# Supporting Information

## Heronamides D–F, Polyketide Macrolactams from Deep-Sea Derived *Streptomyces* sp. SCSIO 03032

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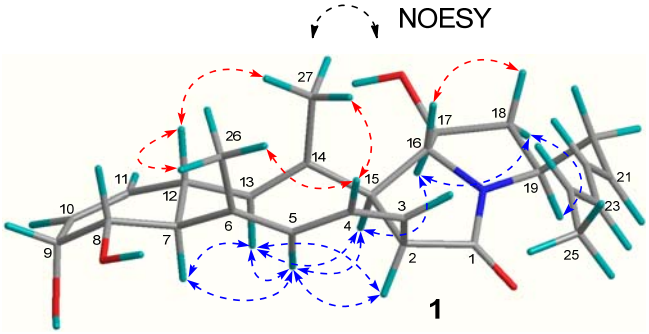
# Content

**Table S1.** Determination of relative configurations of **1** by $^{1}$H-$^{1}$H coupling constants and NOESY correlations**.**

| **Position** | **configuration** | ***J* (Hz)** | **NOESY** |
|---|---|---|---|
| $\Delta^{3,4}$ | *Z* | 10.4 | |
| $\Delta^{5,6}$ | *E* | | from H-26 to H-4 |
| $\Delta^{13,14}$ | *E* | | from H-27 to H-12 |
| $\Delta^{21,22}$ | *E* | 14.5 | |
| $\Delta^{21,22}$ | *E* | 14.5 | |
| H-5/H-2 | on the same side | | between H-5 and H-2 |
| H-5/H-7 | on the same side | | between H-5 and H-7 |
| H-5/H-13 | on the same side | | between H-5 and H-13 |
| H-5/H-15 | on the same side | | between H-5 and H-15 |
| H-7/H-8 | *trans* | 10.5 | |
| H-7/H-12 | *trans* | 10.5 | |
| H-8/H-9 | *cis* | 4.1 | |




NOESY correlations from H-12 to $H_3$-26/$H_3$-27, and from H-4 to $H_3$-26/$H_3$-27 indicated that H-4, H-12, $H_3$-26, and $H_3$-27 were on the same face of the 10-membered ring, whereas the protons H-2, H-5, H-7, H-13, and H-15 were placed on the other face of the 10-membered ring on the basis of NOESY correlations from H-5 to H-2/H-7/H-13/H-15, and from H-13 to H-2/H-7/H-15. NOESY correlations from H-17 to H-15/H-18b, and between H-18b and H-19 suggested that the protons H-17, H-18b, and H-19 were on the same side as H-15.

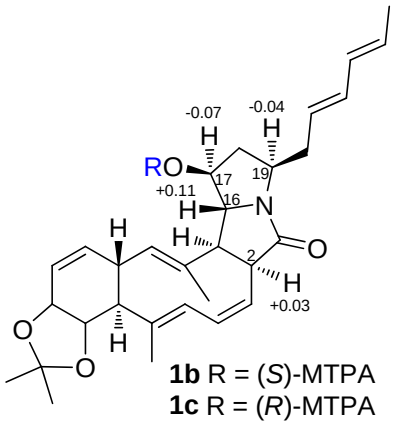
**Table S2.** $^{1}$H NMR spectroscopic data for **1a** (500 MHz, $CDCl_3$) and $^{1}$H, NOESY NMR spectroscopic data for **1b** (500 MHz, pyridine-$d_5$).

| Position | 1a | 1b | | |
|---|---|---|---|---|
| | $\delta_H$, mult (*J* in Hz) | $\delta_H$, mult (*J* in Hz) | COSY | NOESY |
| 2 | 3.86, ddd (9.0, 7.1, 1.7) | 3.89, ddd (9.0, 7.1, 1.7) | 3, 4, 15 | |
| 3 | 5.82, dd (10.0, 7.1) | 5.77, m (10.0, 7.1) | 2, 4 | |
| 4 | 6.73, ddd (10.0, 10.0, 1.7) | 6.74, ddd (10.0, 10.0, 1.7) | 2, 3, 5 | |
| 5 | 5.62, m | 5.58, m[a] | 4 | 7 |
| 7 | 2.03, dd (10.6, 10.6) | 2.05, dd (10.6, 10.6) | 8, 12 | 5 |
| 8 | 4.45, dd (10.6, 5.3) | 4.49, dd (10.6, 5.3) | 7, 9 | |
| 9 | 4.67, m | 4.69, m | 8, 10 | |
| 10 | 6.01, m | 6.01, m[a] | 9, 11 | |
| 11 | 6.21, m | 6.17, m[a] | 10, 12 | |
| 12 | 2.80, m | 2.82, m | 7, 11, 13 | 26 |
| 13 | 5.03, m | 5.03, m[a] | 12 | |
| 15 | 3.32, dd (9.0, 9.0) | 3.47, dd (9.0, 9.0) | 2, 16 | |
| 16 | 4.29, dd (9.0, 6.9) | 4.41, dd (9.0, 6.9) | 15, 17 | 26 |
| 17 | 4.21, m | 5.40, m | 16, 18a, 18b | 15, 18a |
| 18a | 2.61, m | 2.78, m | 17, 18b, 19 | |
| 18b | 2.17, m | 1.97, m | 17, 18a, 19 | |
| 19 | 4.21, m | 4.29, m | 18a, 18b, 20a, 20b | 18a |
| 20a | 2.80, m | 2.35, m | 19, 20b, 21 | |
| 20b | 2.66, m | 2.61, m | 19, 20a, 21 | |
| 21 | 5.62, m | 5.62, m[a] | 20a, 20b, 22 | |
| 22 | 6.24, dd (10.5, 15.1) | 6.17, m[a] | 21, 23 | |
| 23 | 6.10, m | 6.10, m[a] | 22, 24 | |
| 24 | 5.77, m | 5.85, m[a] | 23, 25 | |
| 25 | 1.63, d (6.7) | 1.64, d (6.7) | 24 | |
| 26 | 1.72, s | 1.54, s | | |
| 27 | 1.54, s | 1.32, s | | 12, 16 |
| 28 | 1.48, s | 1.47, s | | |
| 29 | 1.46, s | 1.76, s | | |

[a]overlapping signals

**Table S3.** $\Delta\delta^{SR}$ (ppm) data for 17-(*S*)- and 17-(*R*)-MTPA esters of heronamide D acetonides (**1b** and **1c**) in pyridine-$d_5$.

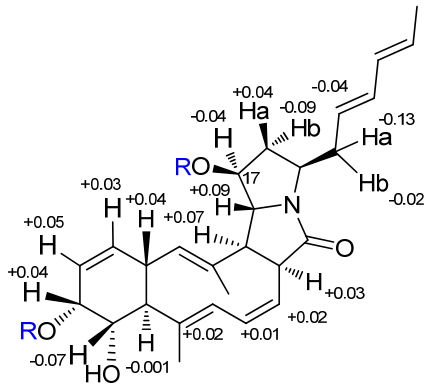
| **No.** | *S*-MTPA (**1b**) | *R*-MTPA (**1c**) | $\Delta\delta^{SR}$ (ppm) |
|---|---|---|---|
| | $\delta_H$ | $\delta_H$ | $\Delta\delta$ ($\delta_S$ - $\delta_R$) |
| 2 | 3.89 | 3.88 | 0.01 |
| 4 | 6.74 | 6.71 | 0.03 |
| 5 | 5.58 | 5.56 | 0.02 |
| 12 | 2.82 | 2.81 | 0.01 |
| 13 | 5.13 | 5.09 | 0.04 |
| 15 | 3.47 | 3.44 | 0.03 |
| 16 | 4.41 | 4.30 | 0.11 |
| 17 | 5.40 | 5.47 | -0.07 |
| 19 | 4.29 | 4.33 | -0.04 |




**1b** R = (*S*)-MTPA
**1c** R = (*R*)-MTPA

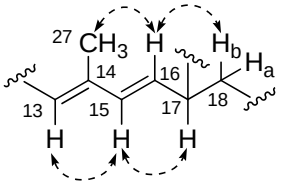
**Table S4.** $\Delta\delta^{SR}$ data (ppm) for the bis-9,17-(*S*)- and bis-9,17-(*R*)-MTPA esters of heronamide D (**1d** and **1e**) in $CDCl_3$.

| No. | *S*-MTPA (**1d**) | *R*-MTPA (**1e**) | $\Delta\delta^{SR}$ (ppm) |
|---|---|---|---|
| | $\delta_H$ | $\delta_H$ | $\Delta\delta$ ($\delta_S$ - $\delta_R$) |
| 3 | 5.51 | 5.49 | 0.02 |
| 4 | 6.62 | 6.61 | 0.01 |
| 5 | 5.34 | 5.32 | 0.02 |
| 7 | 1.912 | 1.913 | -0.001 |
| 8 | 4.07 | 4.14 | -0.07 |
| 9 | 5.59 | 5.56 | 0.03 |
| 10 | 6.00 | 5.95 | 0.05 |
| 11 | 6.09 | 6.06 | 0.03 |
| 12 | 2.81 | 2.77 | 0.04 |
| 13 | 4.92 | 4.85 | 0.07 |
| 15 | 3.16 | 3.12 | 0.04 |
| 16 | 4.11 | 4.02 | 0.09 |
| 17 | 5.06 | 5.10 | -0.04 |
| 18a | 1.85 | 1.94 | -0.09 |
| 18b | 2.61 | 2.57 | 0.04 |
| 20 | 2.44 | 2.57 | -0.13 |
| | 2.23 | 2.25 | -0.02 |
| 21 | 5.40 | 5.44 | -0.04 |
| 25 | 1.742 | 1.746 | -0.004 |
| 26 | 1.696 | 1.699 | -0.003 |
| 27 | 1.28 | 1.13 | 0.15 |

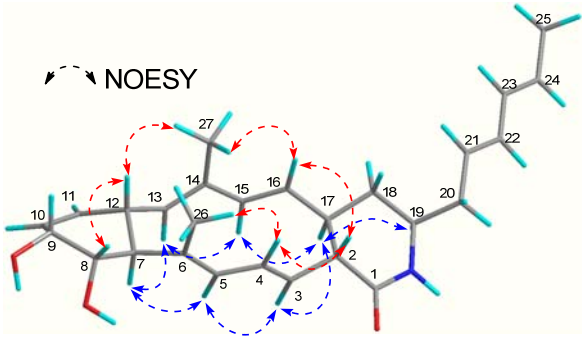



**1d** R = (*S*)-MTPA
**1e** R = (*R*)-MTPA

**Table S5.** Determination of relative configurations of **2** by $^{1}$H-$^{1}$H coupling constants and NOESY correlations**.**

| **Position** | **configuration** | ***J* (Hz)** | **NOESY** |
|---|---|---|---|
| $\Delta^{3,4}$ | E | 15.0 | |
| $\Delta^{5,6}$ | E | | from H-26 to H-4 |
| $\Delta^{15,16}$ | E | 15.0 | from H-27 to H-12 |
| $\Delta^{21,22}$ | E | 15.0 | |
| $\Delta^{23,24}$ | E | 15.0 | |
| H-7/H-12 | *trans* | 10.5 | |
| H-8/H-9 | *cis* | 4.0 | |
| H-8/H-12 | on the same side | | between H-8 and H-12 |
| H-2/H-17 | *trans* | 10.5 | |
| H-17/H-19 | on the same side | | between H-17 and H-19 |
| $H_3$-27/H-15 | *anti* | |  |



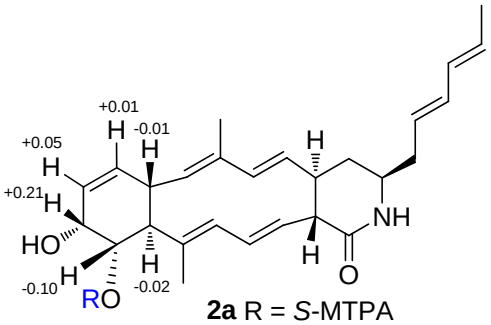



**2**

The protons H-2, H-4, H-12, H-16, H-26, and H-27 were placed on the same face of the 12-membered ring of **2**, on the basis of NOESY correlations from H-16 to H-2, from H-4 to $H_3$-26/H-2, and from H-12 to $H_3$-27; whereas the protons H-3, H-5, H-7, H-13, H-15, and H-17 were put on the other face of the 12-membered ring of **2,** on the basis of NOESY correlations from H-5 to H-3/H-7, between H-7 and H-13, and between H-3 and H-17**.**

**Table S6.** $\Delta\delta^{SR}$ data (ppm) for 8-(*S*)- and 8-(*R*)-MTPA ester of heronamide E (**2a** and **2b**) in $CDCl_3$.

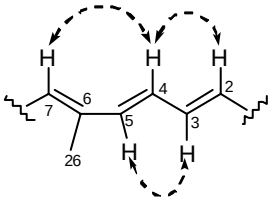
| No. | *S*-MTPA (**2a**) | *R*-MTPA (**2b**) | $\Delta\delta^{SR}$ (ppm) |
|---|---|---|---|
| | $\delta_H$ | $\delta_H$ | $\Delta\delta$ ($\delta_S$ - $\delta_R$) |
| 2 | 2.655 | 2.660 | -0.005 |
| 3 | 5.12 | 5.17 | -0.05 |
| 4 | 5.80 | 5.87 | -0.07 |
| 5 | 5.62 | 5.69 | -0.07 |
| 7 | 2.67 | 2.69 | -0.02 |
| 8 | 5.33 | 5.43 | -0.10 |
| 9 | 4.50 | 4.30 | 0.20 |
| 10 | 5.87 | 5.82 | 0.05 |
| 11 | 5.92 | 5.90 | 0.02 |
| 12 | 3.22 | 3.24 | -0.02 |
| 13 | 4.832 | 4.836 | -0.004 |
| 15 | 5.67 | 5.69 | -0.02 |
| 16 | 4.89 | 4.91 | -0.02 |
| 17 | 2.424 | 2.421 | 0.003 |
| 19 | 3.500 | 3.499 | 0.001 |
| 25 | 1.756 | 1.759 | -0.003 |
| 27 | 1.62 | 1.65 | -0.03 |
| 26 | 1.42 | 1.53 | -0.11 |



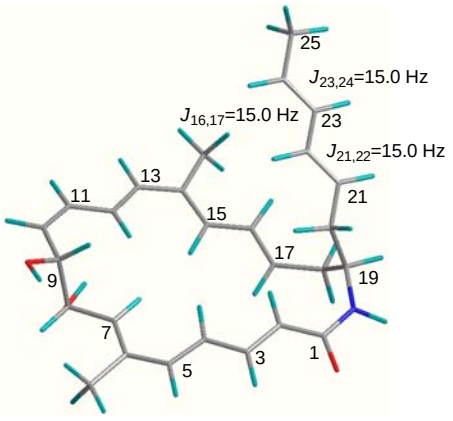

**2a** R = *S*-MTPA
**2b** R = *R*-MTPA

**Table S7.** Determination of relative configurations of **3** by $^{1}$H-$^{1}$H coupling constants and NOESY correlations in **3** or **3a.**

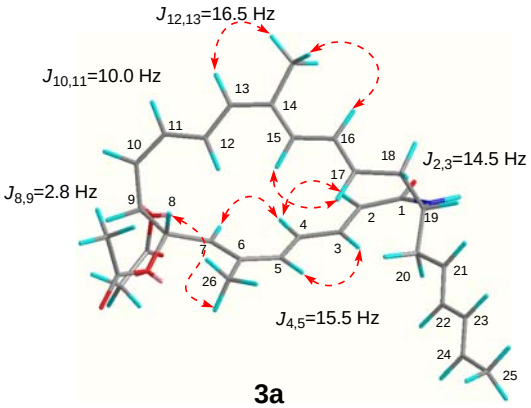
| **Position** | **configuration** | ***J* (Hz)** | **NOESY** |
|---|---|---|---|
| $\Delta^{2,3}$ | $E^b$ | 14.5 | |
| $\Delta^{4,5}$ | $E^b$ | 15.5 | |
| $\Delta^{6,7}$ | $E^b$ | | from H-26 to H-8 |
| $\Delta^{10,11}$ | $Z^b$ | 10.0 | |
| $\Delta^{12,13}$ | $E^b$ | 16.5 | |
| $\Delta^{14,15}$ | $E^b$ | | from H-27 to H-16 |
| $\Delta^{16,17}$ | $E^a$ | 15.0 | |
| $\Delta^{21,22}$ | $E^a$ | 15.0 | |
| $\Delta^{23,24}$ | $E^a$ | 15.0 | |
| H-8/H-9 | *cis*$^b$ | 2.8 | |
| H-3/H-4 | *anti*$^b$ | | between H-2 and H-4, and between H-3 and H-5 |
| H-5/H-26 | *cis*$^b$ | | between H-7 and H-4 |
| H-13/$H_3$-27 | *cis*$^b$ | | between H-13 and $H_3$-27 |
| H-15/H-16 | *anti*$^b$ | | between H-16 and $H_3$-27 and between H-15 and H-17 |




[a]observed in **3**, [b]observed in **3a.**




**3**



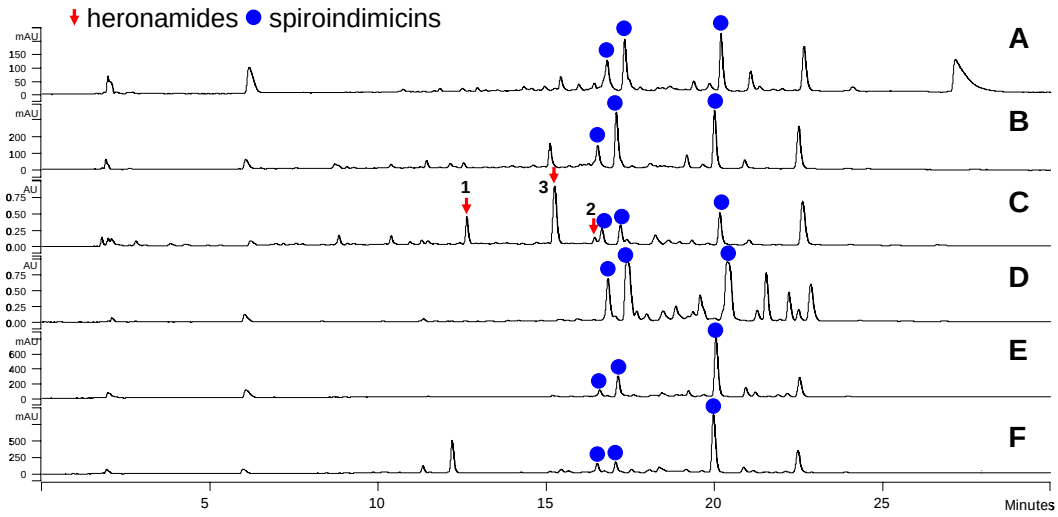

**3a**

**Table S8.** NMR spectroscopic data (500 MHz, $CDCl_3$) for **3a**.

| Position | $\delta_H$, mult (*J* in Hz) | $\delta_C$, type | COSY | HMBC | NOESY |
|---|---|---|---|---|---|
| 1 | | 167.5, C | | | |
| 2 | 5.75, d (14.5) | 123.0, CH | 3 | 1, 4 | NH, 4 |
| 3 | 6.94, ddd (1.5, 8.5, 14.5) | 142.0, CH | 2, 4, 5 | 1, 4, 5 | 5 |
| 4 | 6.17, dd (8.5, 15.5) | 125.9, CH | 3, 5 | 2, 6 | 2, 7 |
| 5 | 6.18, dd (1.5, 15.5) | 143.4, CH | 2, 4 | 3, 4, 26 | |
| 6 | | 135.7, C | | | |
| | 5.20, d (7.5) | 131.6, CH | 8, 27 | 5, 26 | 4 |
| 8 | 6.07, m | 71.6, CH | 9 | 7, 9 | 26 |
| 9 | 5.64, m | 70.9, CH | 8, 10 | 8, 10 | |
| 10 | 5.44, dd (10.0, 10.0) | 122.7, CH | 9, 11, | 12 | |
| 11 | 6.26, dd (10.0, 10.0) | 132.8, CH | 10, 12 | 13 | |
| 12 | 5.95,dd (11.0, 16.5) | 123.2, CH | 11 | 13, 14 | |
| 13 | 6.17, m | 138.7, CH | | | |
| 14 | | 133.3, C | | | |
| 15 | 5.98, d (11.0) | 131.4, CH | | 16, 27 | 17 |
| 16 | 6.06, m | 133.7, CH | 17 | 18a | 27 |
| 17 | 5.62, m | 131.3, CH | 16, 18 | 16 | 15 |
| 18a | 2.51, m | 41.4, $CH_2$ | 8b, 11, 17 | | |
| 18b | 1.81, m | | 18a, 19 | 19 | |
| 19 | 4.22, m | 49.8, CH | 18b, 20, NH | | 18a |
| 20a | 2.32, m | 38.2, $CH_2$ | 19, 21 | 18a, 19, 21 | |
| 20b | 2.35, m | 38.2, $CH_2$ | 19, 21 | | |
| 21 | 5.56, m | 126.3, CH | 20, 22 | 19, 20, 23 | |
| 22 | 6.08, m | 130.4, CH | 21, 23 | | |
| 23 | 6.01, m | 131.0, CH | | | |
| 24 | 5.67, m | 128.5, CH | | | |
| 25 | 1.75, d (6.5) | 18.0, $CH_3$ | 24 | 23, 24 | |
| 26 | 1.96, s | 12.7, $CH_3$ | | 5, 6, 7 | |
| 27 | 1.59, s | 12.4, $CH_3$ | 15 | 13, 14, 15 | 8 |
| 28* | 2.06, s | 21.0, $CH_3$ | | 30 | 16 |
| 29* | 2.10, s | 21.1, $CH_3$ | | 31 | |
| 30* | | 170.3, C | | | |
| 31* | | 170.5, C | | | |
| NH | 4.85, d (11.0) | | 19 | 1 | |

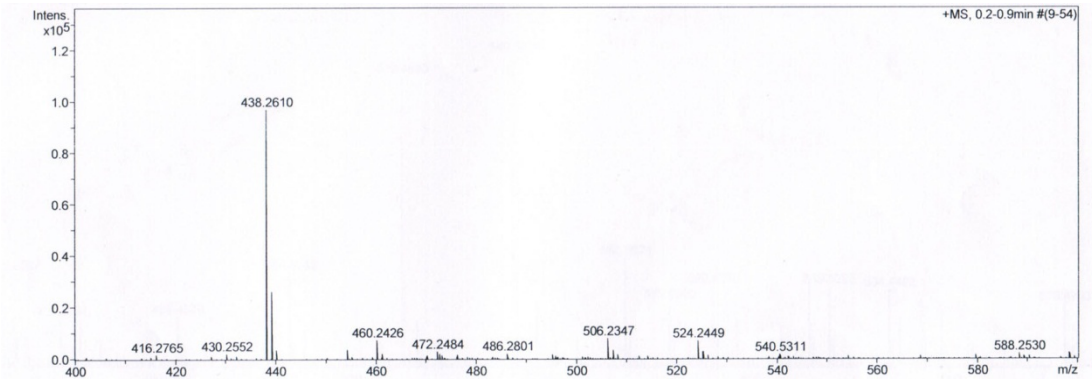
*8, 9-OC (O) Me or 8, 9-OC (O) signals

**Figure S1.** HPLC analysis of metabolite profiles of *Streptomyces* sp. SCSIO 03032 cultured in different media.

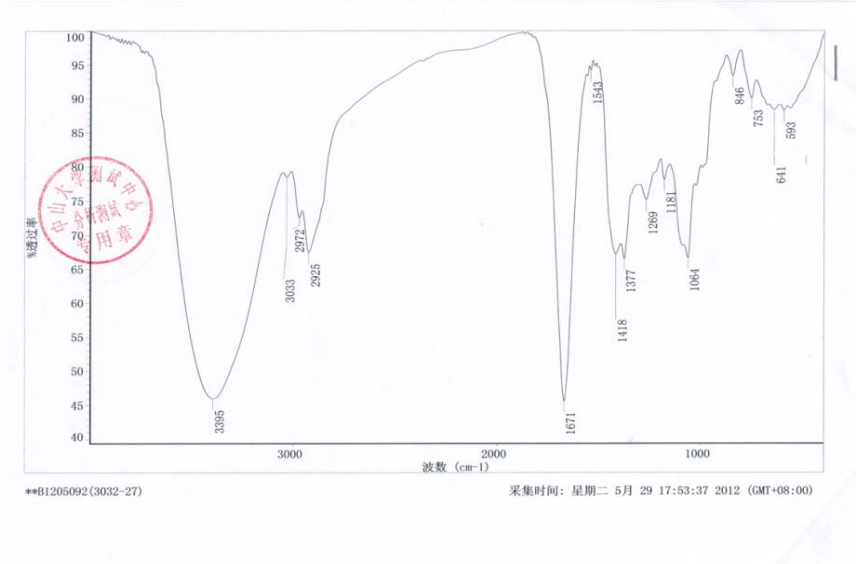



(**A**). AM1 medium (glucose 0.6 %, chitin 0.2 %, $CaCO_3$ 0.2 %, sea salt 3 %, pH 7.2-7.4); (**B**). AM2 medium (l-Asn 0.2 %, trehalose 1 %, $MgSO_4$ 0.1 %, $CaCO_3$ 0.2 %, sea salt 3 %, pH 7.2-7.4); (**C**). Modified-ISP3 (oat meal 1.5 %, $FeSO_4$ 0.0001 %, $MnCl_2$ 0.0001 %, $ZnSO_4$ 0.0001 %, sea salt 3 %, pH 7.2-7.4); (**D**). modified-A1BFe+C (starch 1 %, yeast extract 0.4 %, peptone 0.2 %, $CaCO_3$ 0.2 %, sea salt 3 %, pH 7.2-7.4); (**E**). AM4 medium (l-Asn 0.2 %, $K_2HPO_4$ 0.15 %, Glycerin 1 %, $CaCO_3$ 0.2 %, sea salt 3 %, pH 7.2-7.4); (**F**). AM5 medium (starch 1.0 %, $(NH_2)_2SO_4$ 0.2 %, $MgSO_4$ 0.1 %, $K_2HPO_4$ 0.1 %, $FeSO_4$ 0.0001 %, $MnCl_2$ 0.0001 %, $ZnSO_4$ 0.0001 %), sea salt 3%, pH 7.2-7.4.

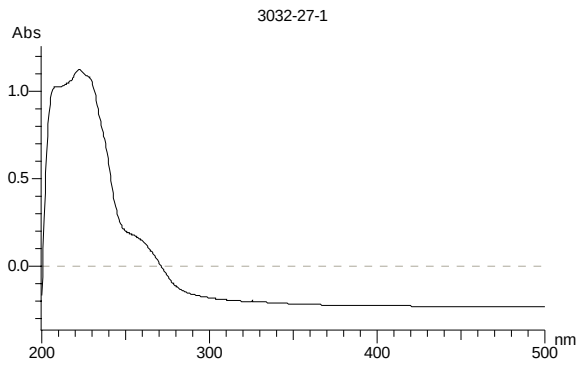
**Figure S2.** Spectroscopic data for heronamide D (**1**).
(**A**) HR-ESI-MS (**a**), IR (**b**), UV (**c**), and CD (**d**) spectra of heronamide D (**1**).
(**a**). HR-ESI-MS




(**b**). IR




(**c**). UV




(**d**). CD

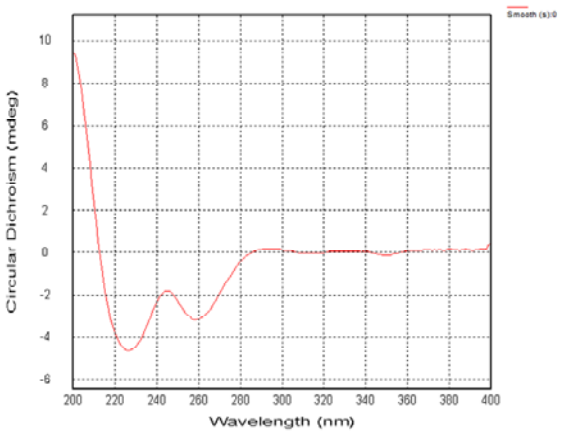


**Figure S2.** Spectroscopic data for heronamide D (**1**). (Continued)

(**B**) The $^{1}H$ NMR spectrum of heronamide D (**1**) in $CDCl_3$.

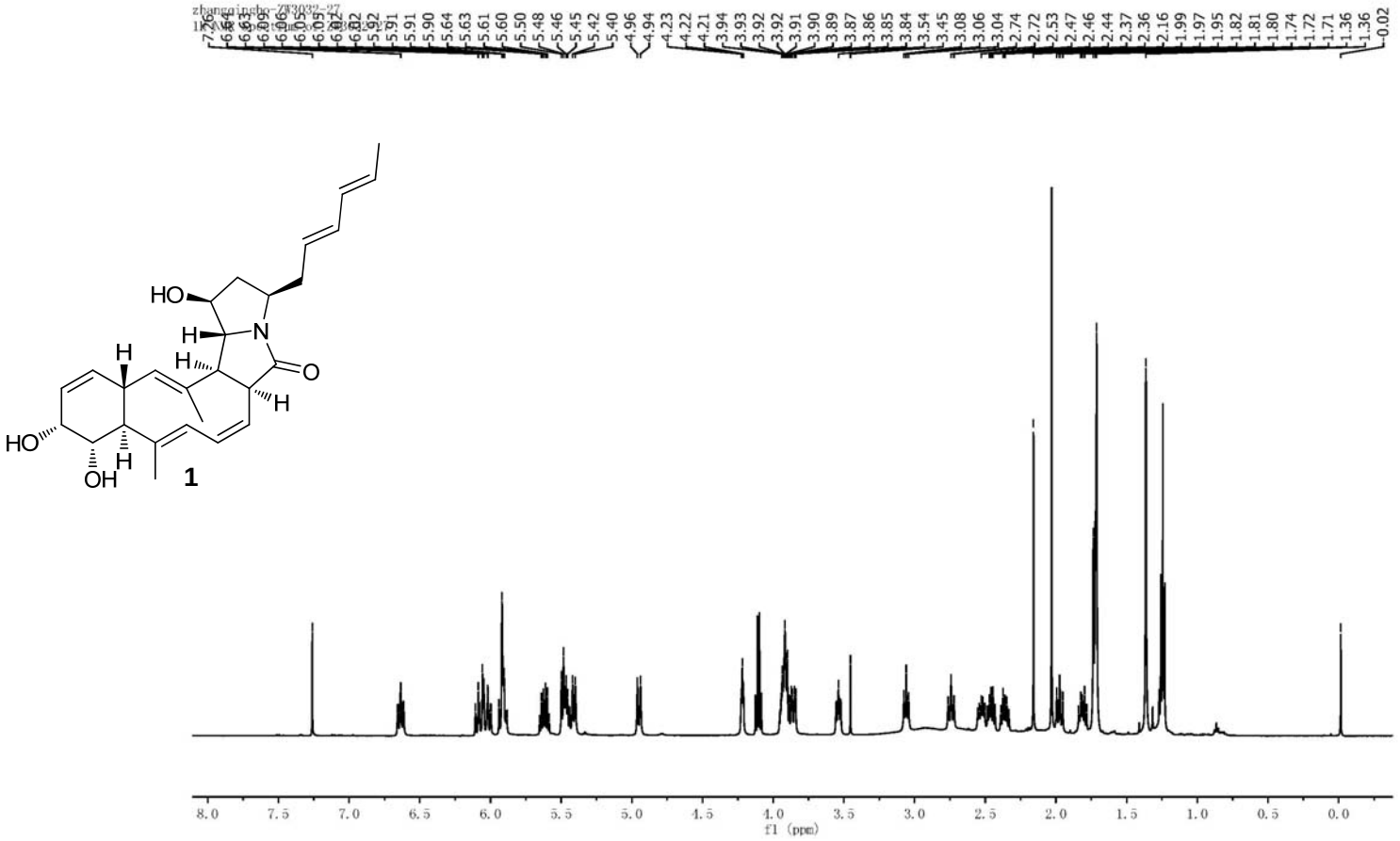


**Figure S2.** Spectroscopic data for heronamide D (**1**). (Continued)

(**C**) The $^{13}C$ and DEPT 135 NMR spectrum of heronamide D (**1**) in $CDCl_3$.

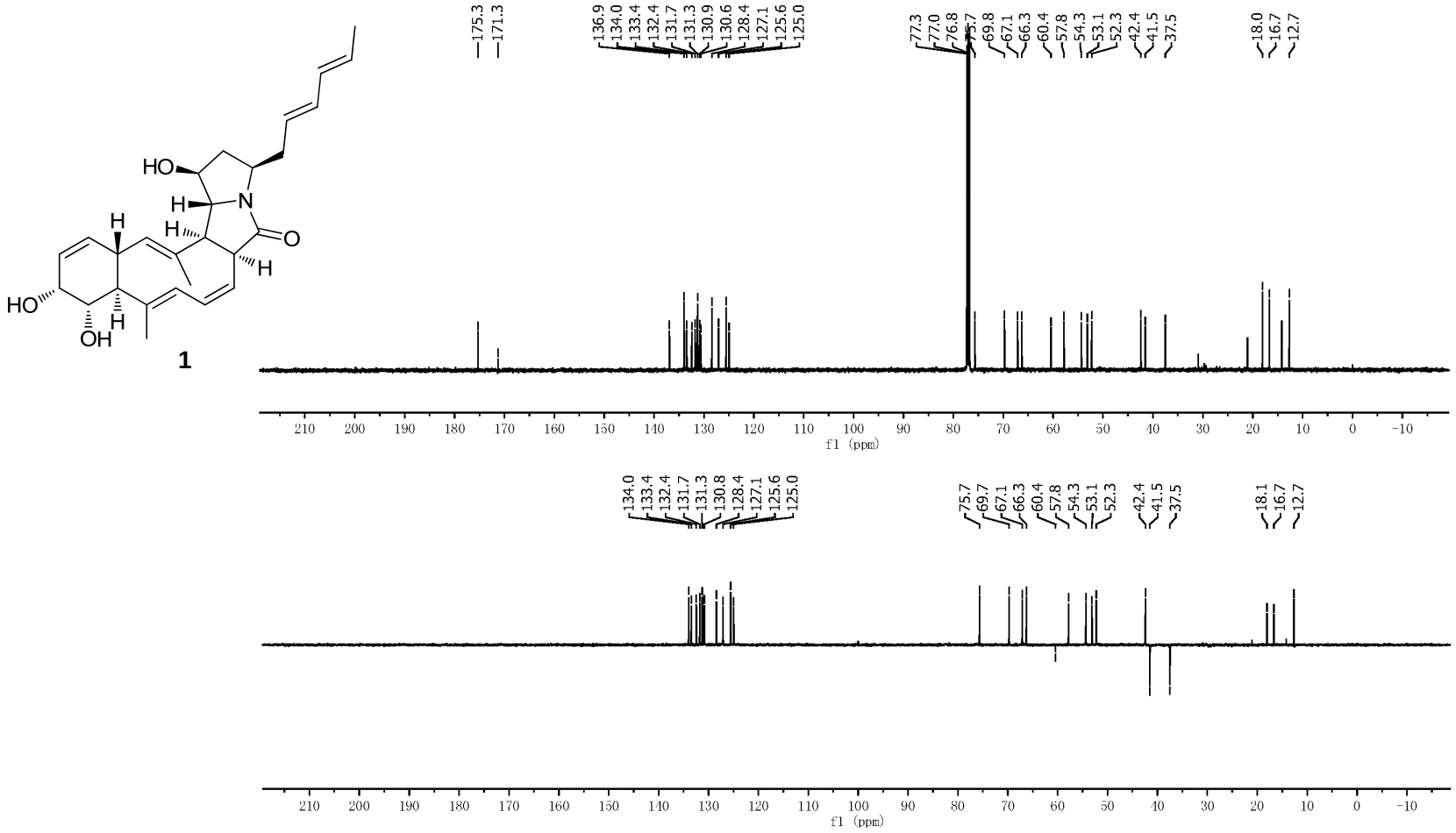


**Figure S2.** Spectroscopic data for heronamide D (**1**). (Continued)

**(D)** The HSQC spectrum of heronamide D (**1**) in $CDCl_3$.

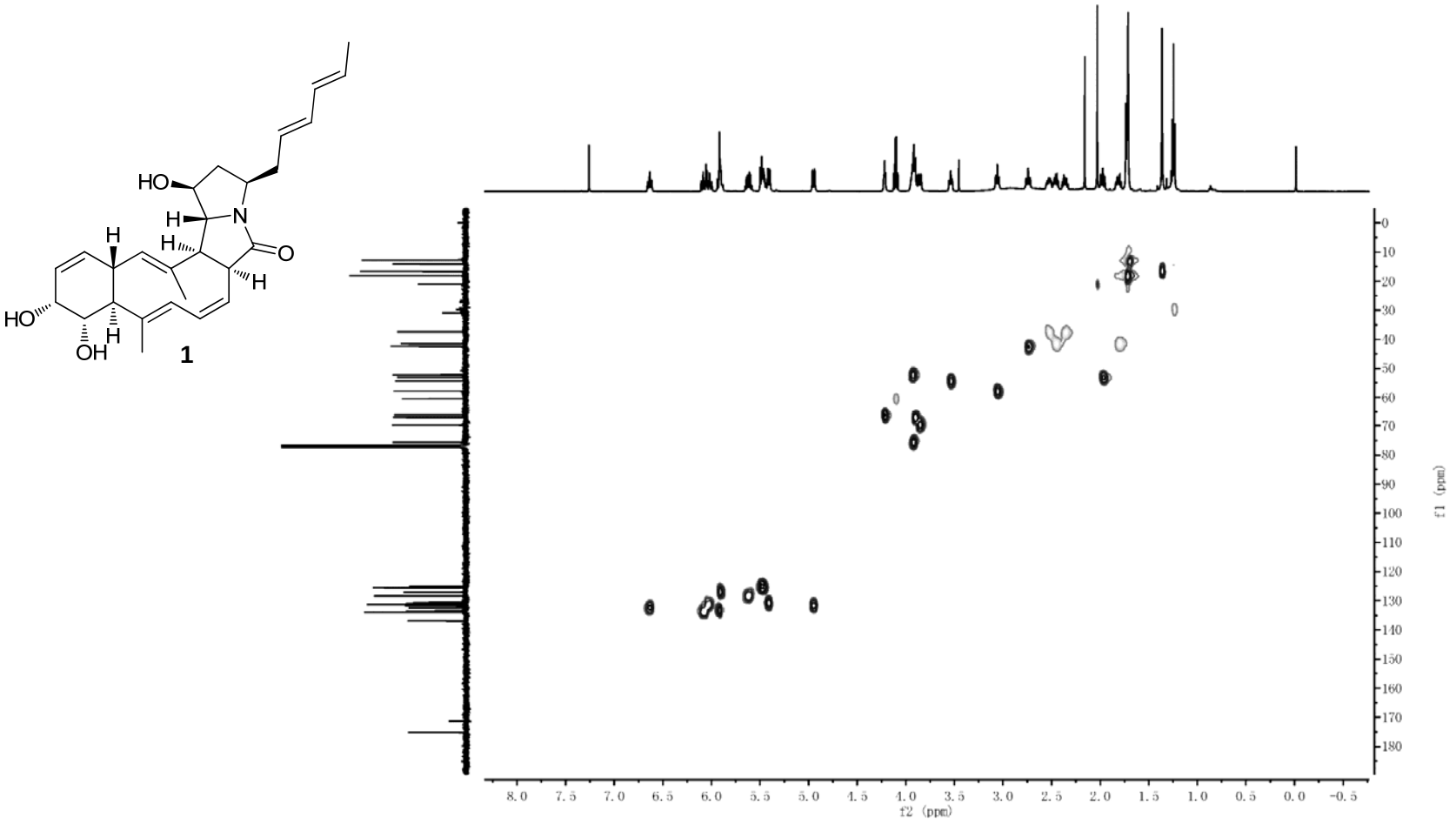


**Figure S2.** Spectroscopic data for heronamide D (**1**). (Continued)

**(E)** The COSY spectrum of heronamide D (**1**) in $CDCl_3$.

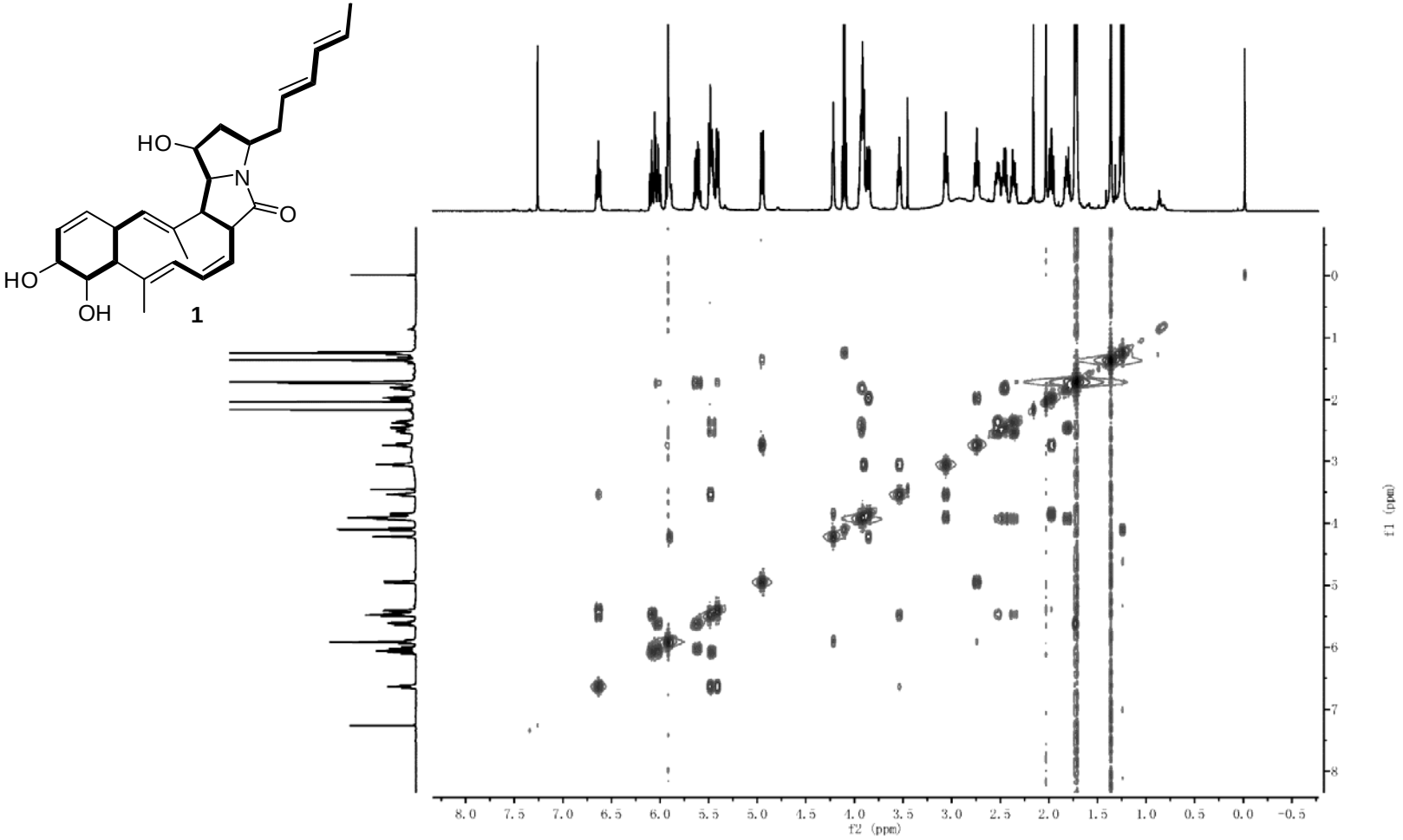


**Figure S2.** Spectroscopic data for heronamide D (**1**). (Continued)

**(F)** The HMBC spectrum of heronamide D (**1**) in $CDCl_3$.

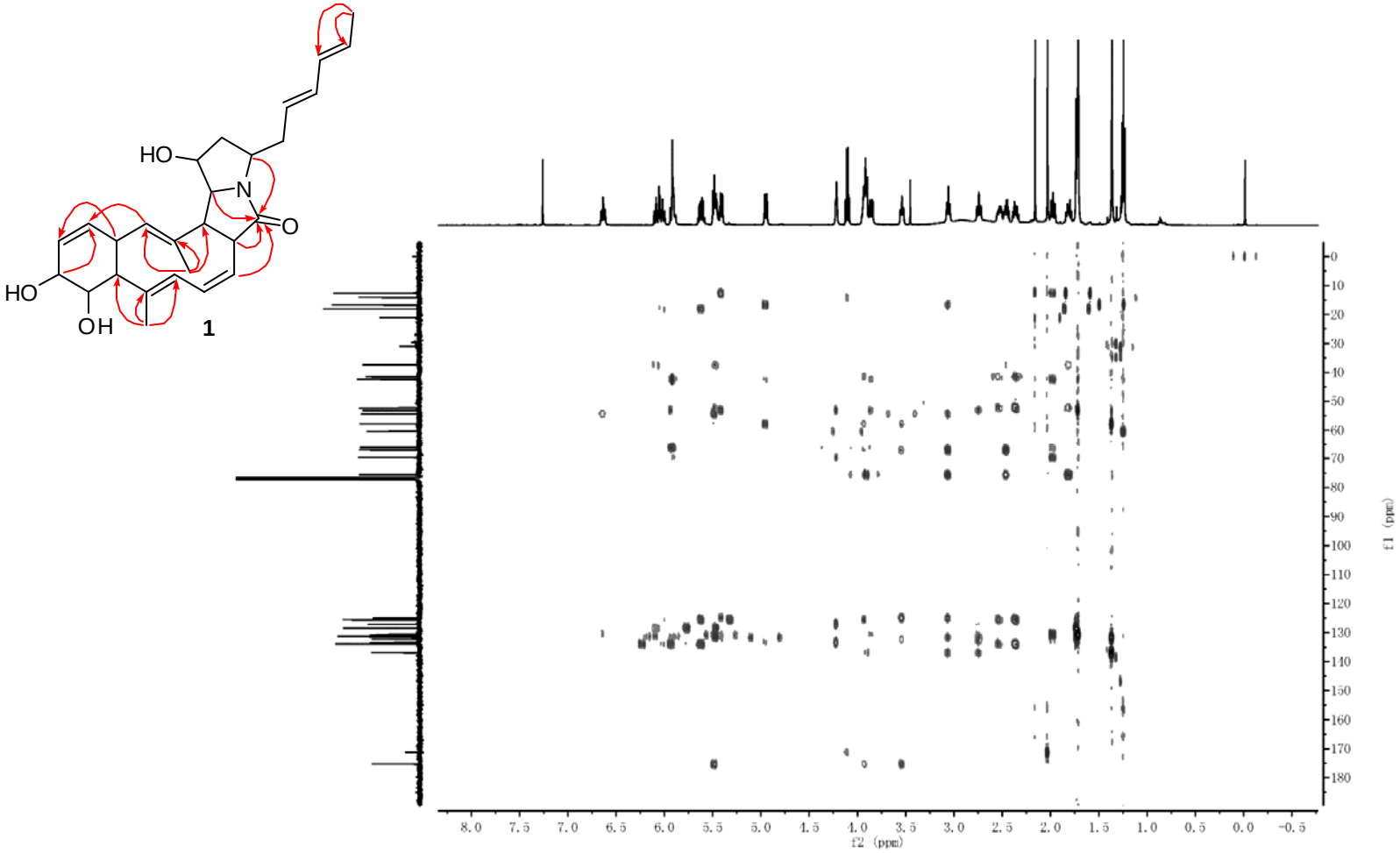


**Figure S2.** Spectroscopic data for heronamide D (**1**). (Continued)

**(G)** The NOESY spectrum of heronamide D (**1**) in $CDCl_3$.

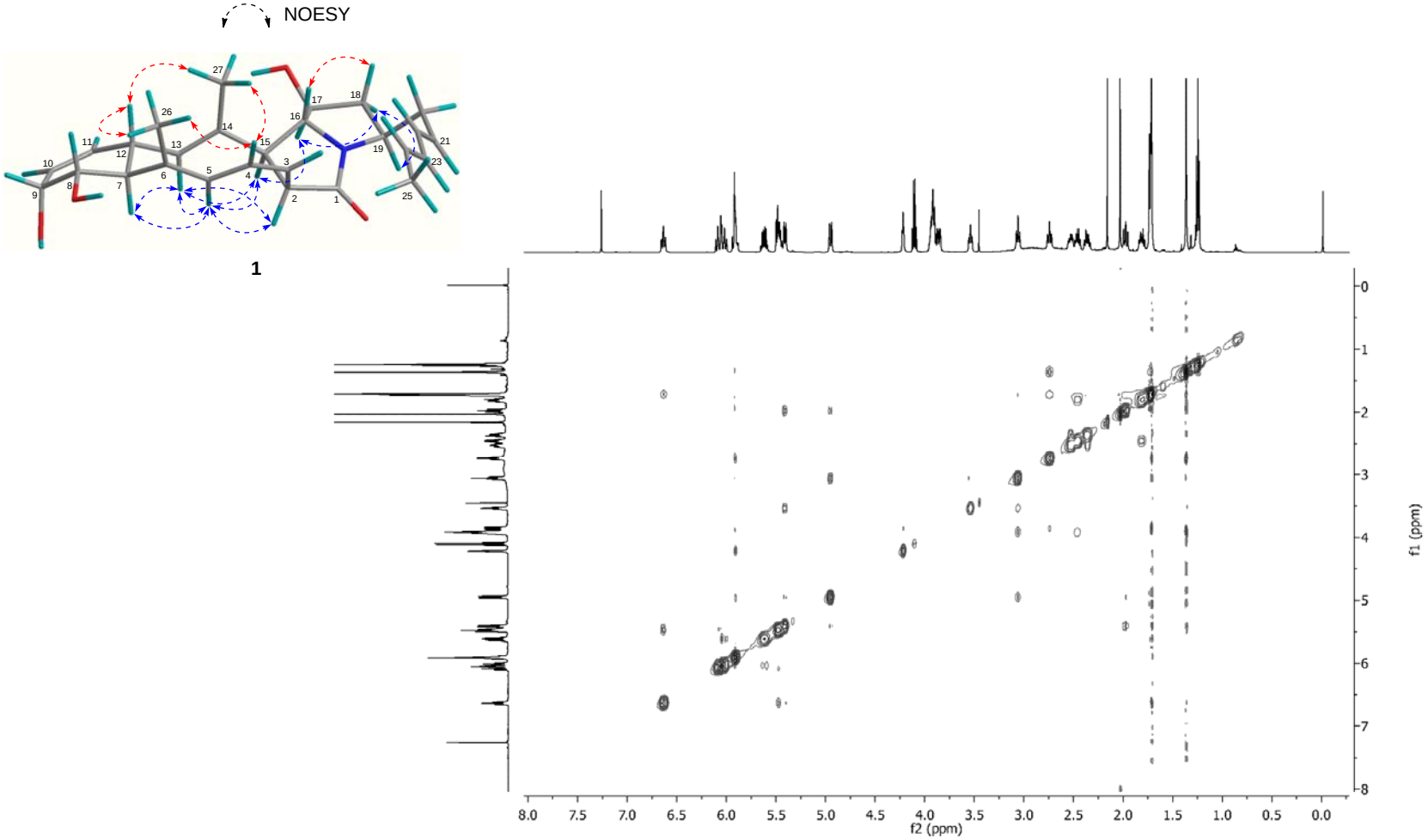


**Figure S3**. ESIMS spectra of **1** derivatives (**1a-e**) and **2** derivatives (**2a** and **2b**).

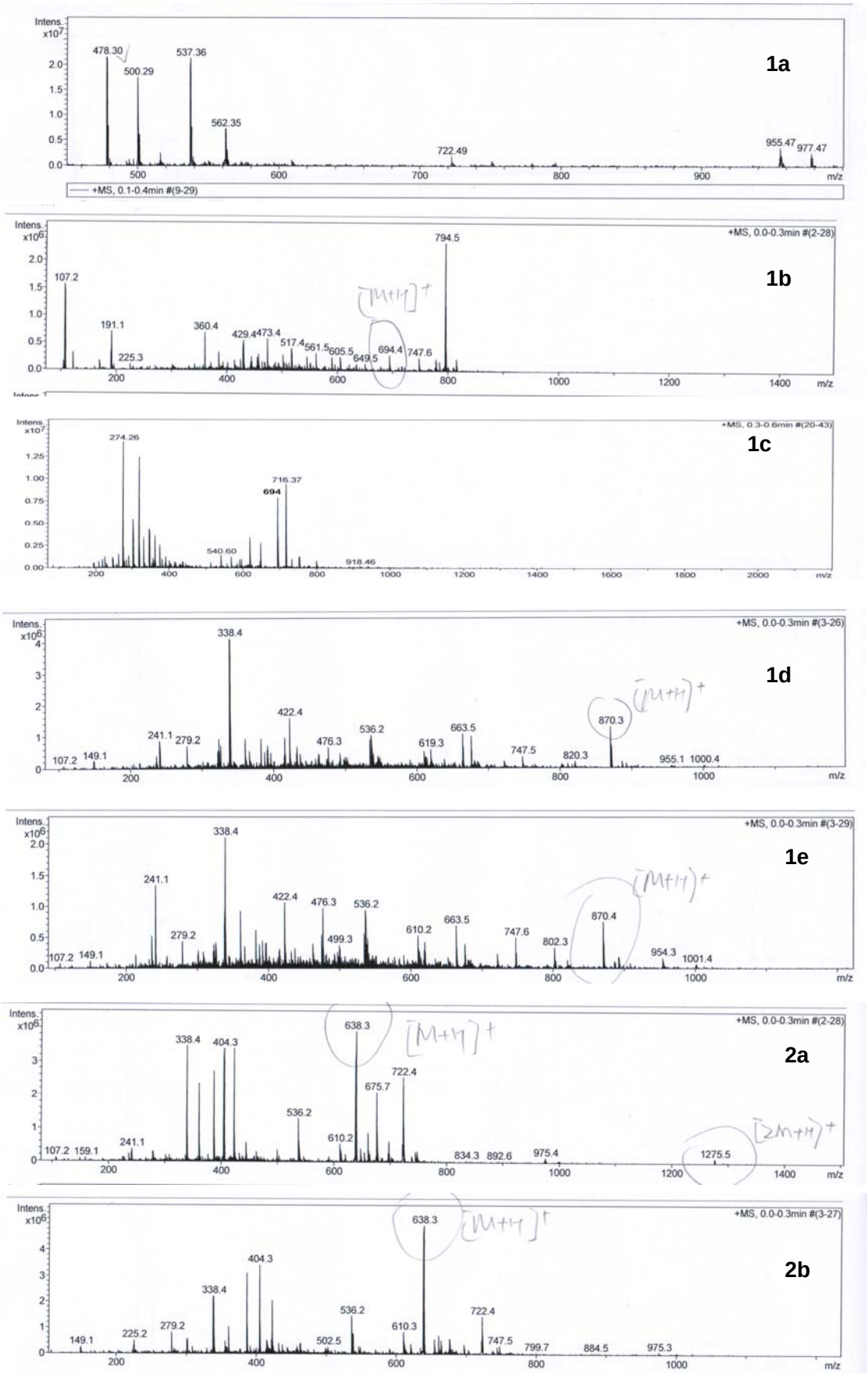


**Figure S4.** $^{1}$H NMR Spectroscopic data for heronamide D acetonide (**1a**) in $CDCl_3$.

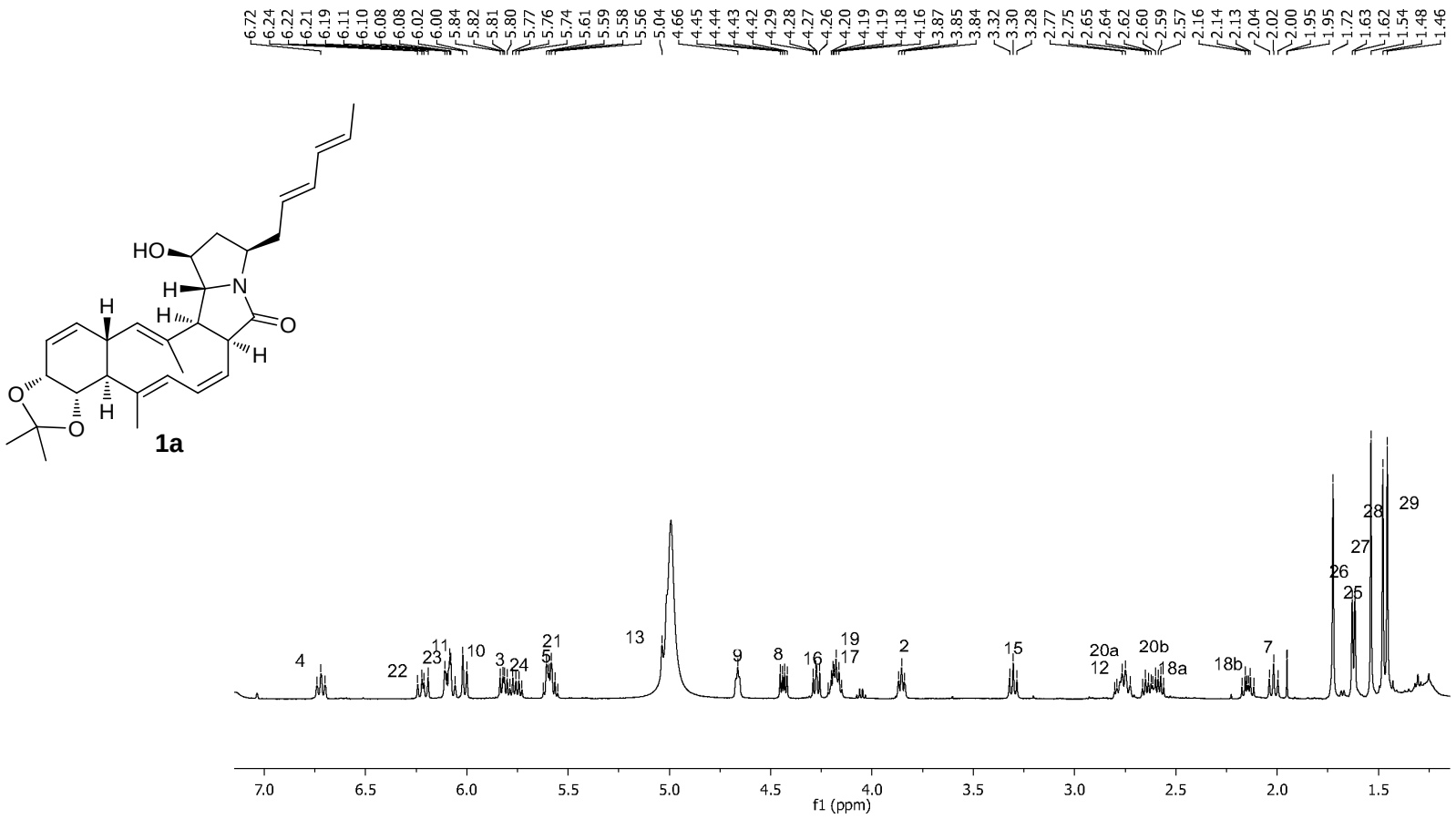


**Figure S5.** Spectroscopic data for **1b**.

**(A)** The $^{1}$H NMR of **1b** in pyridine-$d_5$.

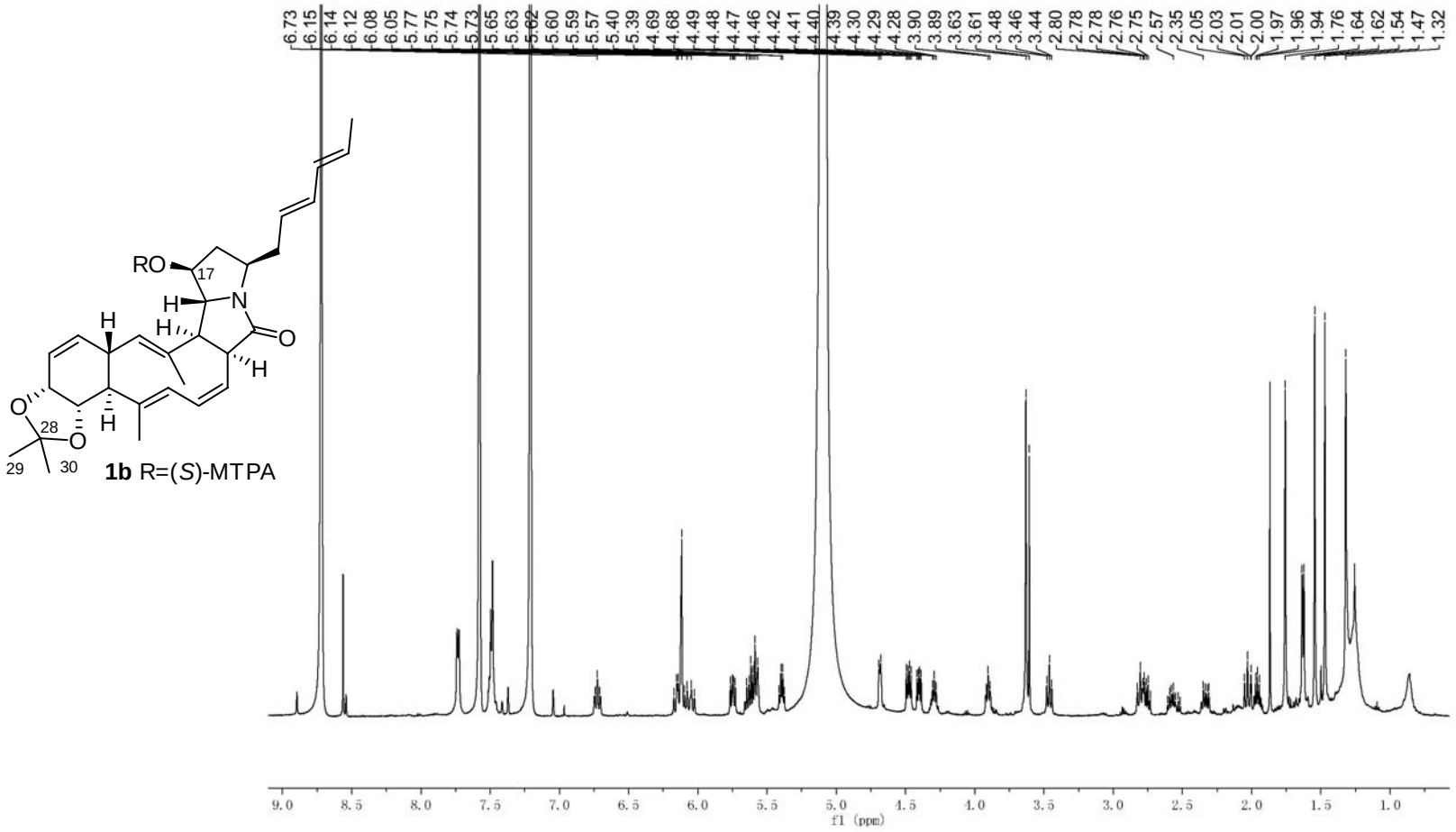


**Figure S5.** Spectroscopic data for **1b**. (Continued)

**(B)** The COSY spectrum of **1b** in pyridine-$d_5$.

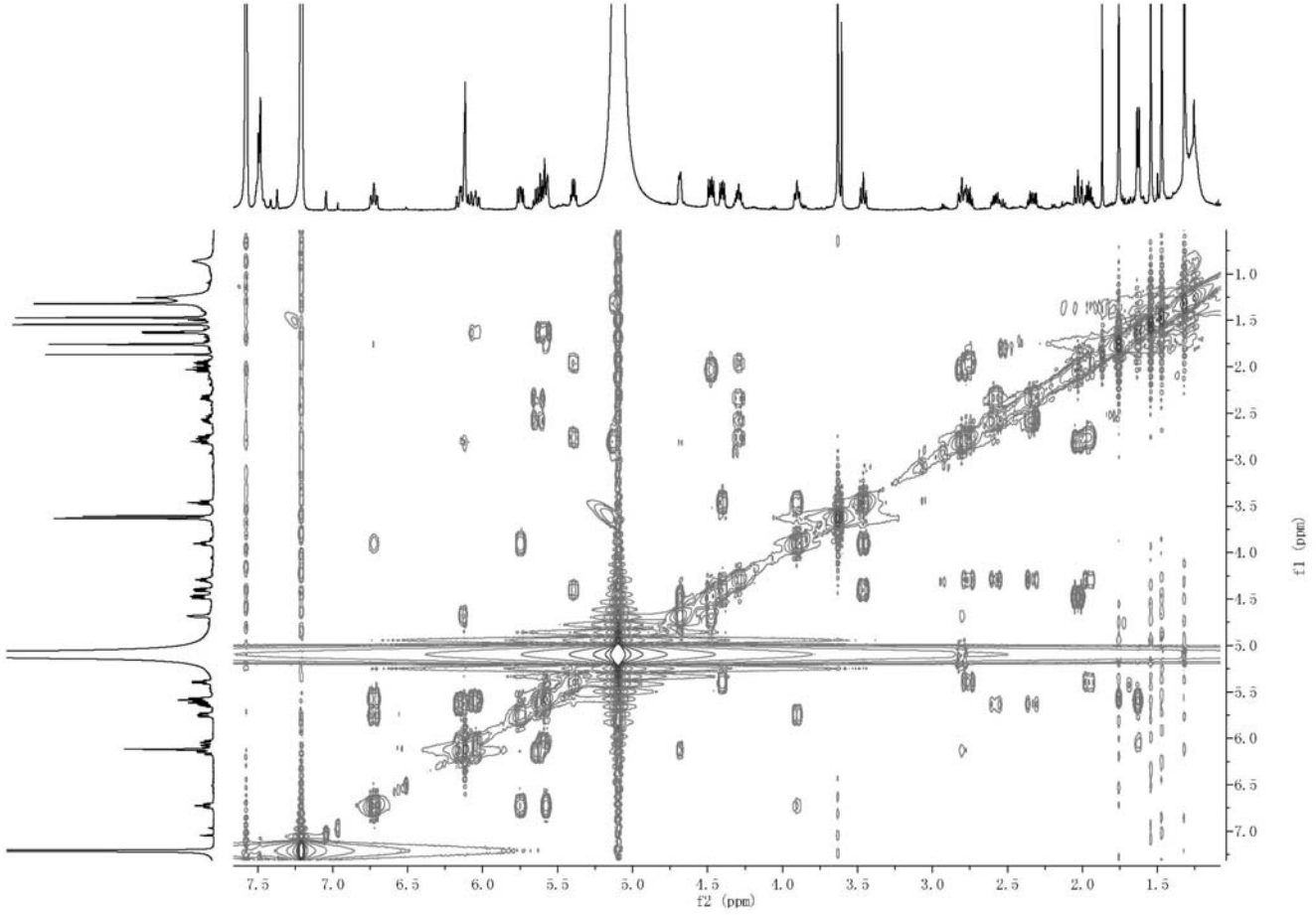


**Figure S5.** Spectroscopic data for **1b**. (Continued)

**(B)** The NOESY spectrum of **1b** in pyridine-$d_5$.

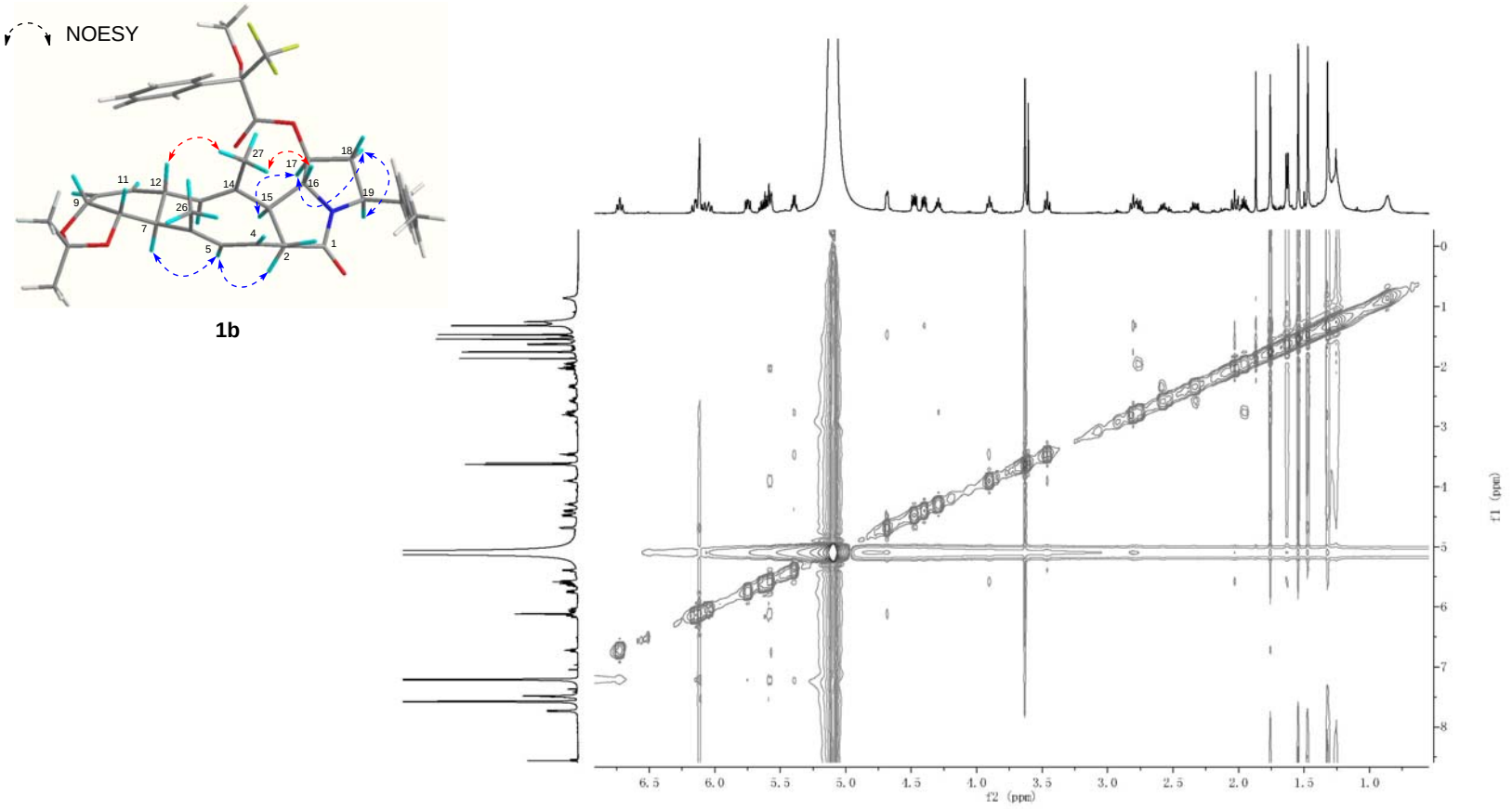


**Figure S6.** $^{1}$H NMR spectroscopic data of *R*- and *S*-MTPA esters of heronamide D acetonide (**1b** and **1c**) in $CDCl_3$.

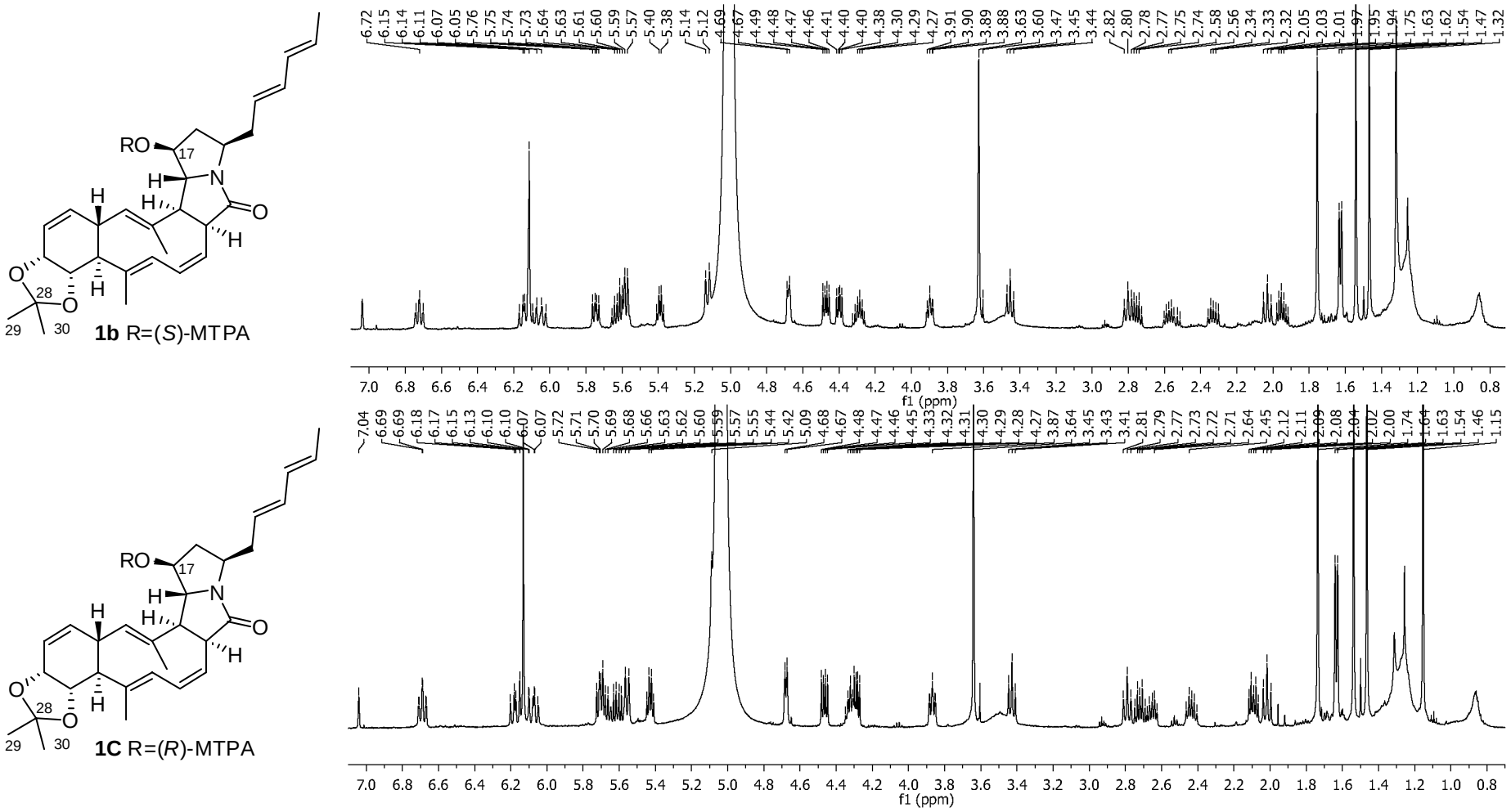


**Figure S7.** NMR spectroscopic data of bis-9,17-(*S*)- and bis-9,17-(*R*)-MTPA esters of heronamide D (**1d** and **1e**) in $CDCl_3$.

**(A)** The $^1H$ NMR spectrum of bis-9,17-(*S*)- and bis-9,17-(*R*)-MTPA esters of heronamide D (**1d** and **1e**) in $CDCl_3$.

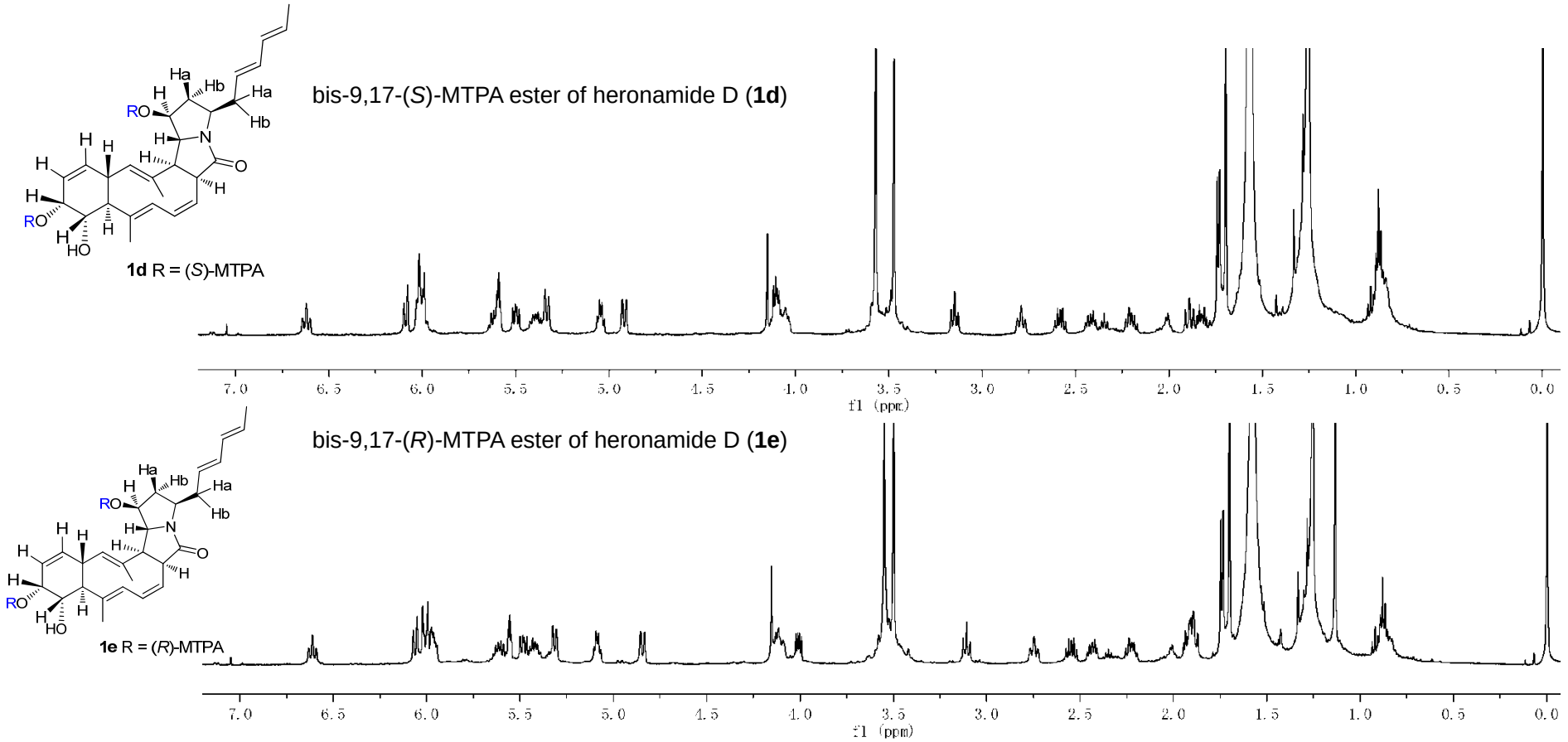


**Figure S7.** NMR spectroscopic data of bis-9,17-(*S*)- and bis-9,17-(*R*)-MTPA esters of heronamide D (**1d** and **1e**) in $CDCl_3$.
**(B)** The COSY spectrum of bis-9,17-(*S*)-MTPA ester of heronamide D (**1d**) in $CDCl_3$

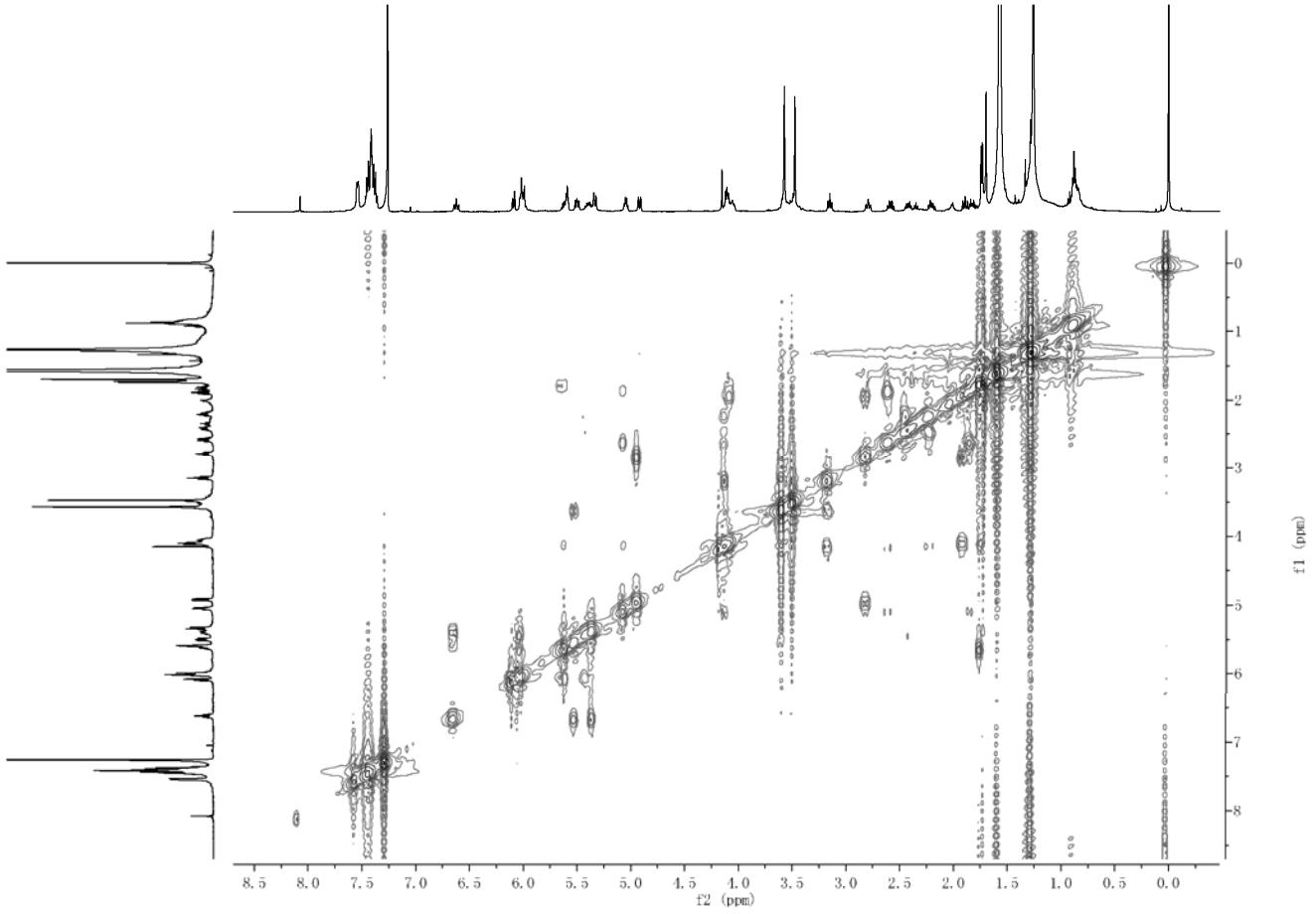


**Figure S7.** NMR spectroscopic data of bis-9,17-(*S*)- and bis-9,17-(*R*)-MTPA esters of heronamide D (**1d** and **1e**) in $CDCl_3$.
**(C)** The COSY spectrum of bis-9,17-(*S*)-MTPA ester of heronamide D (**1e**) in $CDCl_3$.

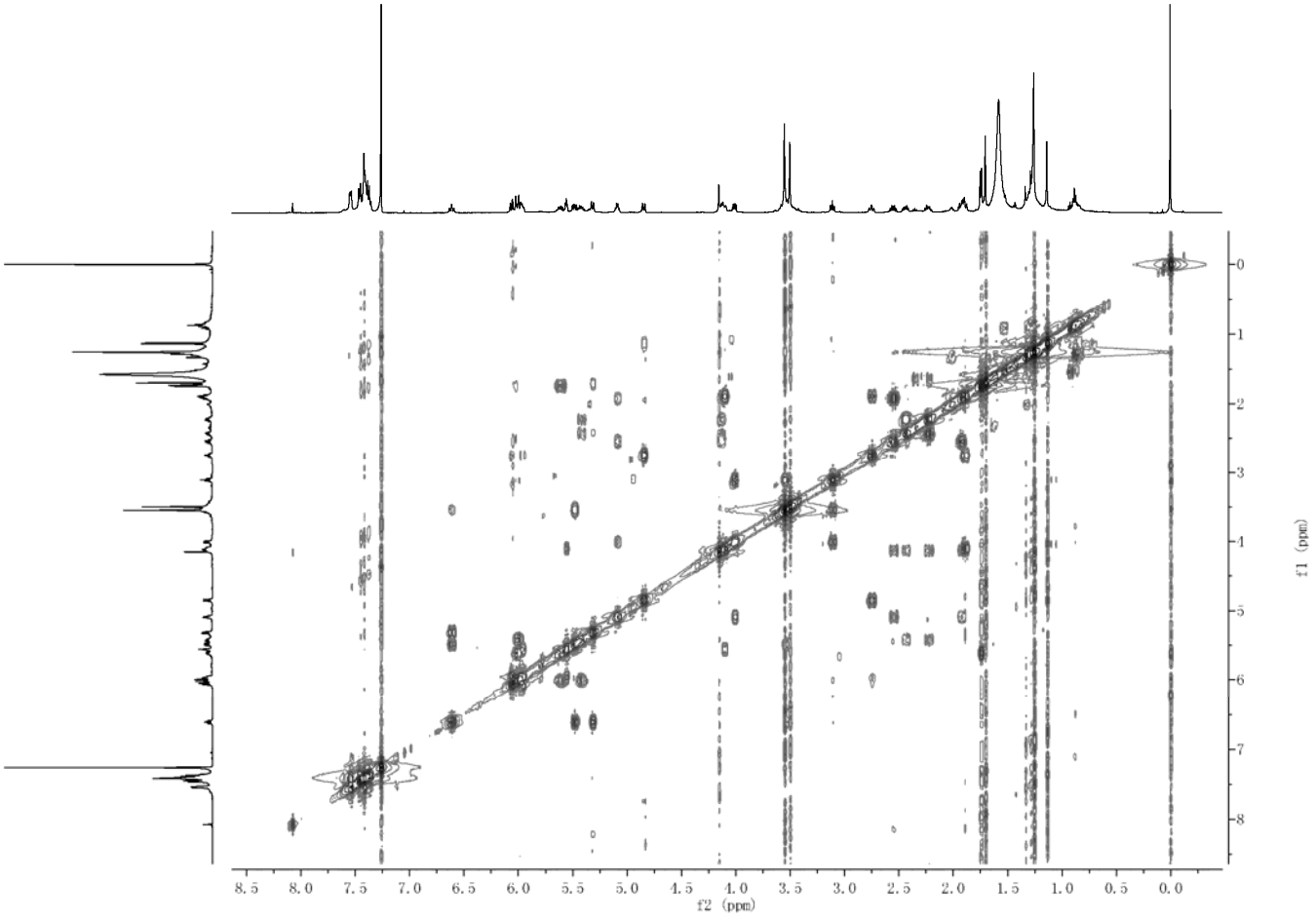
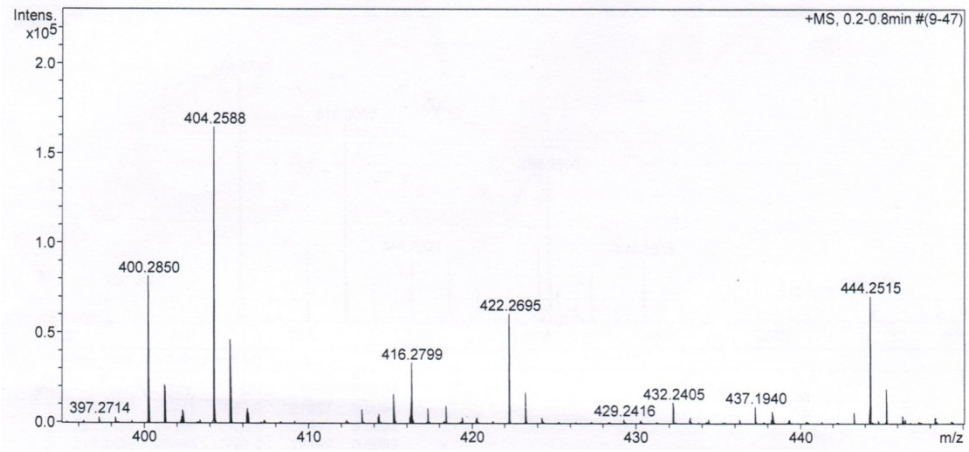
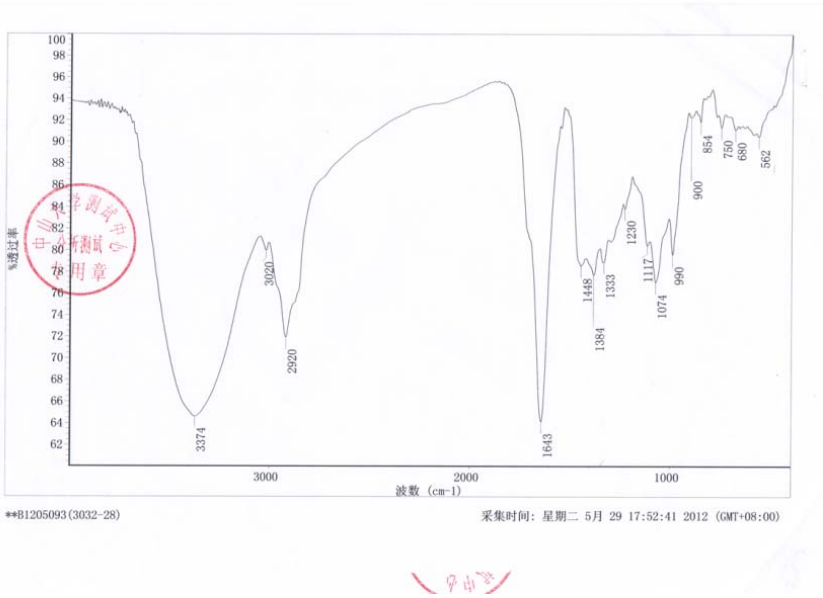


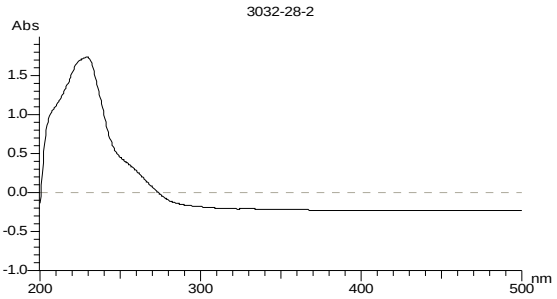
**Figure S8.** Spectroscopic data for heronamide E (**2**).
(A) HR-ESI-MS (**a**), IR (**b**) UV (**c**), and CD (**d**) spectra of heronamide E (**2**).
(**a**). HR-ESI-MS




(**b**). IR




(**c**). UV




(**d**). CD

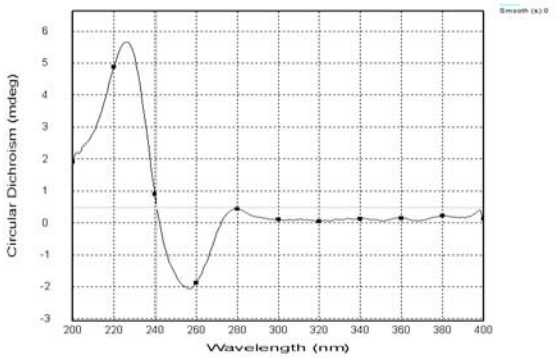


**Figure S8.** Spectroscopic data for heronamide E (**2**). (Continued)

**(B)** The $^{1}H$ NMR spectrum of heronamide E (**2**) in $CDCl_3$.

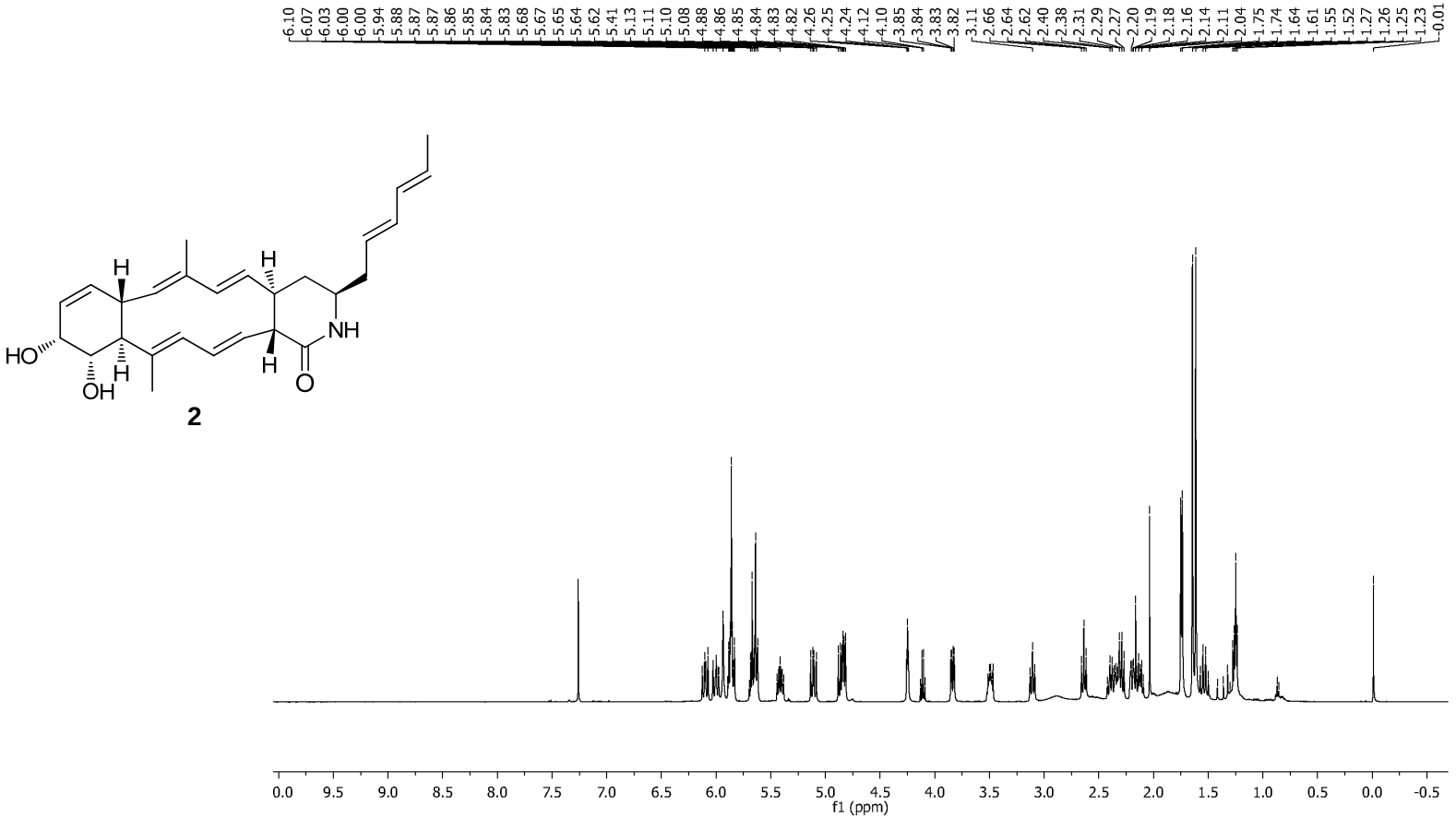


**Figure S8.** Spectroscopic data for heronamide E (**2**). (Continued)

**(C)** The $^{13}C$ NMR and DEPT 135 spectrum of heronamide E (**2**) in $CDCl_3$.

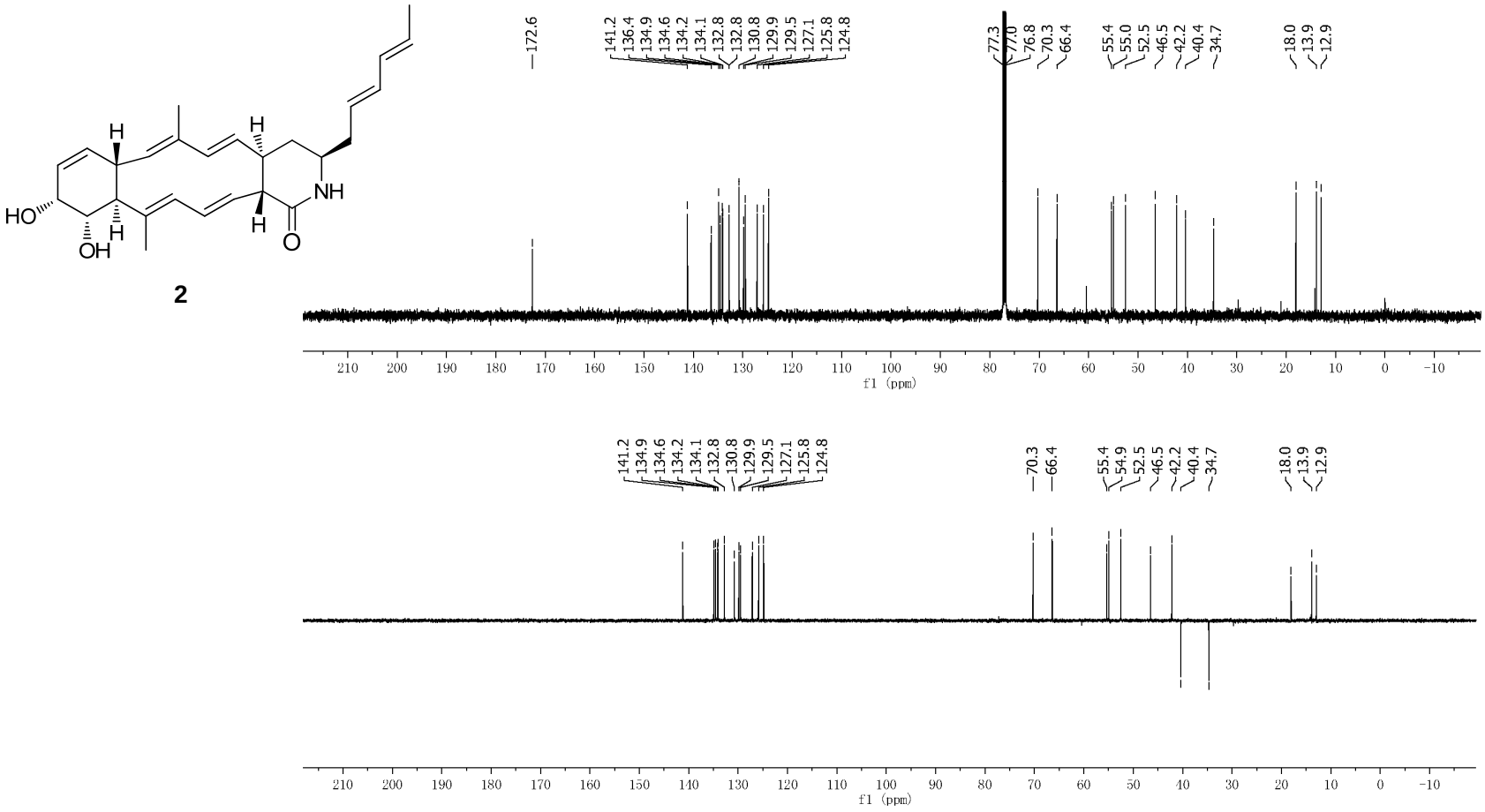


**Figure S8.** Spectroscopic data for heronamide E (**2**). (Continued)

**(D)** The HSQC spectrum of heronamide E (**2**) in $CDCl_3$.

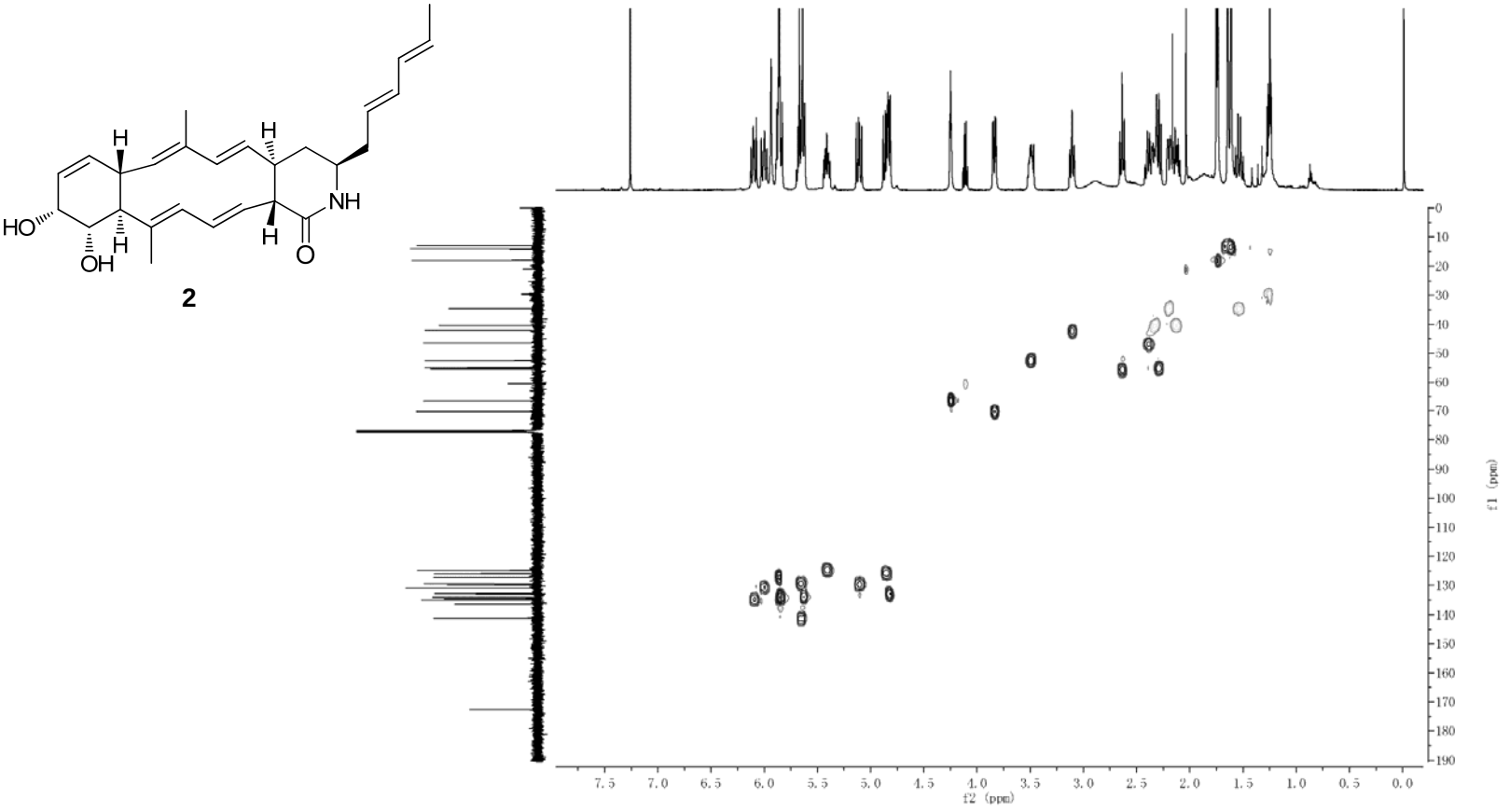


**Figure S8.** Spectroscopic data for heronamide E (**2**). (Continued)

**(E)** The COSY spectrum of heronamide E (**2**) in $CDCl_3$.

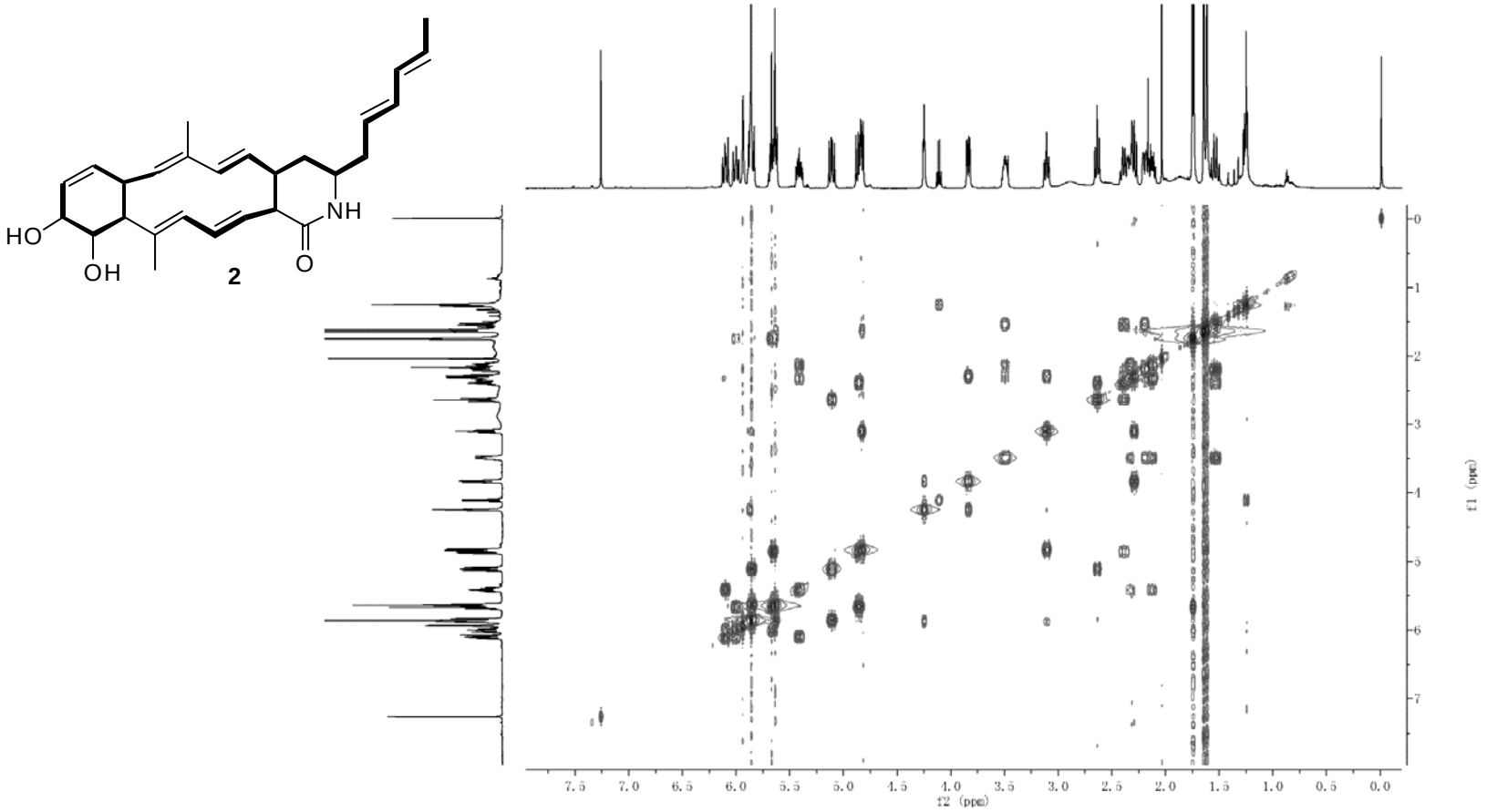


**Figure S8.** Spectroscopic data for heronamide E (**2**). (Continued)

**(F)** The HMBC spectrum of heronamide E (**2**) in $CDCl_3$.

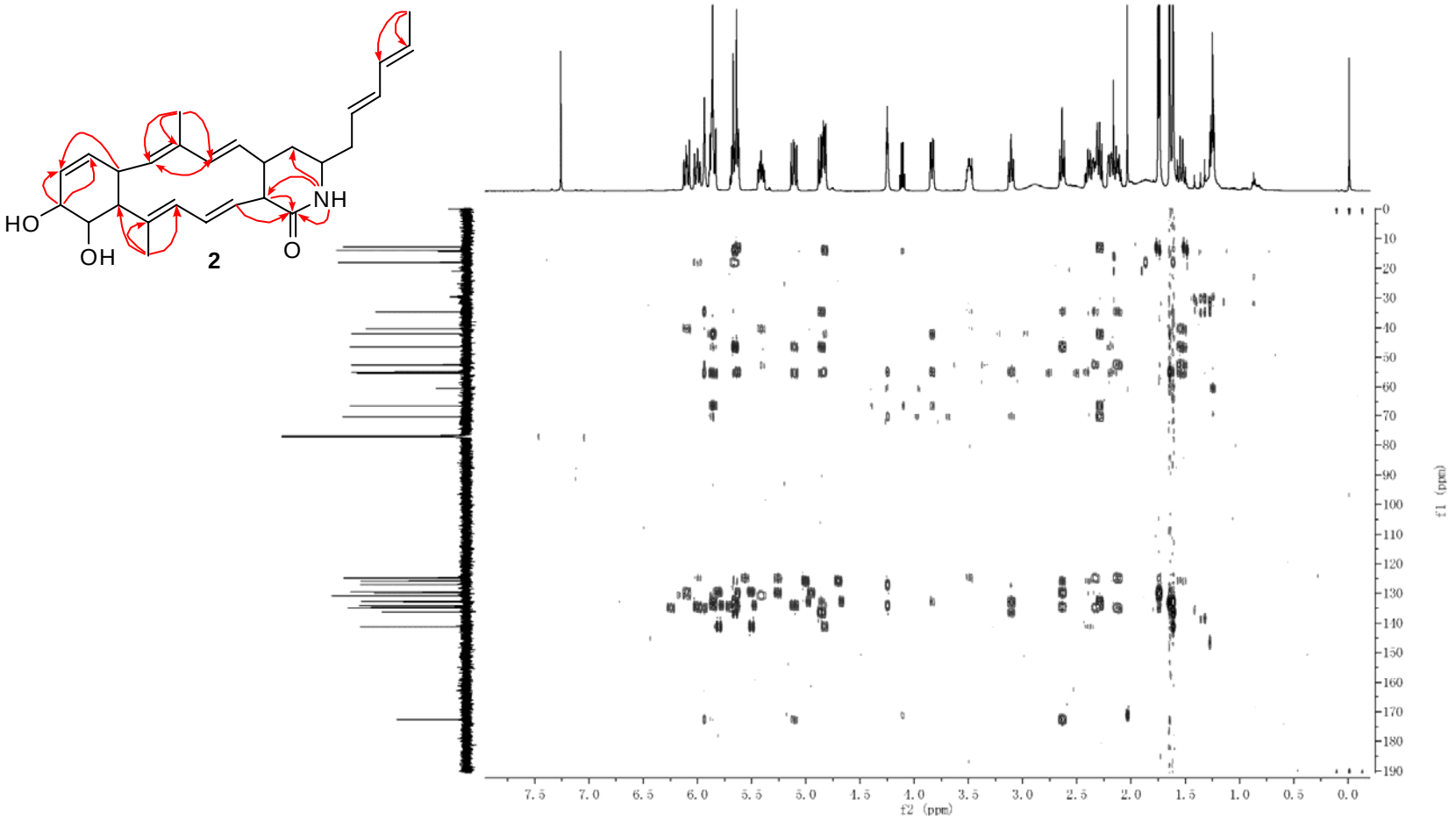


**Figure S8.** Spectroscopic data for heronamide E (**2**). (Continued)

**(G)** The NOESY spectrum of heronamide E (**2**) in $CDCl_3$.

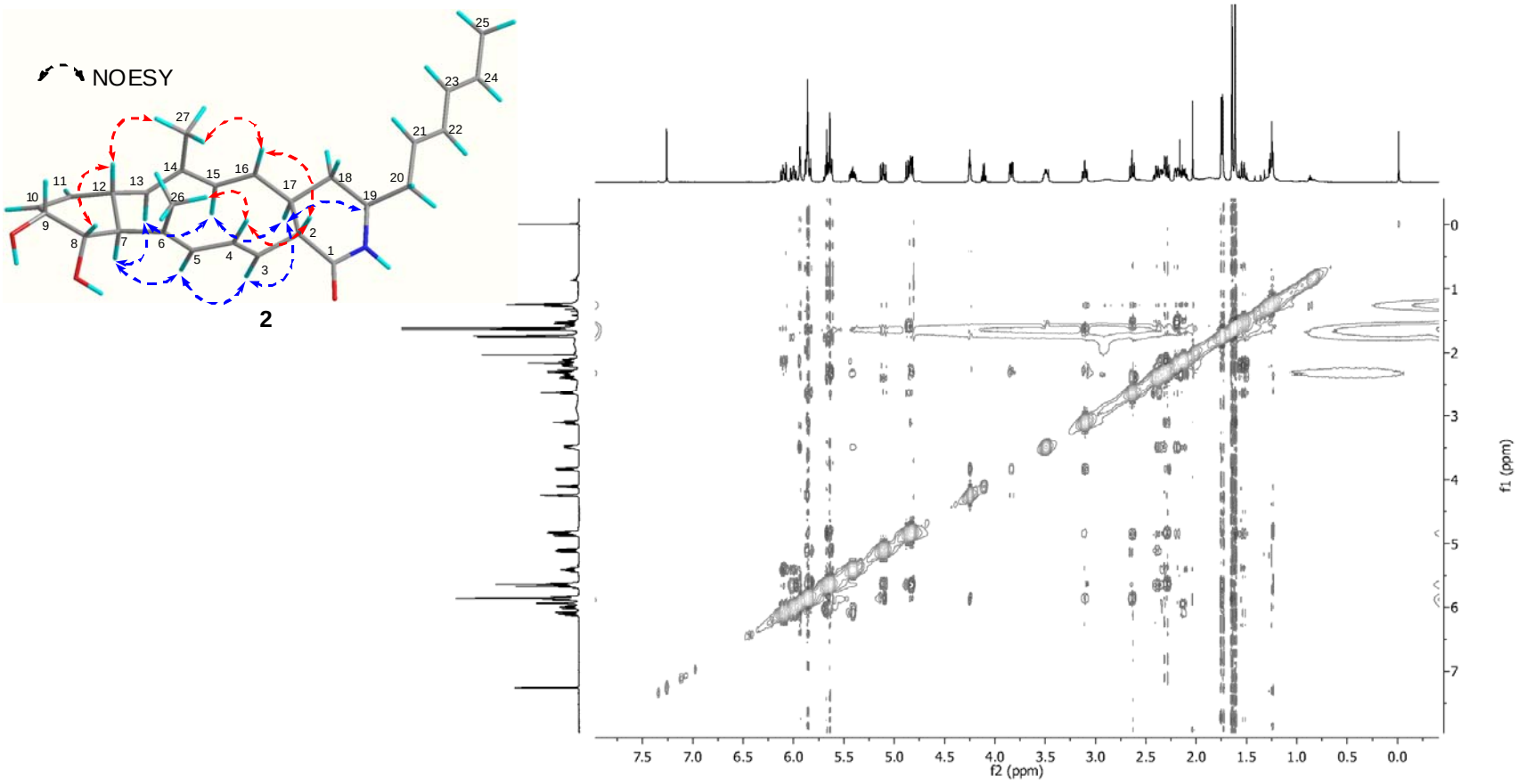


**Figure S9.** NMR spectroscopic data of 8-(*S*)- and 8-(*R*)-MTPA esters of heronamide E (**2a** and **2b**) in $CDCl_3$.

**(A)** The $^1H$ NMR spectrum of 8-(*S*)- and 8-(*R*)-MTPA esters of heronamide E (**2a** and **2b**) in $CDCl_3$.

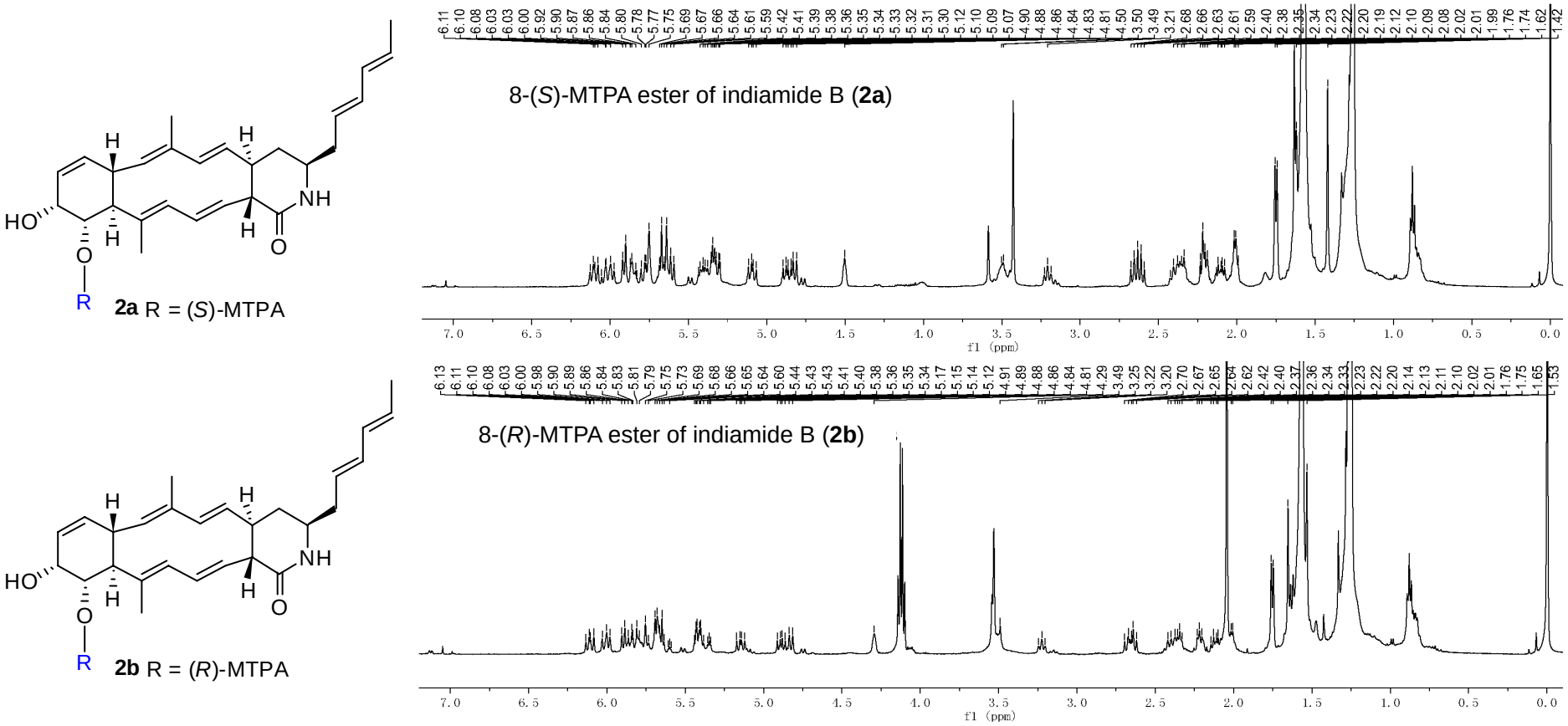


**Figure S9.** NMR spectroscopic data of 8-(*S*)- and 8-(*R*)-MTPA ester of heronamide E (**2a** and **2b**) in $CDCl_3$.
**(B)** The COSY spectrum of 8-(*S*)-MTPA ester of heronamide E (**2a**) in $CDCl_3$.

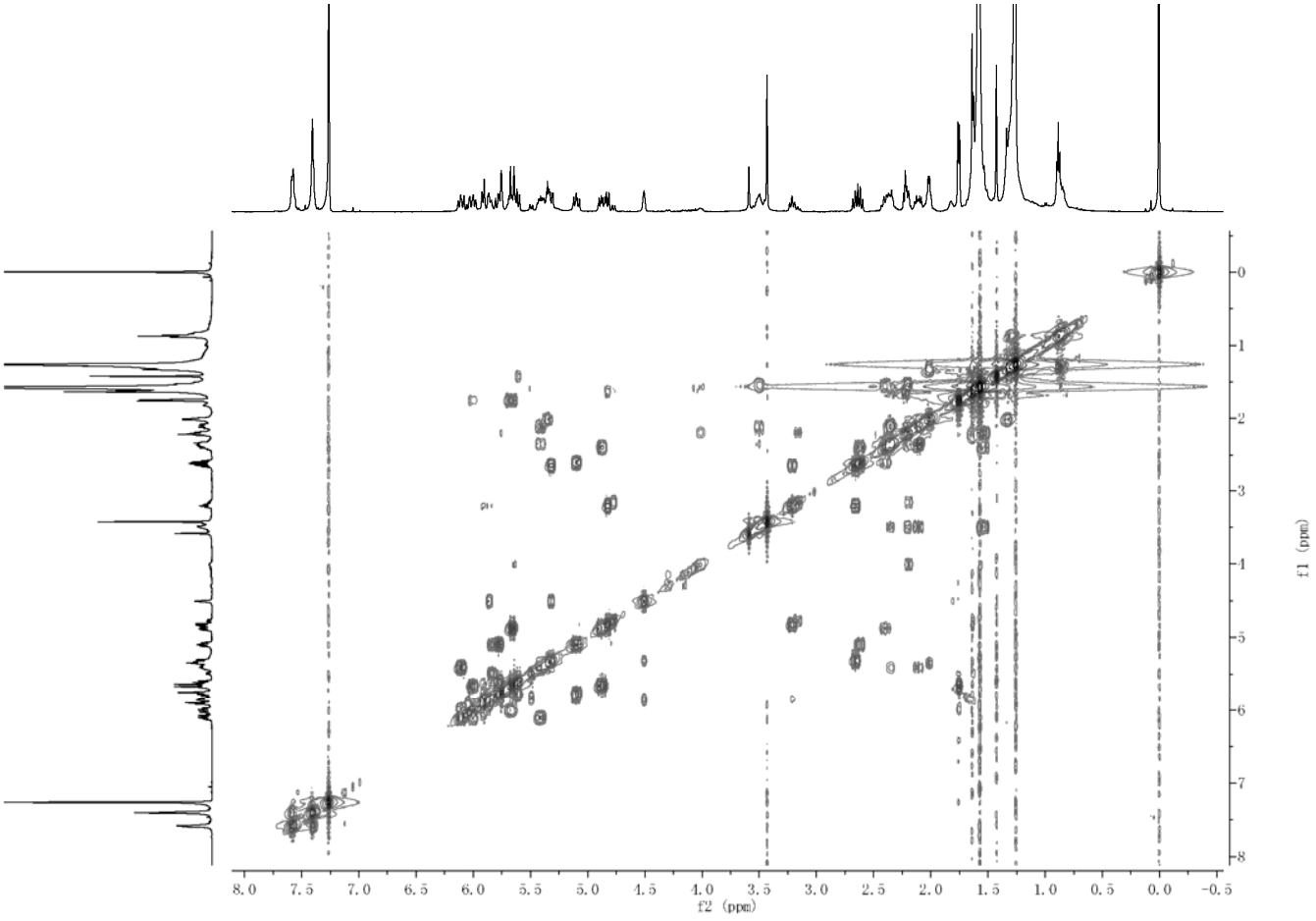


**Figure S9.** NMR spectroscopic data of *R* and *S* mosher ester of heronamide E (**2a** and **2b**) in $CDCl_3$.
**(C)** The COSY spectrum of 8-(*R*)-MTPA ester of heronamide E (**2b**) in $CDCl_3$.

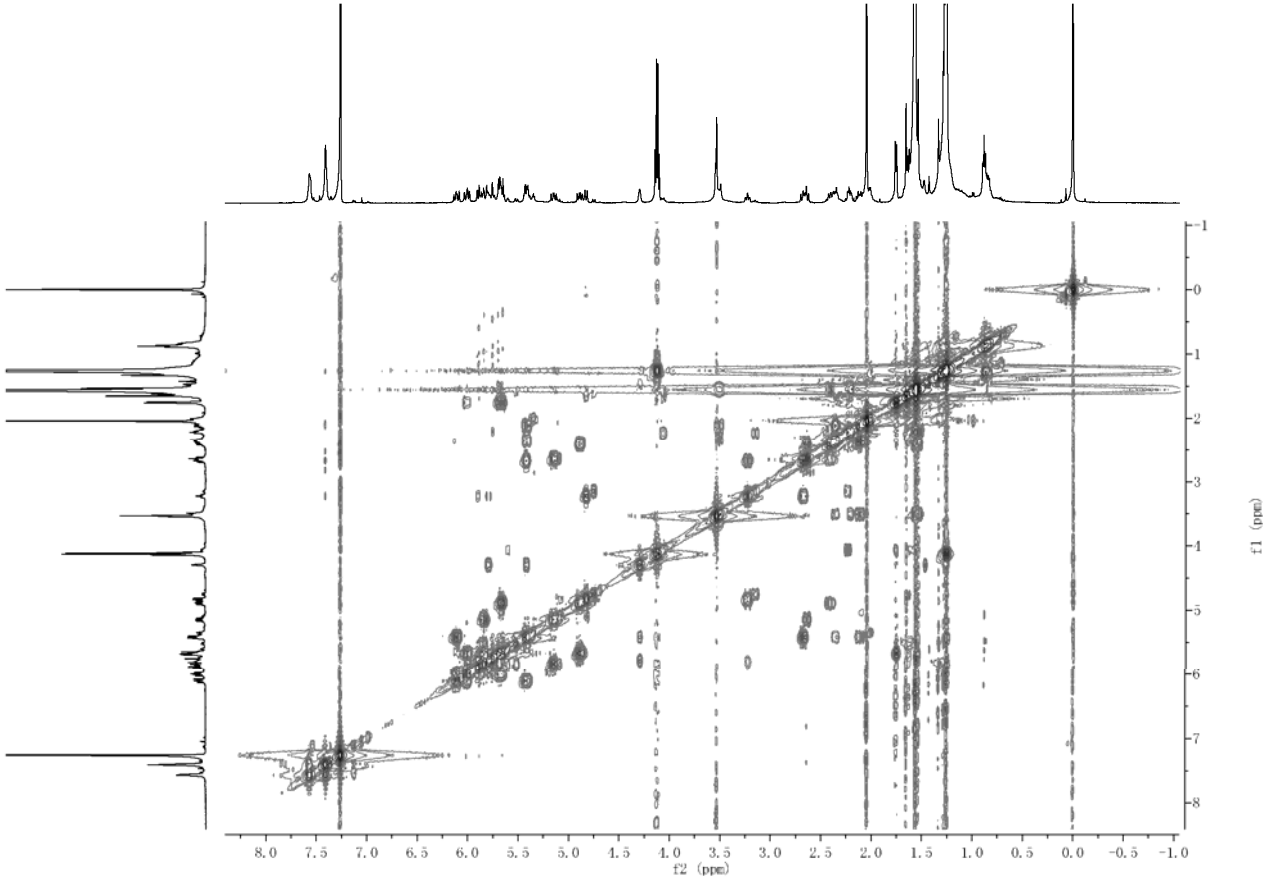
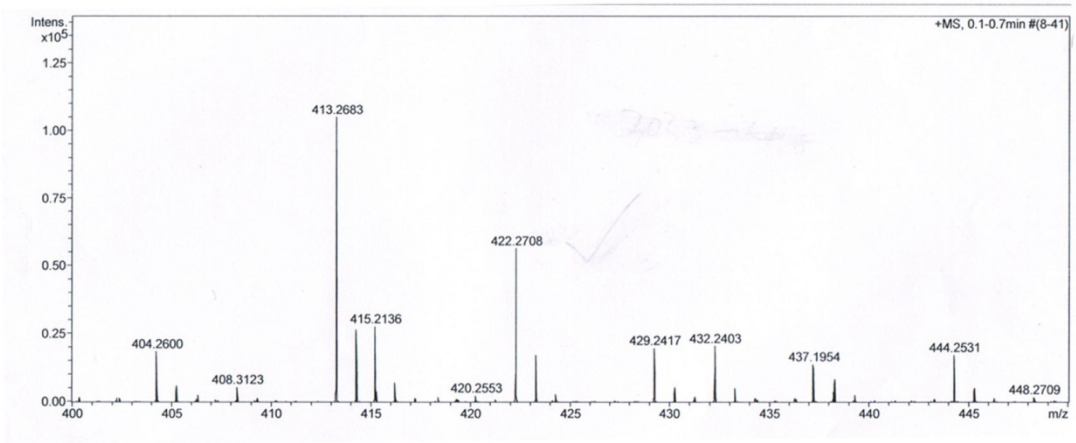
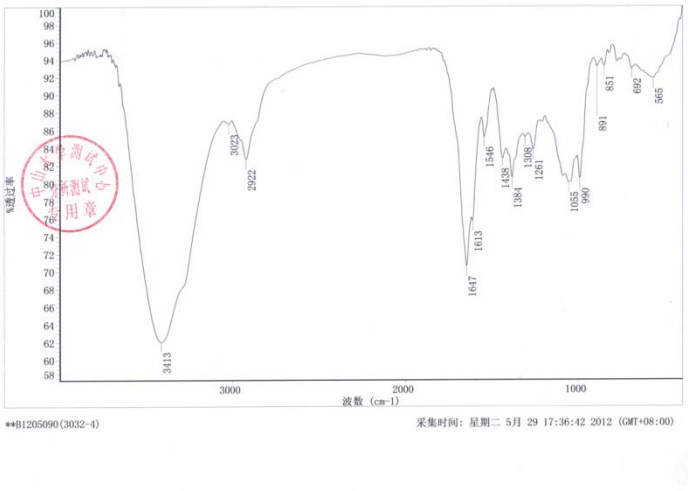
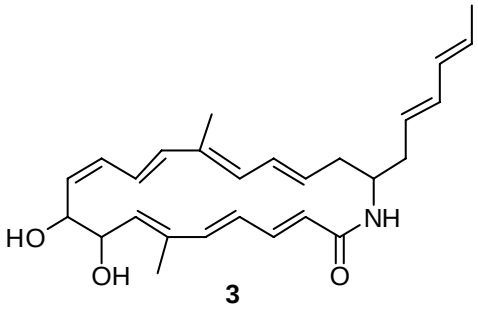


**Figure S10.** Spectroscopic data for heronamide F (**3**).
(**A**) HR-ESI-MS (**a**), IR (**b**), UV (**c**) and CD (**d**) spectra of heronamide F (**3**).
(**a**). HR-ESI-MS

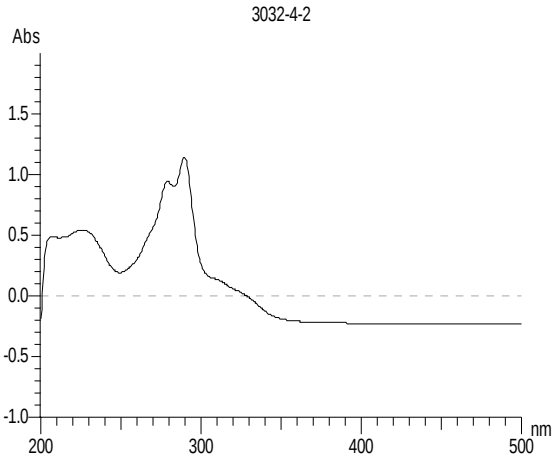



(**b**). IR




(**c**). UV




(**d**). CD

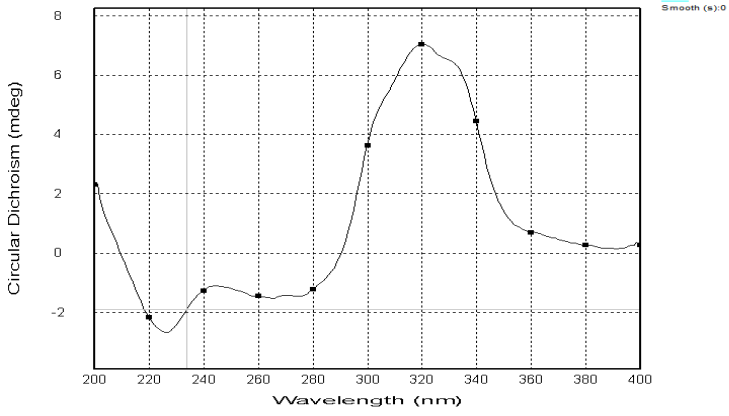


**Figure S10.** Spectroscopic data for heronamide F (**3**). (Continued)

**(B)** The $^{1}$H NMR spectrum of heronamide F (**3**) in pyridine-$d_5$.

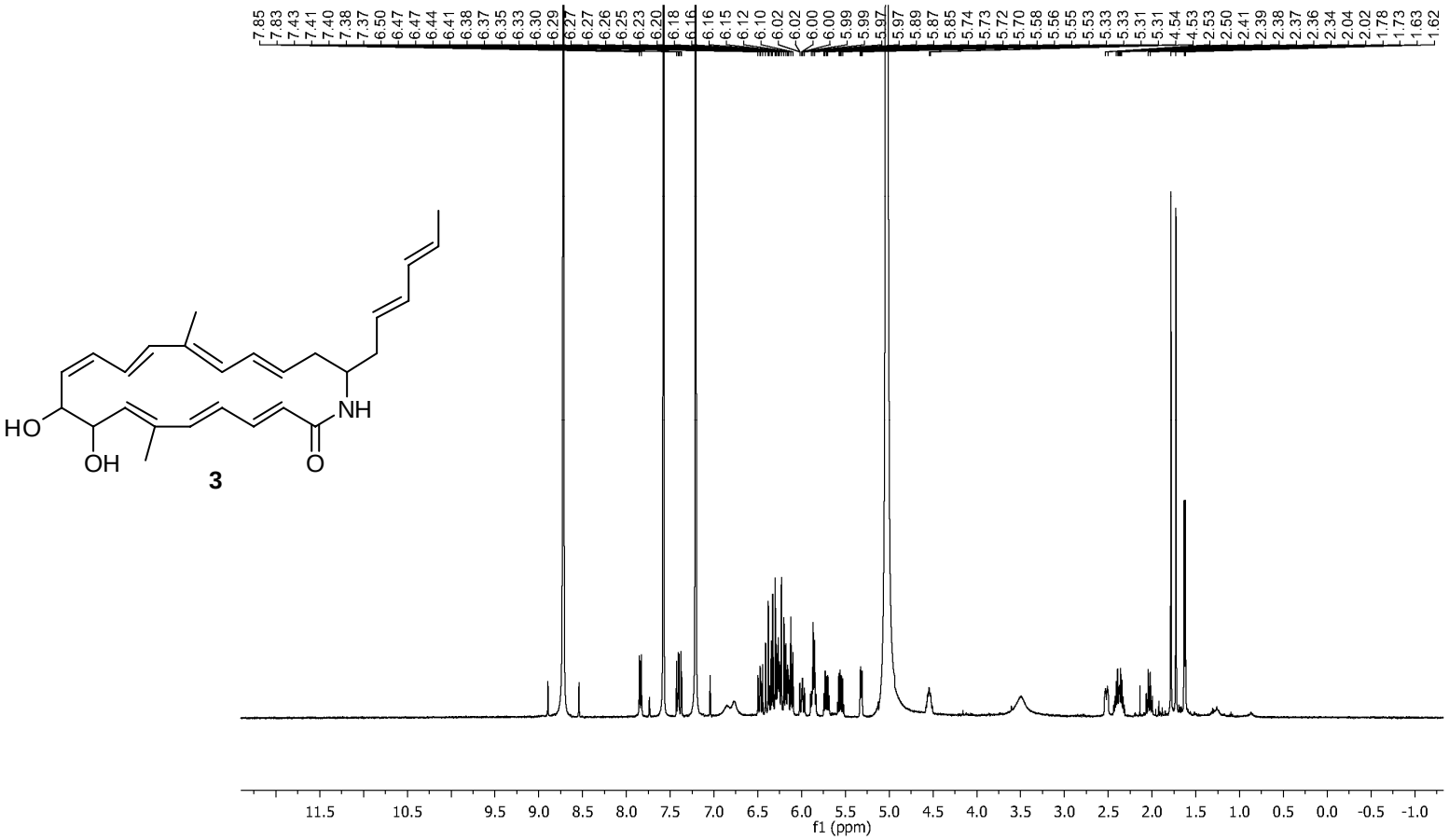


**Figure S10.** Spectroscopic data for heronamide F (**3**). (Continued)

**(C)** The $^{13}$C NMR and DEPT 135 spectrum of heronamide F (**3**) in pyridine-$d_5$.

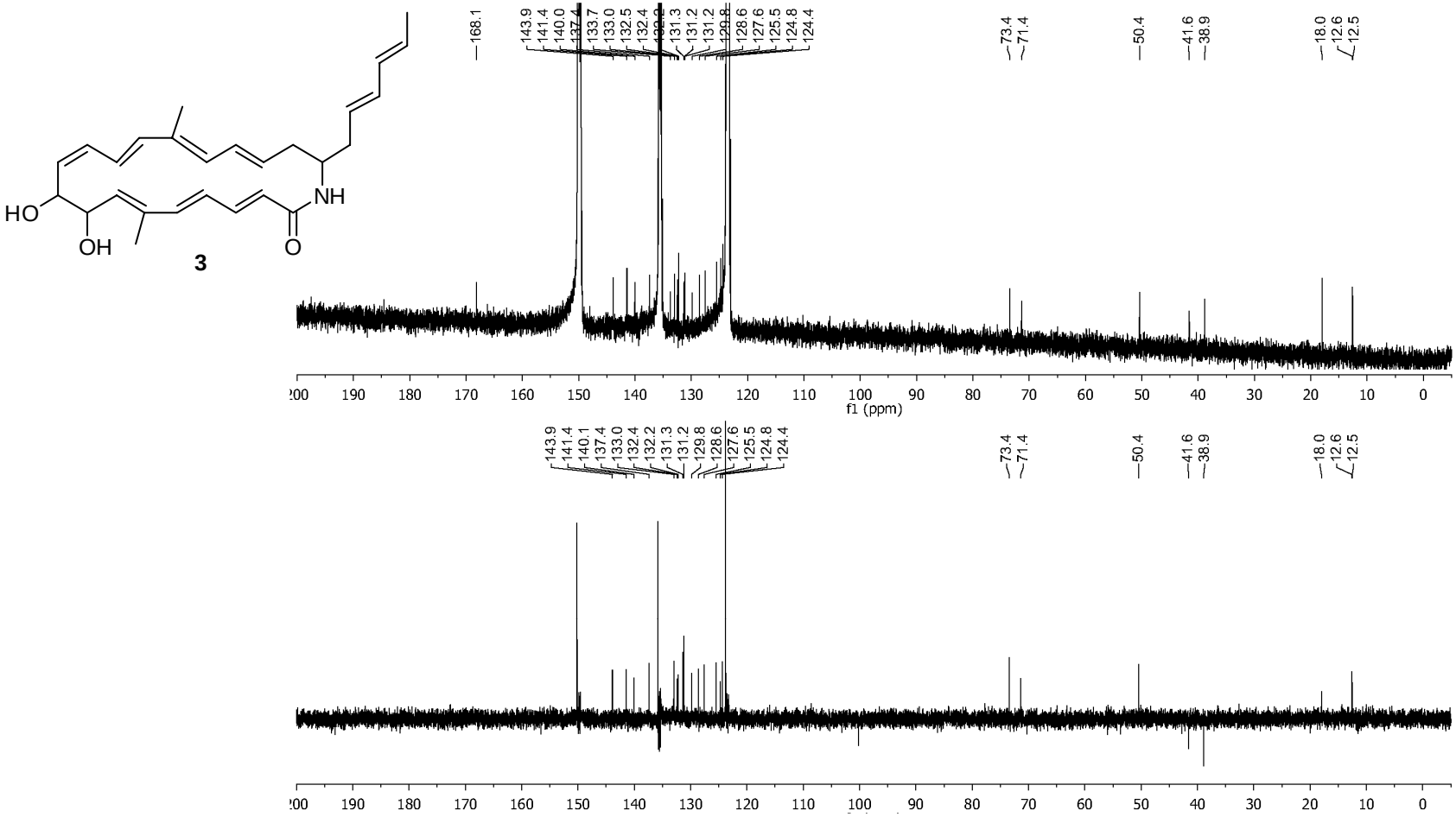


**Figure S10.** Spectroscopic data for heronamide F (**3**). (Continued)

**(D)** The HSQC spectrum of heronamide F (**3**) in pyridine-$d_5$.

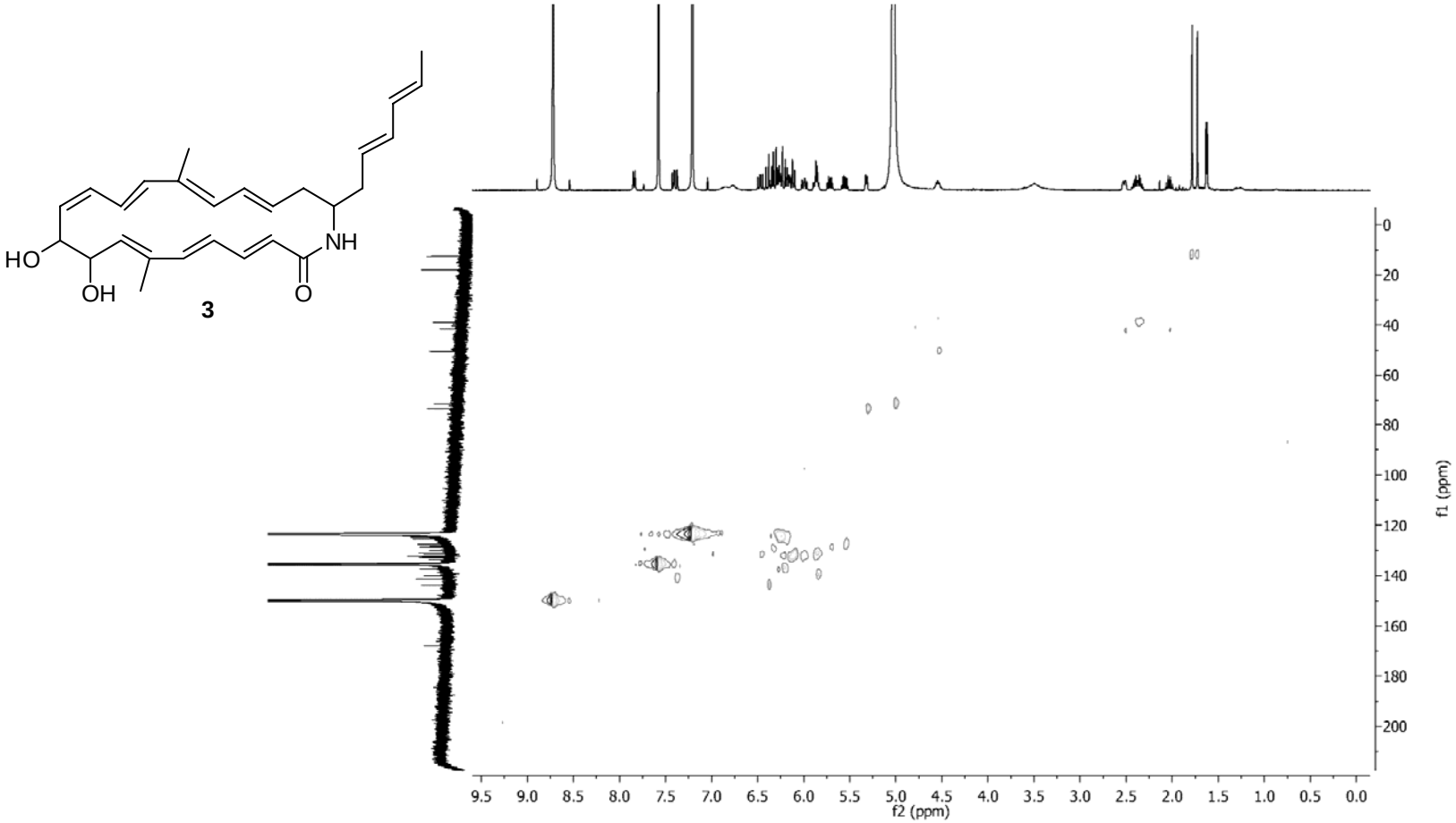


**Figure S10.** Spectroscopic data for heronamide F (**3**). (Continued)

**(E)** The COSY spectrum of heronamide F (**3**) in pyridine-$d_5$.

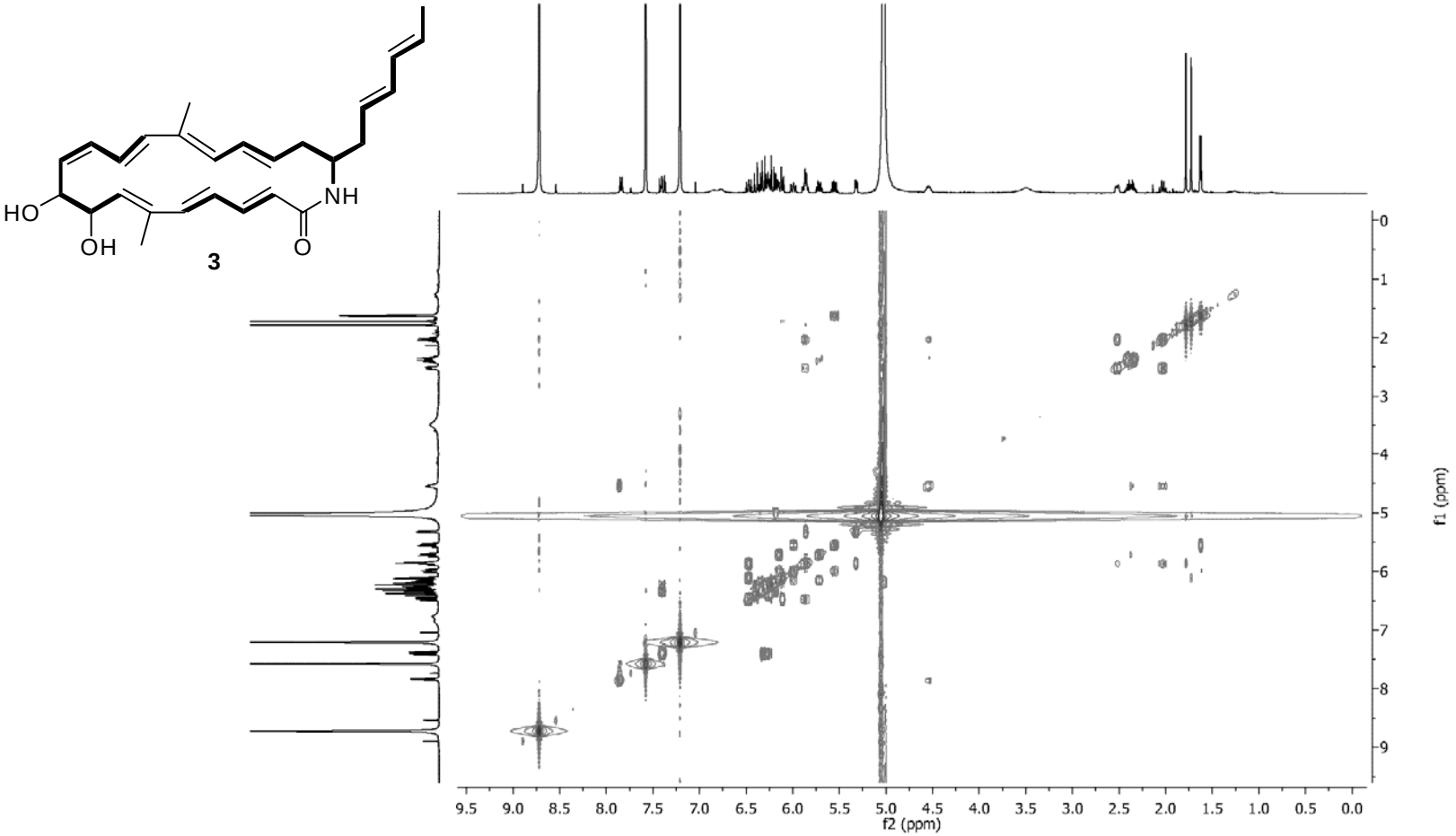


**Figure S10.** Spectroscopic data for heronamide F (**3**). (Continued)

**(F)** The HMBC spectrum of heronamide F (**3**) in pyridine-$d_5$.

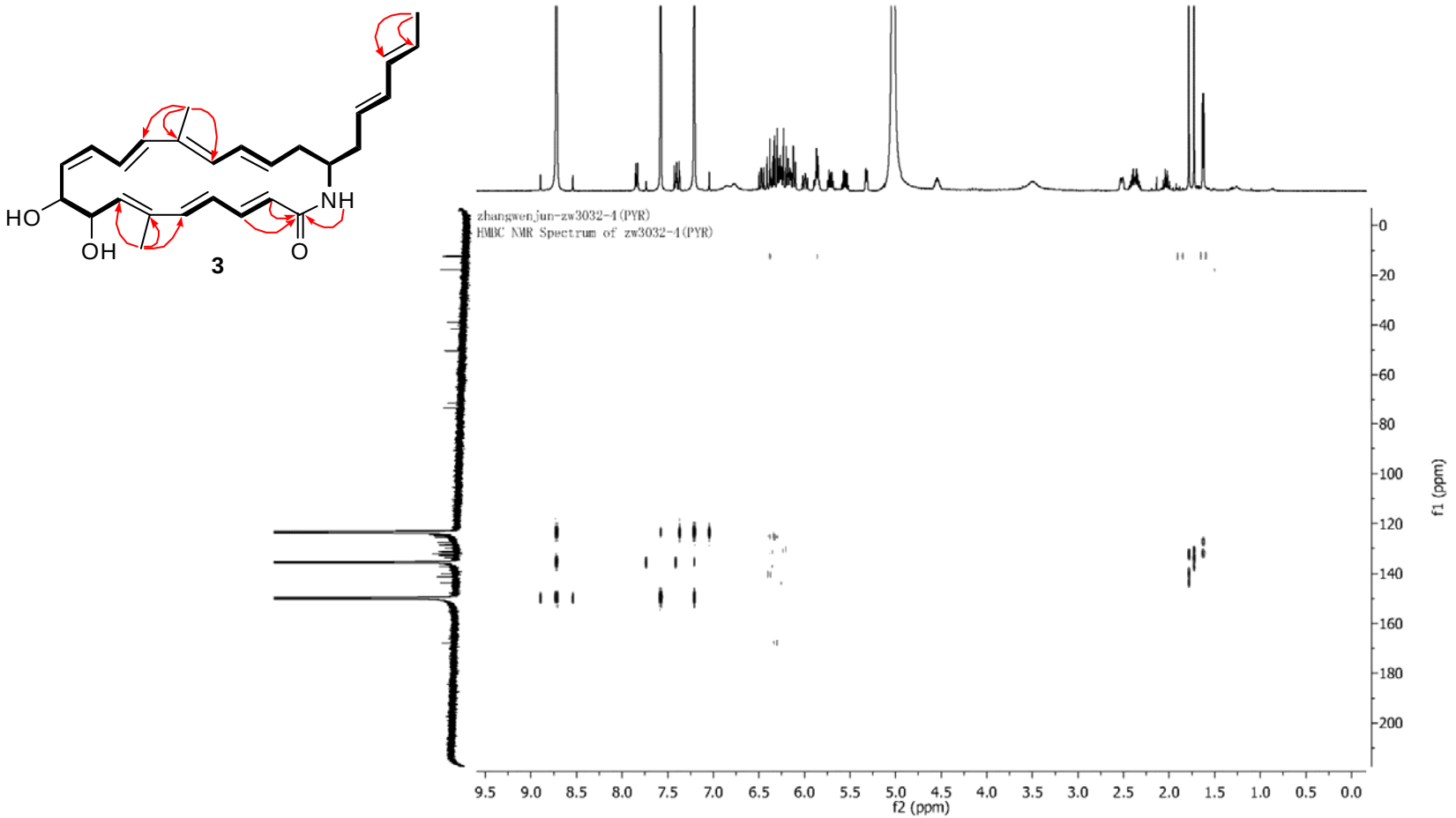
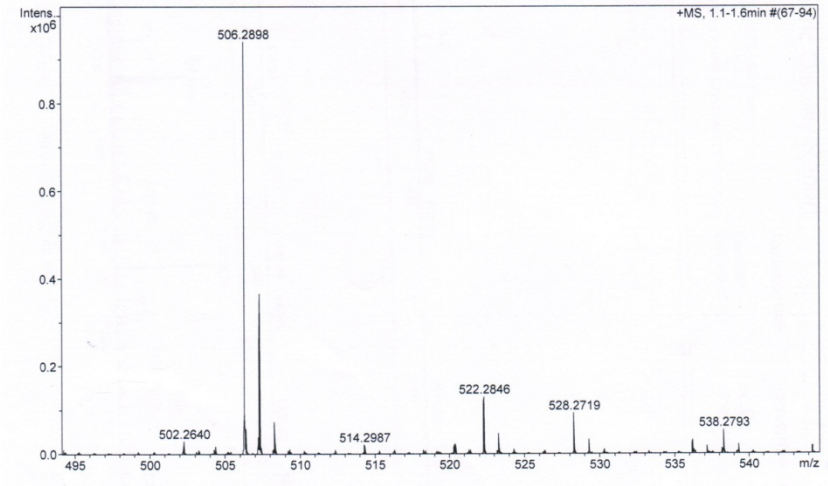
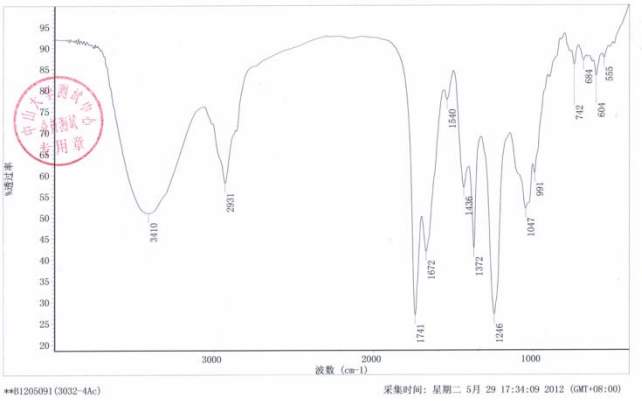
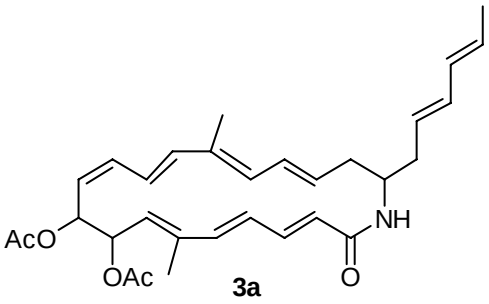


**Figure S11.** Spectroscopic data for diacetate of heronamide F (**3a**).
**(**A) HR-ESI-MS , IR , UV , and CD spectra of diacetate of heronamide F (**3a**).
(**a**). HR-ESI-MS

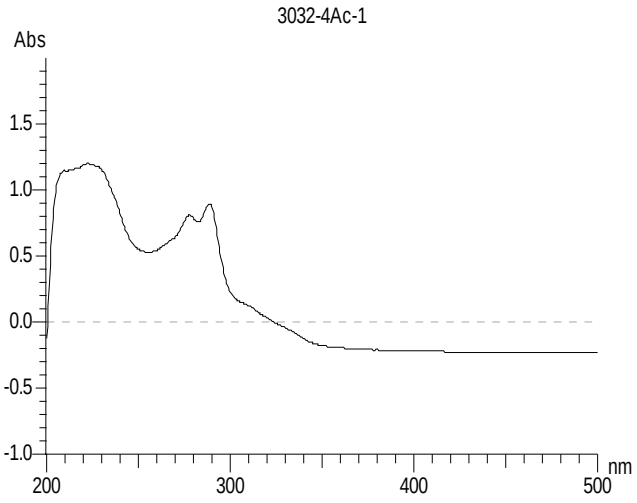



(**b**). IR




(**c**). UV




(**d**). CD

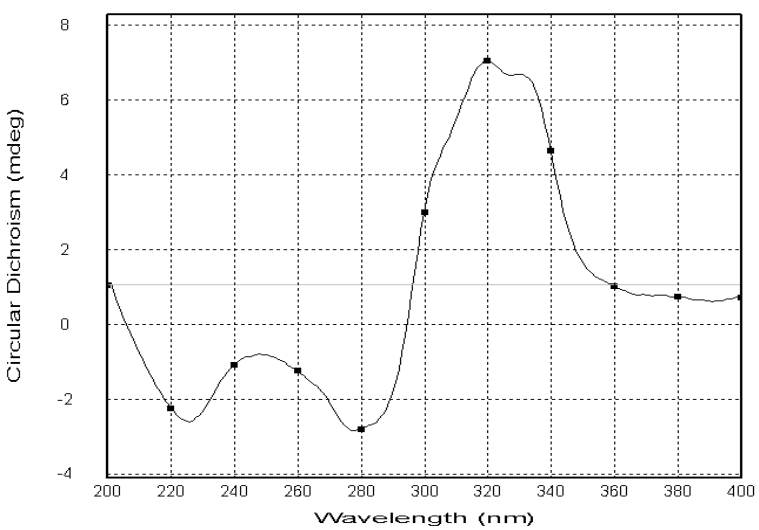


**Figure S11.** Spectroscopic data for diacetate of heronamide F (**3a**). (Continued)

**(B)** The $^{1}H$ NMR spectrum of diacetate of heronamide F (**3a**) in $CDCl_3$.

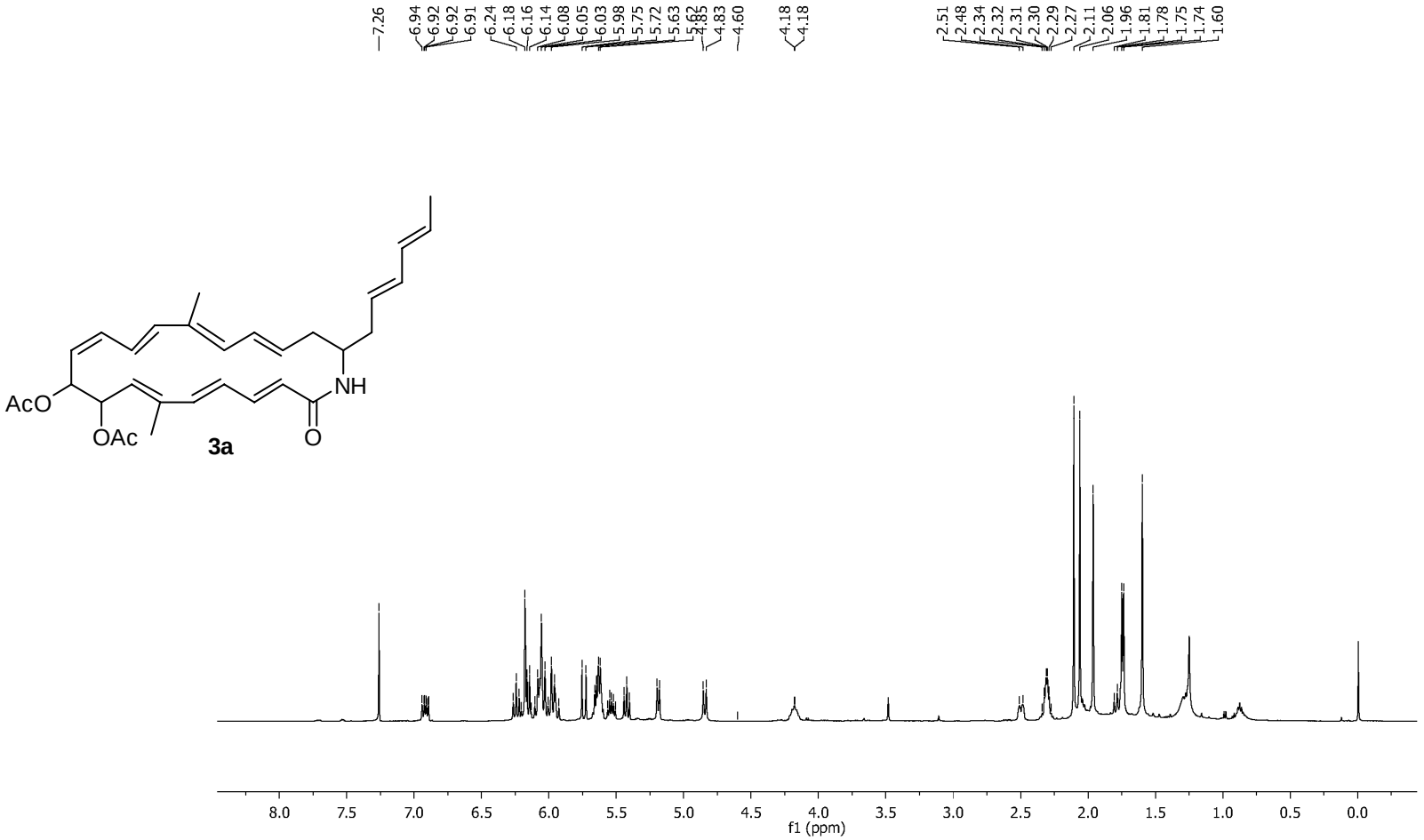


**Figure S11.** Spectroscopic data for diacetate of heronamide F (**3a**). (Continued)

**(C)** The $^{13}C$ NMR and DEPT 135 spectrum of diacetate of heronamide F (**3a**) in $CDCl_3$.

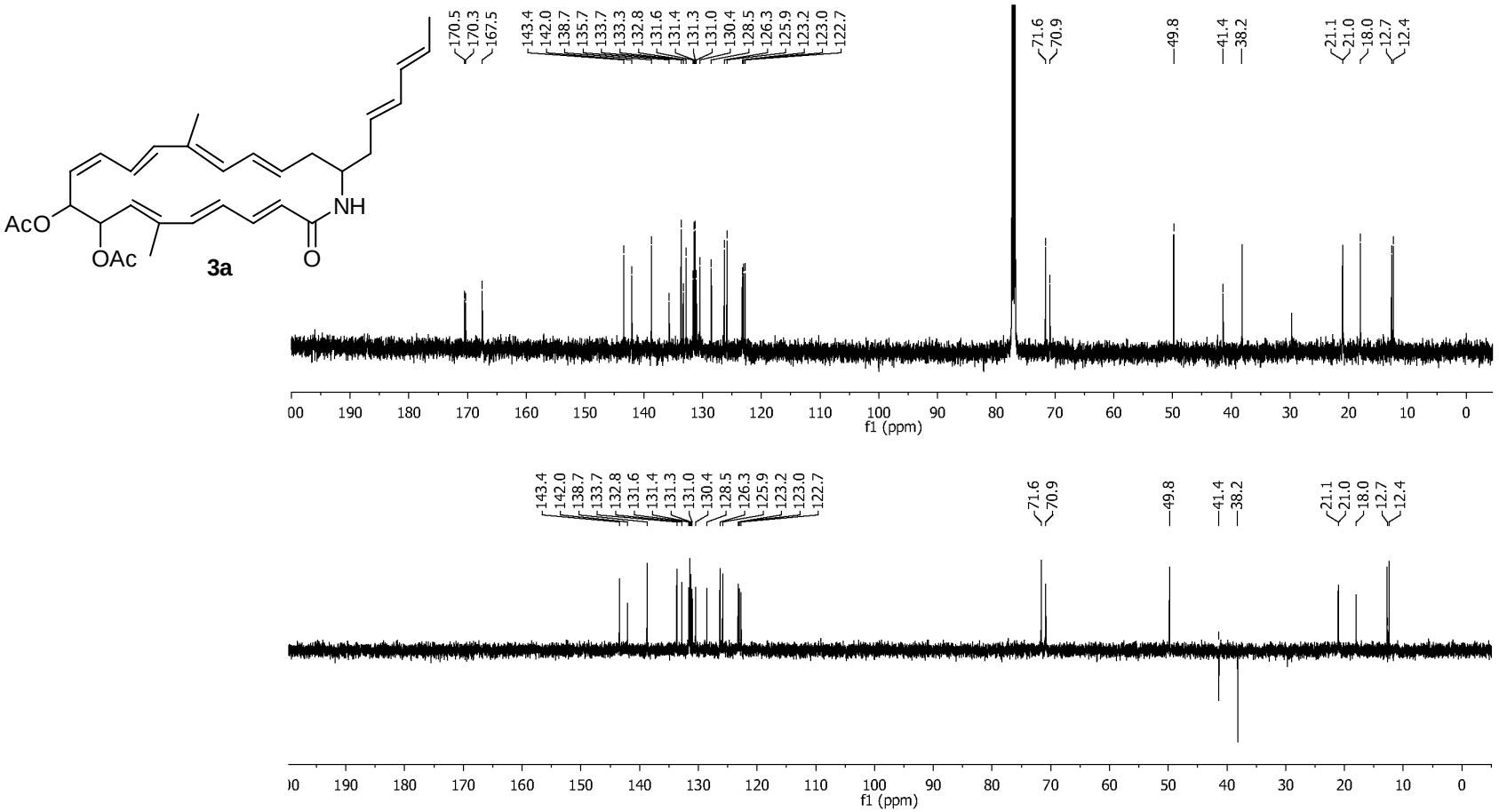


**Figure S11.** Spectroscopic data for diacetate of heronamide F (**3a**). (Continued)

**(D)** The HSQC spectrum of diacetate of heronamide F (**3a**) in $CDCl_3$.

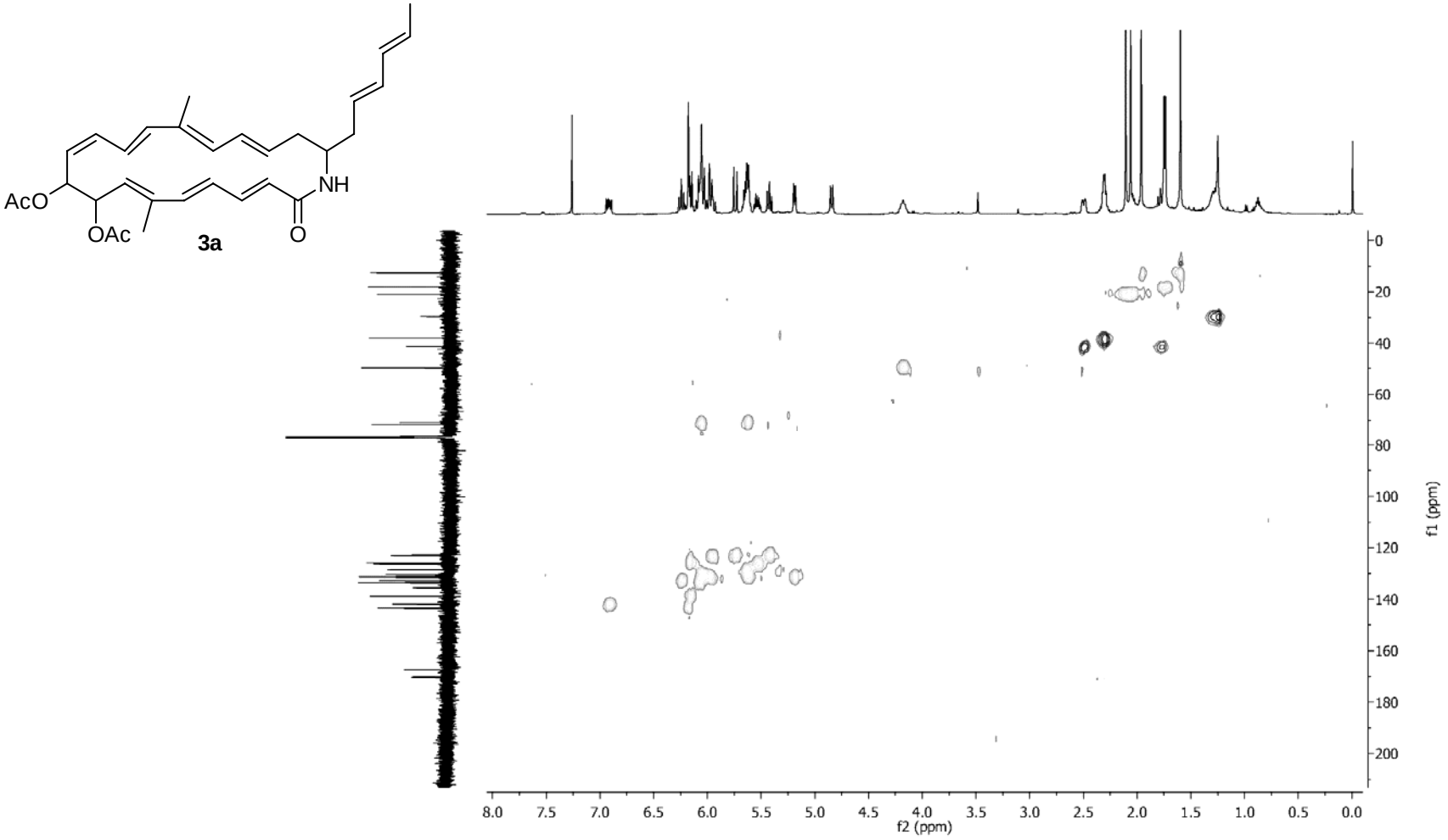


**Figure S11.** Spectroscopic data for diacetate of heronamide F (**3a**). (Continued)

**(E)** The COSY spectrum of diacetate of heronamide F (**3a**) in $CDCl_3$.

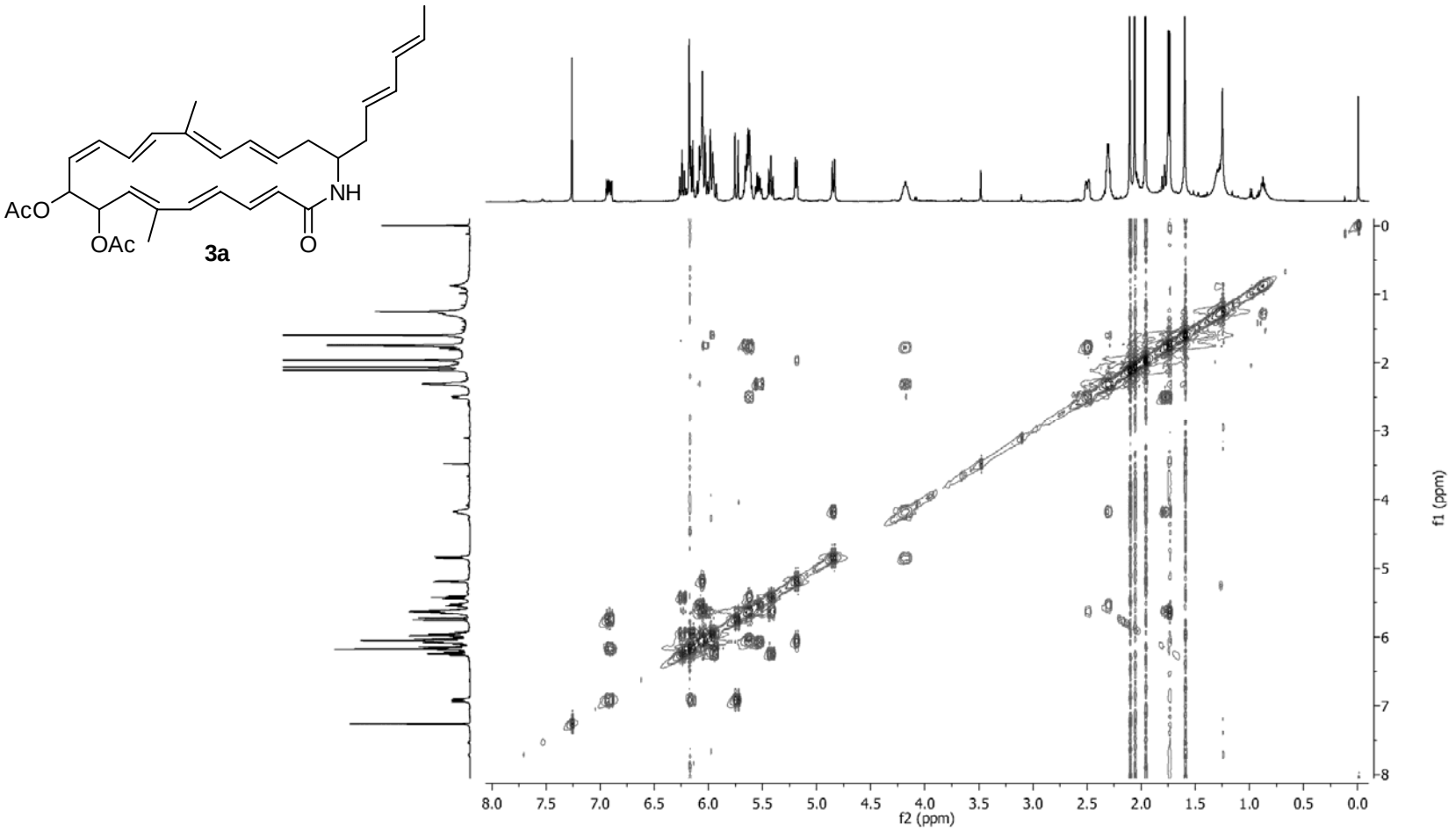


**Figure S11.** Spectroscopic data for diacetate of heronamide F (**3a**). (Continued)

**(F)** The HMBC spectrum of diacetate of heronamide F (**3a**) in $CDCl_3$.

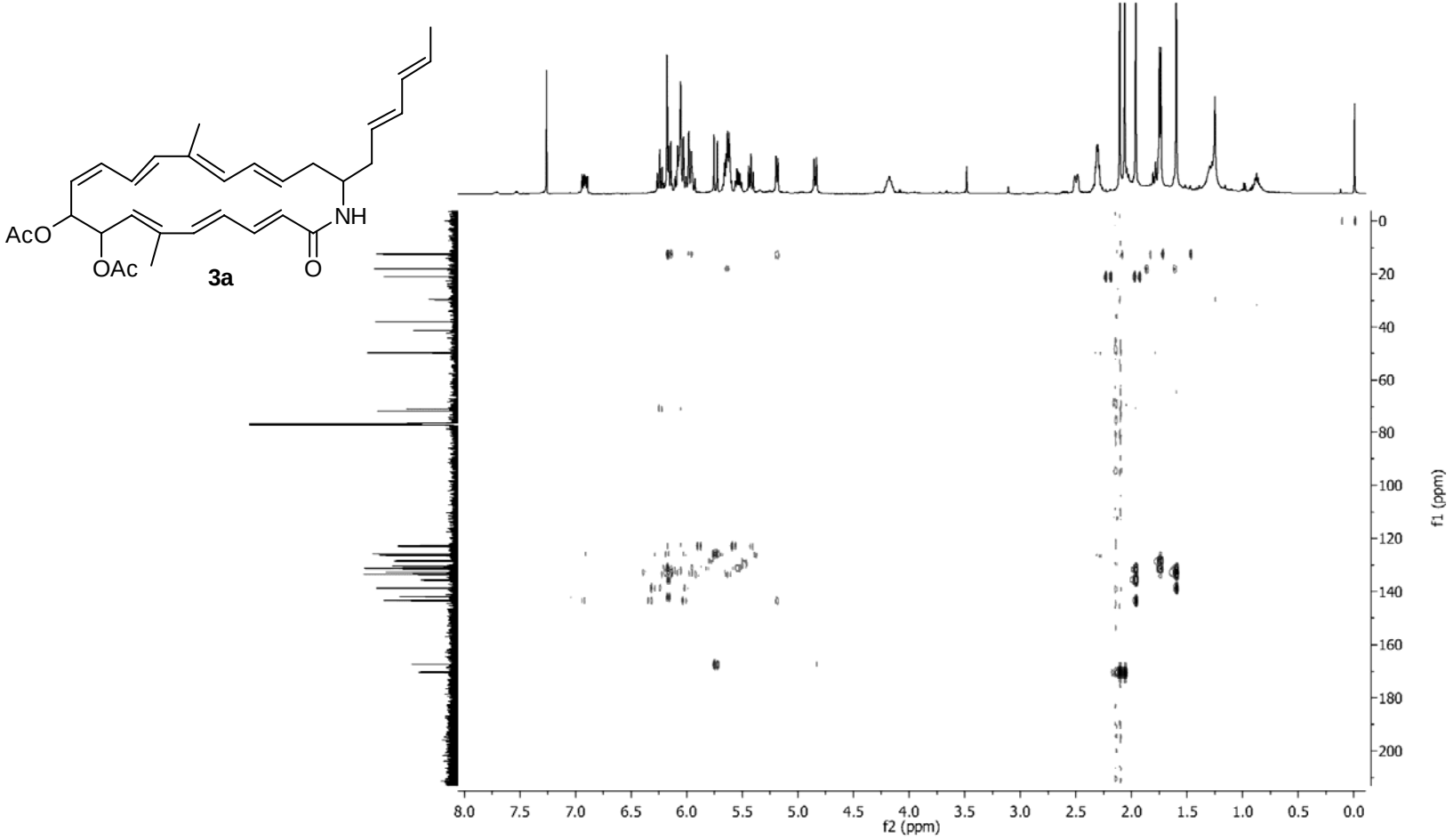


**Figure S11.** Spectroscopic data for diacetate of heronamide F (**3a**). (Continued)

**(G)** The NOESY spectrum of diacetate of heronamide F (**3a**) in $CDCl_3$.

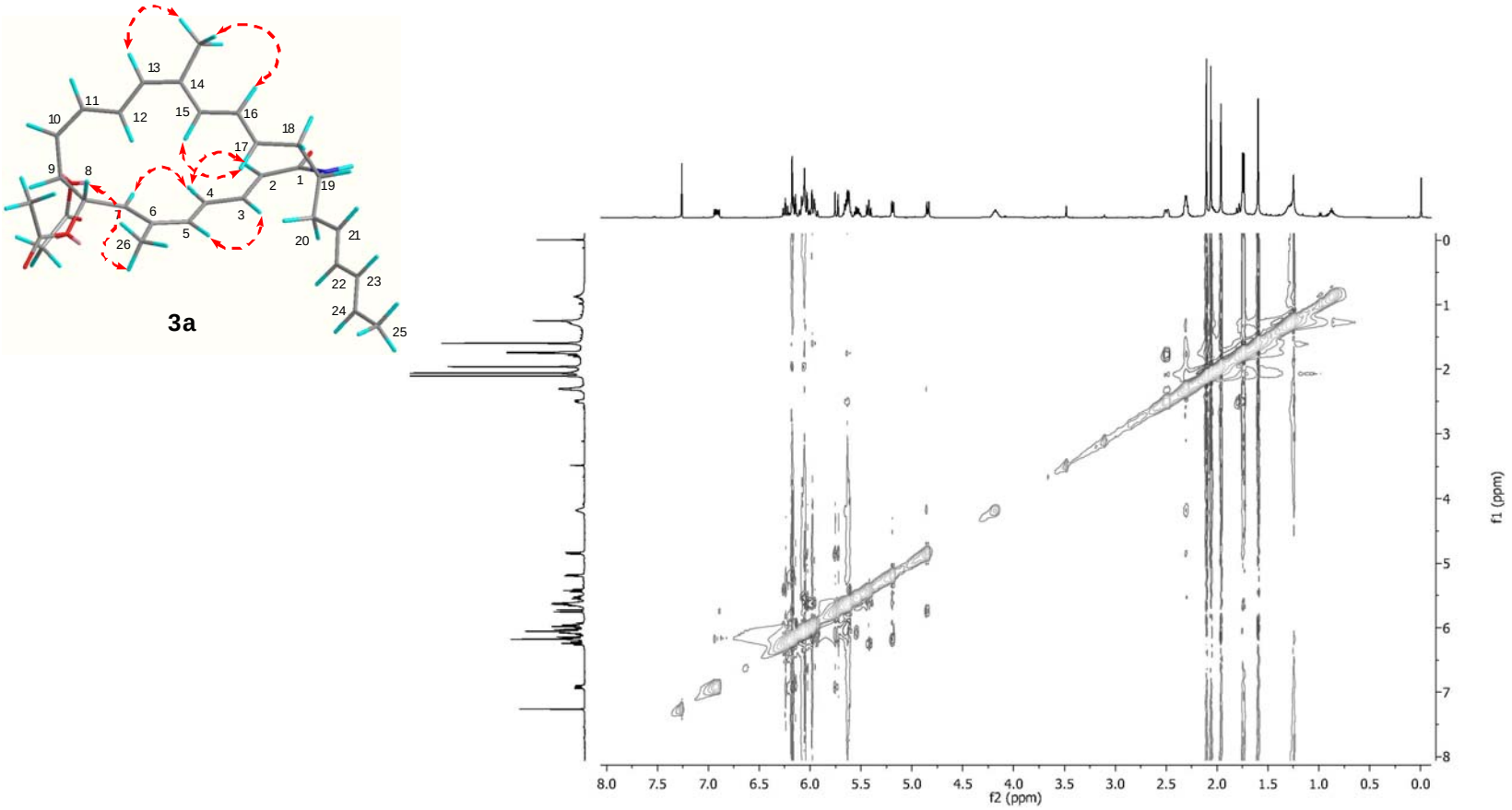
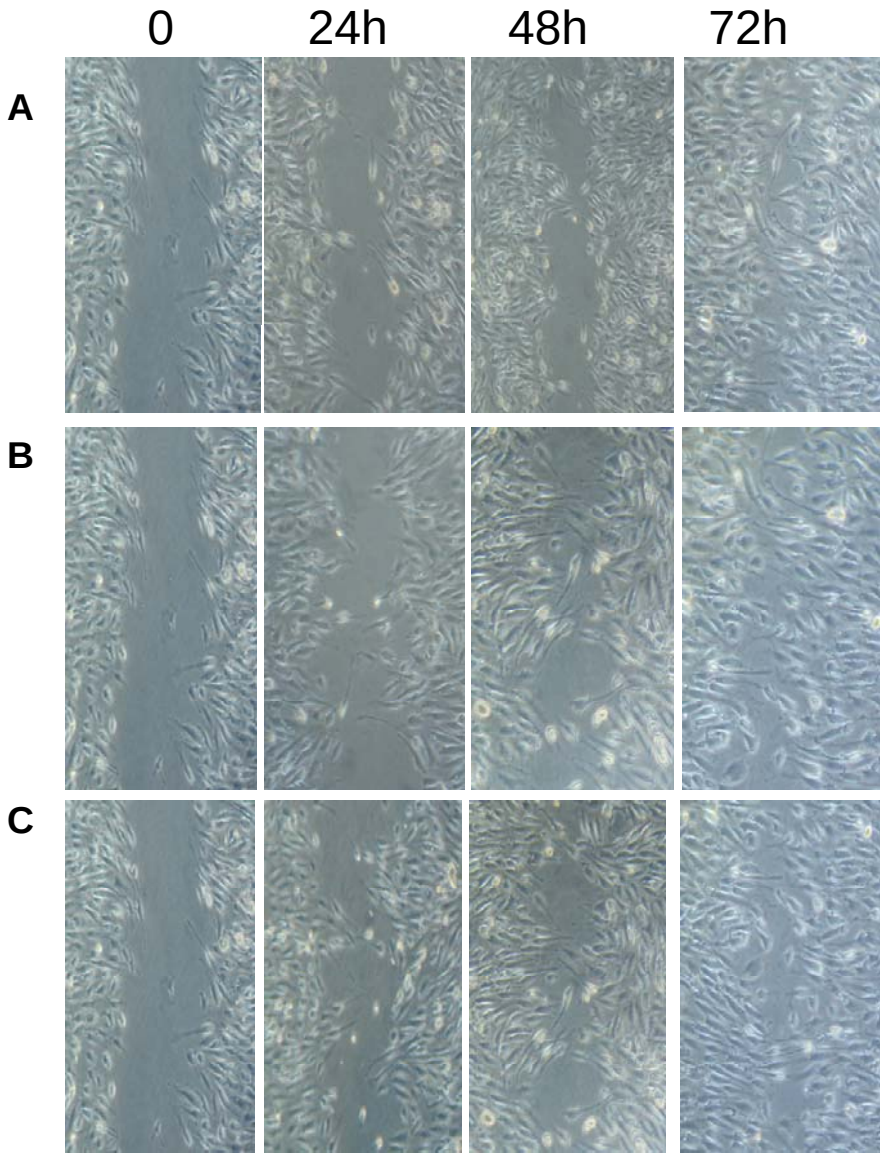


**Figure S12.** The effect of heronamides D (**1**) and F (**3**) on the migration of HUVEC cells.




The inhibitory effect of heronamides D (**1**) and F (**3**) on the migration capability of HUVEC cells was detected by wound healing assay, which was observed under an inverted-phase contrast microscope × 40. (A) 1 % DMSO; (B) 17.1 μM **1** in1 % DMSO; (C) 11.8 μM **3** in 1 % DMSO.