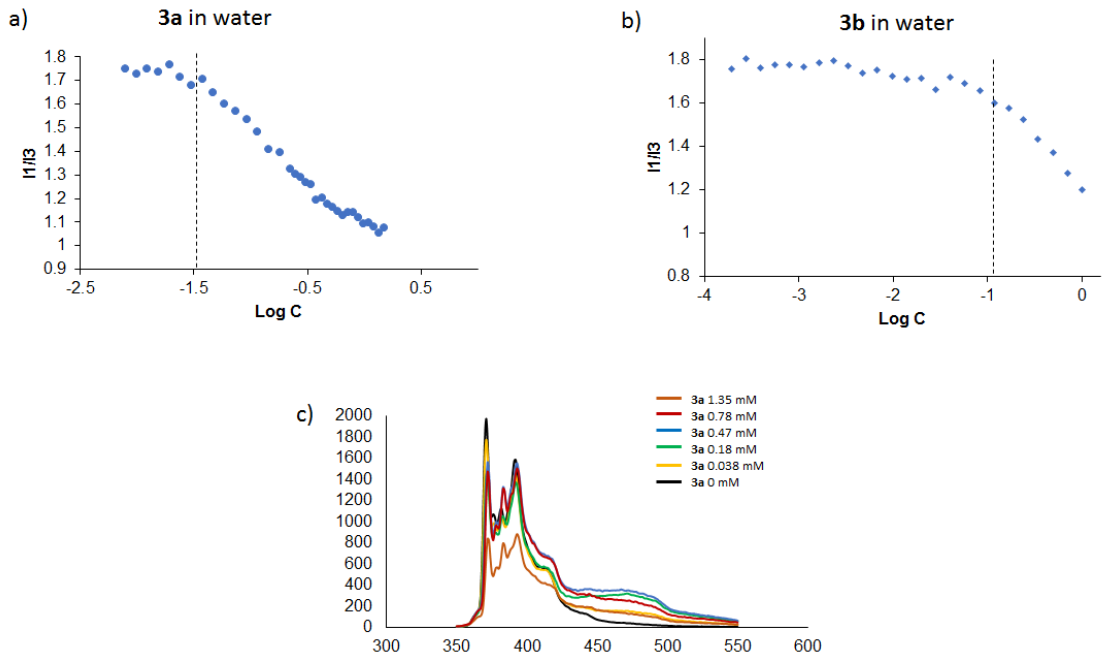


Fig. S11. a)-b) Plots of the I_1/I_3 ratios *v* log C for **3a-3b** in H_2O at 25 °C. d) Emission spectra of pyrene in H_2O at 25 °C in the presence of different amounts of **3a**.

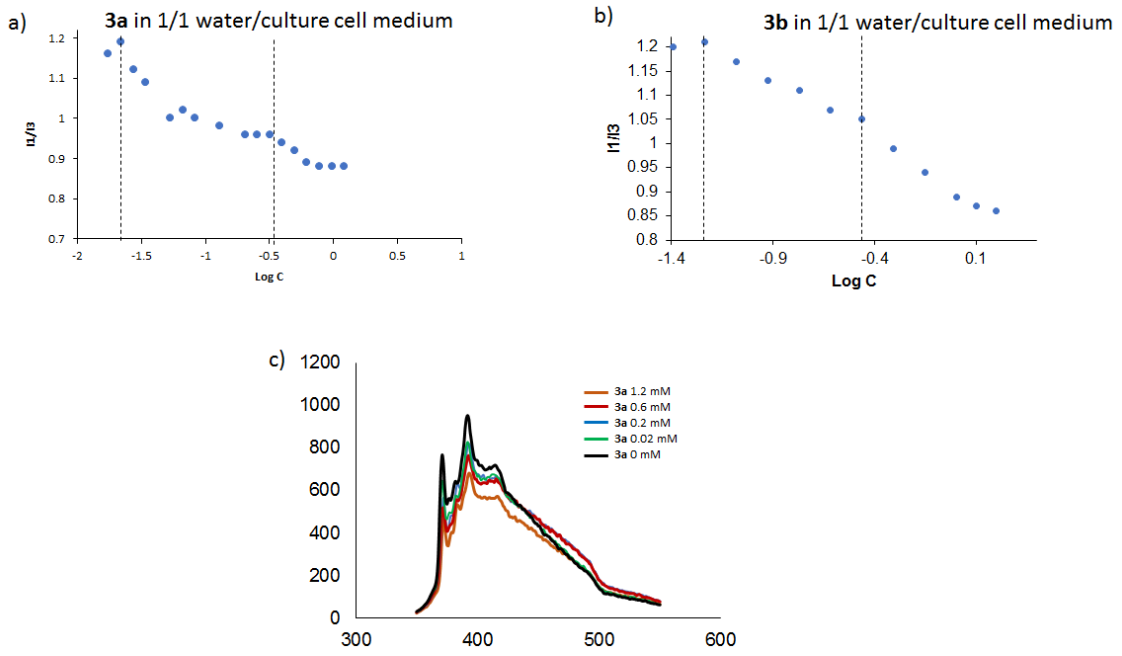


Fig. S12. a)-b) Plots of the I_1/I_3 ratios *v* log C for **3a-3b** in 1/1 water/bacterial cell culture medium at 25 °C. d) Emission spectra of pyrene in 1/1 water/bacterial cell culture medium at 25 °C in the presence of different amounts of **3a**.

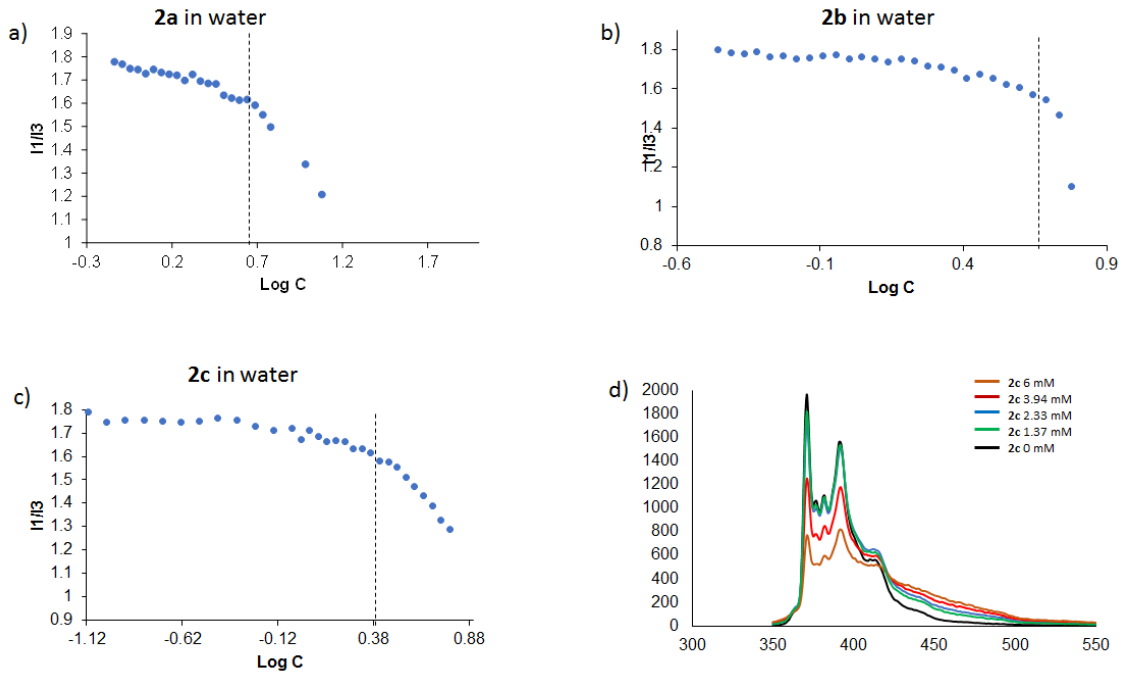


Fig. S13. a) - c) Plots of the I_1/I_3 ratios *v* log C for **2a-2c** in H_2O at 25 °C. d) Emission spectra of pyrene in H_2O at 25 °C in the presence of different amounts of **2c**.

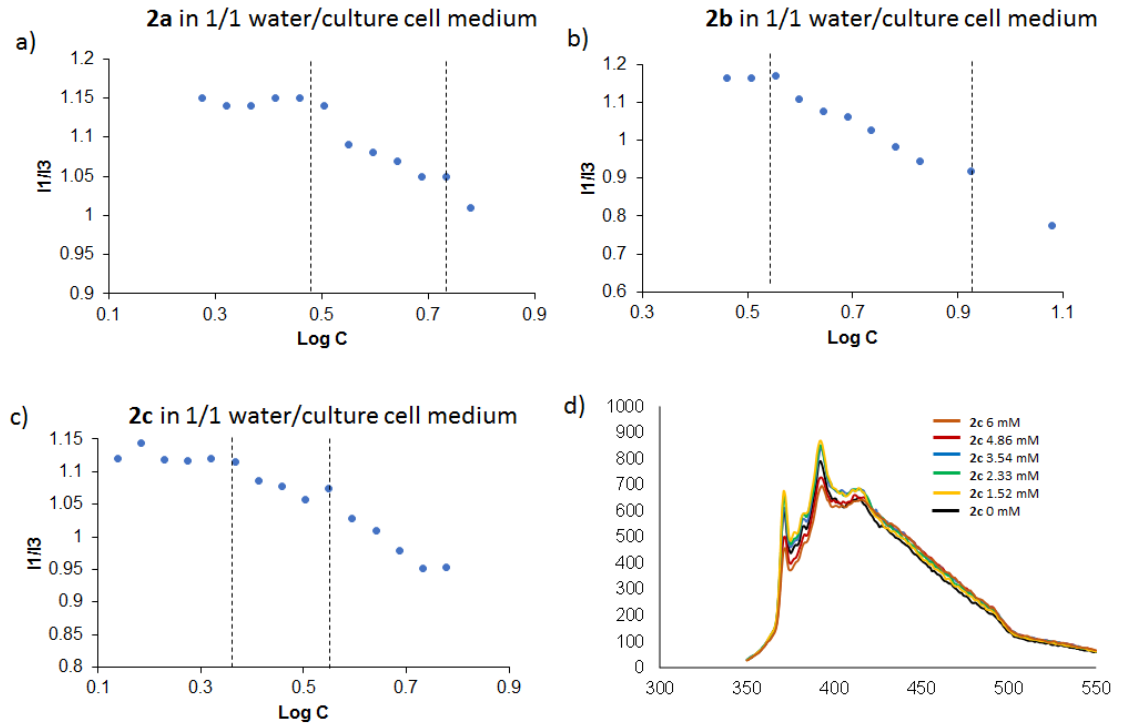


Fig. S14. a) - c) Plots of the I_1/I_3 ratios *v* log C for **2a-2c** in 1/1 water/ bacterial cell culture medium at 25 °C. d) Emission spectra of pyrene in 1/1 water/ bacterial cell culture medium at 25 °C in the presence of different amounts of **2c**.

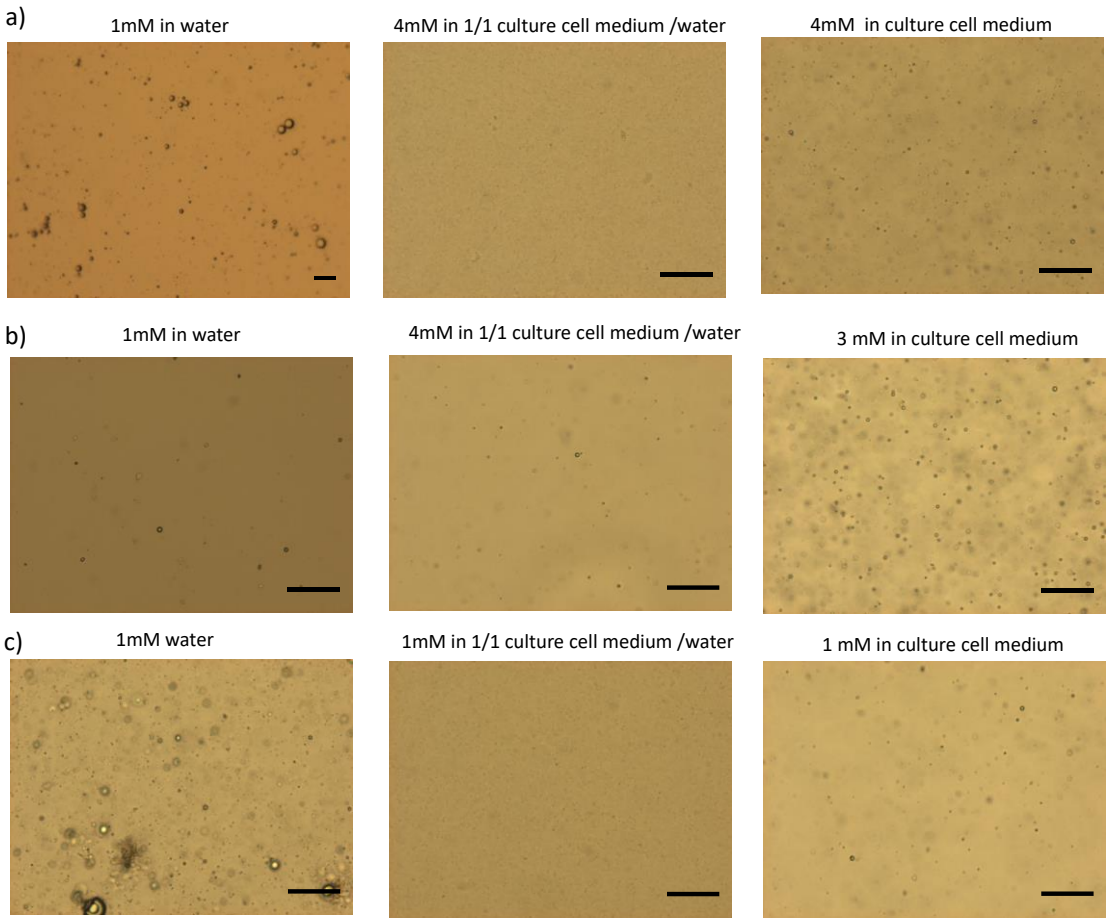


Fig. S15. Optical microscopy images for a) **1a** b) **1b** and c) **1c** at 25 °C in water, 1/1 water/bacterial cell culture medium and bacterial culture medium. Scale bar 50 μm.

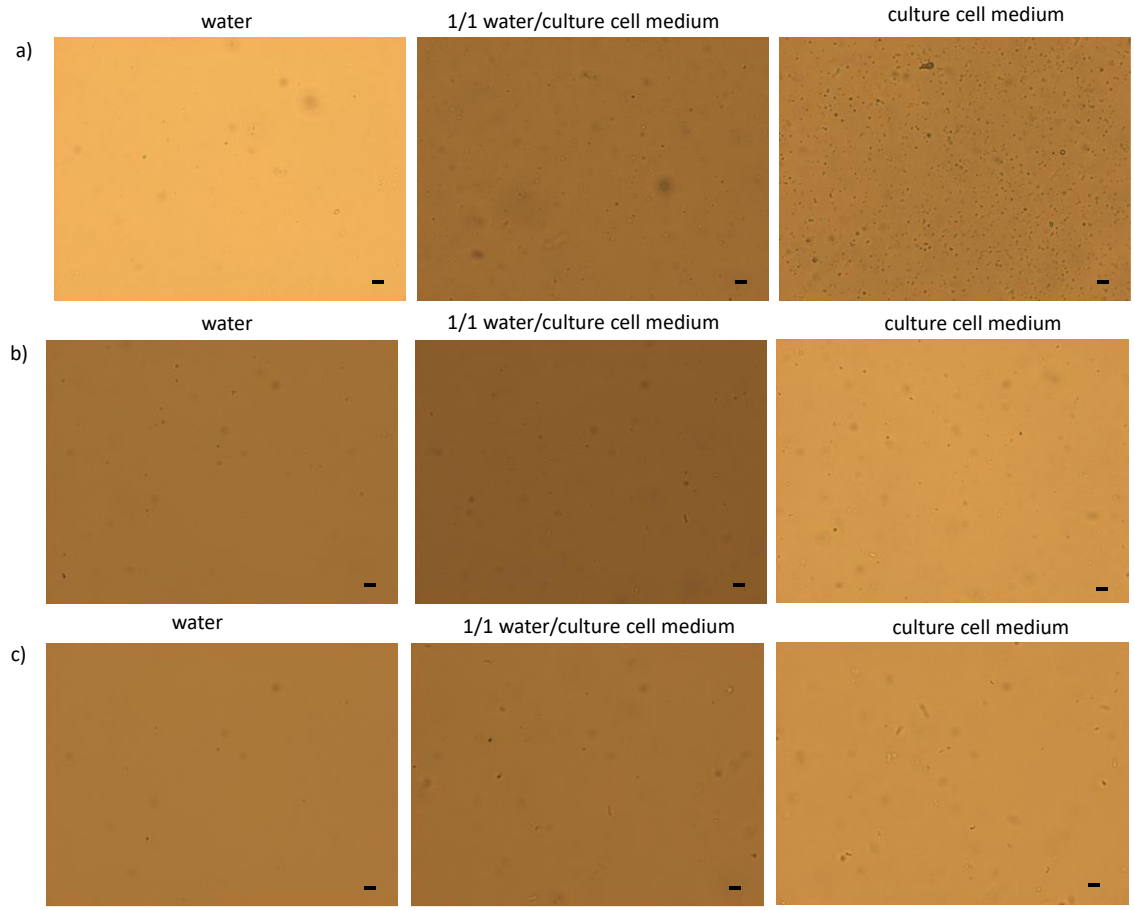


Fig S16. Optical microscopy images for a) **2a** b) **2b** and c) **2c** 4 mM at 25 ºC, in water, 1/1 water/bacterial cell culture medium and bacterial cell culture medium. Scale bar 10 μM.

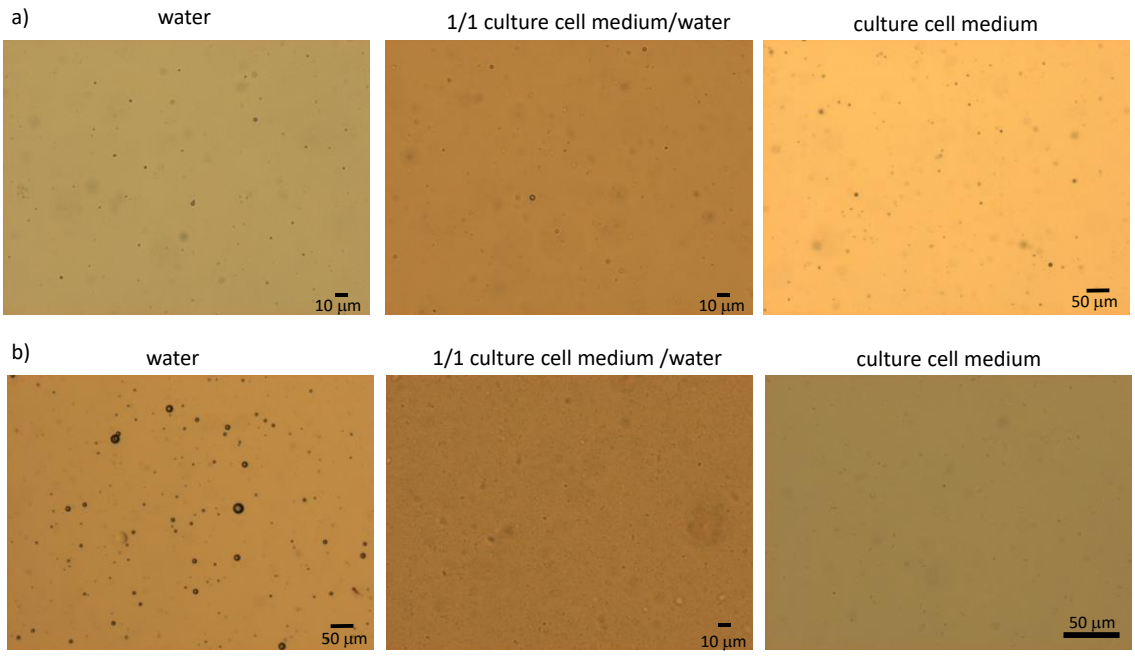


Fig S17. Optical microscopy images for a) **3a** 0.5 mM and b) **3b** 0.5 mM at 25 ºC, in water, 1/1 water/bacterial cell culture medium and bacterial cell culture medium.

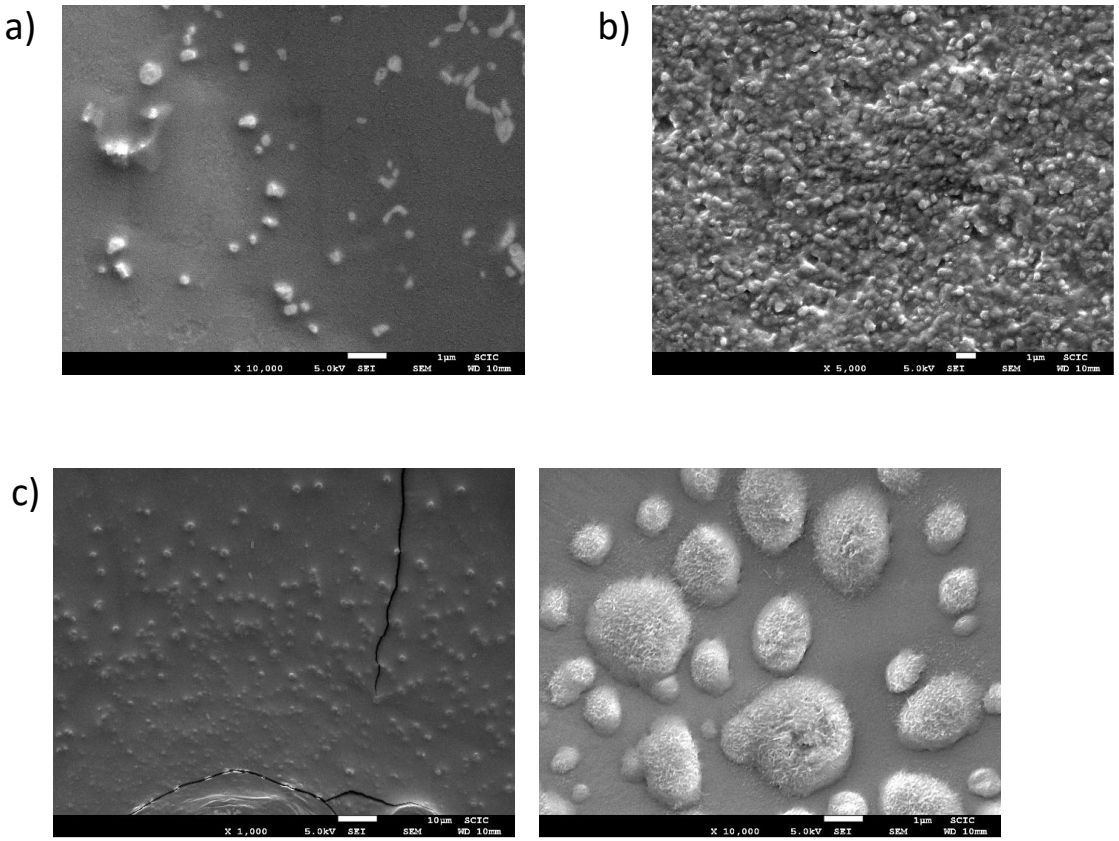


Fig S18. SEM images for **1c** a) 0.5 mM in water**;** b) 1 mM in 1/1 water/bacterial cell culture medium and c) 1 mM in bacterial cell culture medium.

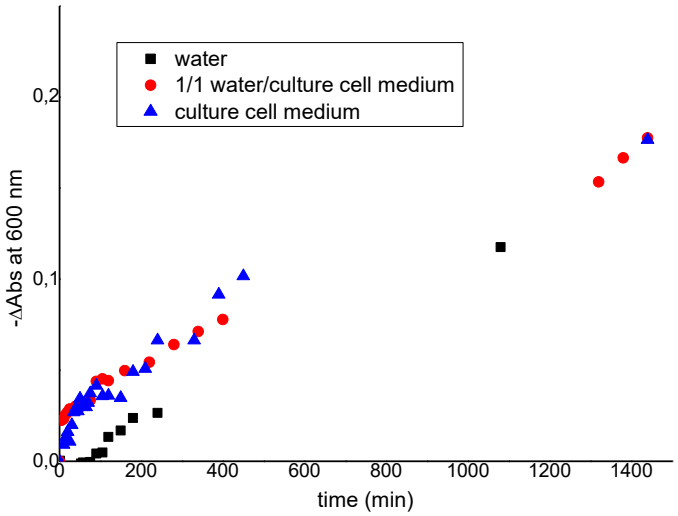


Fig. S19. Absorbance variation at 600 nm against time for **1a** (1 mM) in water, 1/1 water/bacterial cell culture medium, and bacterial cell culture medium.

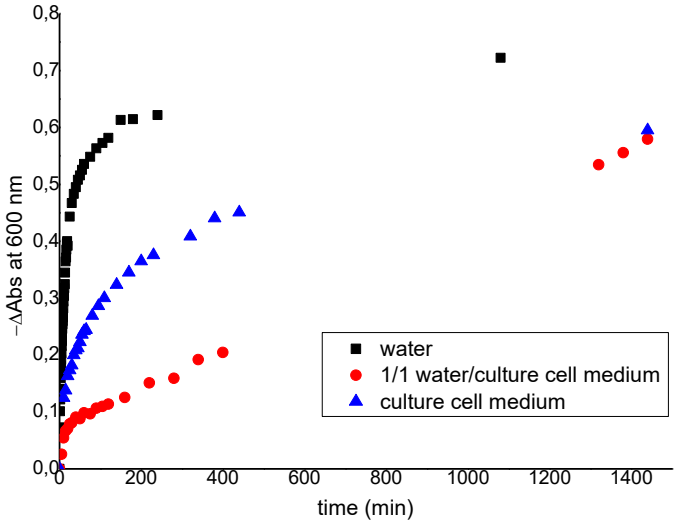


Fig. S20. Absorbance variation at 600 nm against time for **1c** (1mM) in water, 1/1 water/bacterial cell culture medium and bacterial cell culture medium.

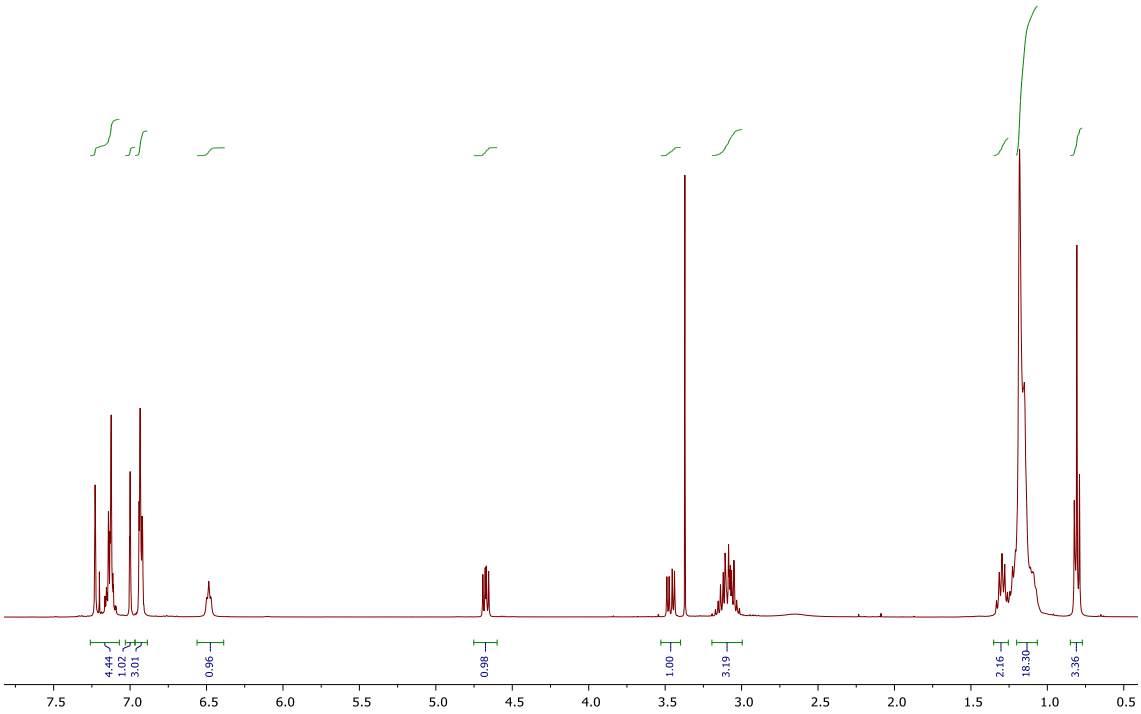


Fig. S21. ^{1}H NMR (400 MHz) of **3a** in $CDCl_3$ and CD_3OD.

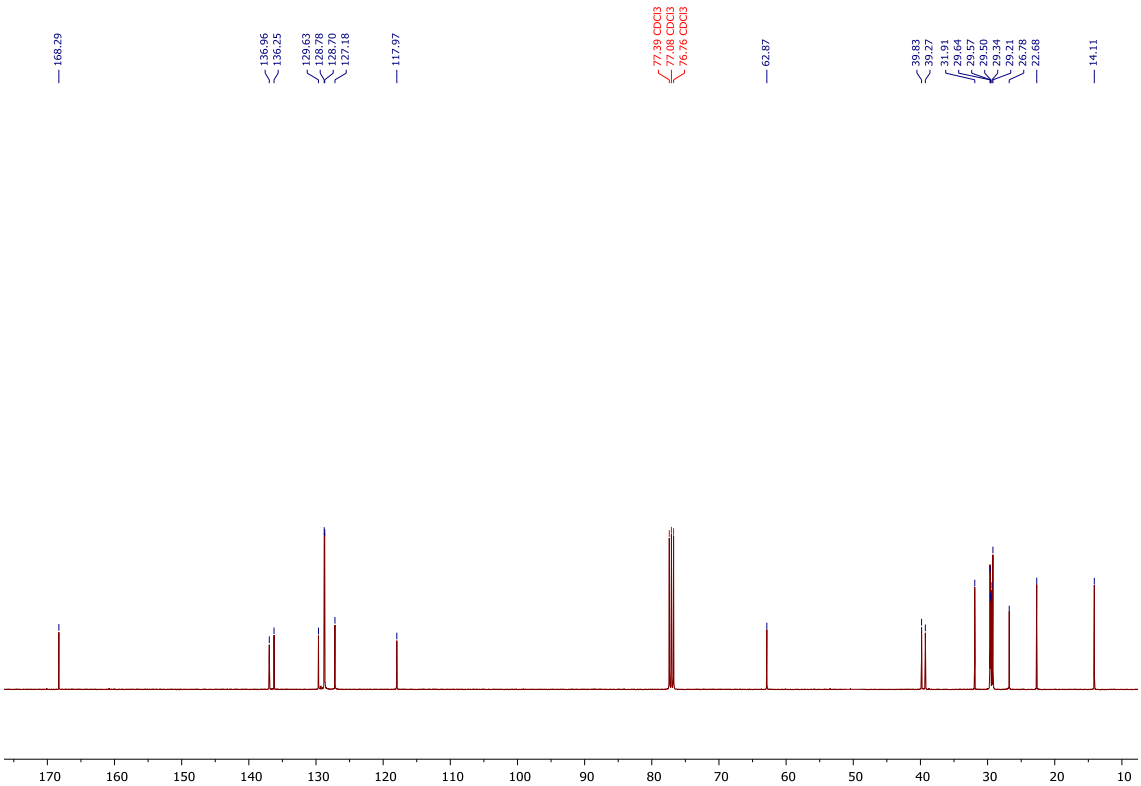


Fig. S22. ^{13}C NMR (101 MHz) of **3a** in $CDCl_3$.

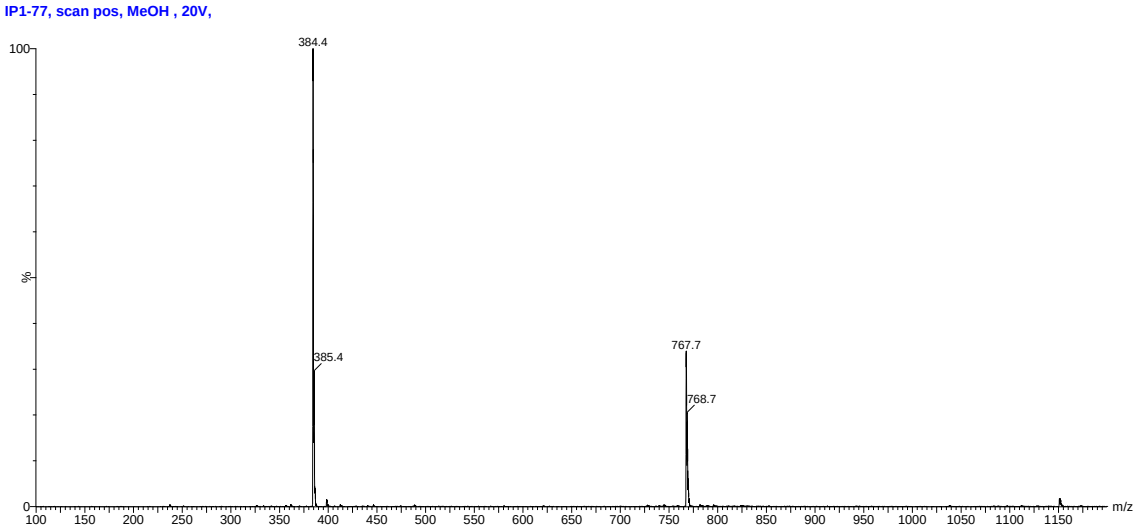


Fig. S23. MS (ESI) of **3a**.

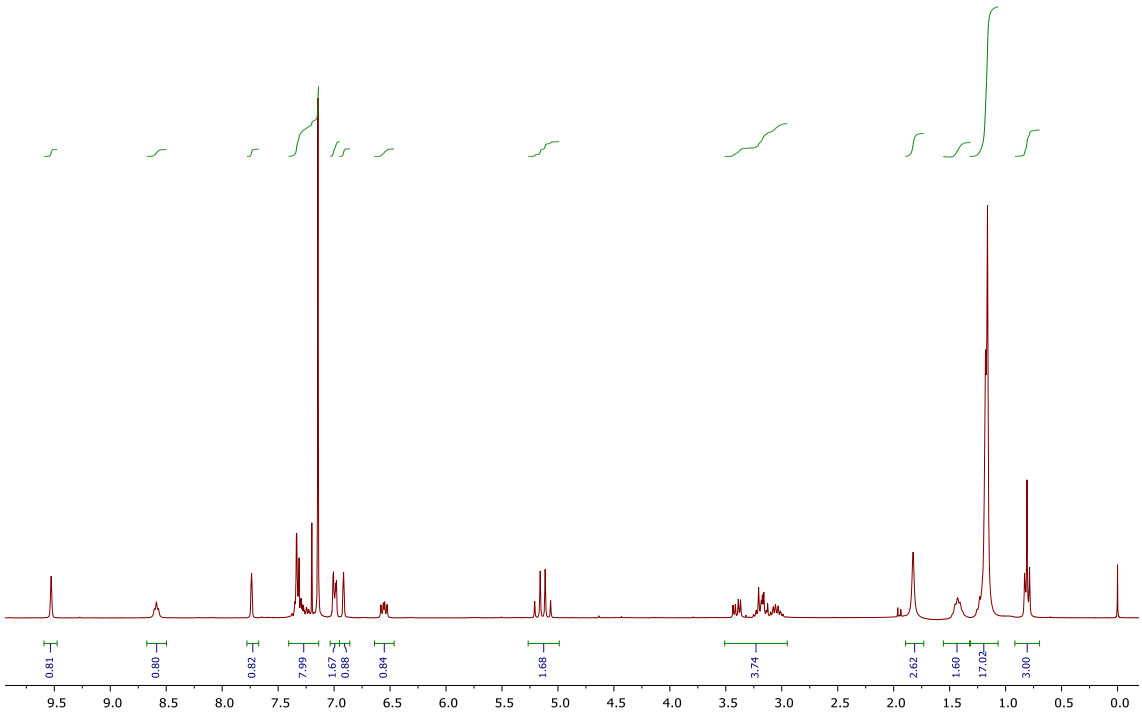


Fig. S24. ^{1}H NMR (300 MHz) of **3b** in $CDCl_3$.

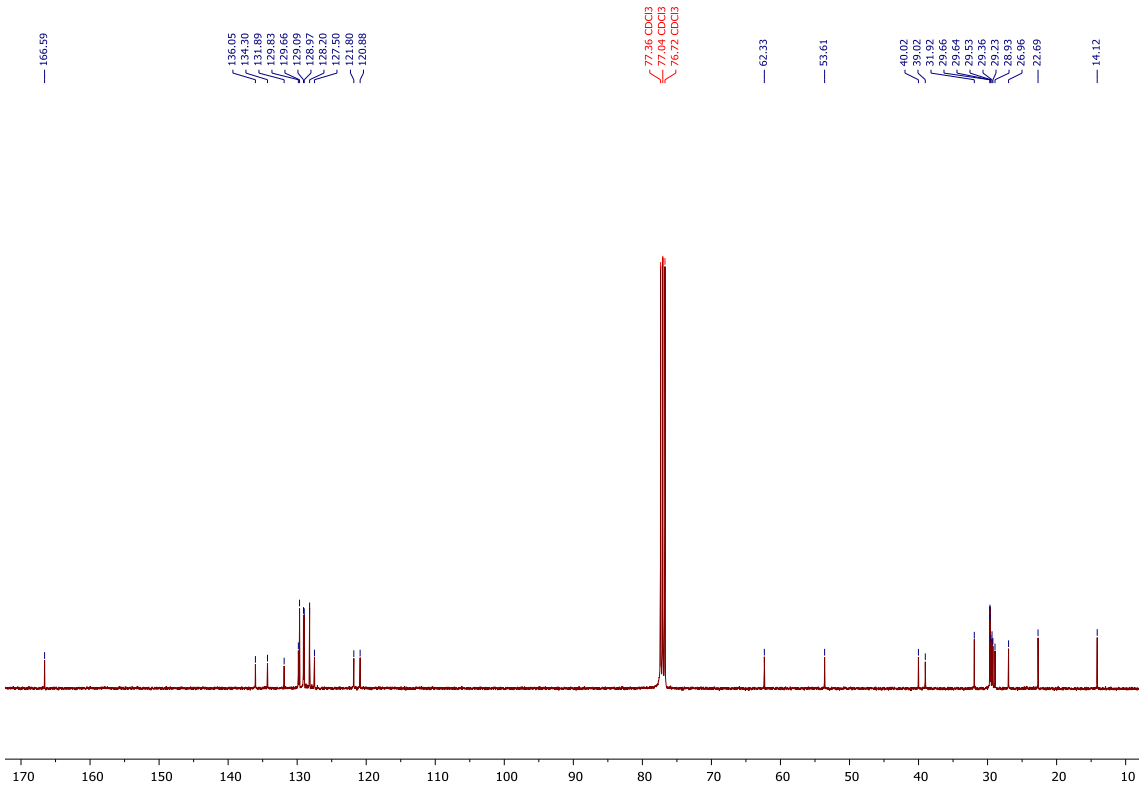


Fig. S25. ^{13}C NMR (101 MHz) of **3b** in $CDCl_3$.

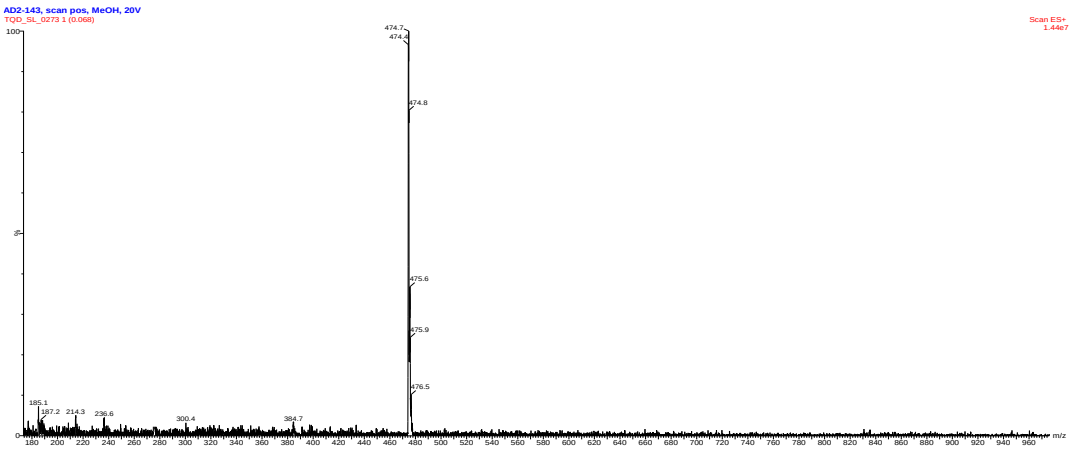


Fig. S26. MS (ESI) of **3b**.

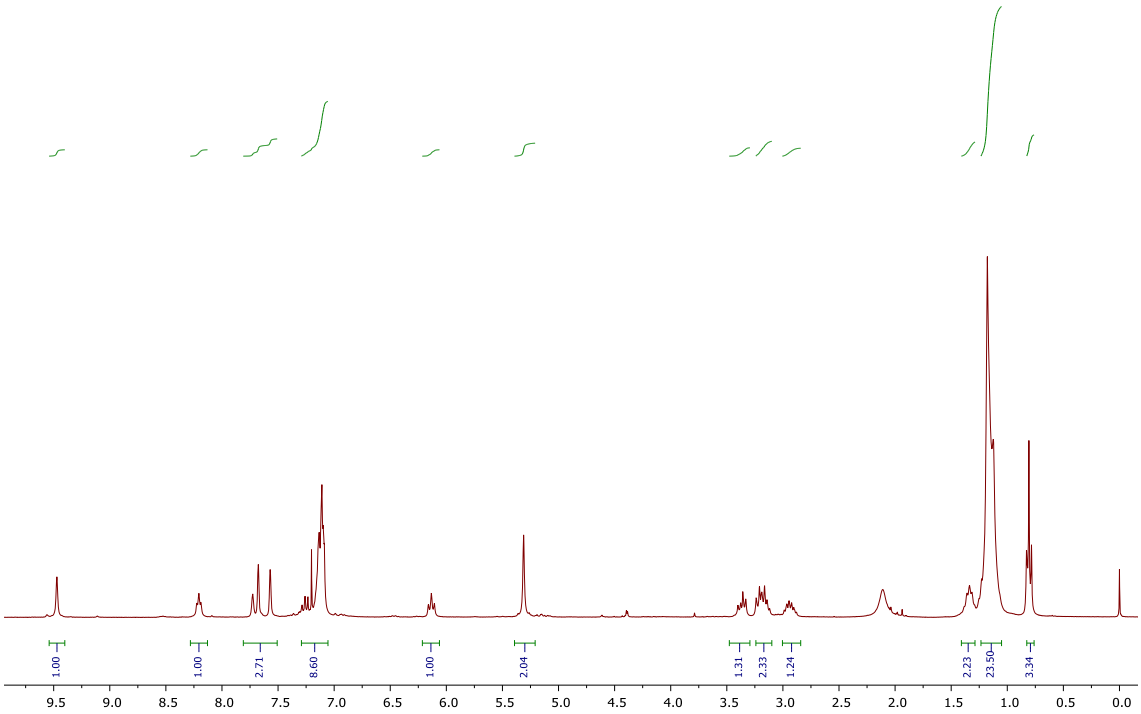


Fig. S27. ^{1}H NMR (300 MHz) of **3c** in $CDCl_3$.

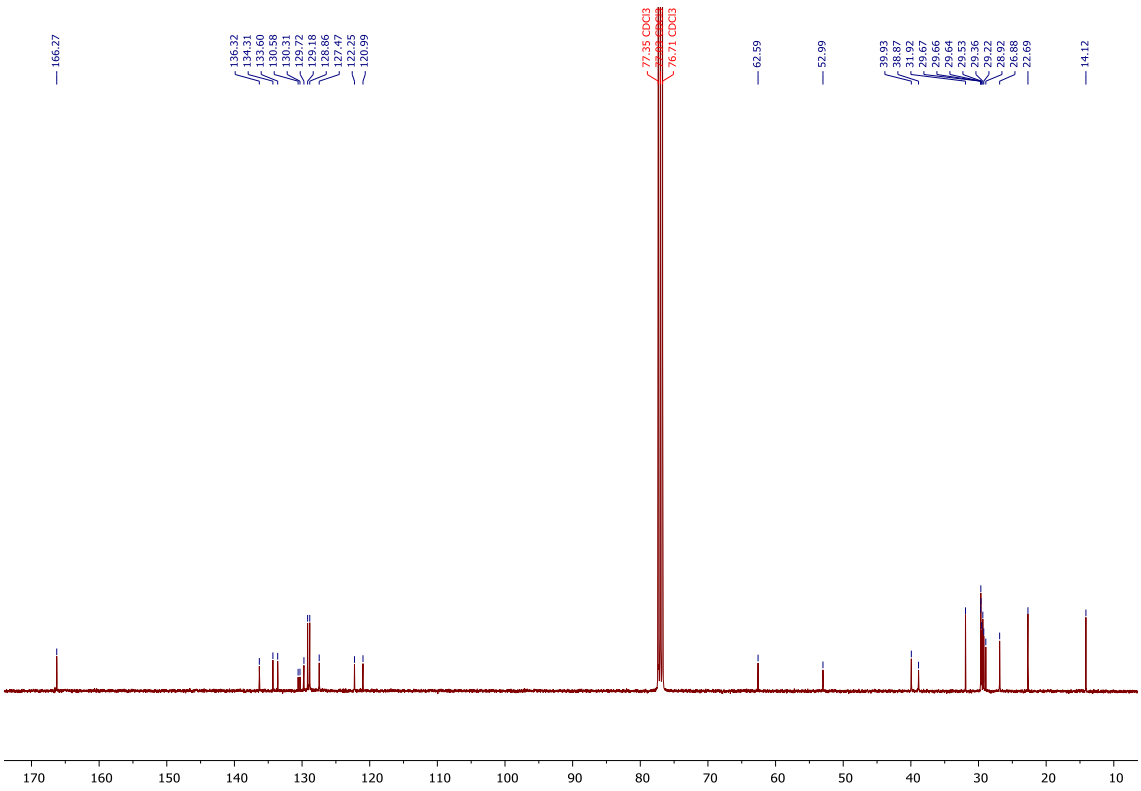


Fig. S28. ^{13}C NMR (101 MHz) of **3c** in $CDCl_3$.

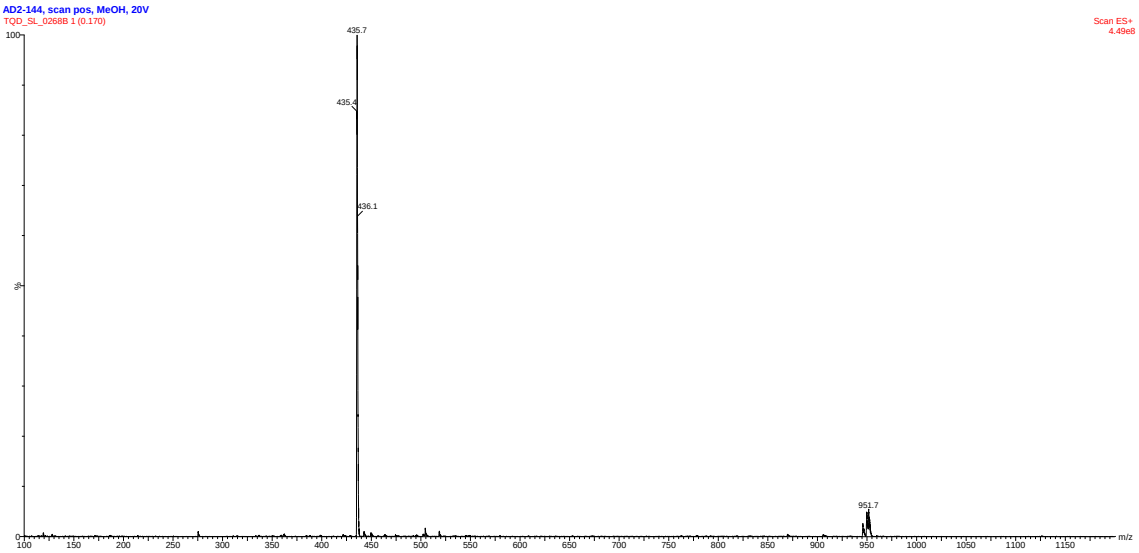


Fig. S29. MS (ESI) of **3c**.

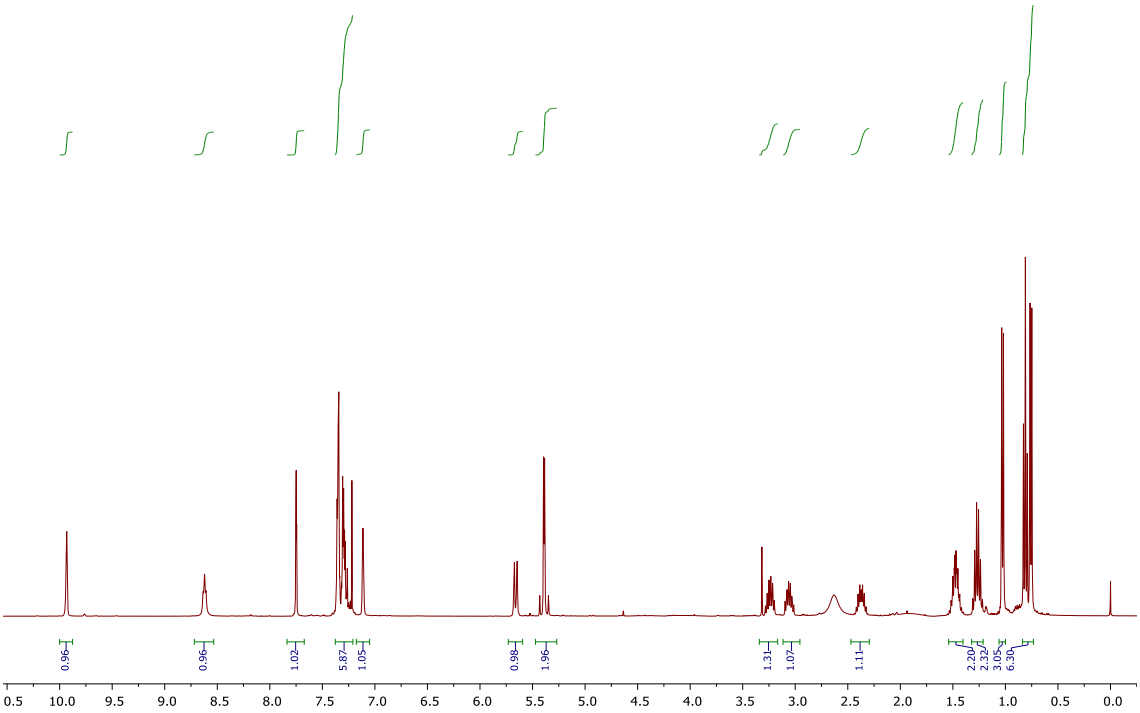


Fig. S30. ^{1}H NMR (400 MHz) of **2b** in $CDCl_3$.

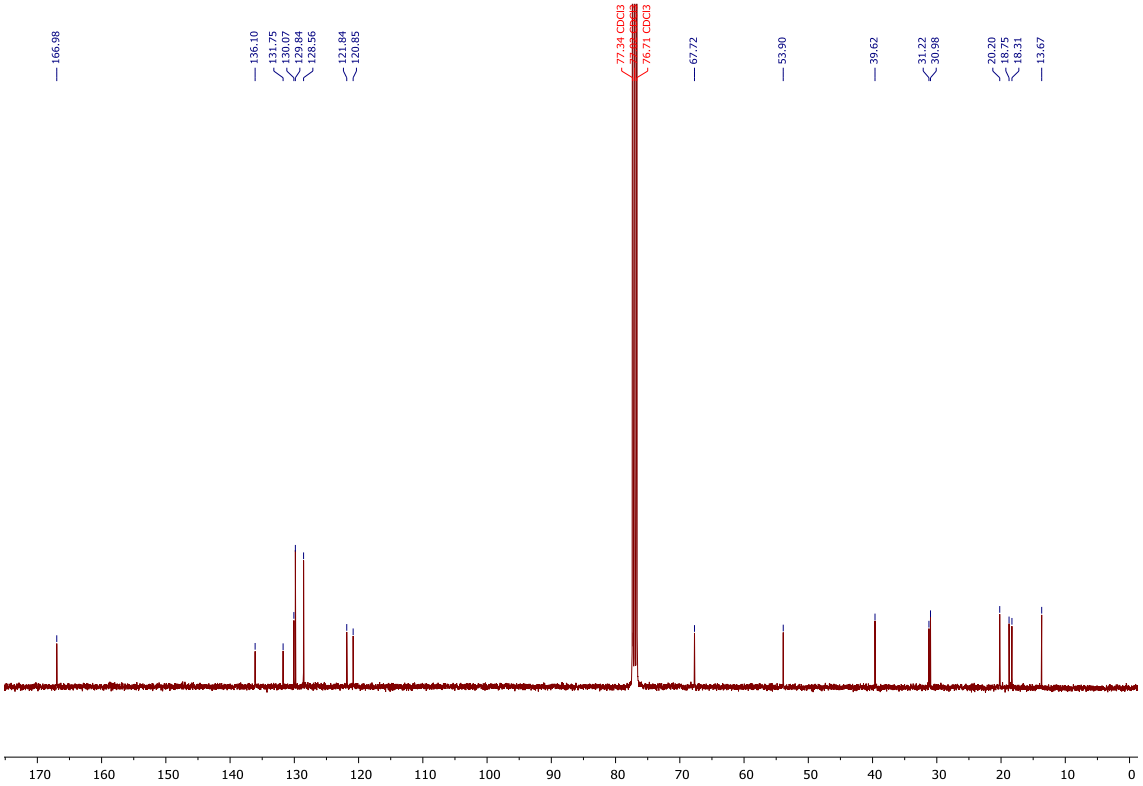


Fig. S31. ^{13}C NMR (101 MHz) of **2b** in $CDCl_3$.

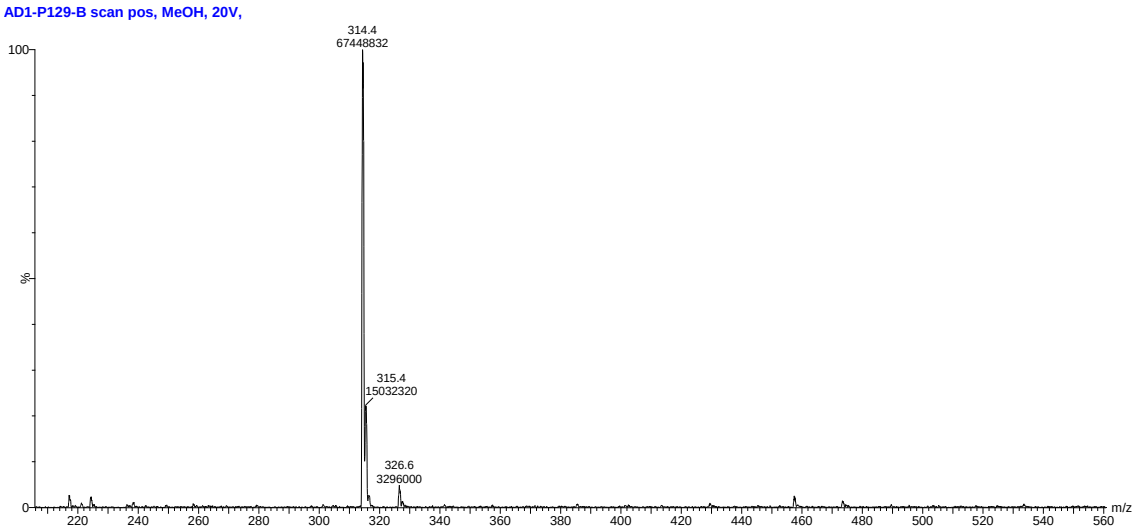


Fig. S32. MS (ESI) of **2b**.

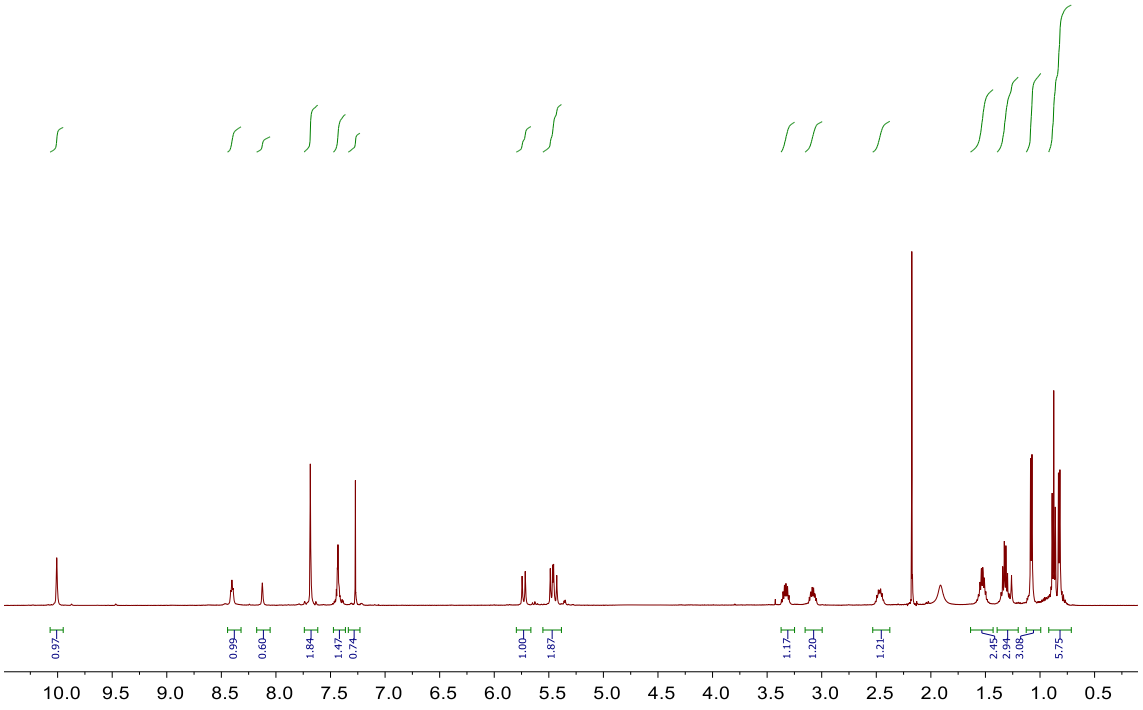


Fig. S33. ^{1}H NMR (500 MHz) of **2c** in $CDCl_3$.

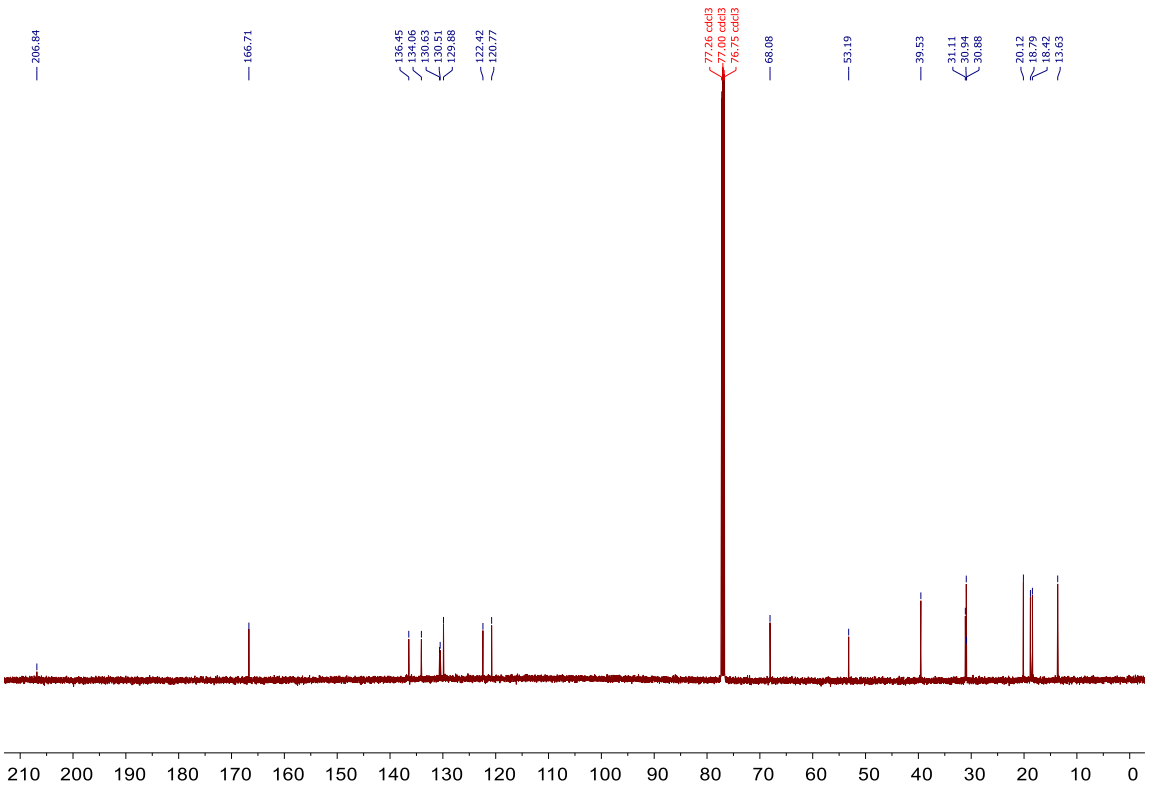


Fig. S34. ^{13}C NMR (126 MHz) of **2c** in $CDCl_3$.

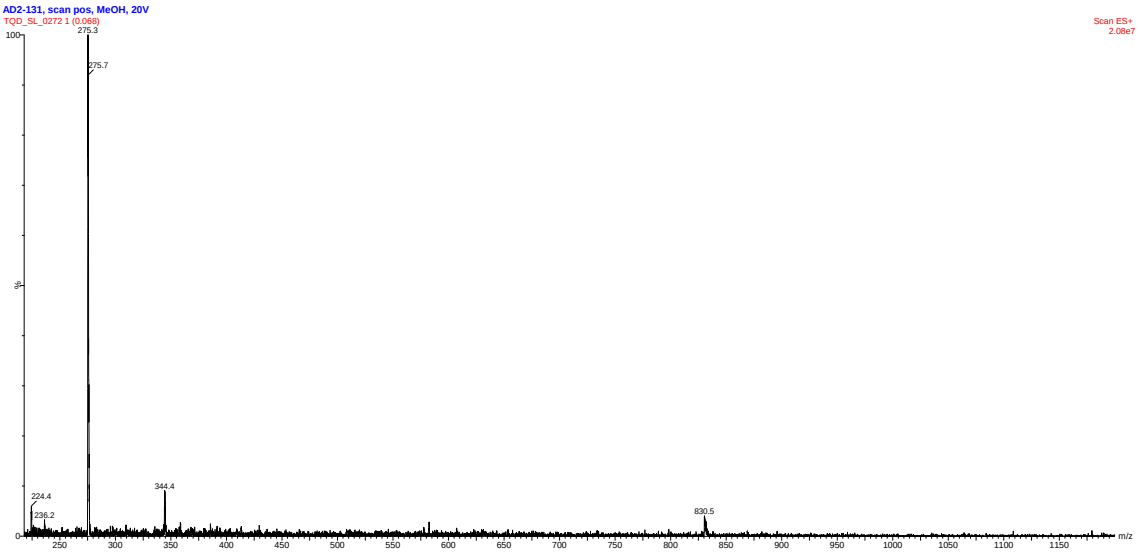


Fig. S35. MS (ESI) of **2c**.