# **Expanding the Described Metabolome of the Marine Cyanobacterium *Moorea producens* JHB through Orthogonal Natural Products Workflows**

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**The *M. producens* JHB Molecular Network**



**Spectroscopic Data for Hectochlorin (1)**



**Spectroscopic Data for Hectochlorin B (5)**



**Spectroscopic Data for Hectochlorin C (6)**



**Spectroscopic Data for Hectochlorin D (7)**

**Figure A. Full *Moorea producens* JHB Molecular Network, from LTQ-FT Data.**

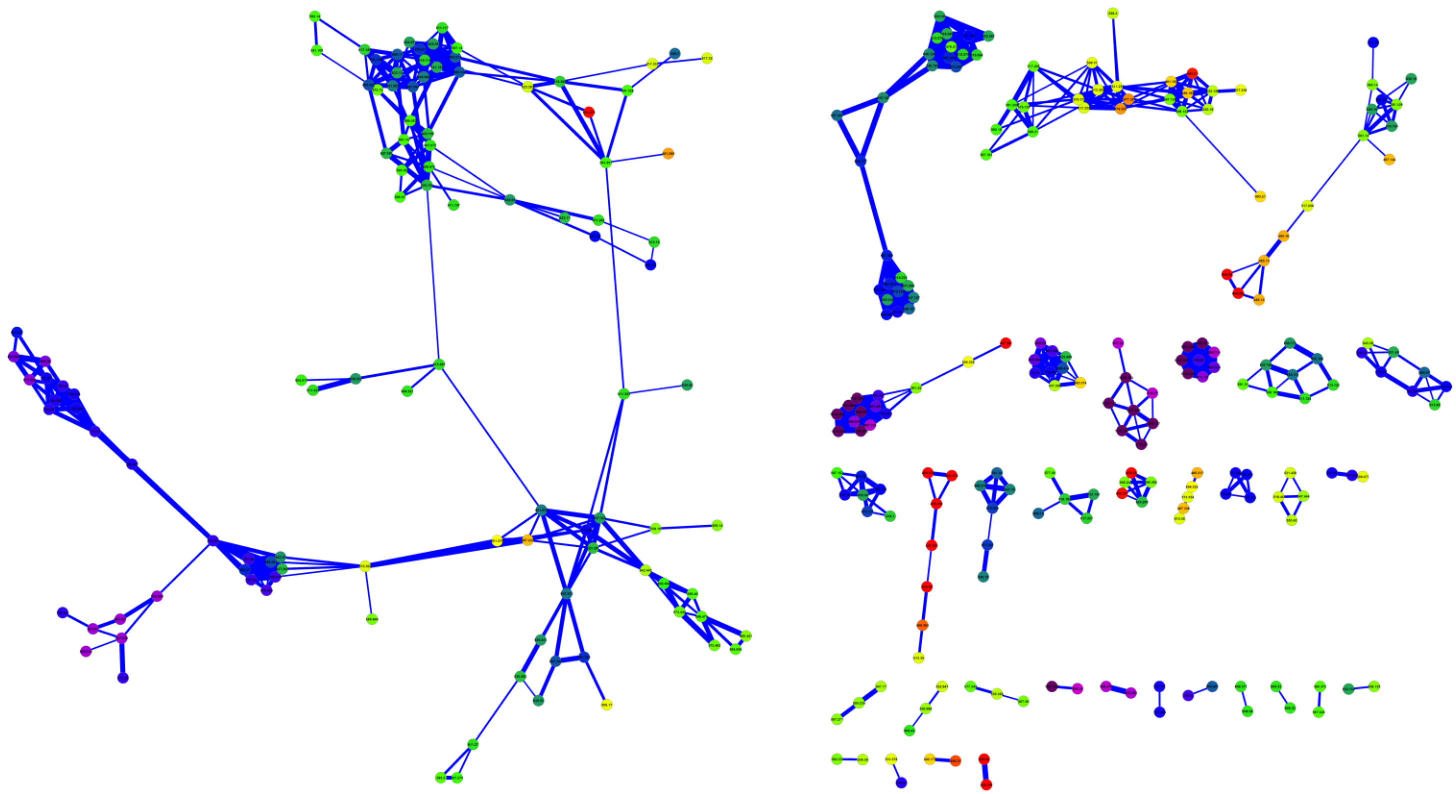


**Figure B. Hectochlorin Cluster within the JHB Molecular Network, from LTQ-FT Data.**

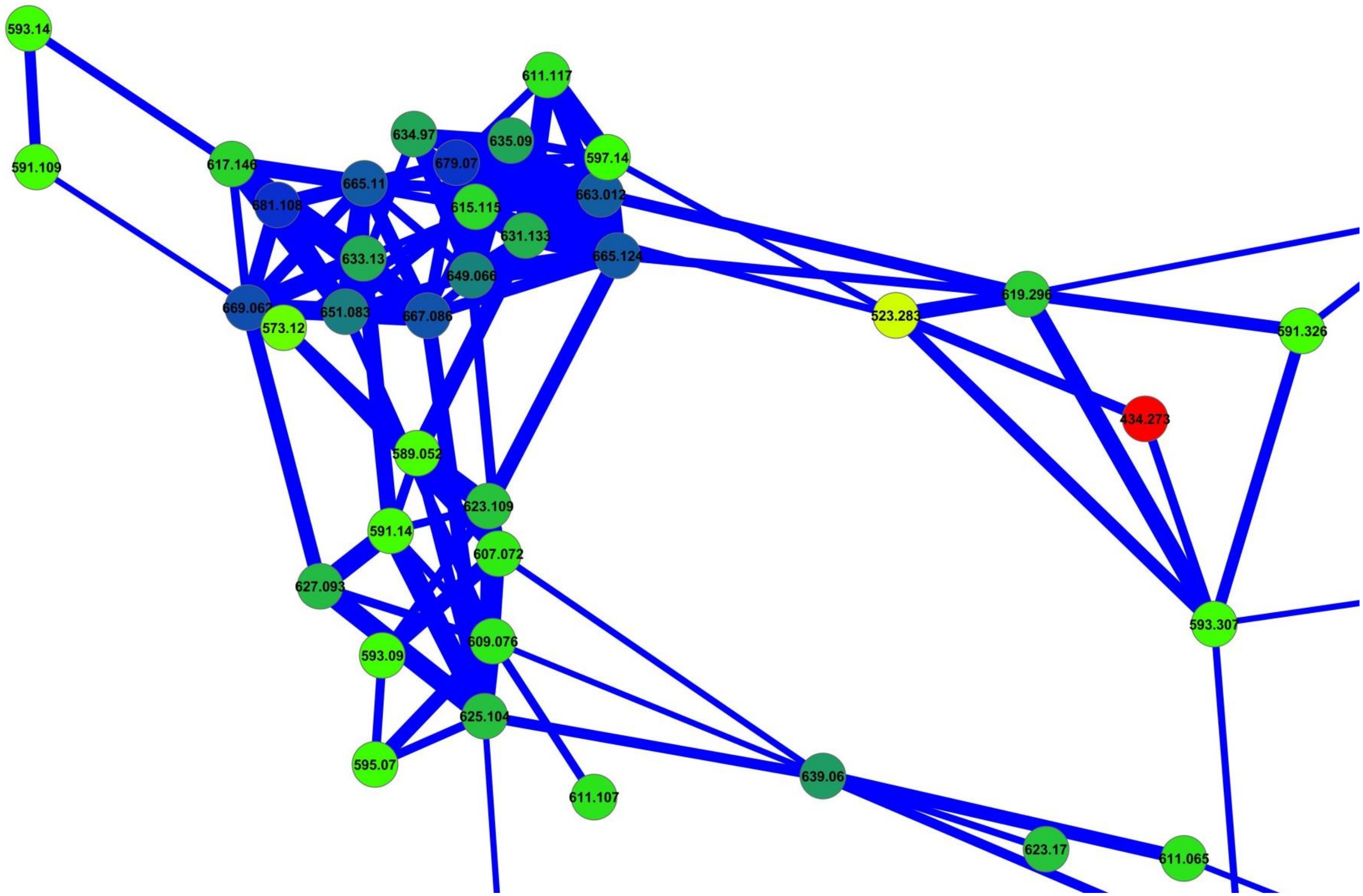
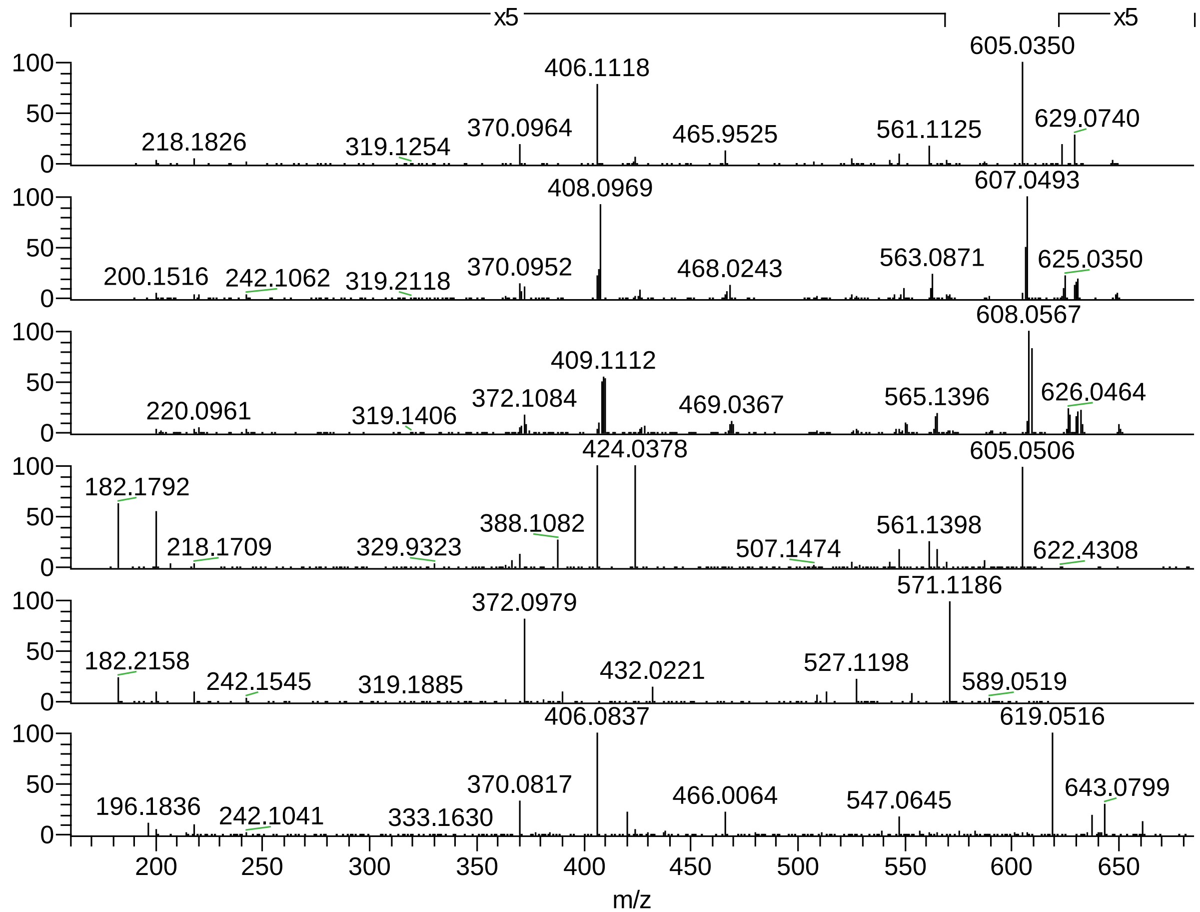


**Figure C. IT-MS$^2$ Fragment Spectra for the Hectochlorins, from LTQ-FT Data.**




Fragment Spectra:

Hectochlorin (**1**) $[M + H]^+$, Parent Mass 665 *m/z*

Hectochlorin (**1**) $[M^{37}Cl + H]^+$, Parent Mass 667 *m/z*

Hectochlorin (**1**) $[M^{37}Cl_2 + H]^+$, Parent Mass 669 *m/z*

Hectochlorin B (**5**) $[M + H]^+$, Parent Mass 623 *m/z*

Hectochlorin C (**6**) $[M + H]^+$, Parent Mass 631 *m/z*

Hectochlorin D (**7**) $[M + H]^+$, Parent Mass 679 *m/z*

**Figure D. Jamaicamide Cluster within the JHB Molecular Network, from LTQ-FT Data.**

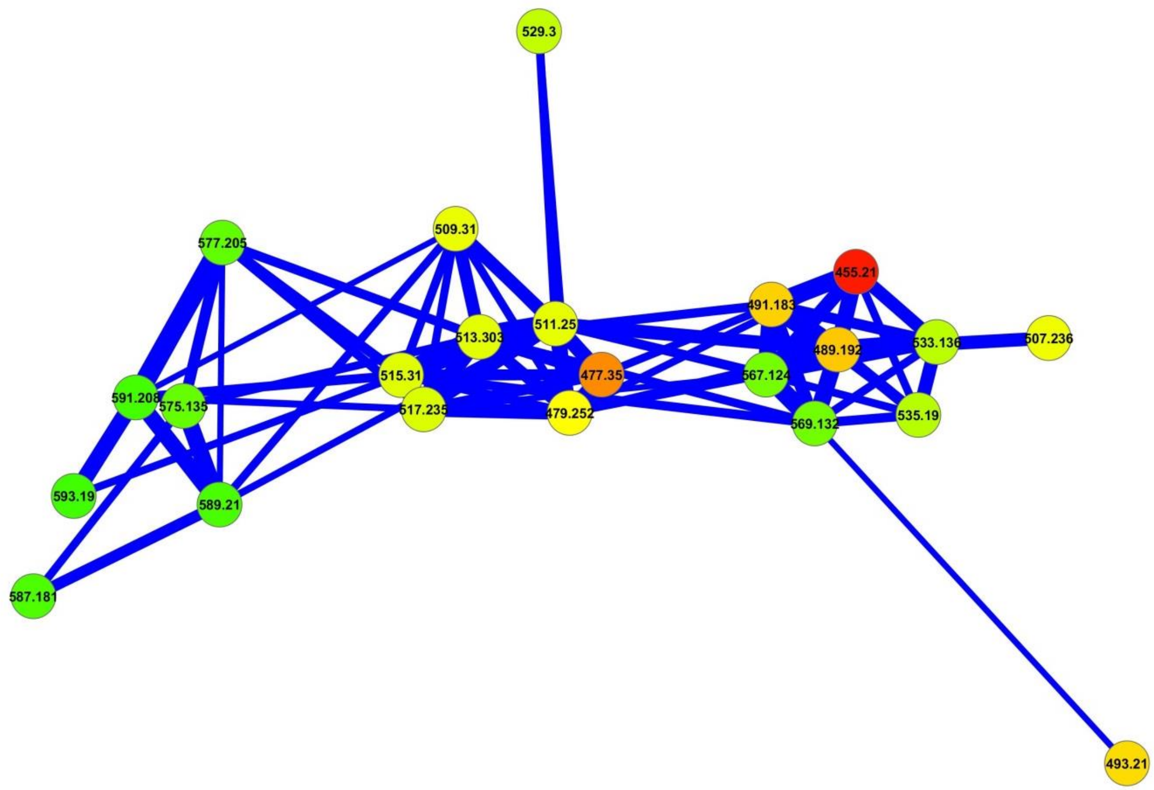
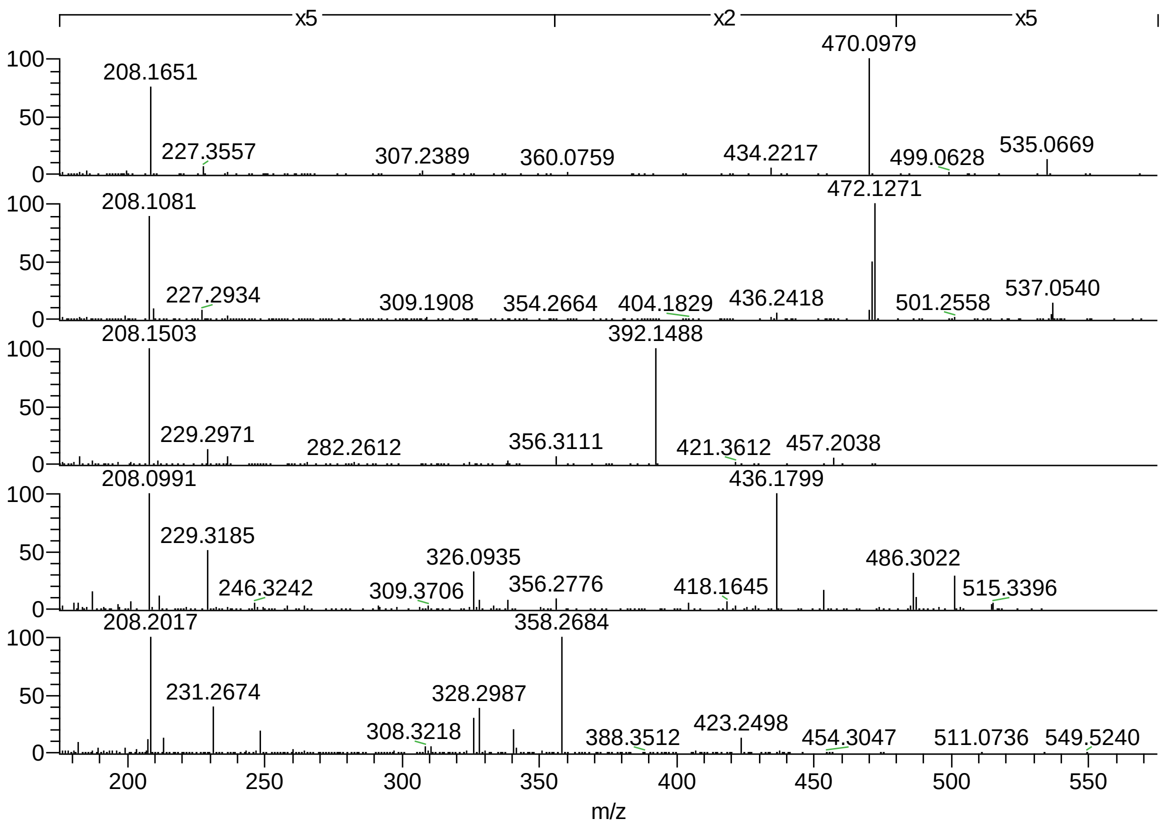


**Figure E. IT-MS$^2$ Fragment Spectra for the Jamaicamides, from LTQ-FT Data.**




Fragment Spectra:

Jamaicamide A (**2**) [M + H]$^+$, Parent Mass 567 *m/z*

Jamaicamide A (**2**) [M$^{81}$Br + H]$^+$, Parent Mass 569 *m/z*

Jamaicamide B (**3**) [M + H]$^+$, Parent Mass 489 *m/z*

Jamaicamide D (**8**) [M + H]$^+$, Parent Mass 533 *m/z*

Jamaicamide E (**9**) [M + H]$^+$, Parent Mass 455 *m/z*

**Table F. HRMS[1] Masses of Observed for the Hectochlorins and Jamaicamides, from LTQ-FT Data.**

| Compound | Calculated Formula | LCMS Observed HRMS[1] Mass *m/z* | Retention Time (min) | Isolated Compound HRMS[1] Mass *m/z* |
|---|---|---|---|---|
| Hectochlorin (**1**) | $C_{27}H_{35}Cl_2N_2O_9S_2$ $[M+H]^+$, 665.1156<br>$C_{27}H_{35}Cl^{37}ClN_2O_9S_2$ $[M+H]^+$, 667.1126<br>$C_{27}H_{34}Cl_2N_2NaO_9S_2$ $[M+Na]^+$, 687.0975<br>$C_{27}H_{34}Cl^{37}ClN_2NaO_9S_2$ $[M+Na]^+$, 689.0945 | 665.1182, 3.9 ppm, 2.6 mamu<br>667.1153, 4.0 ppm, 2.7 mamu<br>687.1070, 13.8 ppm, 9.5 mamu<br>689.1057, 16.2 ppm, 11.2 mamu | 23.8 | 665.1154, -0.3 ppm, -0.2 mamu<br>667.1126, 0 ppm, 0 mamu<br>687.0976, 0.1 ppm, 0.1 mamu<br>689.0948, 0.4 ppm, 0.3 mamu |
| Hectochlorin B (**5**) | $C_{25}H_{33}Cl_2N_2O_8S_2$ $[M+H]^+$, 623.1050<br>$C_{25}H_{33}Cl^{37}ClN_2O_8S_2$ $[M+H]^+$, 625.1020<br>$C_{25}H_{33}Cl_2N_2NaO_8S_2$ $[M+Na]^+$, 645.0869<br>$C_{25}H_{33}Cl^{37}ClN_2NaO_8S_2$ $[M+Na]^+$, 647.0840 | 623.1041, -1.4 ppm, -0.9 mamu<br>625.1019, -0.2 ppm, -0.1 mamu<br>645.0884, 2.3 ppm, 1.5 mamu<br>647.0856, 2.5 ppm, 1.6 mamu | 20.3 | 623.1050, 0 ppm, 0 mamu<br>625.1021, 0.2 ppm, 0.1 mamu<br>645.0870, 0.2 ppm, 0.1 mamu<br>647.0841, 0.2 ppm, 0.1 mamu |
| Hectochlorin C (**6**) | $C_{27}H_{36}ClN_2O_9S_2$ $[M+H]^+$, 631.1545<br>$C_{27}H_{36}{}^{37}ClN_2O_9S_2$ $[M+H]^+$, 633.1516<br>$C_{27}H_{36}ClN_2NaO_9S_2$ $[M+Na]^+$, 653.1365<br>$C_{27}H_{36}{}^{37}ClN_2NaO_9S_2$ $[M+Na]^+$, 655.1335 | 631.1516, -4.6 ppm, -2.9 mamu<br>633.1492, -3.8 ppm, -2.4 mamu<br>653.1333, -4.9 ppm, -3.2 mamu<br>655.1312, -3.5 ppm, -2.3 mamu | 22.6 | 631.1545, 0.0 ppm, 0 mamu<br>633.1519, 0.5 ppm, 0.3 mamu<br>653.1360, -0.8 ppm, 0.5 mamu<br>655.1337, 0.3 ppm, 0.2 mamu |
| Hectochlorin D (**7**) | $C_{28}H_{37}Cl_2N_2O_9S_2$ $[M+H]^+$, 679.1312<br>$C_{28}H_{37}Cl^{37}ClN_2O_9S_2$ $[M+H]^+$, 681.1283<br>$C_{28}H_{37}Cl_2N_2NaO_9S_2$ $[M+Na]^+$, 701.1131<br>$C_{28}H_{37}Cl^{37}ClN_2NaO_9S_2$ $[M+Na]^+$, 703.1102 | 679.1273, -5.7 ppm, -3.9 mamu<br>681.1245, -5.8 ppm, -3.8 mamu<br>701.1091, -5.7 ppm, -4.0 mamu<br>703.1065, -5.3 ppm, -3.7 mamu | 25.8 | 679.1306, -0.9 ppm, -0.6 mamu<br>681.1274, -1.3 ppm, -0.9 mamu<br>701.1129, -0.3 ppm, -0.2 mamu<br>703.1097, -0.7 ppm, -0.5 mamu |
| Jamaicamide A (**2**) | $C_{27}H_{37}BrClN_2O_4$ $[M+H]^+$, 567.1620<br>$C_{27}H_{37}{}^{81}BrClN_2O_4$ $[M+H]^+$, 569.1599<br>$C_{27}H_{36}BrClN_2NaO_4$ $[M+Na]^+$, 589.1439<br>$C_{27}H_{36}{}^{81}BrClN_2NaO_4$ $[M+Na]^+$, 591.1419 | 567.1631, 1.9 ppm, 1.1 mamu<br>569.1601, 0.3 ppm, 0.2 mamu<br>589.1478, 6.6 ppm, 3.9 mamu<br>591.1450, 5.2 ppm, 3.1 mamu | 30.5 | 567.1621, 0.2 ppm, 0.1 mamu<br>569.1597, -0.4 ppm, -0.2 mamu<br>589.1442, 0.5 ppm, 0.3 mamu<br>591.1418, -0.2 ppm, -0.1 mamu |
| Jamaicamide B (**3**) | $C_{27}H_{38}ClN_2O_4$ $[M+H]^+$, 489.2515<br>$C_{27}H_{38}{}^{37}ClN_2O_4$ $[M+H]^+$, 491.2485<br>$C_{27}H_{37}ClN_2NaO_4$ $[M+Na]^+$, 511.2334<br>$C_{27}H_{37}{}^{37}ClN_2NaO_4$ $[M+Na]^+$, 513.2305 | 489.2515, 0 ppm, 0 mamu<br>491.2510, 5.1 ppm, 2.5 mamu<br>511.2358, 4.7 ppm, 2.4 mamu<br>513.2336, 6.0 ppm, 3.1 mamu | 27.2 | 489.2513, -0.4 ppm, -0.2 mamu<br>491.2487, 0.4 ppm, 0.2 mamu<br>511.2333, -0.2 ppm, 0.1 mamu<br>513.2306, 0.2 ppm, 0.1 mamu |
| Jamaicamide D (**8**) | $C_{27}H_{38}BrN_2O_4$ $[M+H]^+$, 533.2009<br>$C_{27}H_{38}{}^{81}BrN_2O_4$ $[M+H]^+$, 535.1989<br>$C_{27}H_{37}BrN_2NaO_4$ $[M+Na]^+$, 555.1829<br>$C_{27}H_{37}{}^{81}BrN_2NaO_4$ $[M+Na]^+$, 557.1808 | 533.1983, -4.9 ppm, -2.6 mamu<br>535.1962, -5.0 ppm, -2.7 mamu<br>555.1799, -5.4 ppm, -3.0 mamu<br>557.1778, -5.4 ppm, -3.0 mamu | 29.9 | 533.2012, 0.6 ppm, 0.3 mamu<br>535.1991, 0.4 ppm, 0.2 mamu<br>555.1833, 0.7 ppm, 0.4 mamu<br>557.1812, 0.7 ppm, 0.4 mamu |
| Jamaicamide E (**9**) | $C_{27}H_{39}N_2O_4$ $[M+H]^+$, 455.2904<br>$C_{27}H_{38}N_2NaO_4$ $[M+Na]^+$, 477.2724 | 455.2877, -5.9 ppm, -2.7 mamu<br>477.2693, -6.5 ppm, -3.1 mamu | 26.5 | Not Isolated by HPLC |
| Jamaicamide F (**12**) | $C_{27}H_{37}ClIN_2O_4$ $[M+H]^+$, 615.1481<br>$C_{27}H_{37}{}^{37}ClIN_2O_4$ $[M+H]^+$, 617.1452<br>$C_{27}H_{36}ClIN_2NaO_4$ $[M+Na]^+$, 637.1300<br>$C_{27}H_{36}{}^{37}ClIN_2NaO_4$ $[M+Na]^+$, 639.1271 | 615.1549, 11.1 ppm, 6.8 mamu<br>617.1516, 10.4 ppm, 6.4 mamu<br>637.1363, 9.9 ppm, 6.3 mamu<br>639.1333, 9.7 ppm, 6.2 mamu | 29.4 | 615.1471, -1.6 ppm, -1.0 mamu<br>617.1441, -1.8 ppm, -1.1 mamu<br>637.1289, -1.7 ppm, -1.1 mamu<br>639.1259, -1.9 ppm, -1.2 mamu |

**Figure G. Full JHB Molecular Network, Iodide Rich Media, from LCQ Data.**

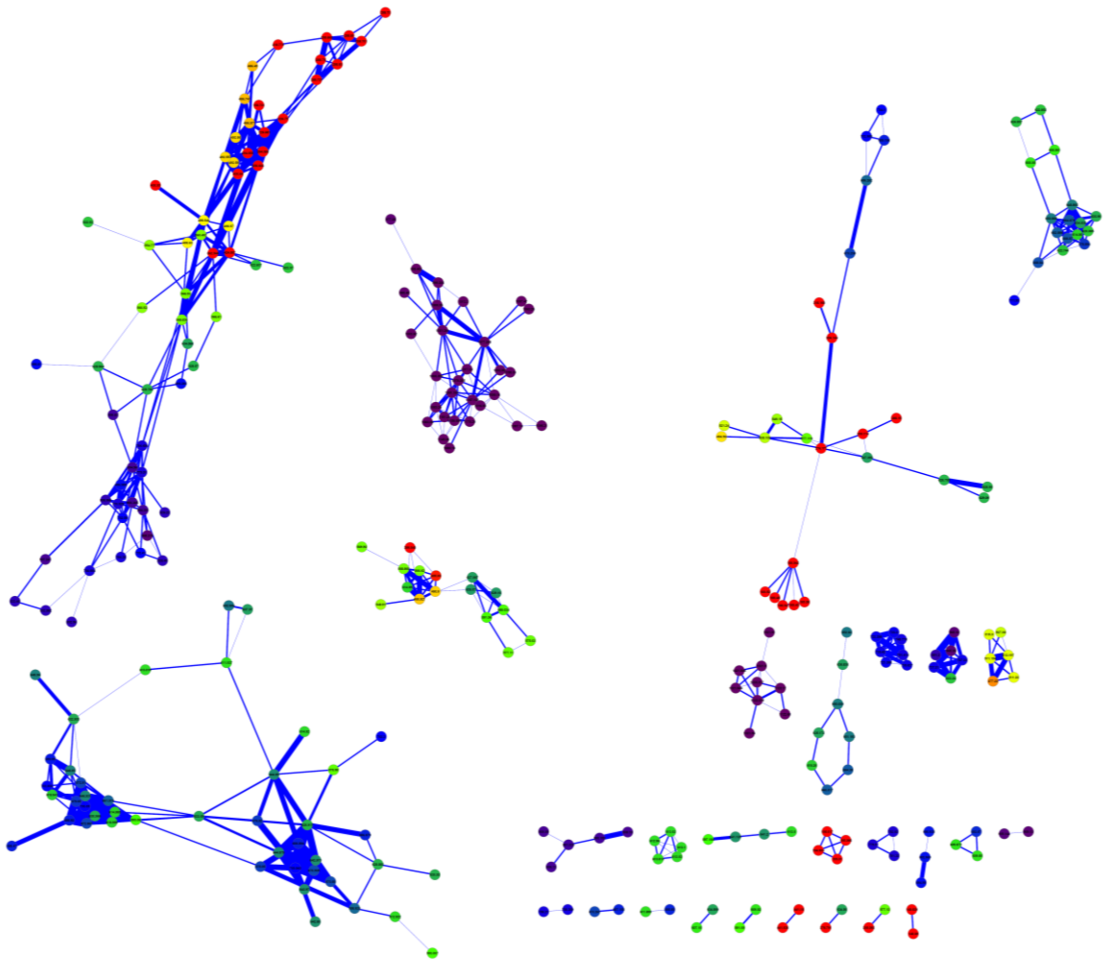


**Figure H. Jamaicamides Cluster within the JHB Molecular Network, Iodide Rich Media, from LCQ Data.**

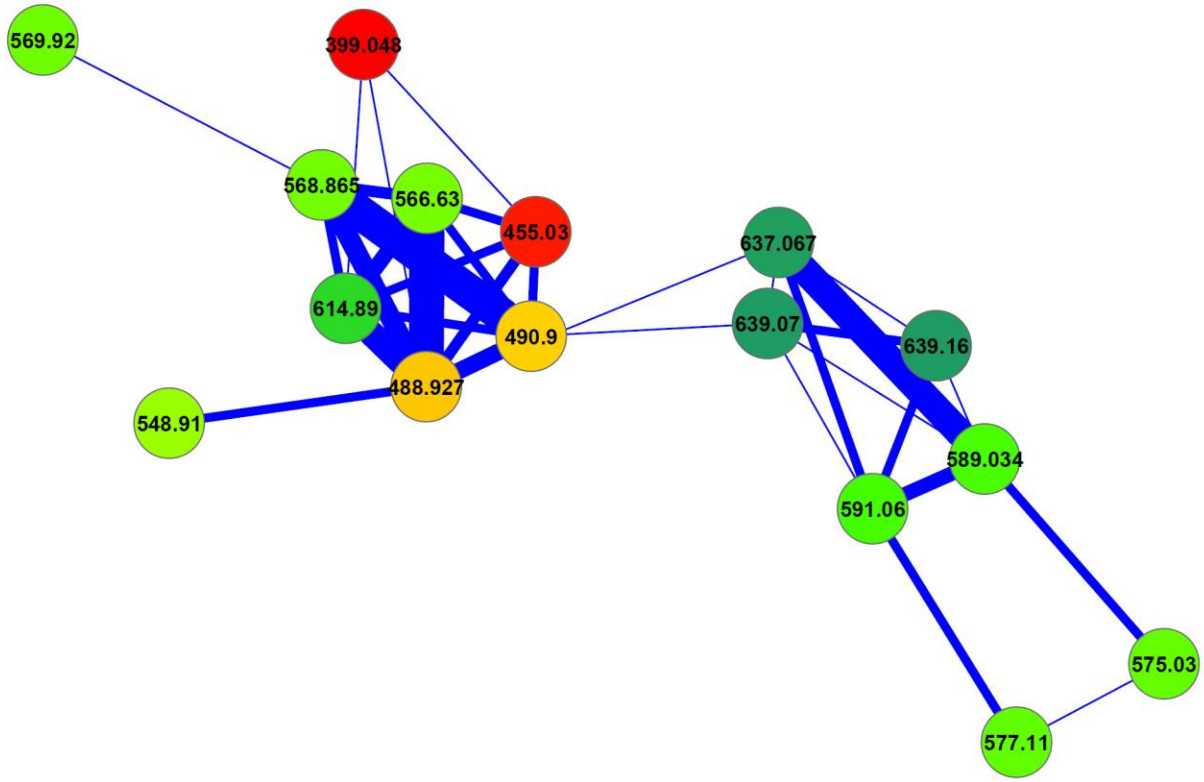
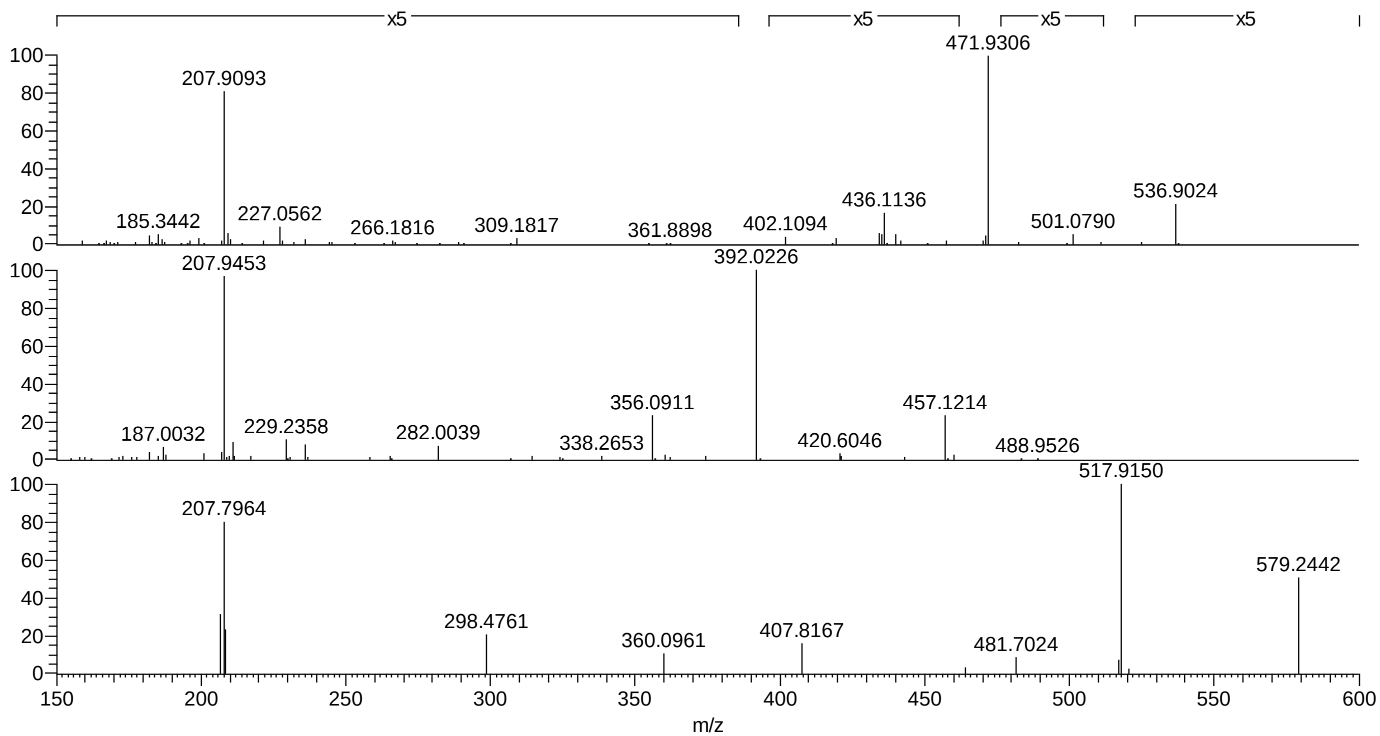


**Figure I. IT-MS$^2$ Fragment Spectra for the Jamaicamides, Iodide Rich Media, from LCQ Data.**




Fragment Spectra:

Jamaicamide A (**2**)
[M$^{81}$Br + H]$^+$,
Parent Mass 569 *m/z*

Jamaicamide B (**3**)
[M + H]$^+$,
Parent Mass 489 *m/z*

Jamaicamide F (**12**)
[M + H]$^+$,
Parent Mass 615 *m/z*

**Table J. NMR Data Summary for Hectochlorin (1).**

| Position | $\delta_C$, type[a] | $\delta_H$ ($J$ in Hz)[b] | HMBC[b] | TOCSY[b] |
|---|---|---|---|---|
| 1 | 172.9, C | -- | | |
| 2 | 42.6, CH | 3.16, quintet (7.4) | 1, 3, 9 | 3-6, 9 |
| 3 | 75.2, CH | 5.35, m | | 2, 4-6, 9 |
| 4a | 30.9, $CH_2$ | 1.71, m | | 2, 3, 4b, 5, 6, 9 |
| 4b | 30.9, $CH_2$ | 1.86, m | | 2, 3, 4a, 5, 6, 9 |
| 5 | 20.9, $CH_2$ | 1.71, m | | 2-4, 6, 9 |
| 6a | 49.3, $CH_2$ | 2.26, m | | 2-5, 6b, 9 |
| 6b | 49.3, $CH_2$ | 2.15, m | | 2-5, 6a, 9 |
| 7 | 90.4, C | -- | | |
| 8 | 37.2, $CH_3$ | 2.11, s | 6,7 | |
| 9 | 15.1, $CH_3$ | 1.29, d (7.4) | 1-3, self | 2-6 |
| 10 | 161.1, C | -- | | |
| 11 | 147.0, C | -- | | |
| 12 | 128.6, CH | 8.17, s | 11, 13 | 14 |
| 13 | 166.3, C[c] | -- | | |
| 14 | 74.7, CH | 6.84, s | 13, 15-17, 26 | 12 |
| 15 | 82.0, C | -- | | |
| 16 | 24.4, $CH_3$ | 1.84, s | 14, 15, 17, self | |
| 17 | 21.9, $CH_3$ | 1.61, s | 14-16, self | |
| 18 | 160.4, C | -- | | |
| 19 | 147.5, C | -- | | |
| 20 | 127.7, CH | 7.94, s | 19, 21 | |
| 21 | 165.1, C | -- | | |
| 22 | 77.8, CH | 5.67, s | 1, 21, 23, 25 | |
| 23 | 71.6, C | -- | | |
| 24 | 26.7, $CH_3$ | 1.31, s | 22, 23, 25 | |
| 25 | 26.0, $CH_3$ | 1.37, s | 22, 24 | |
| 26 | 168.7, C | -- | | |
| 27 | 20.9, $CH_3$ | 2.19, s | 26, self | |

All experiments in $CDCl_3$ with TMS standard, 1% v/v for 13C experiment, and 0.3% v/v for the rest. [a]Specturm collected on a Varian VX 500 MHz with $^{13}$C-optimized cryoprobe. [b]Spectra collected on a Bruker 600 MHz (600 MHz and 150 MHz for the $^{1}$H and $^{13}$C nuclei respectively) with 1.7 mm inverse cryo-probe. [c]Signal by projection from the HMBC experiment.

**Figure K.  $^{1}$H-NMR (600 MHz, $CDCl_3$) Spectrum of Hectochlorin (1).**

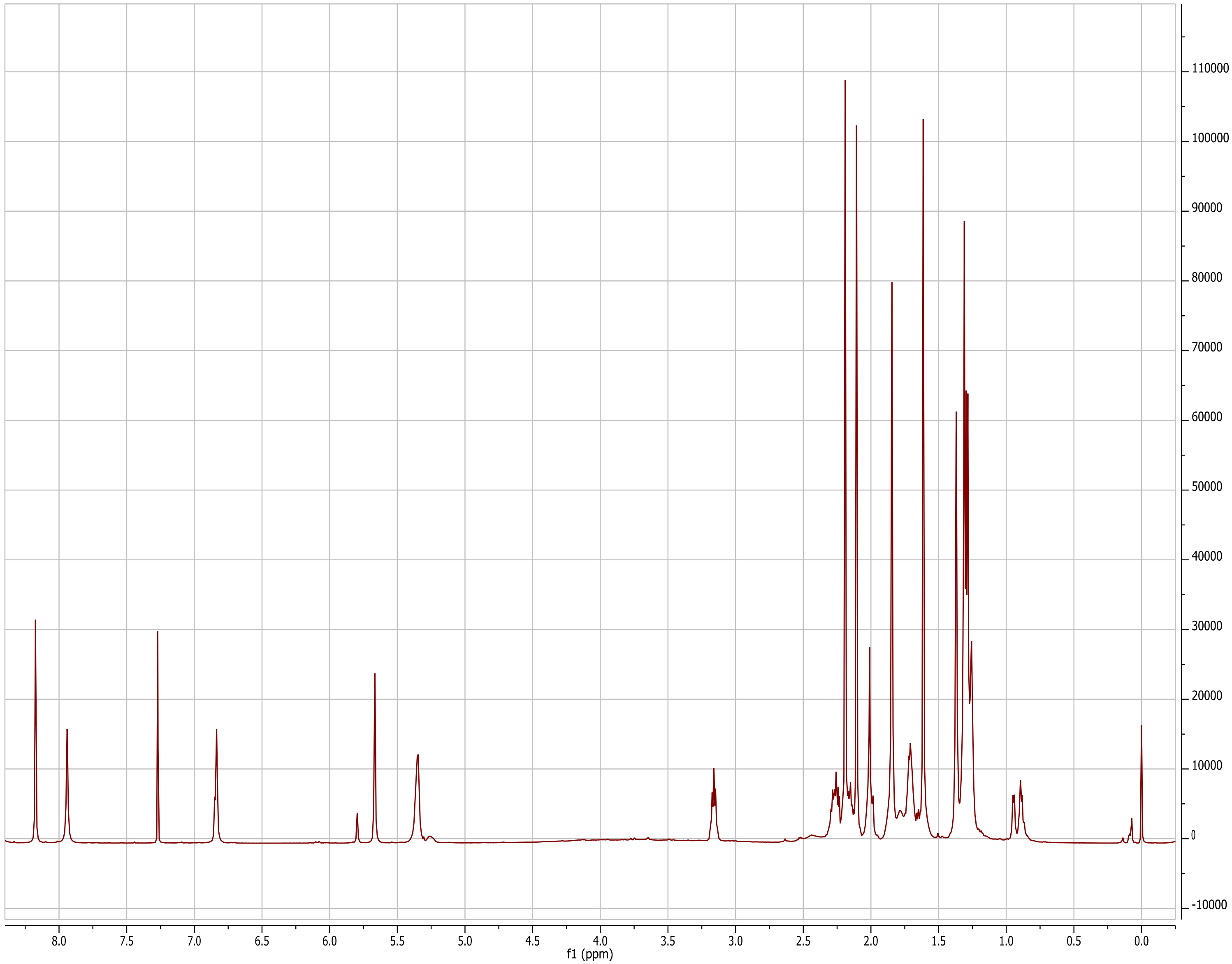
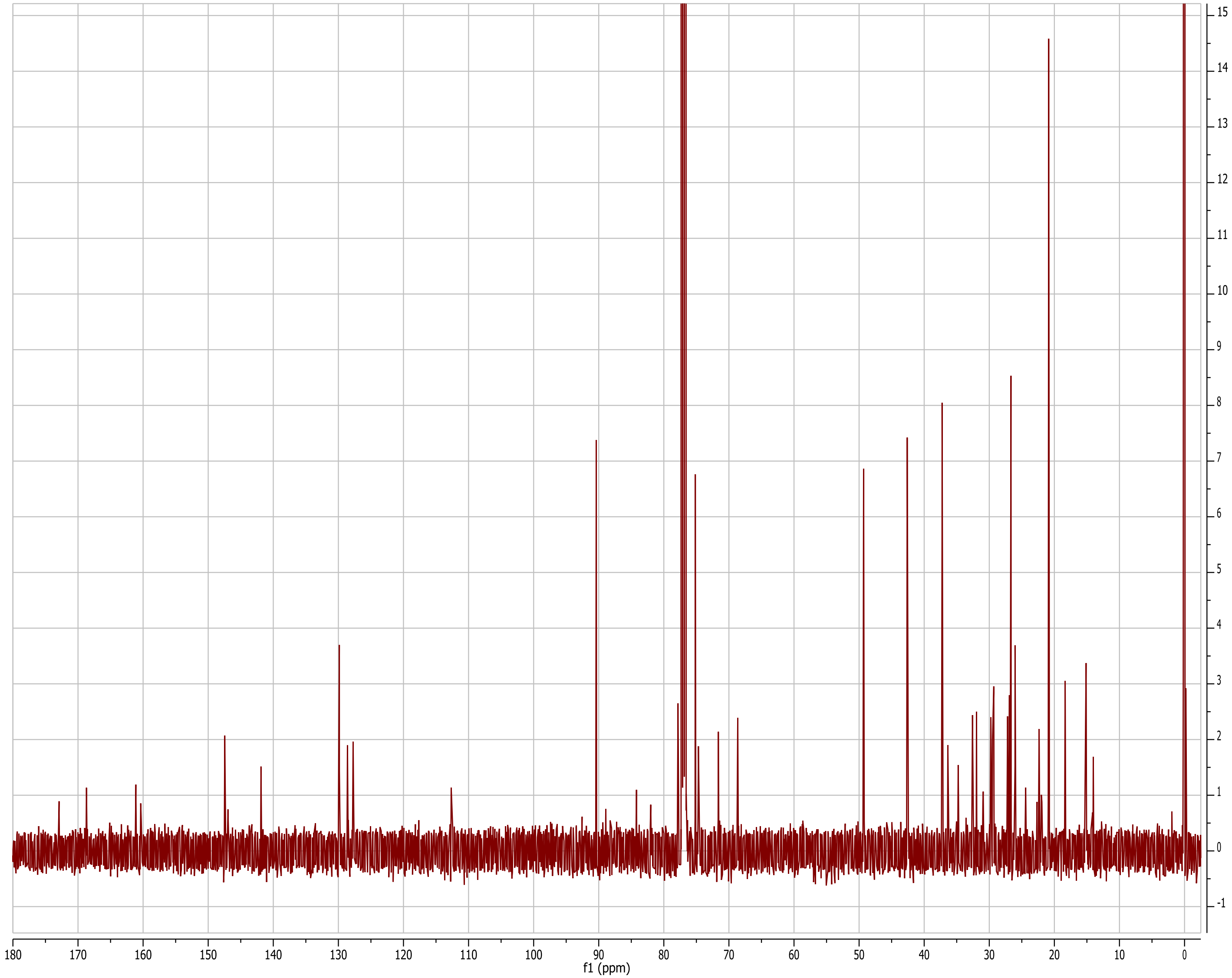


**Figure L. $^{13}$C-NMR (125 MHz, $CDCl_3$) Spectrum of Hectochlorin (1).**




Benzene contamination at 129.8 ppm.

**Figure M. HSQC-NMR (600 MHz, $CDCl_3$) Spectrum of Hectochlorin (1).**

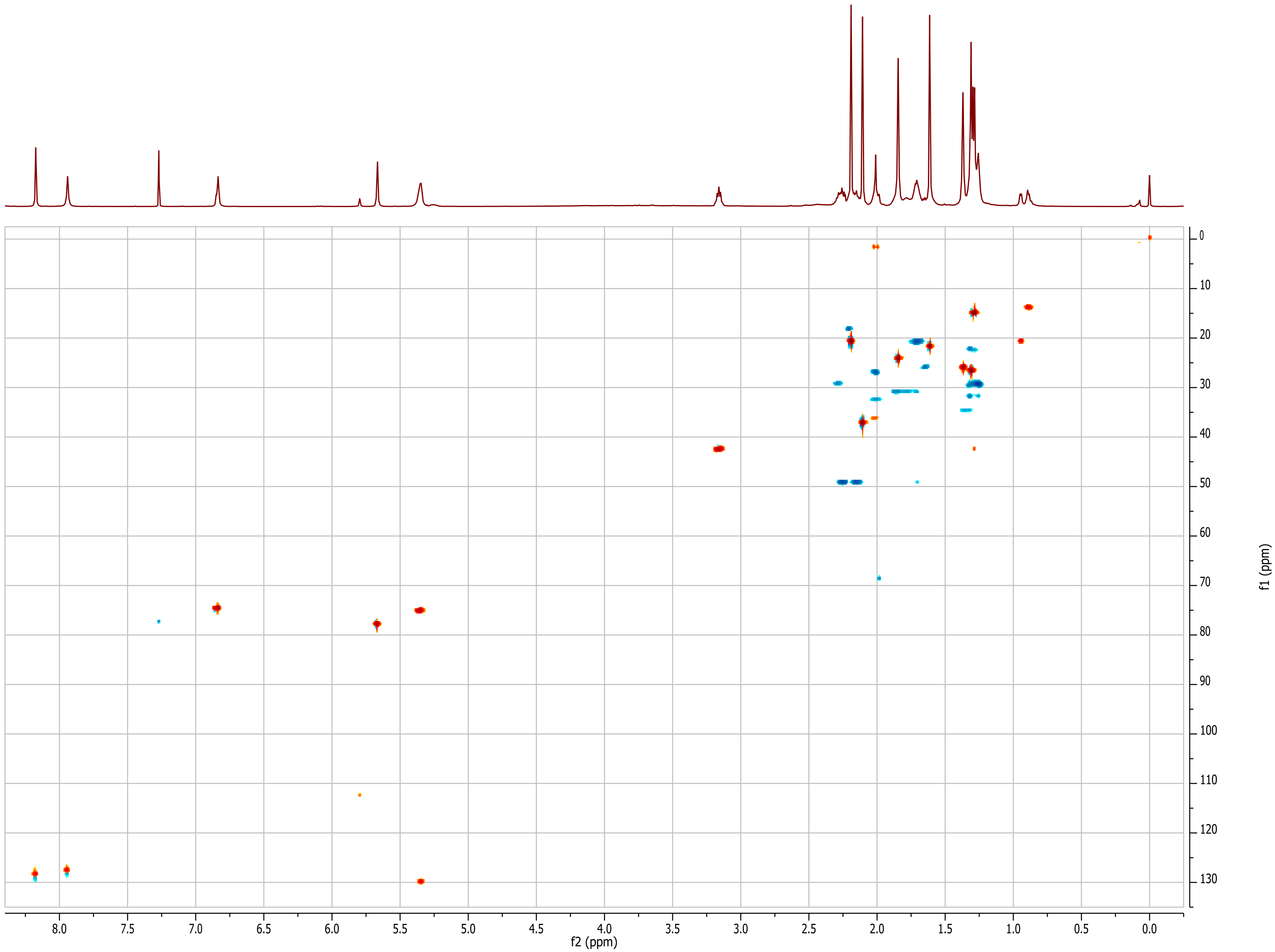


**Figure N. HMBC-NMR (600 MHz, $CDCl_3$) Spectrum of Hectochlorin (1).**

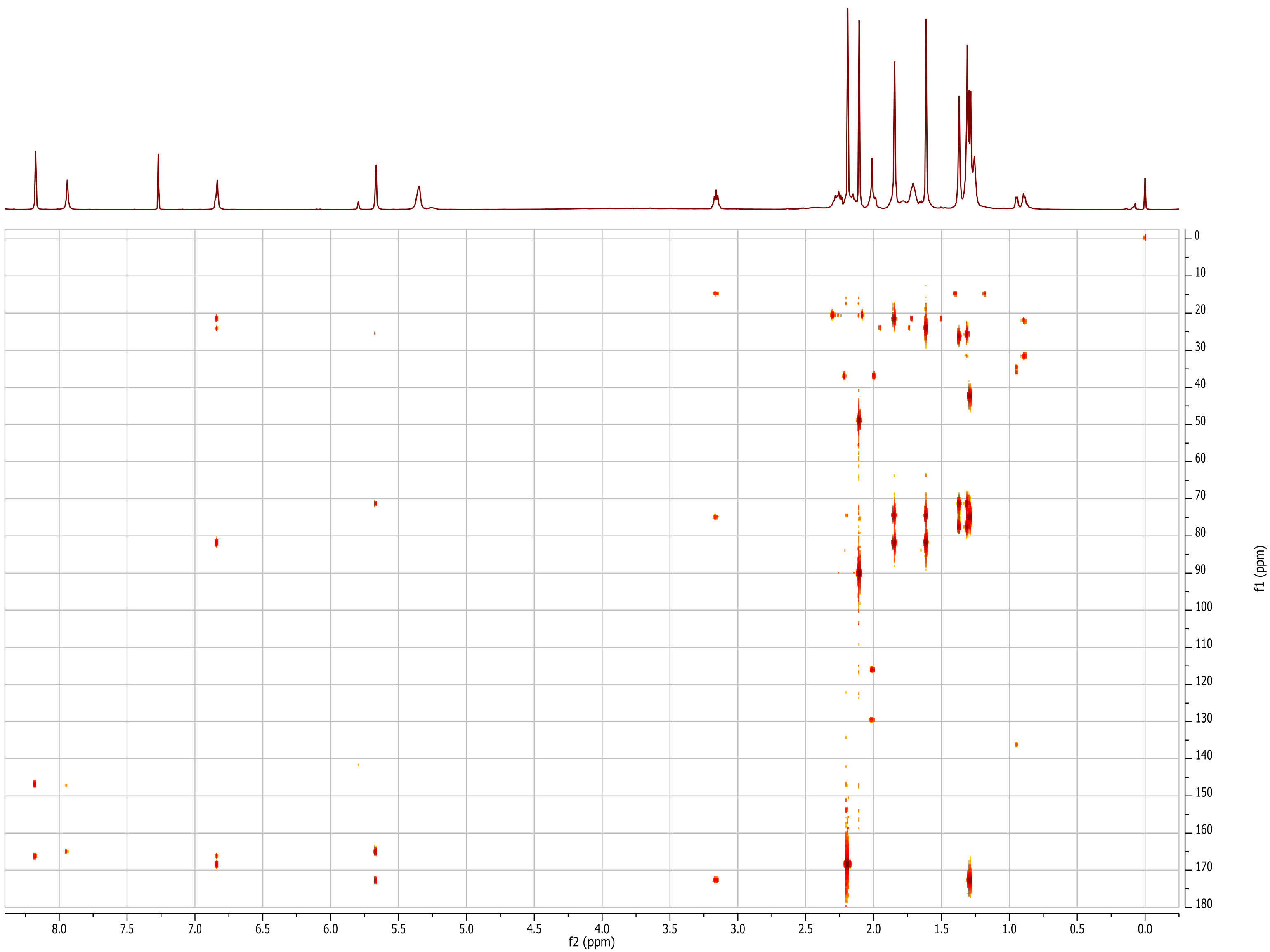


**Figure O. TOCSY-NMR (600 MHz, $CDCl_3$) Spectrum of Hectochlorin (1).**

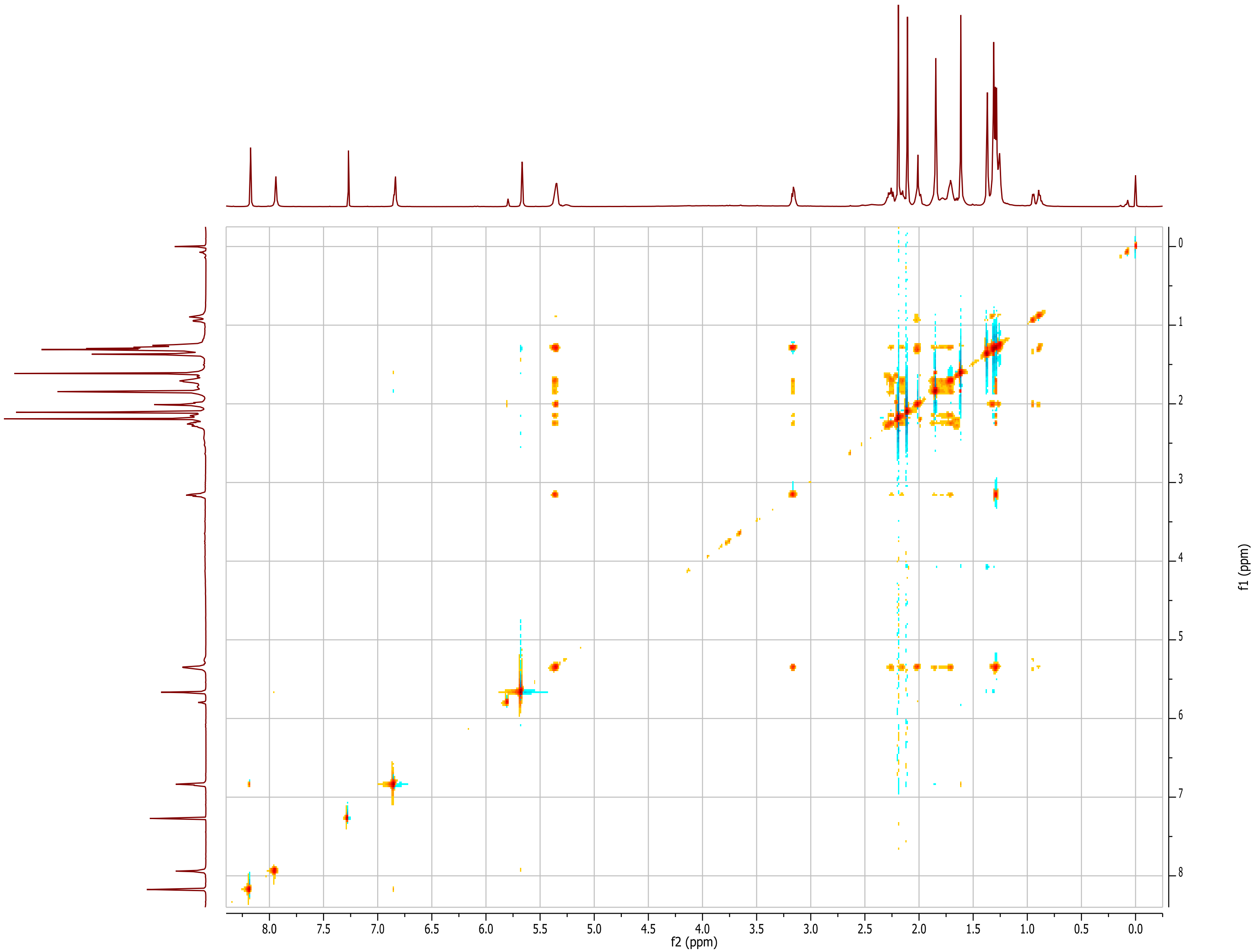
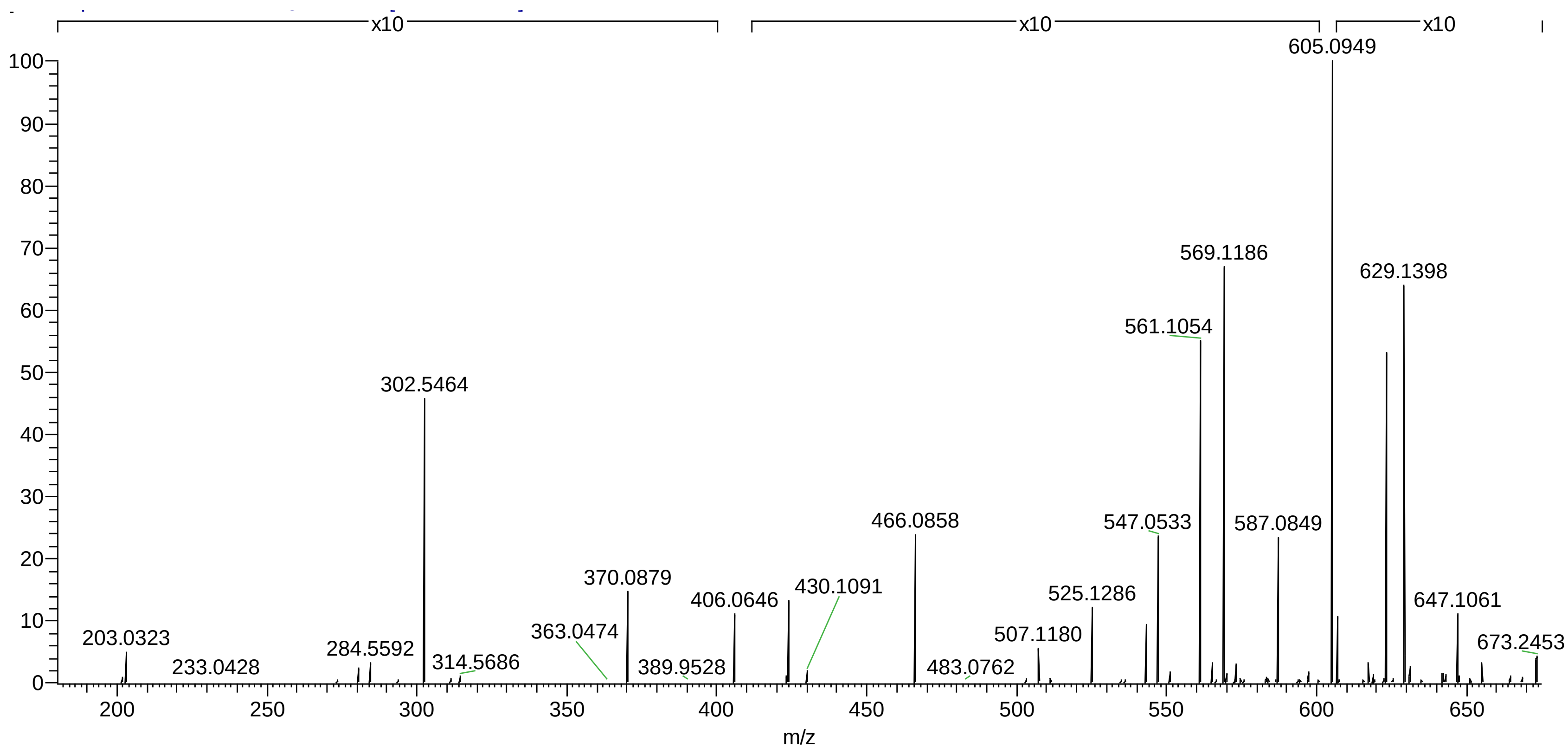
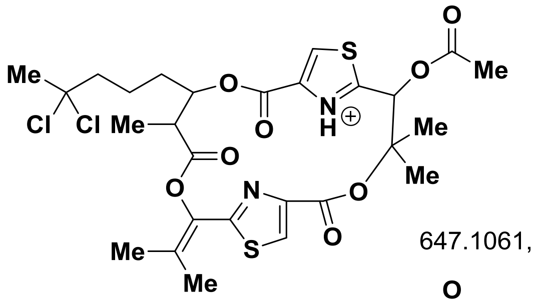


**Figure P. FTMS$^2$ Fragment Spectrum of Hectochlorin (1).**

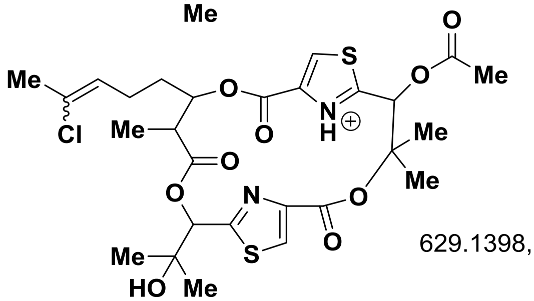



Hectochlorin (**1**) $[M + H]^+$, Parent Mass 665 *m/z*

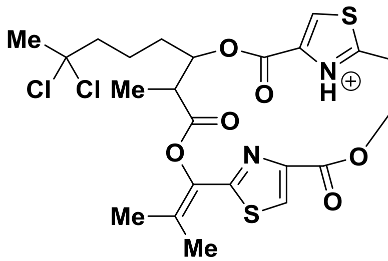
**Figure Q. FT-MS$^2$ Fragment Summary for Hectochlorin (1).**



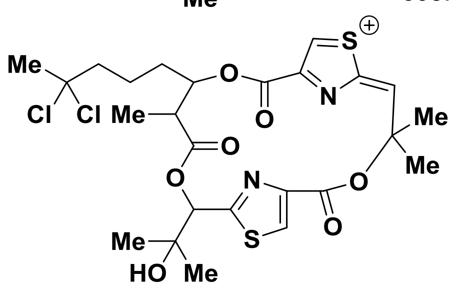
647.1061, 1.7 ppm

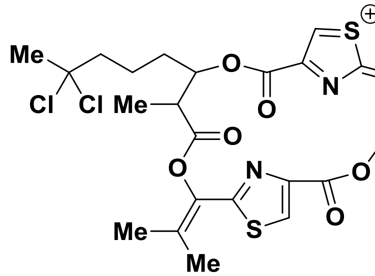


629.1398, 1.4 ppm

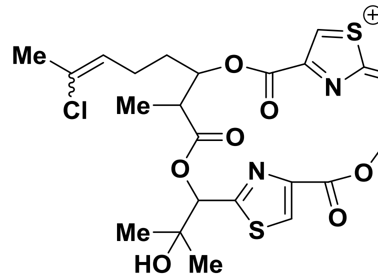


isobaric at:
605.0949, 0.8 ppm

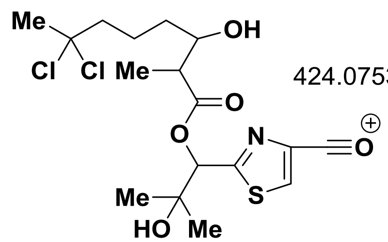




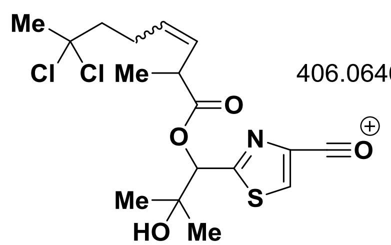
587.0849, 1.7 ppm



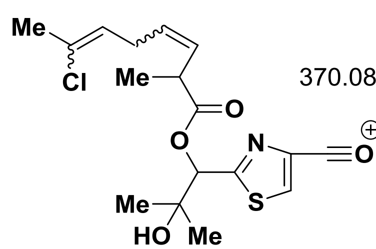
569.1186, 1.6 ppm



424.0753, 1.4 ppm



406.0646, 1.2 ppm



370.0879, 1.4 ppm

**Table R. NMR Data Summary for Hectochlorin B (5).**

| Position | $\delta_C$, type[a] | $\delta_H$ (*J* in Hz)[b] | HMBC[b] | TOCSY[b] |
|---|---|---|---|---|
| 1 | 173.2, C | -- | | |
| 2 | 42.4, CH | 3.14, quintet (7.6) | 1, 3, *4 weak*, 9 | 3, 9 |
| 3 | 74.2, $CH_2$ | 5.32, m | *2,4 weak* | 2, 4-6, 9 |
| 4a | 30.8, $CH_2$ | 1.74, m | | 3 |
| 4b | 30.8, $CH_2$ | 1.83, m | | 3 |
| 5 | 20.6, $CH_2$ | 1.73, m | | 3, 6 |
| 6a | 49.2, $CH_2$ | 2.12, m | 5, 7, *4, 8 weak* | 3, 5, 6b |
| 6b | 49.2, $CH_2$ | 2.25, m | 5, 7, *4, 8 weak* | 3, 5, 6a |
| 7 | 90.3, C | -- | | |
| 8 | 37.2, $CH_3$ | 2.09, s | 6, 7, self | |
| 9 | 14.9, $CH_3$ | 1.28, d (7.2)[c] | 1-3, self | 2, 3 |
| 10 | 160.6, C | | | |
| 11 | 146.3, C | | | |
| 12 | 128.3, CH | 8.11, s | 10, 11, 13 | |
| 13 | 171.4, C | | | |
| 14 | 76.3, CH | 5.09, bs | | |
| 15 | 85.5, C | | | |
| 16 | 26.7, $CH_3$ | 1.84, s | 14, 15, 17 | |
| 17 | 22.2, $CH_3$ | 1.77, s | 14-16 | |
| 18 | 162.3, C | | | |
| 19 | 147.0, C | | | |
| 20 | 128.5, CH | 8.04, s | 18, 19, 21 | |
| 21 | 164.9, C | | | |
| 22 | 77.2, CH | 5.58, s | 1, 21, 23, 24 | |
| 23 | 71.6, C | | | |
| 24 | 25.7, $CH_3$ | 1.35, s | 22, 23, 25 | |
| 25 | 26.9, $CH_3$ | 1.28, s[c] | 22-24 | |

All experiments in $CDCl_3$ with TMS standard, 1% v/v for 13C experiment, and 0.3% v/v for the rest. [a]Carbon chemical shifts from 2D-NMR experiment extraction. [b]Spectra collected on a Bruker 600 MHz (600 MHz and 150 MHz for the $^1H$ and $^{13}C$ nuclei, respectively) with 1.7 mm inverse cryo-probe. [c]Proton species overlapped, shift and coupling extracted from the HSQC.

**Figure S. $^{1}$H-NMR (600 MHz, $CDCl_3$) Spectrum of Hectochlorin B (5).**

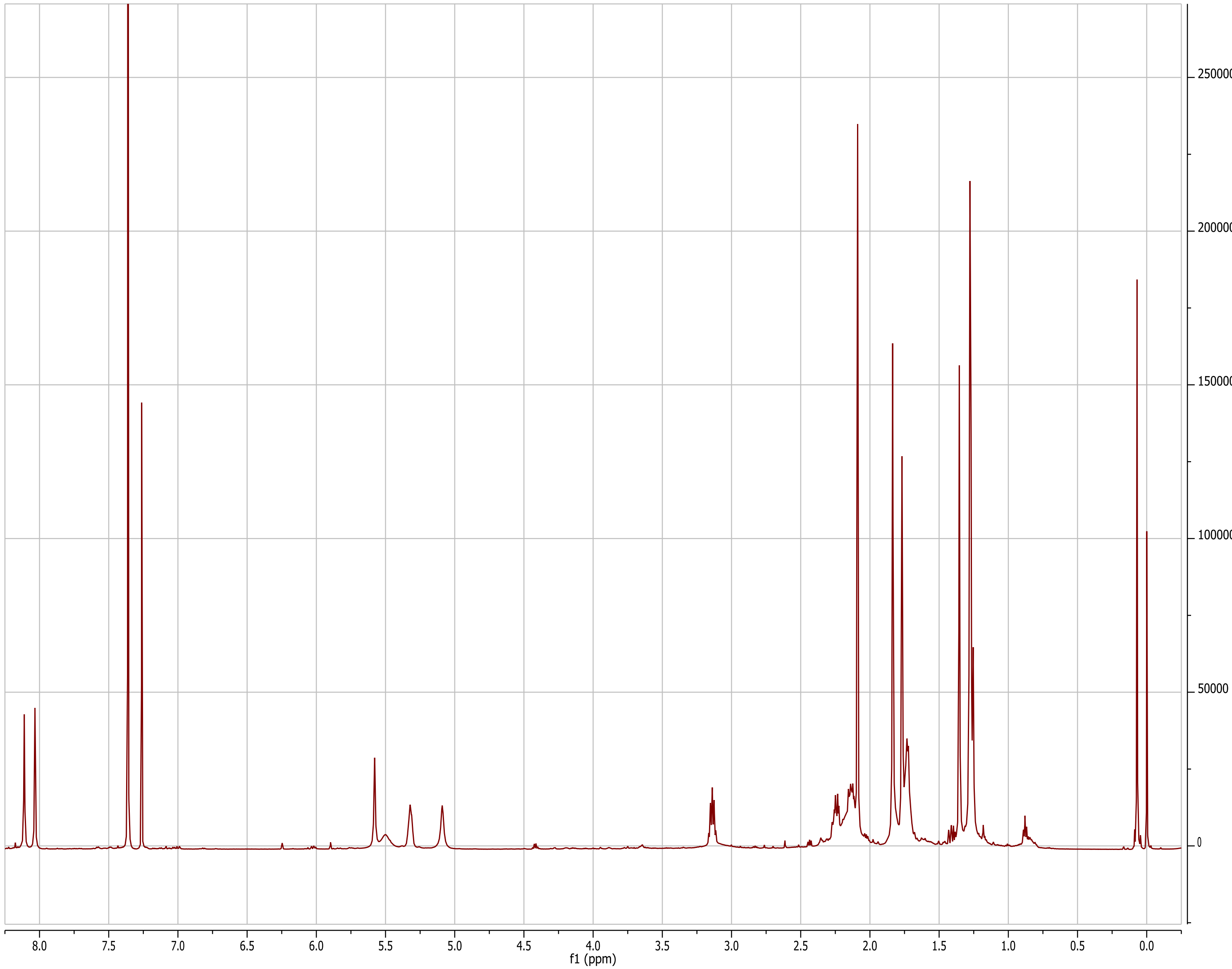
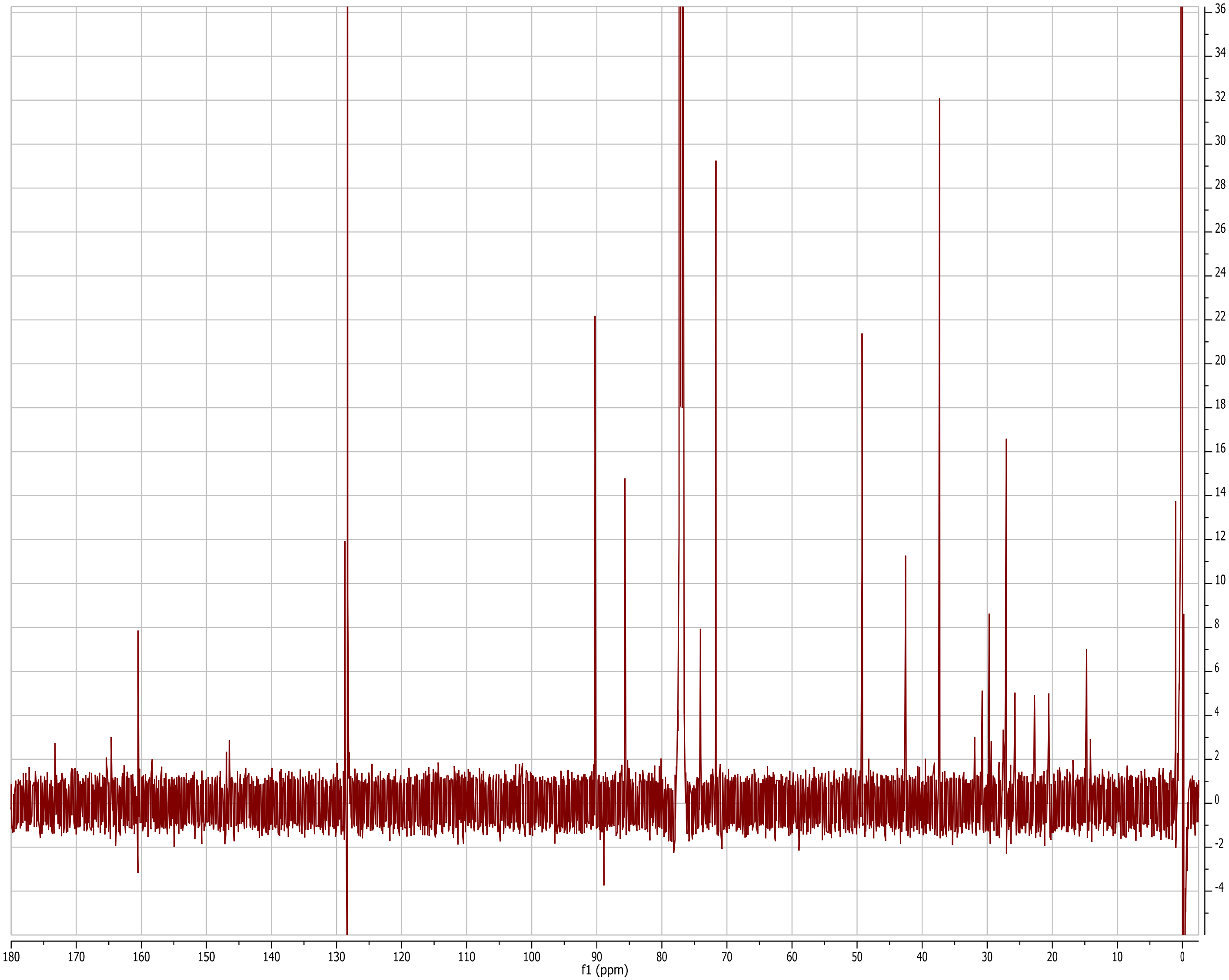


**Figure T.** [13]**C-NMR (125 MHz, $CDCl_3$) Spectrum of Hectochlorin B (5).**




Benzene contamination at 128.3 ppm.

**Figure U.** **HSQC-NMR (600 MHz, $CDCl_3$) Spectrum of Hectochlorin B (5).**

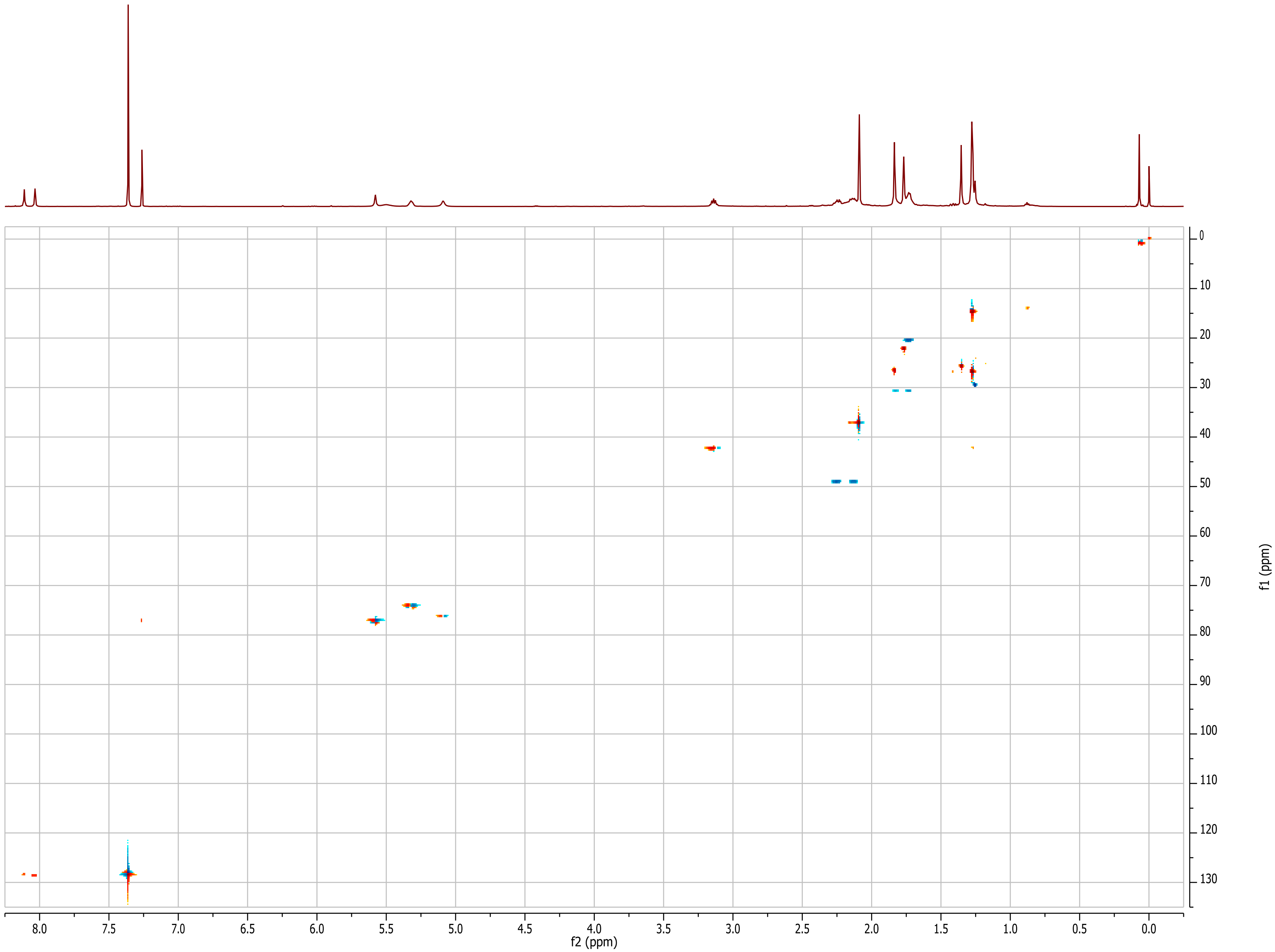


**Figure V. HMBC-NMR (600 MHz, $CDCl_3$) Spectrum of Hectochlorin B (5).**

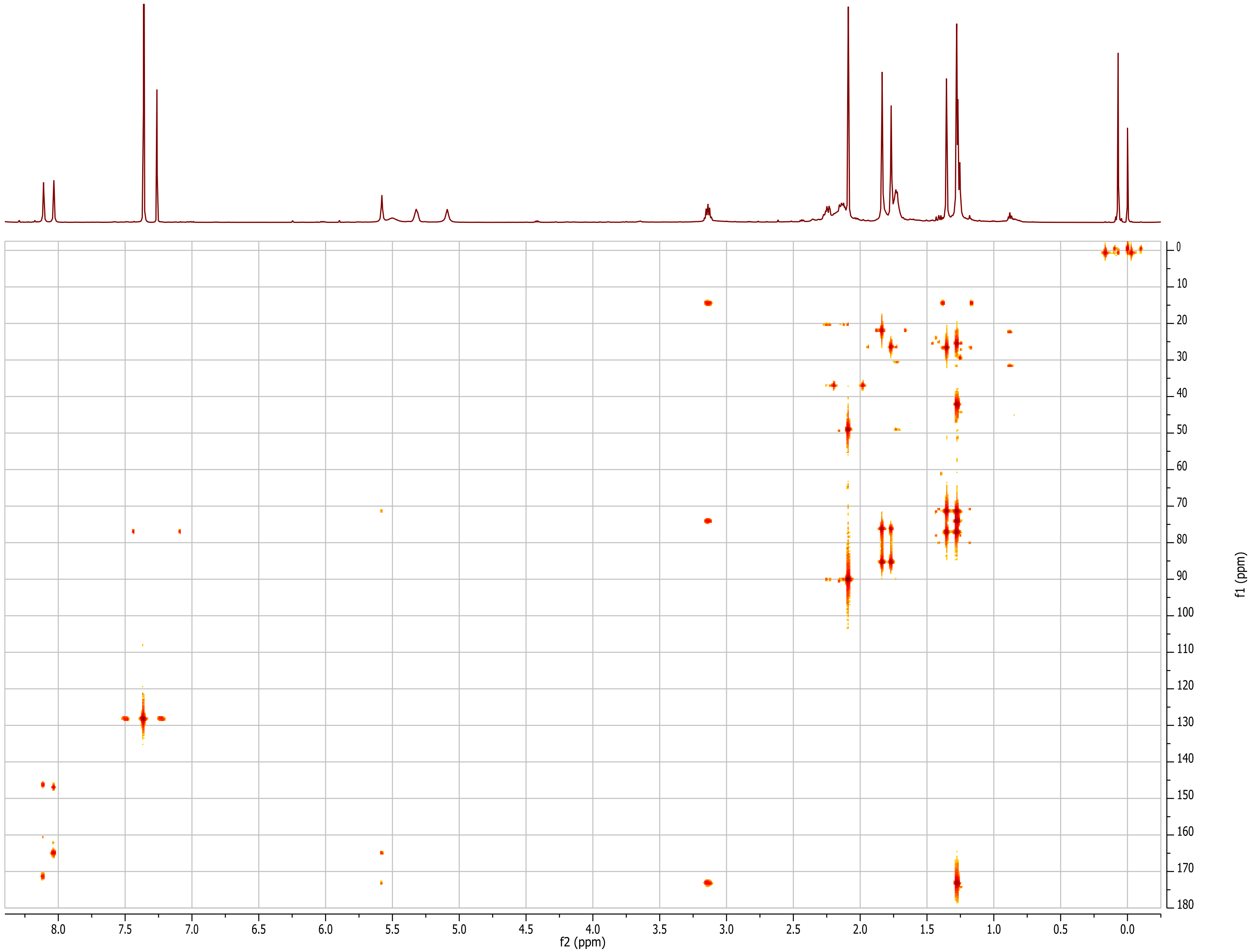


**Figure W. TOCSY-NMR (600 MHz, $CDCl_3$) Spectrum of Hectochlorin B (5).**

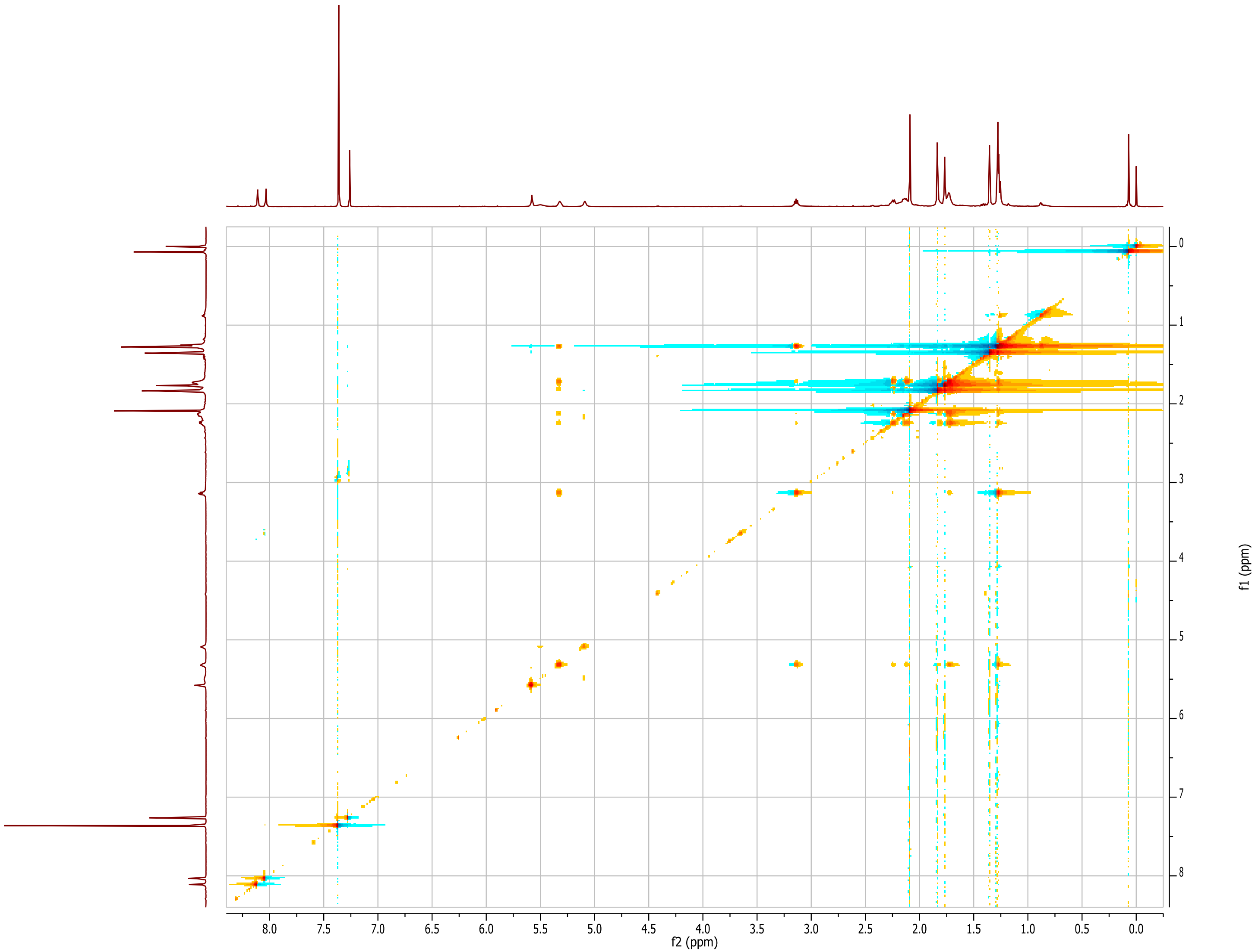
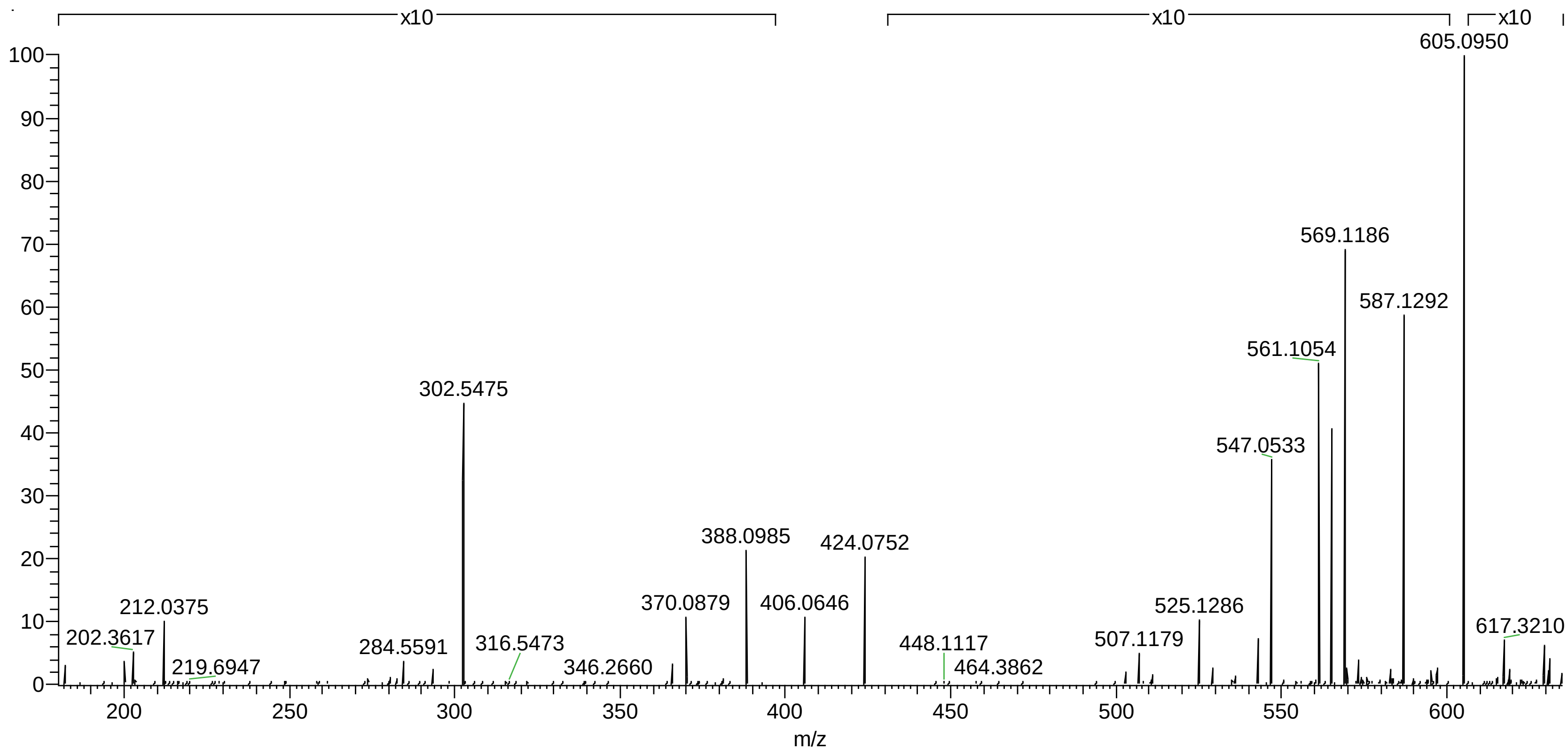
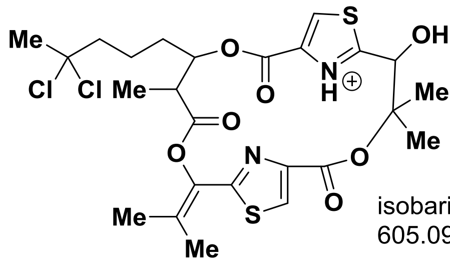


**Figure X. FTMS$^2$ Fragment Spectrum of Hectochlorin B (5).**

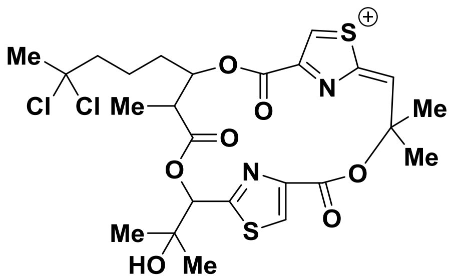


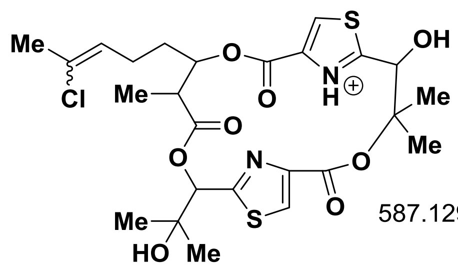

Hectochlorin B (**5**) $[M + H]^+$, Parent Mass 623 *m/z*

**Figure Y. FT-MS$^2$ Fragment Summary for Hectochlorin B (5).**

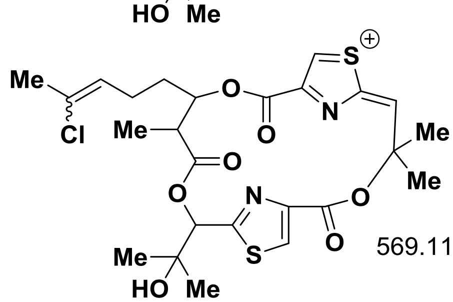


isobaric at:
605.0950, 1.0 ppm

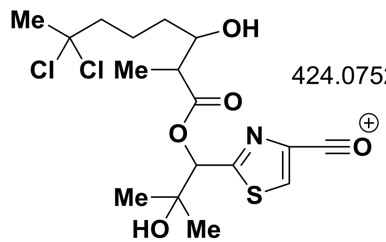




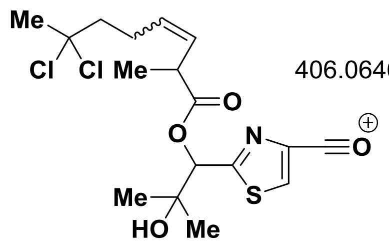
587.1292, 1.5 ppm



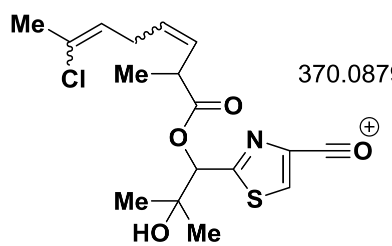
569.1186, 1.6 ppm



424.0752, 1.2 ppm

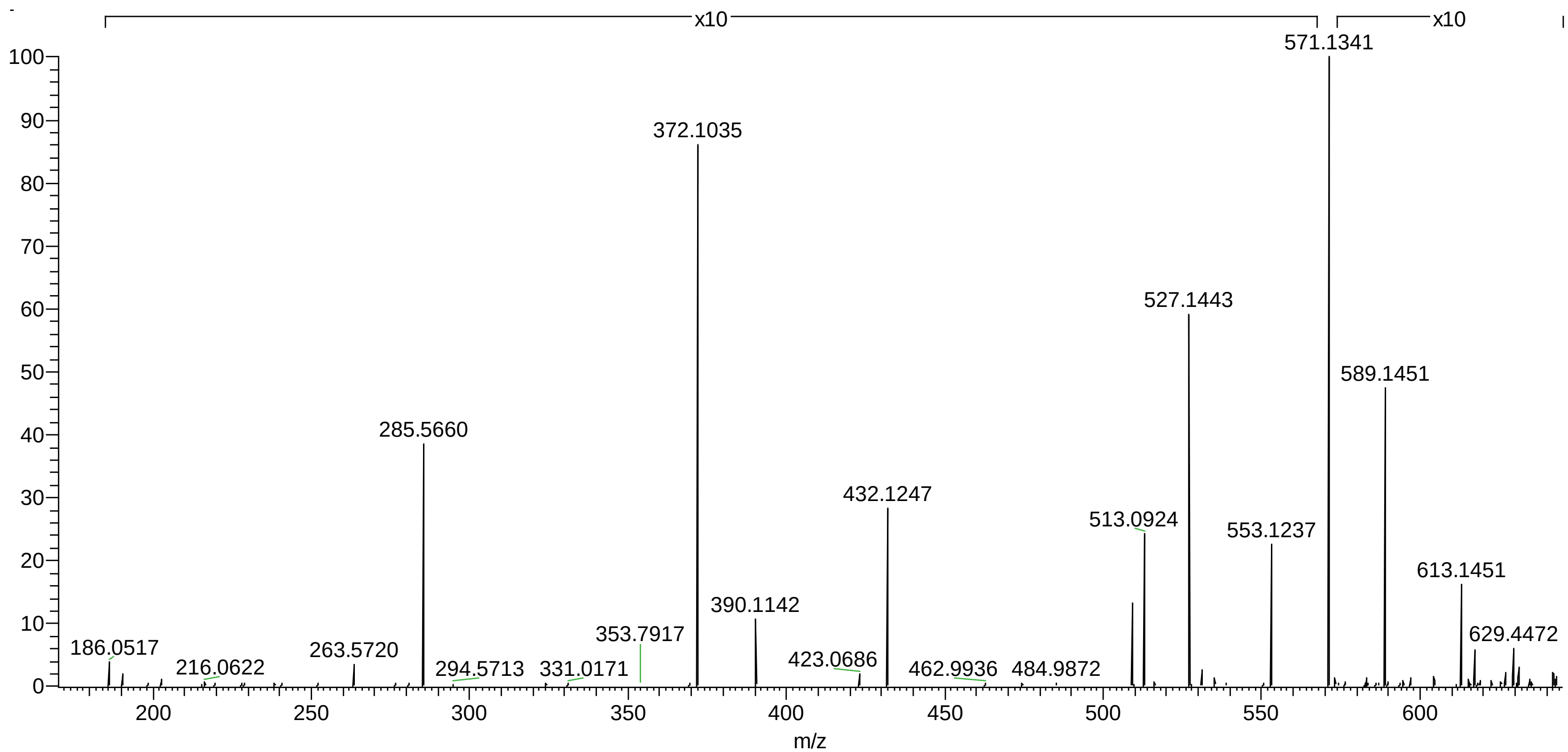


406.0646, 1.2 ppm



370.0879, 1.4 ppm

**Figure Z. FTMS$^2$ Fragment Spectrum for Hectochlorin C (6).**




Hectochlorin C (**6**) [M + H]$^+$, Parent Mass 631 *m/z*

**Figure AA. FTMS$^2$ Fragment Summary for Hectochlorin C (6).**

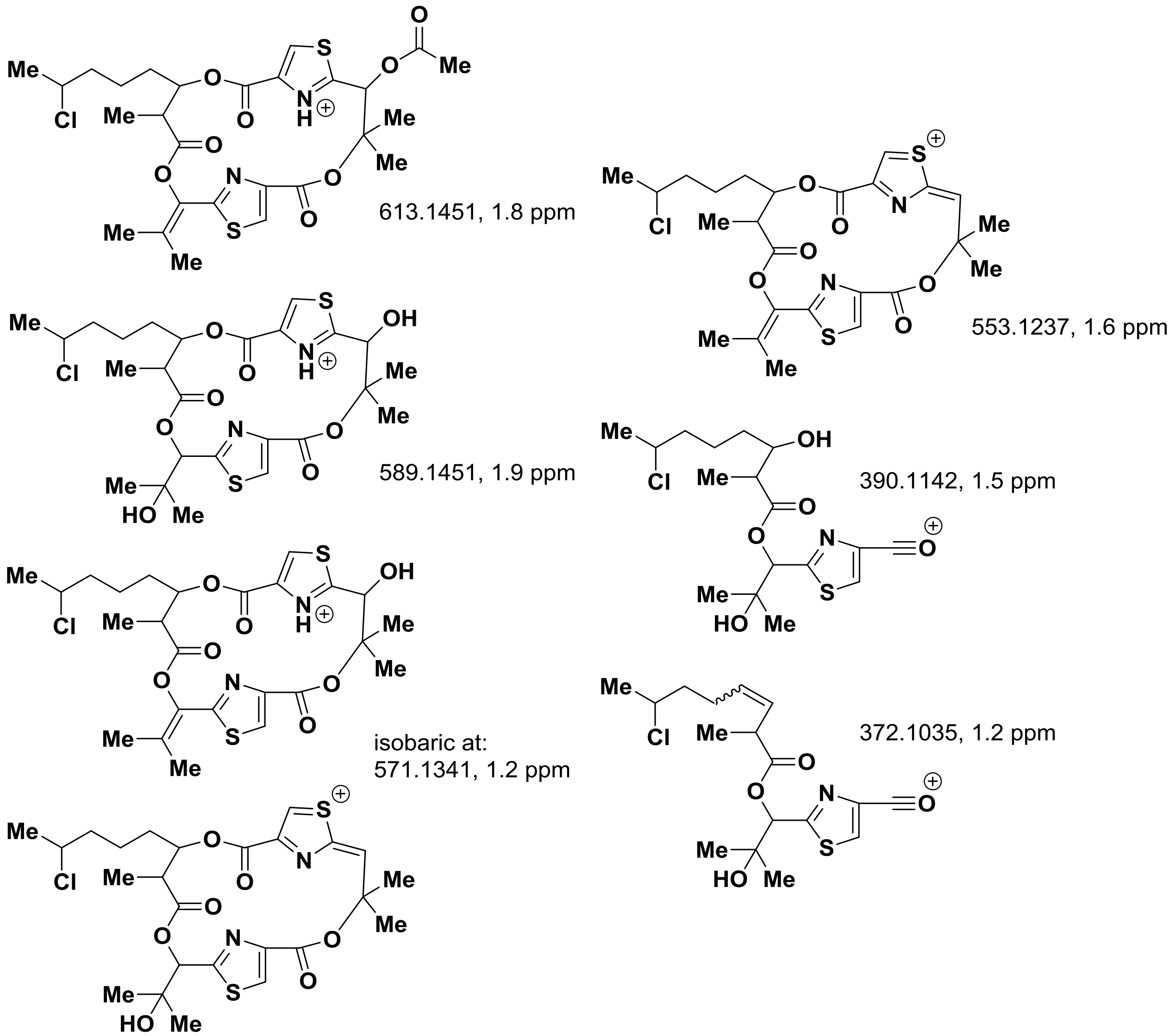
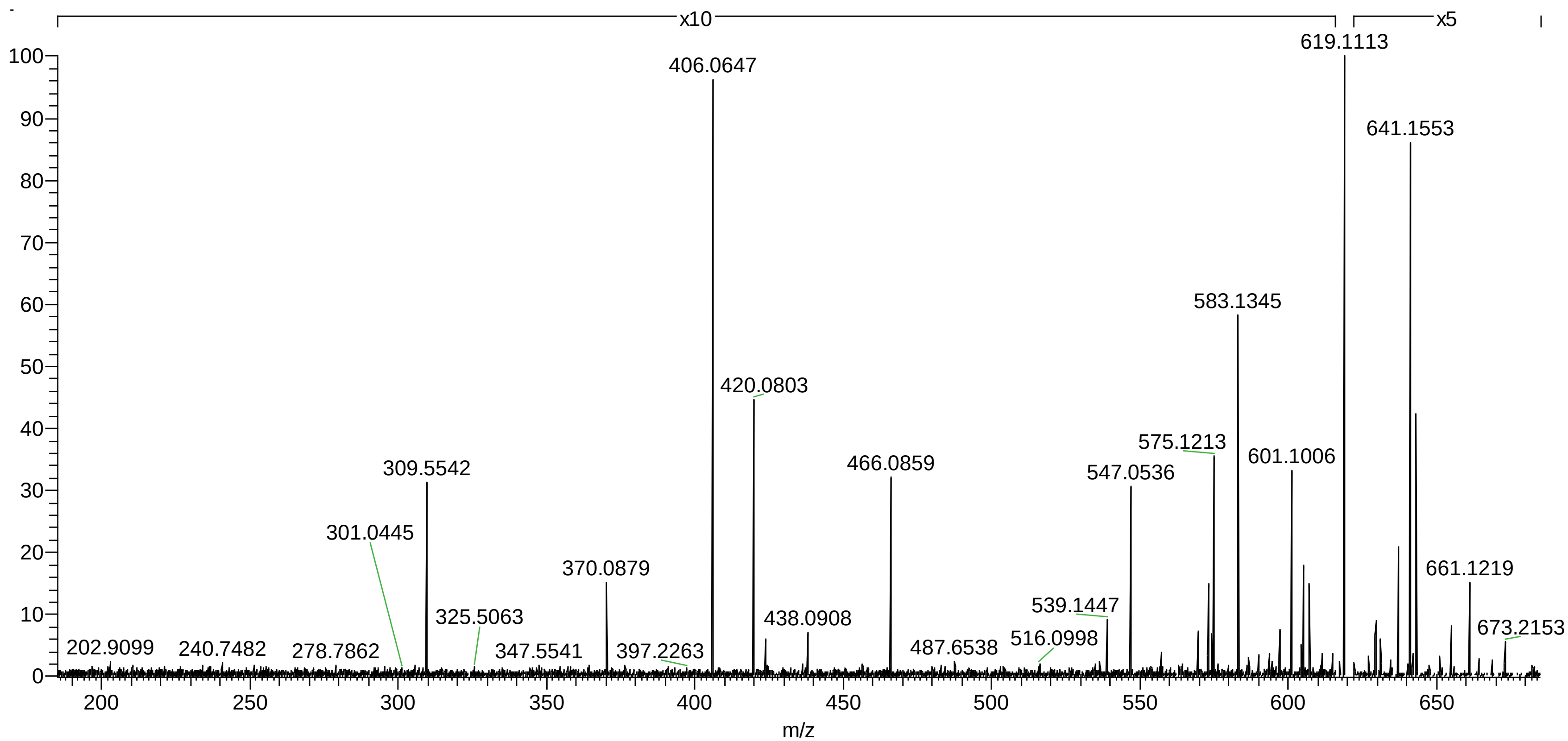
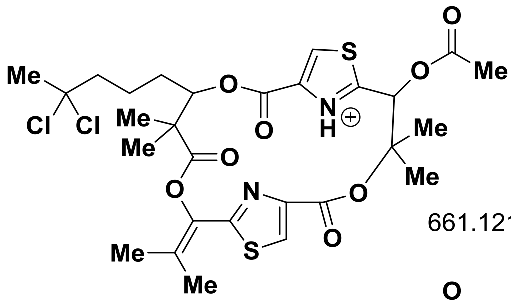


**Figure AB. FTMS$^2$ Fragment Spectrum for Hectochlorin D (7).**

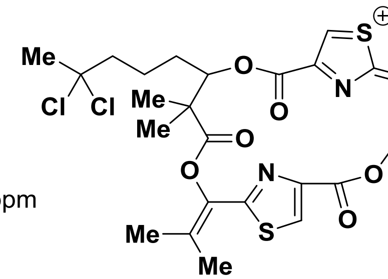



Hectochlorin D (**7**) $[M + H]^+$, Parent Mass 679 *m/z*

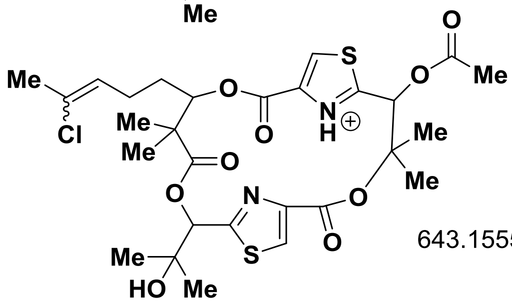
**Figuve AC. FTMS$^2$ Fragment Summary for Hectochlorin D (7).**



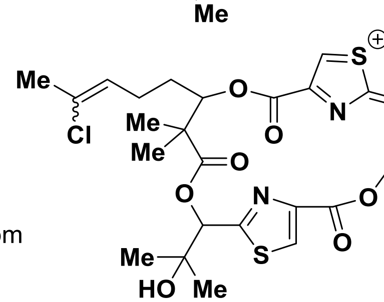
661.1219, 2.0 ppm



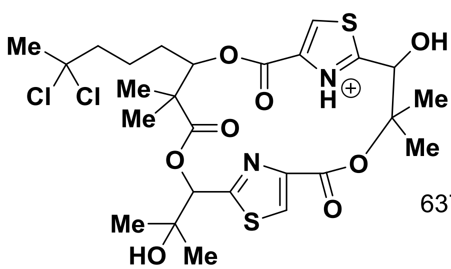
601.1006, 1.8 ppm



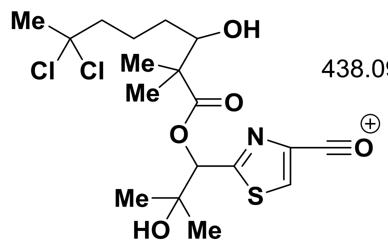
643.1555, 1.6 ppm



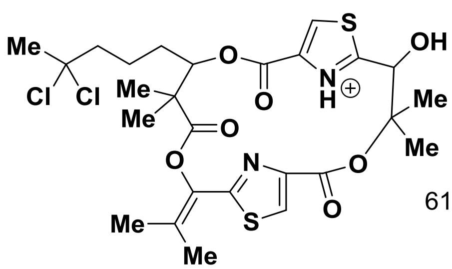
583.1345, 1.9 ppm



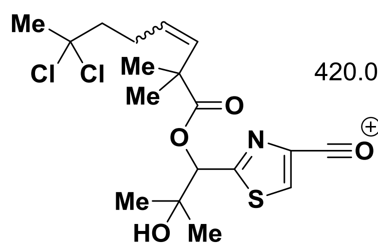
637.1219, 2.0 ppm



438.0908, 1.1 ppm



619.1101, 1.9 ppm



420.0803, 1.2 ppm

**Figure AD. Proposed Biosynthetic Pathway Divergence for Jamaicamide A and D (2 and 8).**

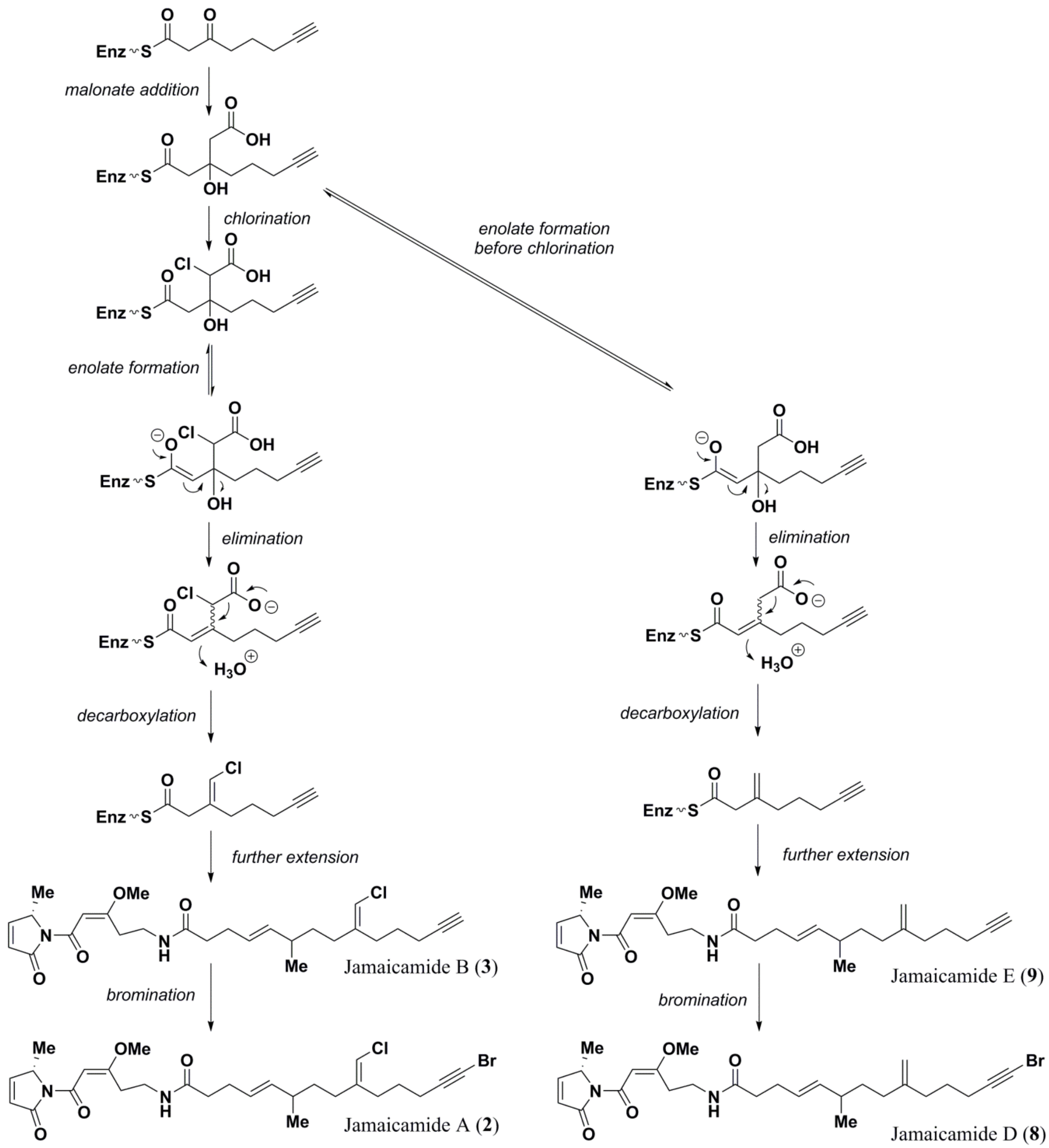


**Table AE. NMR Data Summary for Jamaicamide D (8).**

| Position | $\delta_C$[a] | $\delta_H$ (*J* in Hz) | HMBC | TOCSY |
|---|---|---|---|---|
| 1 | | 1.50[b] | | 3 |
| 2 | | -- | | |
| 3 | | 2.20, t (7.1) | | 1, 4, 5 |
| 4 | | 1.60-1.66, m | | 3, 5 |
| 5 | | 2.06-2.10, m | | 3, 4 |
| 6 | | -- | | |
| 7 | | 2.01-2.05, m | | 8, 26 |
| 8 | 34.9 | 1.29-1.40, m | | 7, 9, 26 |
| 9 | 36.6 | 1.91-1.95, m | | 8, 26 |
| 10 | 137.1 | 5.26-5.39, m[c] | | 12, 13, 26 |
| 11 | | 5.26-5.39, m[c] | | 12, 13, 26 |
| 12 | | 2.26-2.30, m | | 10, 11, 13a |
| 13a | | 2.17-2.20, m | | 10, 11, 12, 13b |
| 13b | | 2.26-2.30, m | | 10, 11, 13a |
| 14 | | -- | | |
| NH | | 6.69, bs | | 15 |
| 15 | | 3.47-3.54, m | | 16, NH |
| 16a | | 2.81-2.86, m | | 15, 16b |
| 16b | | 2.98-3.51, m | | 15, 16a |
| 17 | 175.6 | -- | | |
| 18 | | 6.73, s | | |
| 19 | | -- | | |
| 20 | | -- | | |
| 21 | | 6.08, dd (1.4, 6.0) | | 22 |
| 22 | 153.1 | 7.23, dd (2.0, 5.9) | | 21, 24 |
| 23 | 58.2 | 4.86, q (6.7) | | 24 |
| 24 | | 1.46, d (6.7) | 22, 23 | 22, 23 |
| 25 | | 3.75, s | 17 | |
| 26 | | 0.95, d (6.7) | 8-10 | 7-11 |
| 27 | | 4.70, m | | |

All experiments in $CDCl_3$ with 0.3% v/v TMS standard, on a Varian Unity 500 MHz (500 MHz and 125 MHz for the $^1H$ and $^{13}C$ nuclei respectively). [a]Carbon chemical shifts by projection from HMBC experiment. [b]Overlapping with water peak, shift determined by TOCY correlation. [c]Proton species overlapped.

**Figure AF. [1]H-NMR (500 MHz, $CDCl_3$) Spectrum of Jamaicamide D (8).**

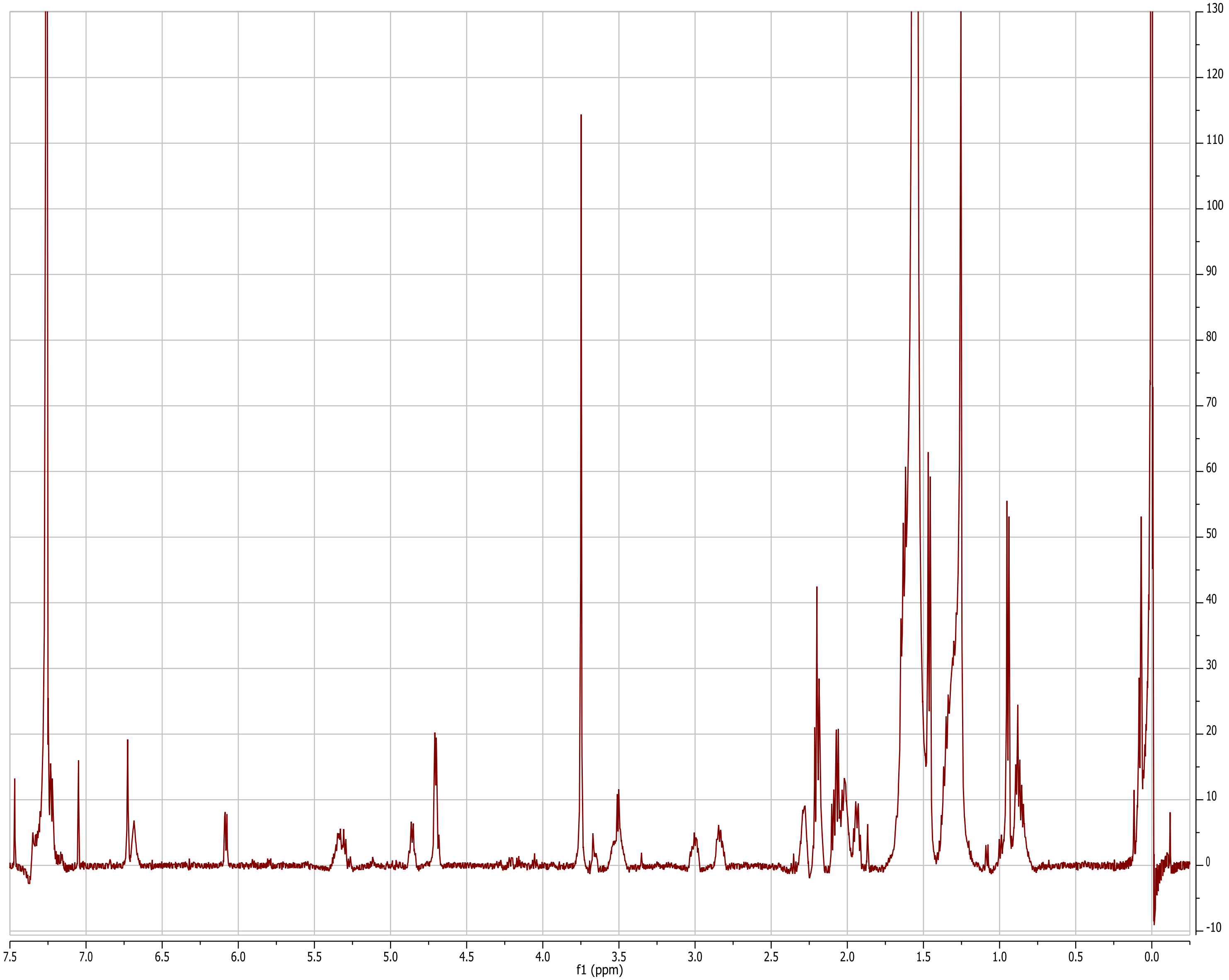


**Figure AG. HMBC-NMR (500 MHz, $CDCl_3$) Spectrum of Jamaicamide D (8).**

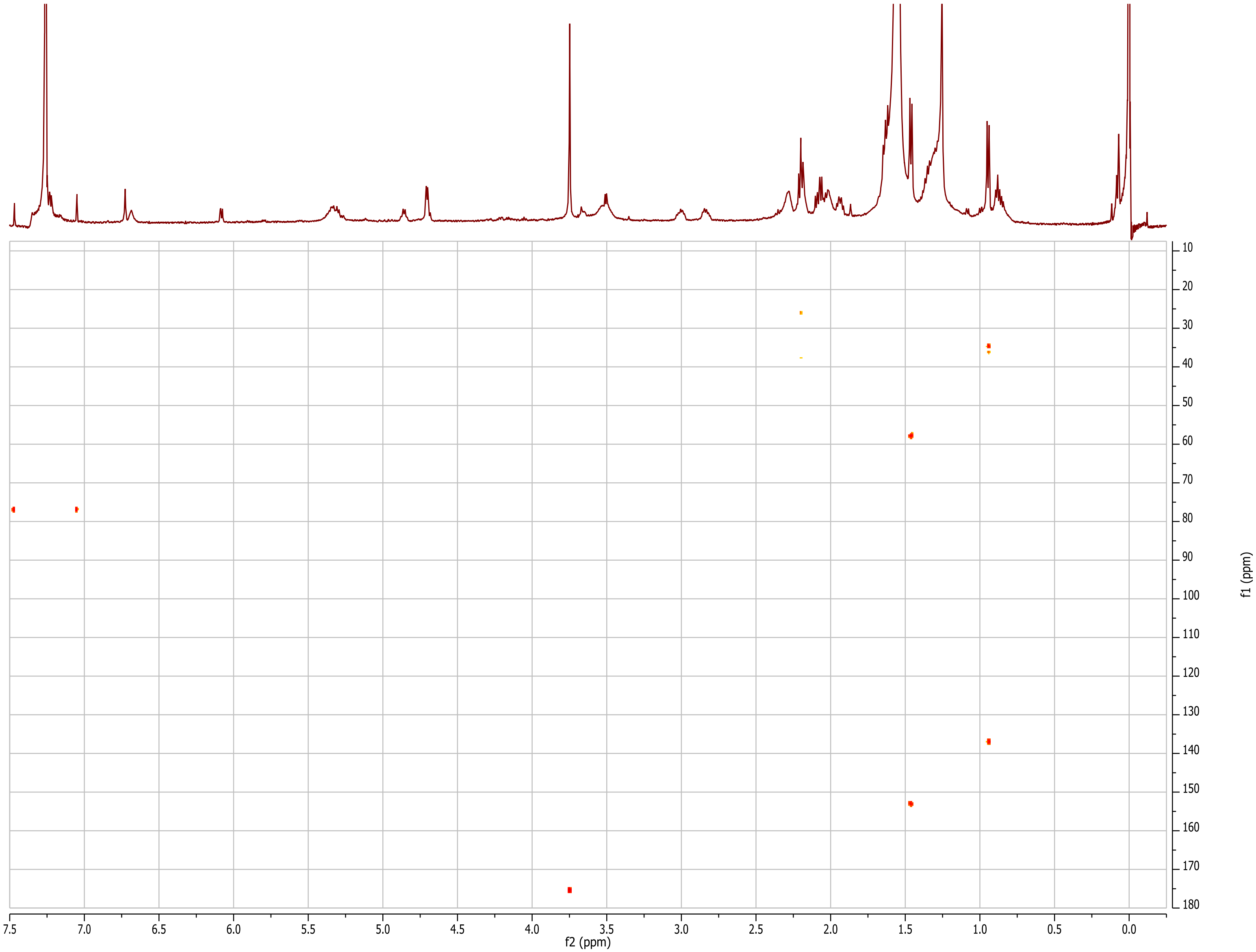


**Figure AH. TOCSY-NMR (500 MHz, $CDCl_3$) Spectrum of Jamaicamide D (8).**

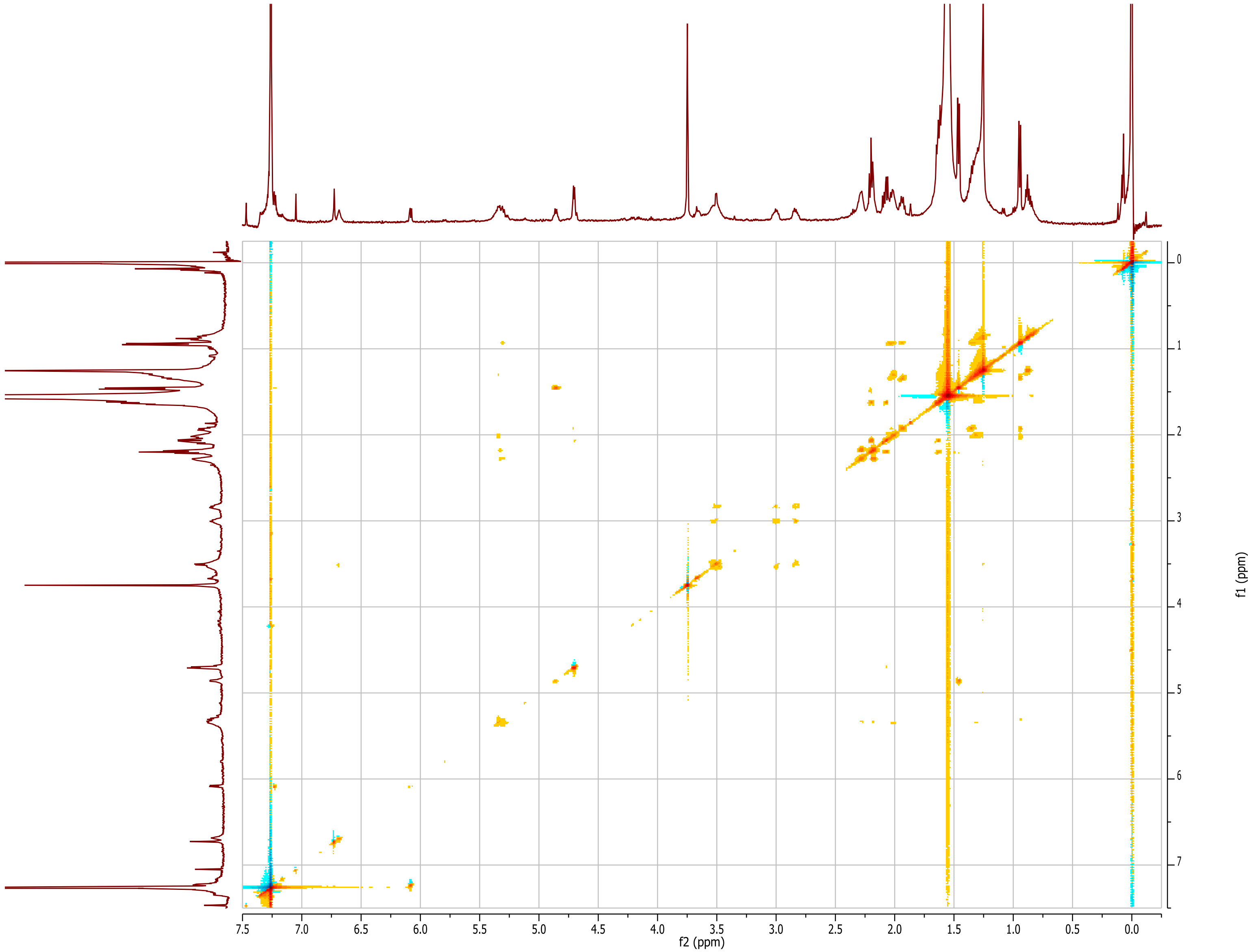


**Table AI. NMR Data Summary for Jamaicamide F (12).**

| Position | $\delta_C$, type[a] | $\delta_H$ ($J$ in Hz)[b] | HMBC[b] | TOCSY[b] |
|---|---|---|---|---|
| 1 | -6.6, C | -- | | |
| 2 | 94.2, C | -- | | |
| 3 | 20.7, $CH_2$ | 2.36, t (7.2) | 1, 2, 4, 5, self | 4, 5 |
| 4 | 26.1, $CH_2$ | 1.64, quin (7.1) | 2, 3, 5, 6, self | 3, 5 |
| 5 | 29.2, $CH_2$ | 2.25,[ac] m | 3, 4, 6, 7, 27 | 3, 4 |
| 6 | 141.8, C | -- | | |
| 7 | 32.6, $CH_2$ | 2.00,[bd] m | 5, 6, 8, 9, 27 | 8, 26 |
| 8 | 34.7, $CH_2$ | 1.34,[ce] m | 6, 10, 9, 7, 26 | 7, 9, 26 |
| 9 | 36.3, CH | 2.02,[bd] m | 7, 10, 11, 26 | 8, 26 |
| 10 | 136.6, CH | 5.27, dd (7.7, 15.4) | 8, 9, 11, 12, 26, self | 9, 11, 12, 13a, 26 |
| 11 | 127.5, CH | 5.36, td (6.5, 15.2) | 9, 10, 12 | 9, 10, 12, 13a, 26 |
| 12 | 28.6, $CH_2$ | 2.29,[ac] m | | 10, 11, 13a |
| 13a | 36.8, $CH_2$ | 2.18, t (7.6) | 11, 12, 14 | 10, 11, 12, 13b |
| 13b | 36.8, $CH_2$ | 2.29,[ac] m | 10, 11, 14, self | 13a |
| 14 | 172.4, C | -- | | |
| NH | -- | 6.69, bs | 14, 15 | 15, 16 |
| 15a | 38.3, $CH_2$ | 3.29,[ce] m | 17, self | NH, 15b, 16 |
| 15b | 38.3, $CH_2$ | 3.54,[ce] m | 17, self | NH, 15a, 16 |
| 16a | 32.3, $CH_2$ | 2.84,[ce] m | 15, 17, 18 | NH, 15, 16b |
| 16b | 32.3, $CH_2$ | 3.00,[ce] m | 15, 17, 18 | NH, 15, 16a |
| 17 | 175.4, C | -- | | |
| 18 | 95.0, CH | 6.73, s | 16, 17, self | |
| 19 | 166.1, C | -- | | |
| 20 | 170.1, C | -- | | |
| 21 | 125.9, CH | 6.08, dd (6.0, 1.6) | 20, 22, 23, 24, self | 22-24 |
| 22 | 153.2, CH | 7.23, dd (2.0, 6.1) | 20, 21, 23, 24, self | 21, 23, 24 |
| 23 | 58.1, CH | 4.86, tq (1.4, 7.0) | *19, 20 weak*, 21, 22, 24 | 21, 22, 24 |
| 24 | 17.9, $CH_3$ | 1.46, d (6.7) | 22, 23, self | 21-23 |
| 25 | 56.2, $CH_3$ | 3.75, s | 17, self | |
| 26 | 20.9, $CH_3$ | 0.95, d (6.7) | 8-10, self | 8-11 |
| 27 | 112.8, CH | 5.79, s | 5-7, self | |

All experiments in $CDCl_3$ with TMS standard, 1% v/v for 13C experiment, and 0.3% v/v for the rest. [a]Specturm collected on a Varian VX 500 MHz with $^{13}C$-optimized cryoprobe. [b]Spectra collected on a Bruker 600 MHz (600 MHz and 150 MHz for the $^{1}H$ and $^{13}C$ nuclei, respectively) with 1.7 mm inverse cryo-probe. [c,d]Proton species overlapped, shift assigned by HSQC. [e]Multiplet shift assigned by HSQC

**Figure AJ. $^{1}H$-NMR (600 MHz, $CDCl_3$) Spectrum of Jamaicamide F (12).**

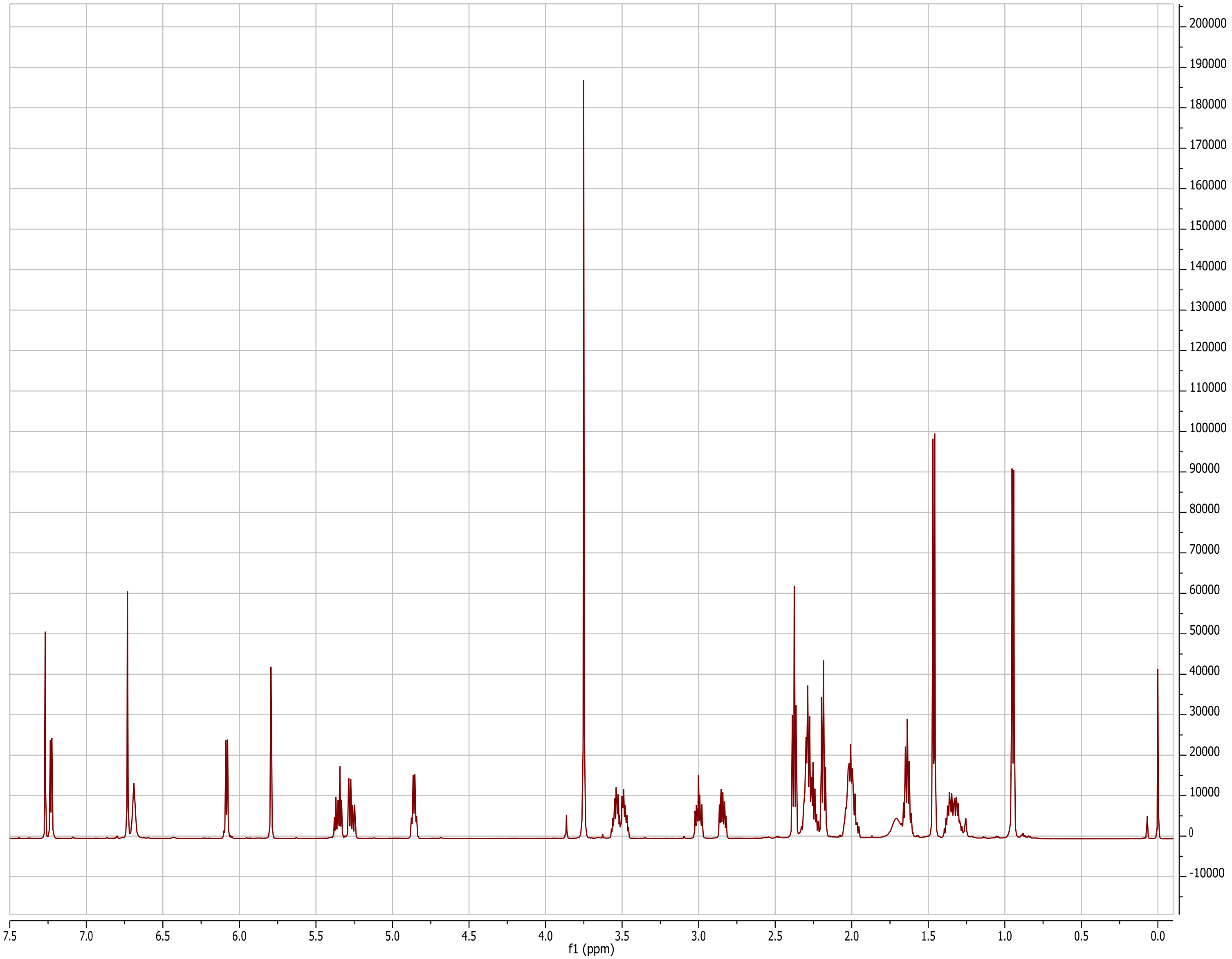


**Figure AK.** $^{13}$**C-NMR (125 MHz,** $CDCl_3$**) Spectrum of Jamaicamide F(12).**

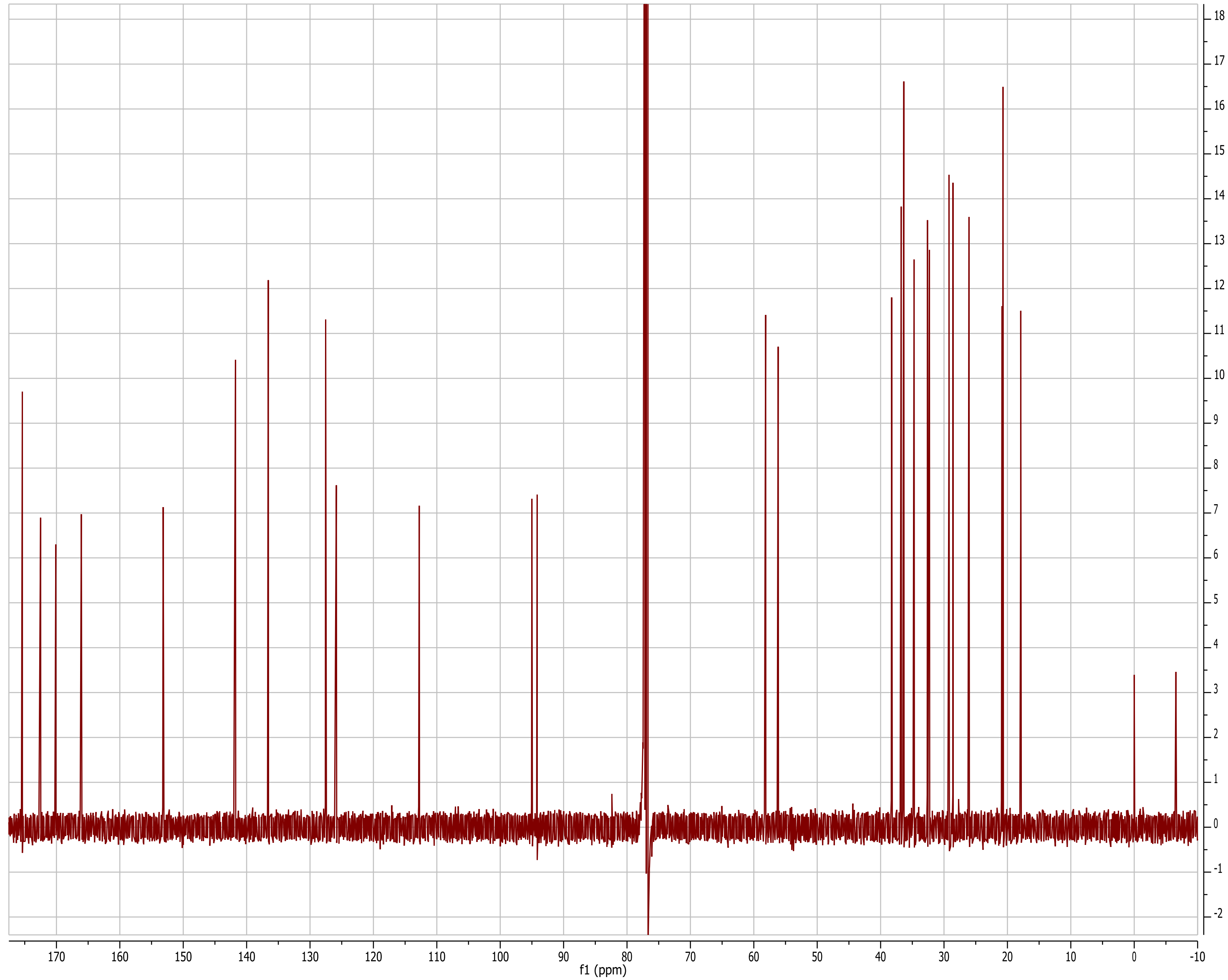


**Figure AL. HSQC-NMR (600 MHz, $CDCl_3$) Spectrum of Jamaicamide F (12).**

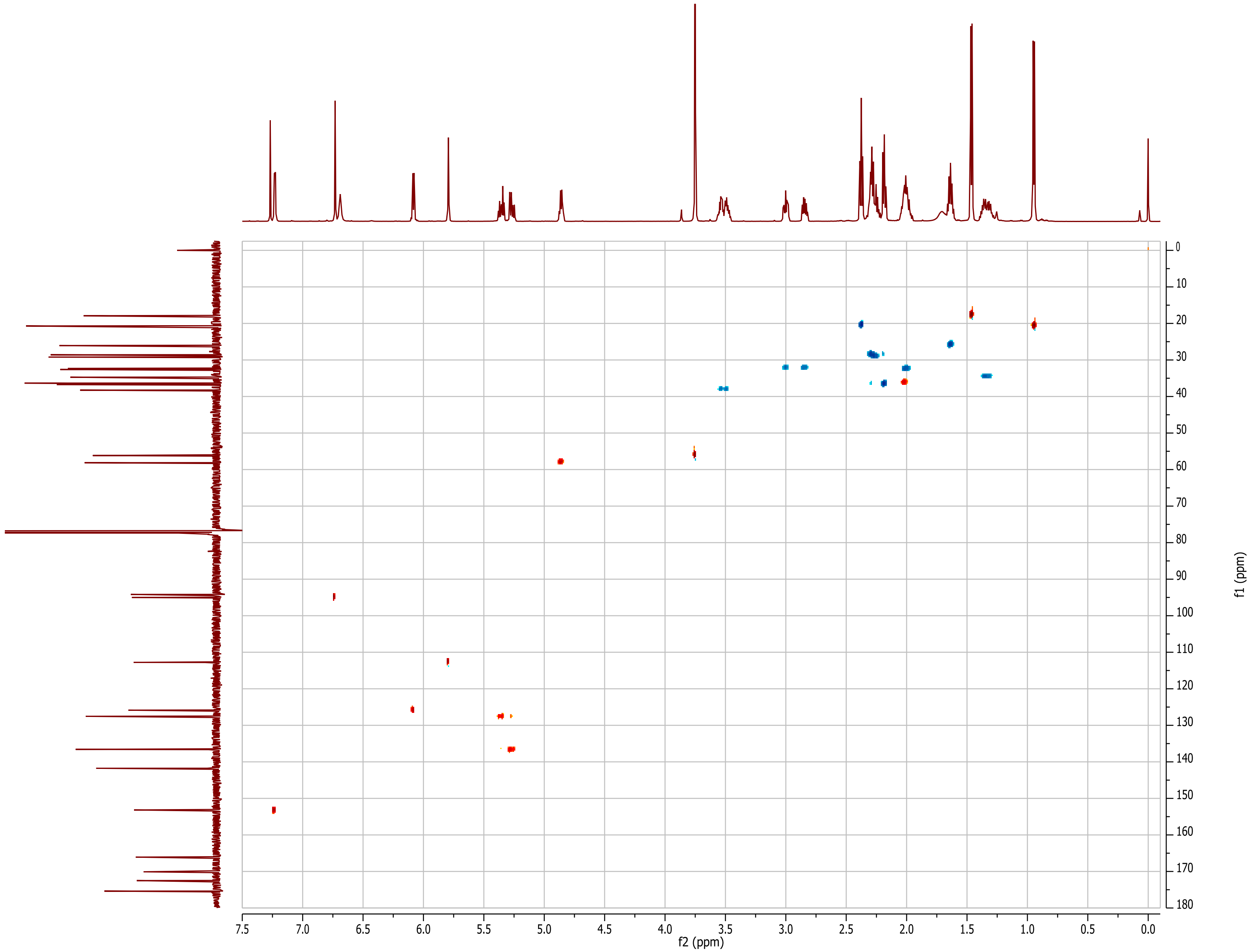


**Figure AM. HMBC-NMR (600 MHz, $CDCl_3$) Spectrum of Jamaicamide F (12).**

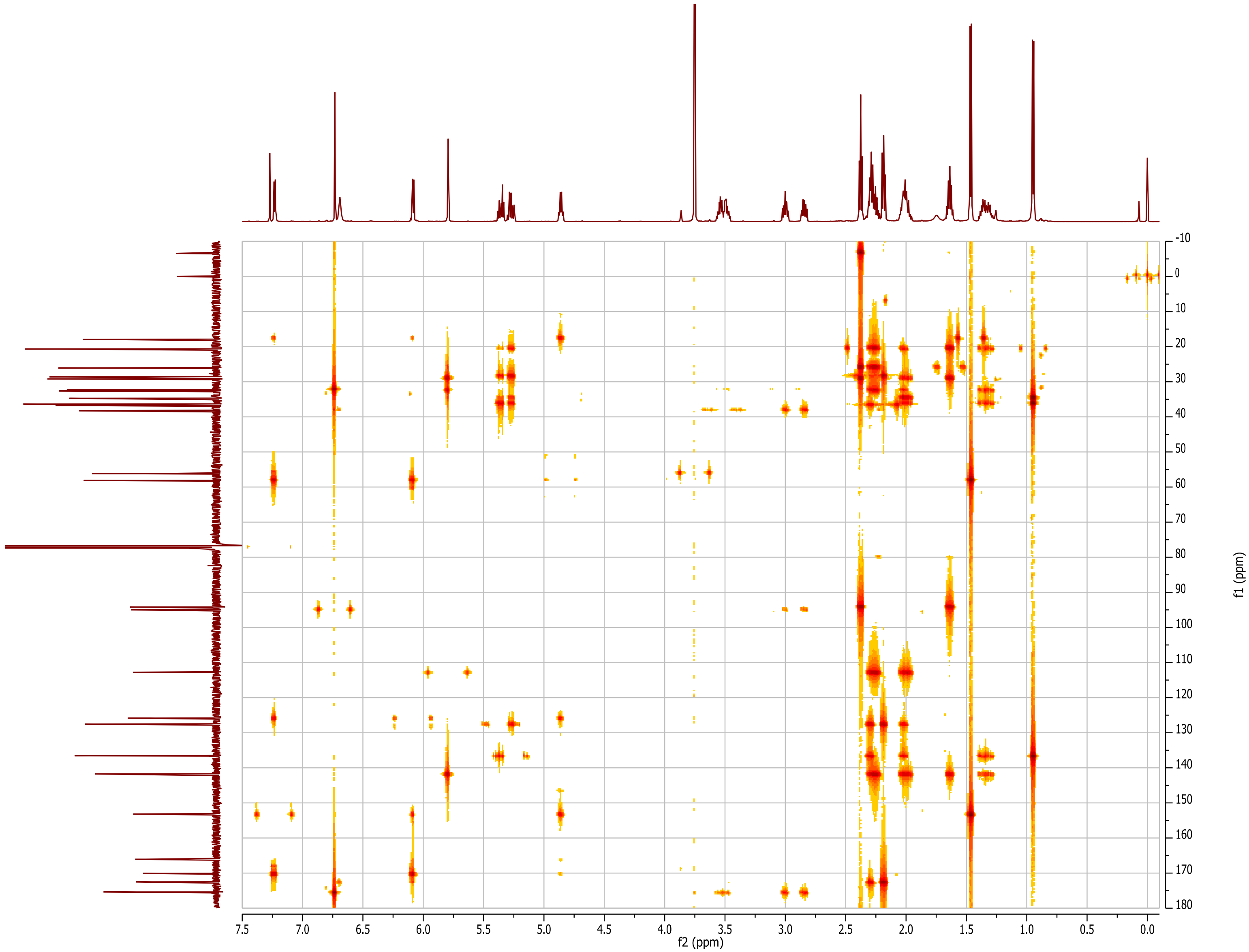


**Figure AN. TOCSY-NMR (600 MHz, $CDCl_3$) Spectrum of Jamaicamide F (12).**

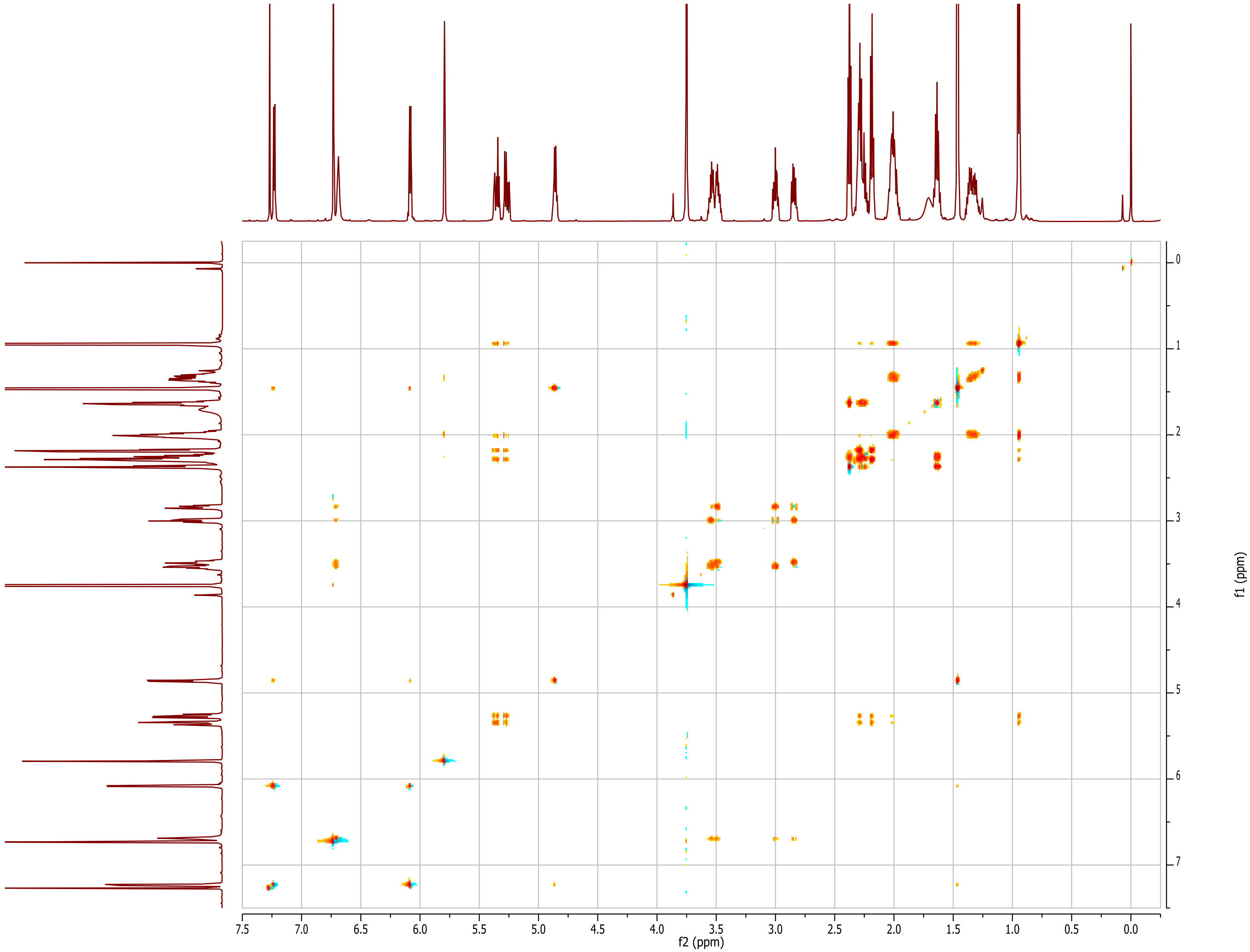
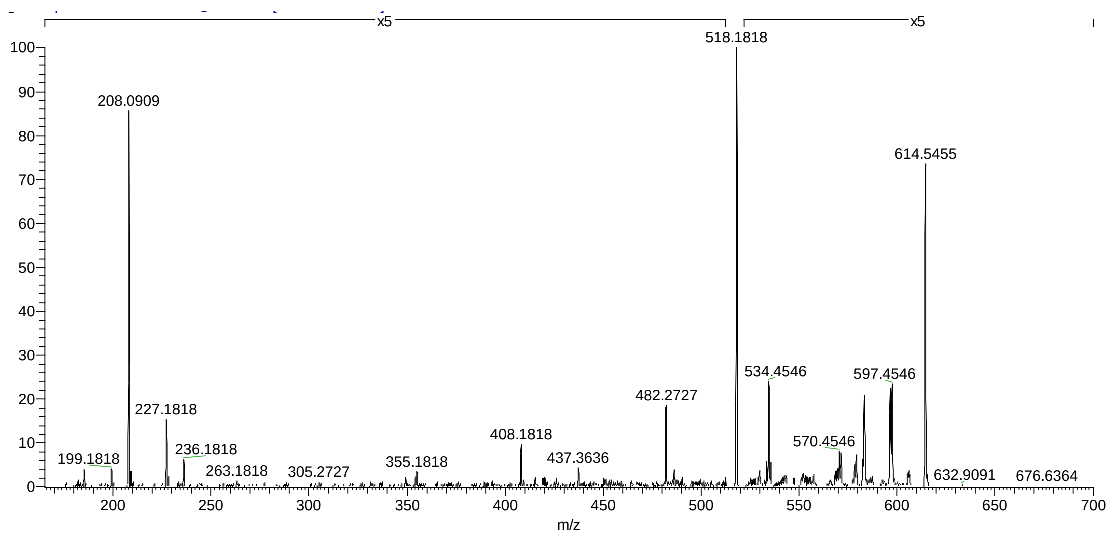
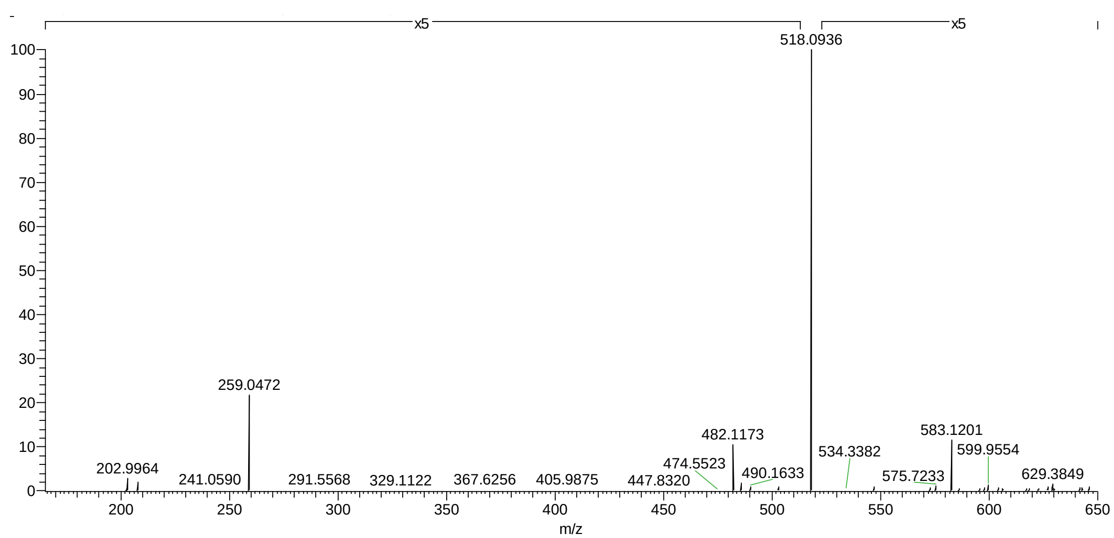


**Figure AO. MS$^2$ Fragment Spectra of Jamaicamide F (12).**

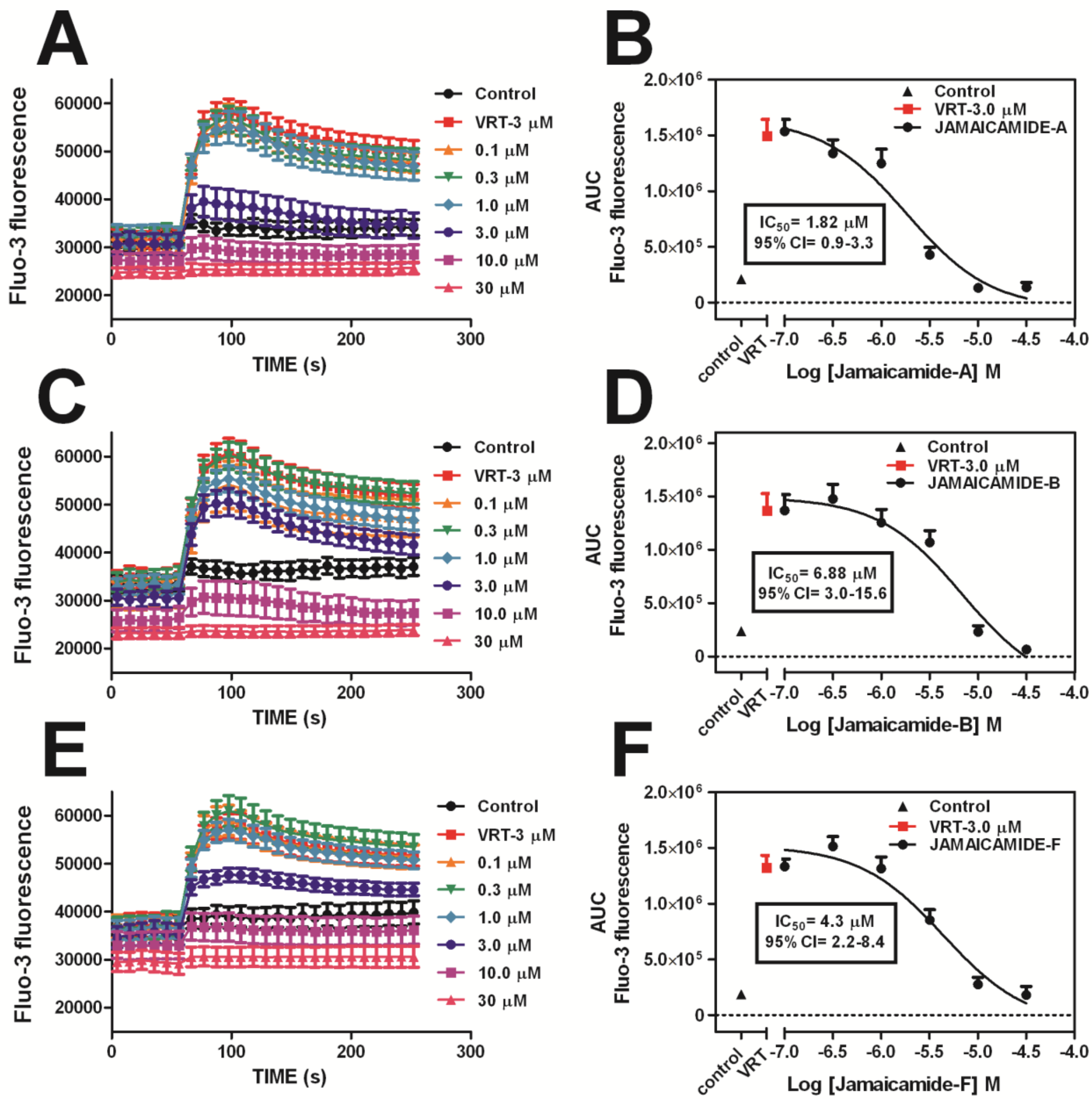



ITMS$^2$ spectrum, parent mass of 615, $[M+H]^+$ of jamaicamide F (**12**).



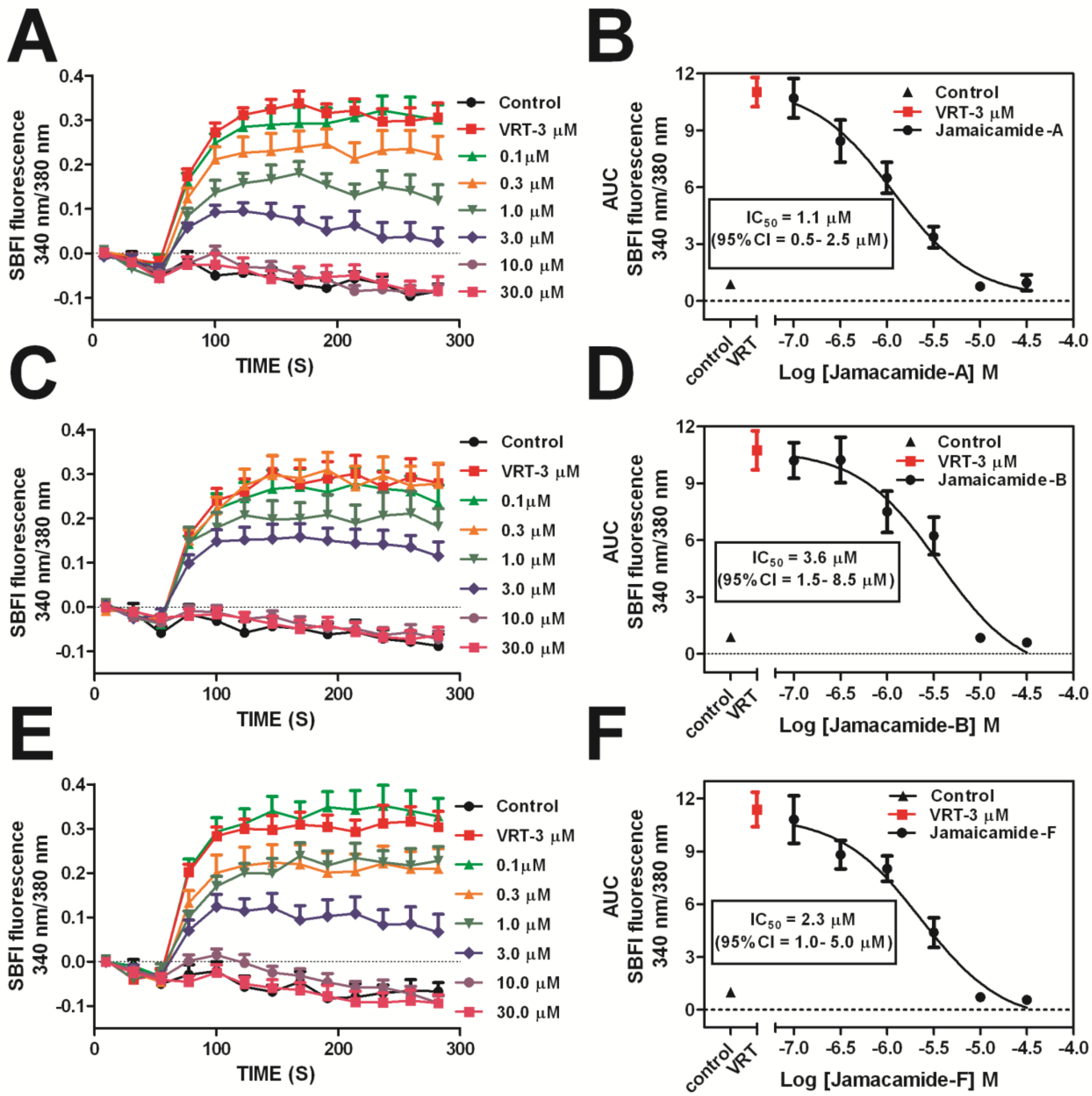

FTMS$^2$ spectrum, parent mass of 615, $[M+H]^+$ of jamaicamide F (**12**).

**Figure AP. Effect of the jamaicamides on the veratridine-induced $Ca^{2+}$ influx in murine neocortical neurons.**




**Panel A, C, E** represents time response relationships for the decrease in veratridine-induced $Ca^{2+}$ influx by jamaicamide A, B and F respectively. **Panel B, D, F** represents concentration-response relationships for the decrease of veratridine-induced $Ca^{2+}$ influx by jamaicamide A, B and F (**2**, **3**, and **12**). This figure represents combined data from 5-6 experiments performed with 2-3 replicates each.

**Figure AQ. Effect of the jamaicamides on the veratridine-induced $Na^+$ influx in murine neocortical neurons.**




**Panel A, C, E** represents time response relationships for the reduction in the veratridine-induced $Na^+$ influx by jamaicamide A, B and F respectively. **Panel B, D, F** represents nonlinear regression analysis of the SBFI (340/380) responses to veratridine in the absence and presence of jamaicamide (A, B and F; **2**, **3**, and **12**). This figure represents combined data from 4 experiments performed with 3 replicates each.

**Figure AR. $^{1}$H-NMR (600 MHz, $CDCl_3$) Spectrum of Hectoramide (4).**

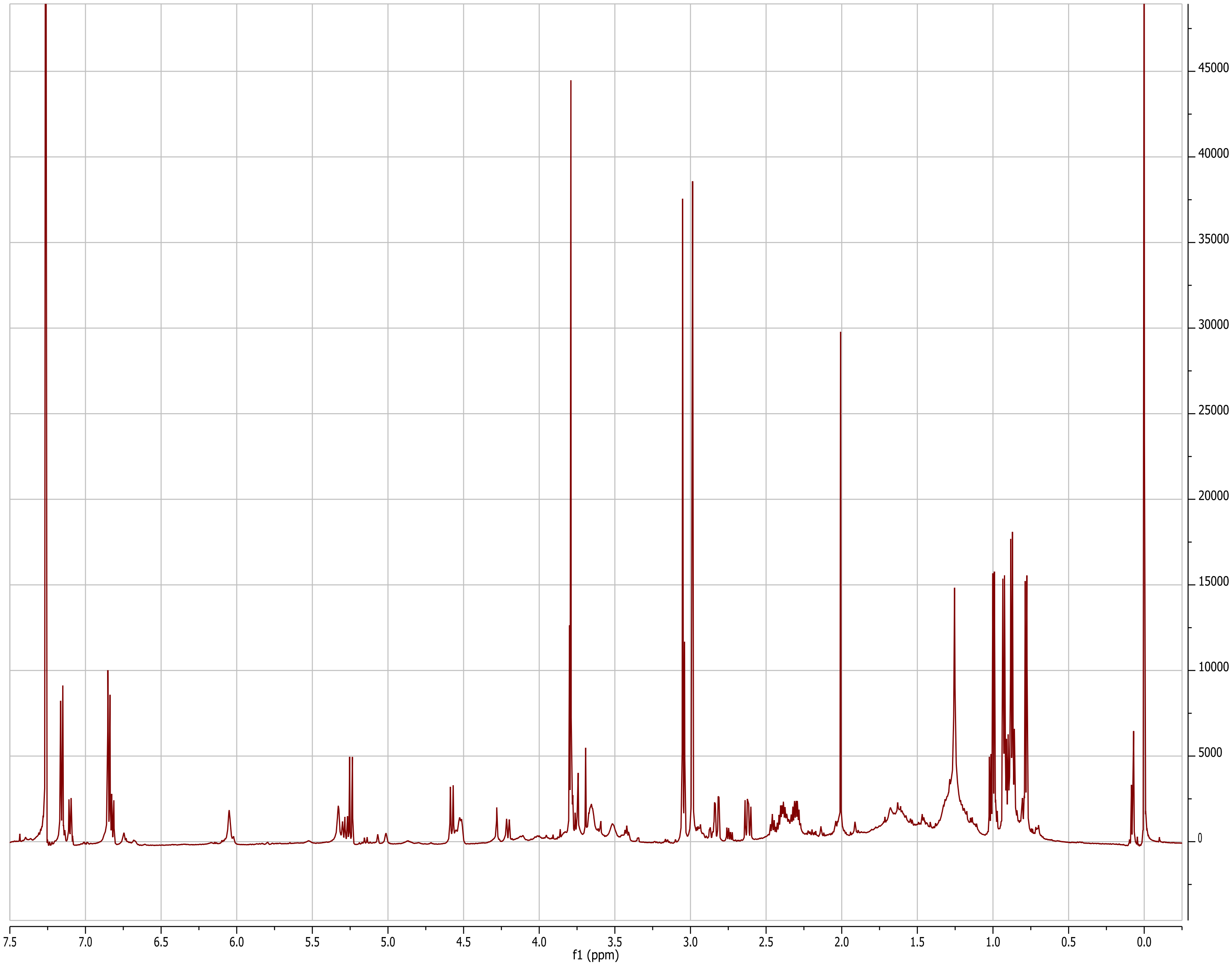


**Figure AS. $^{13}$C-NMR (125 MHz, $CDCl_3$) Spectrum of Hectoramide (4).**

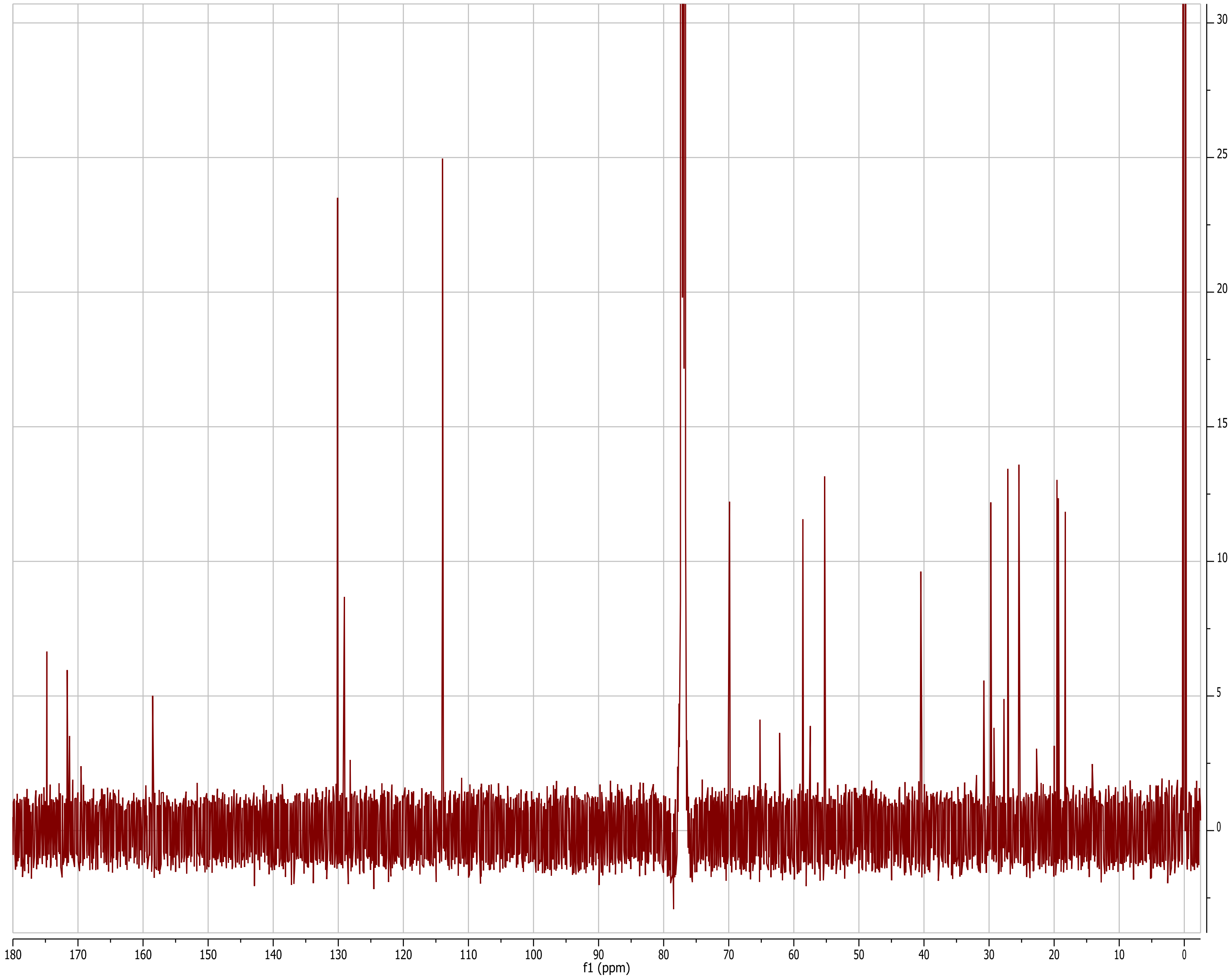
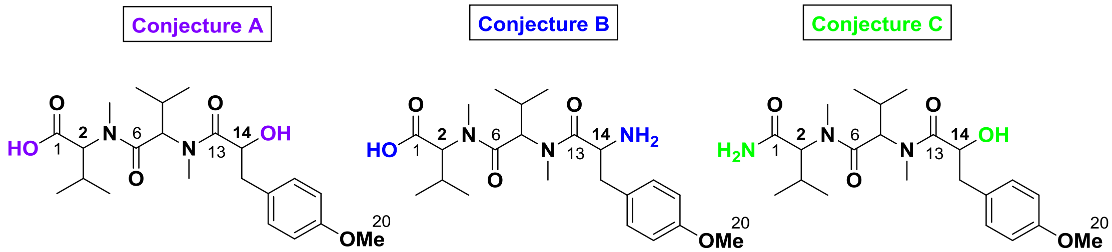


**Figure AT. Predicted $^{13}$C-NMR for Potential Structures of Hectoramide (4).**




| Postion, $\delta_C$ | Conjecture A ChemDraw $\delta_C$ Prediction, Difference | Conjecture B ChemDraw $\delta_C$ Prediction, Difference | Conjecture C ChemDraw $\delta_C$ Prediction, Difference |
|---|---|---|---|
| 1, 171.3 | 175.7, -4.4 | 175.7, -4.4 | 176.7, -5.4 |
| **2, 62.2** | **80.4, -18.2** | **80.4, -18.2** | **72.5, -10.3** |
| 3, 25.4 | 27.7, -2.3 | 27.7, -2.3 | 26.7, -1.3 |
| 4, 18.2(8) | 19.2, -0.9 | 19.2, -0.9 | 18.8, -0.5 |
| 5, 19.6 | 19.2, 0.4 | 19.2, 0.4 | 18.8, 0.8 |
| 6, 30.8 | 32.5, -1.7 | 32.5, -1.7 | 32.1, -1.3 |
| 7, 171.7 | 172.7, -1.0 | 172.7, -1.0 | 172.7, -1.0 |
| 8, 58.6 | 68.1, -9.5 | 67.8, -9.2 | 67.7, -9.1 |
| 9, 27.1 | 27.3, -0.2 | 27.3, -0.2 | 27.3, -0.2 |
| 10, 18.3(4) | 18.8, -0.5 | 18.8, -0.5 | 18.8, -0.5 |
| 11, 19.4 | 18.8, 0.6 | 18.8, 0.6 | 18.8, 0.6 |
| 12, 29.7 | 32.4, -2.7 | 32.1, -2.4 | 32.4, -2.7 |
| 13, 174.8 | 168.9, 5.9 | 170.0, 4.8 | 168.9, 5.9 |
| **14, 69.9** | **70.4, -0.5** | **51.2, 18.7** | **70.4, -0.5** |
| 15, 40.5 | 41.5, -1.0 | 39, 1.5 | 41.5, -1.0 |
| 16, 129.1 | 128.3, 0.8 | 128.9, 0.2 | 128.3, 0.8 |
| 17, 130.1 | 129.8, 0.3 | 129.8, 0.3 | 129.8, 0.3 |
| 18, 114.0 | 114.2, -0.2 | 114.2, -0.2 | 114.2, -0.2 |
| 19, 158.5 | 157.8, 0.7 | 157.8, 0.7 | 157.8, 0.7 |
| 20, 55.3 | 55.8, -0.5 | 55.8, -0.5 | 55.8, -0.5 |

**Figure AU. HSQC (600 MHz, $CDCl_3$) Spectrum of Hectoramide (4).**

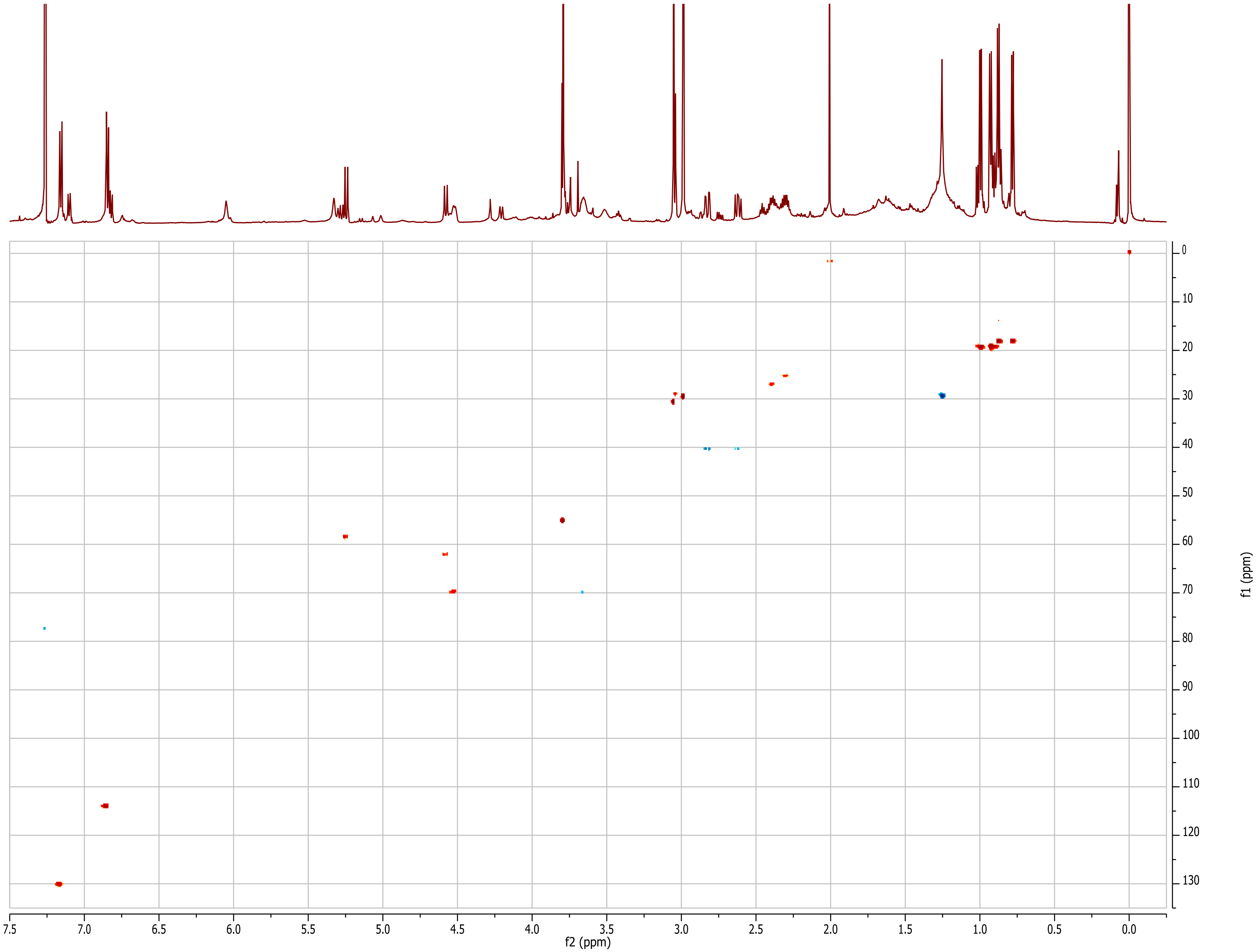


**Figure AV. HMBC (600 MHz, $CDCl_3$) Spectrum of Hectoramide (4), Long Duration.**

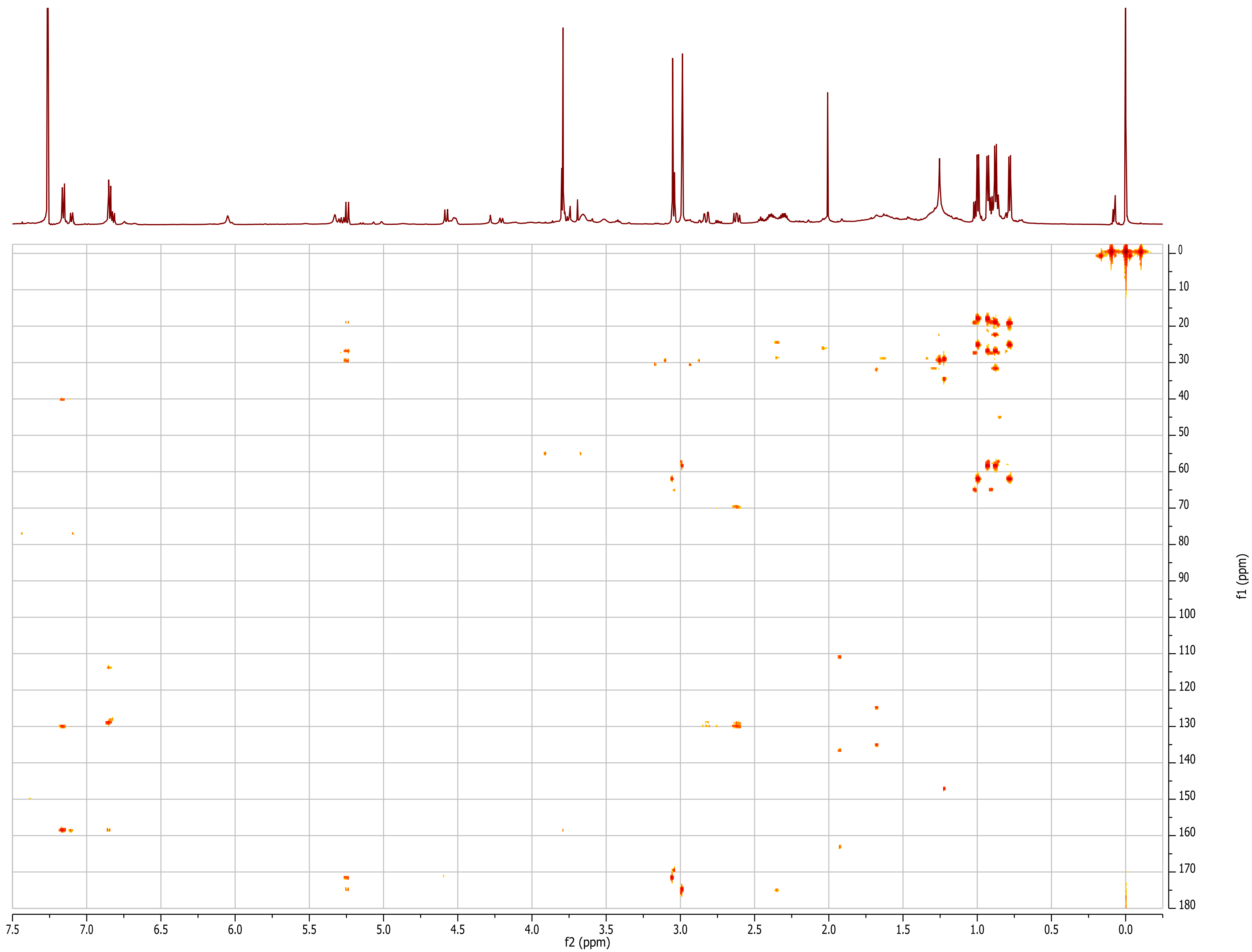


**Figure AW. HMBC (600 MHz, $CDCl_3$) Spectrum of Hectoramide (4), Short Duration.**

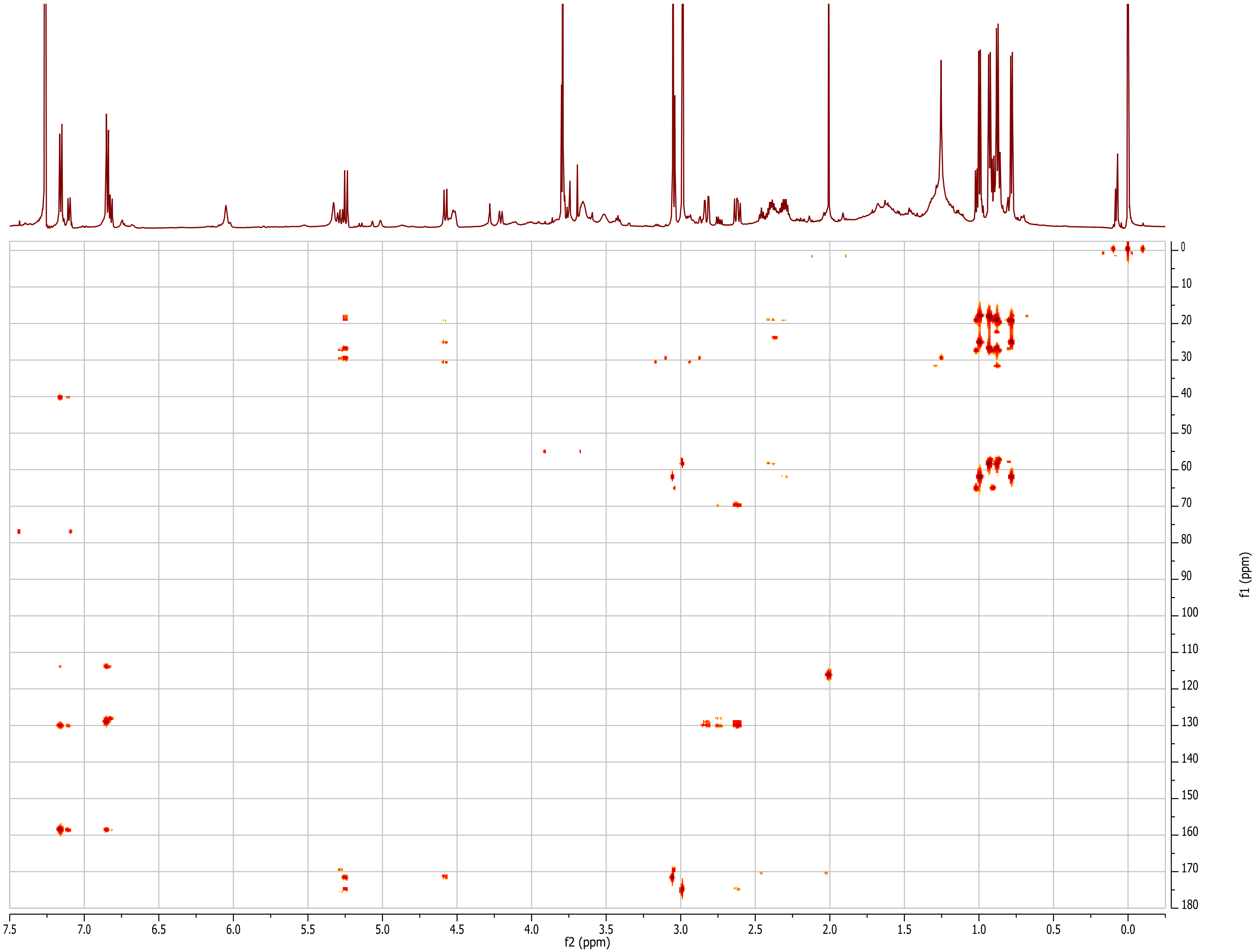


**Figure AX. TOCSY (600 MHz, $CDCl_3$) Spectrum of Hectoramide (4).**

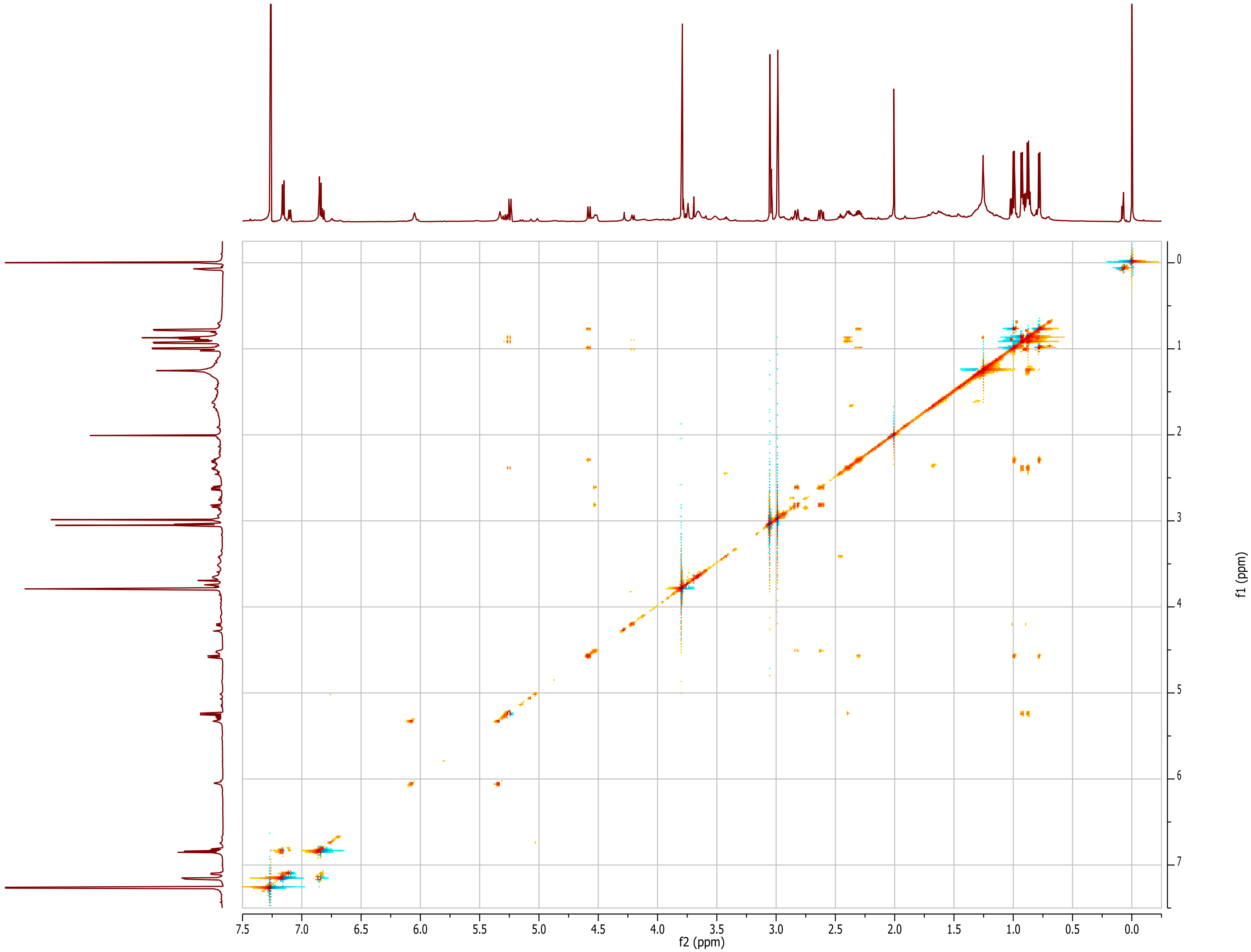
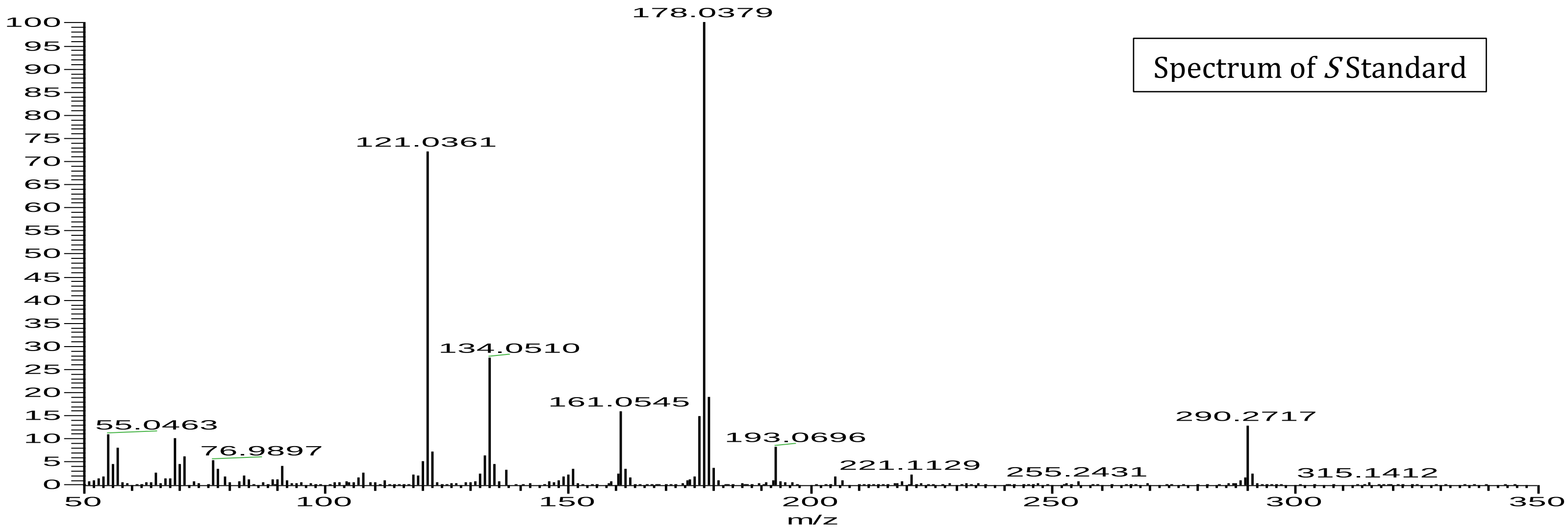
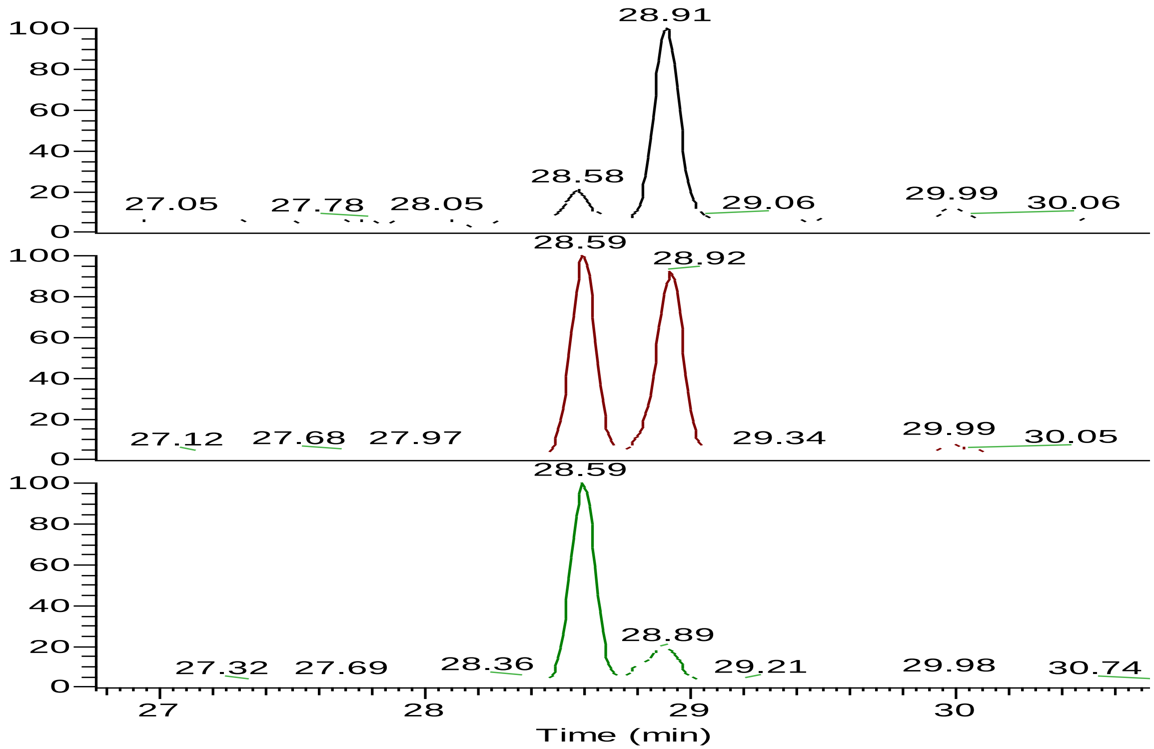


**Figure AY. GC-MS Analysis of 2-S-Octonol Ester Standards.**




Chromatogram of *S* Standard, 177.75-178.25 *m/z*

Chromatogram of a 1:1 mix *S/R* Standards, 177.75-178.25 *m/z*

Chromatogram of *R* Standard, 177.75-178.25 *m/z*

**Figure AZ. GC-MS Analysis of 2-S-Octonol Ester Derivatized Hydrolysate of Hectoramide (4).**

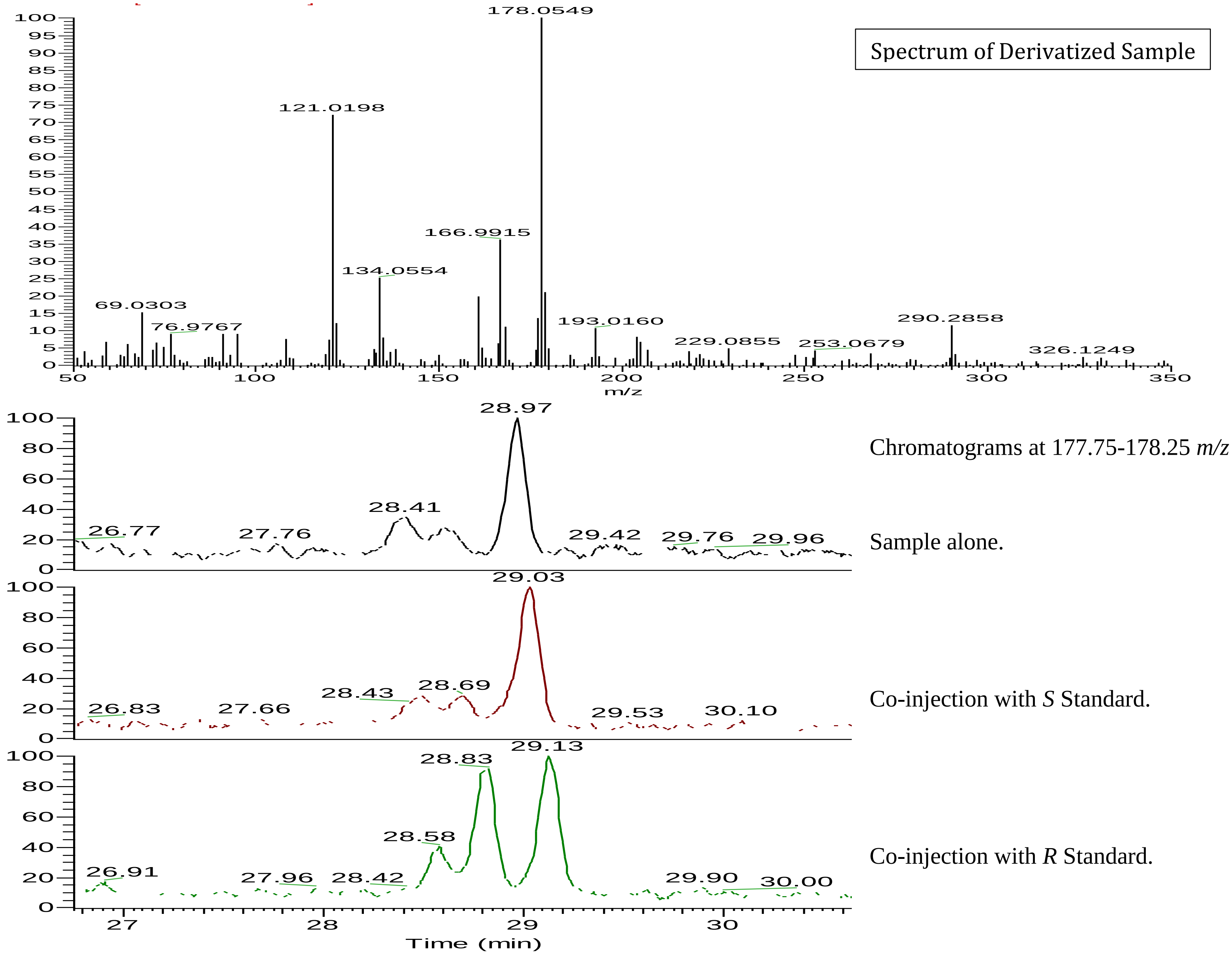
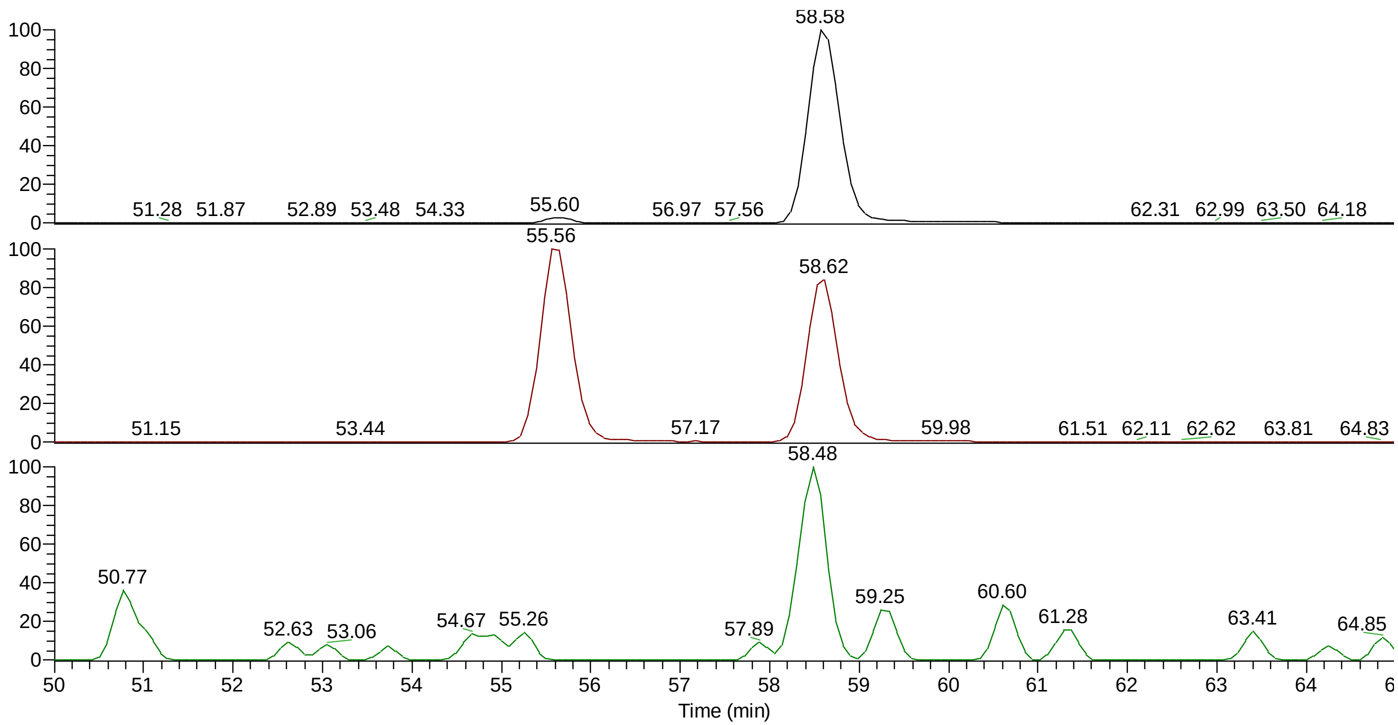


**Figure AAA. Marfey's Analysis of D-FDAA Derivatized Hydrolysate of Hectoramide (4).**




Chromatograms of 383.70-384.10 *m/z*

D-FDAA derivatized L-*N*-Me-Val standard.

D-FDAA derivatized D/L-*N*-Me-Val standard.

D-FDAA derivatized hydrolyaste.