

# Supplement

## Combining HPLC-DAD-QTOF-MS and LC-SPE-NMR to Monitor In Vitro Vitetrifolin D Phase I and II Metabolism

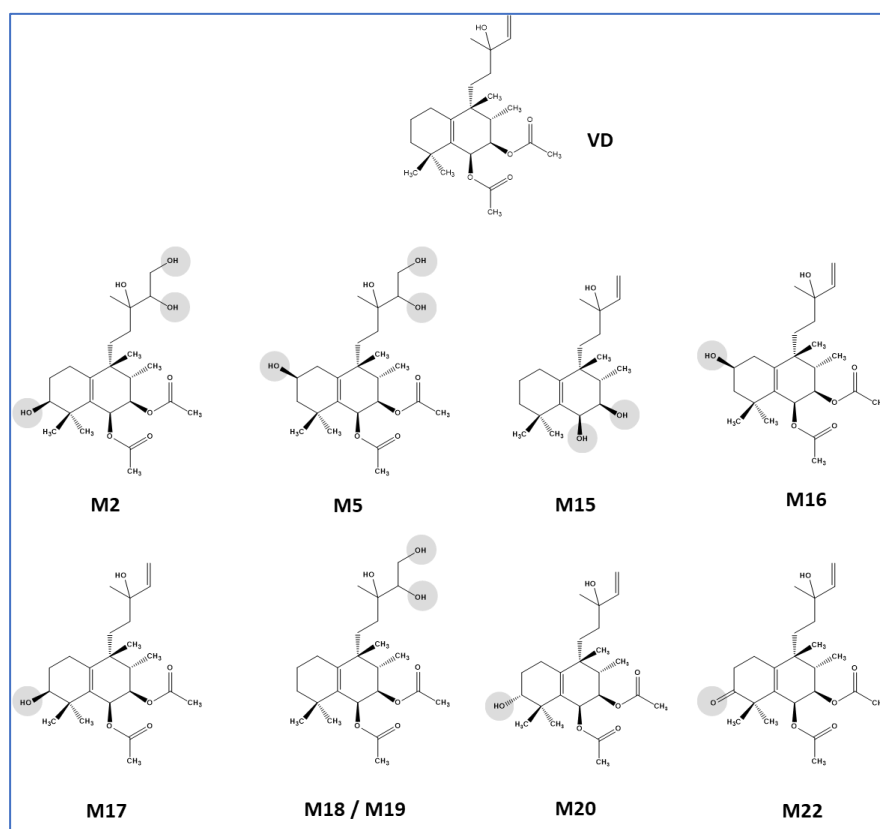
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Description of supporting material:



**Scheme S1:** Workflow sketch for the hyphenate instrument setups HPLC-DAD-QTOF-MS and HPLC-SPE-NMR utilized in this study.

**Scheme S2:** HPLC-DAD-QTOF-MS derived mass spectra of 2 $\beta$ -OH-VD (M16) and VD.

**Scheme S3:** LC-SPE-NMR (<sup>1</sup>H (600 MHz) / <sup>13</sup>C (150 MHz), CD<sub>3</sub>CN) derived correlations of VD: (a) multi-bond HMBC correlations (arrows) and COSY-correlations (red bonds); (b) NOESY correlation contacts.

**Figure S1:** HLM incubation experiment with 100  $\mu$ M VD. Base peak chromatograms (BPCs) of different sampling timepoints showing a stable metabolite profile after 24 h incubation time.

**Figure S2:** HPLC-DAD-QTOF-MS derived extracted ion chromatograms (EICs) for single fold

oxidized metabolites generated in the HLM incubation experiment with 100  $\mu$ M VD.

**Figure S3:** HPLC-DAD-QTOF-MS derived extracted ion chromatograms (EICs) for twofold oxidized metabolites generated in the HLM incubation experiment with 100  $\mu$ M VD.

**Figure S4:** HPLC-DAD-QTOF-MS derived extracted ion chromatograms (EICs) for threefold oxidized metabolites generated in the HLM incubation experiment with 100  $\mu$ M VD.

**Figure S5:** HPLC-DAD-QTOF-MS derived extracted ion chromatograms (EICs) for hydrolyzed metabolites generated in the HLM incubation experiment with 100  $\mu$ M VD.

**Figure S6:** HPLC-DAD-QTOF-MS derived extracted ion chromatograms (EICs) for glucuroniated metabolites generated in the S9-UGT incubation experiment with 100  $\mu$ M VD.

**Table S1:**  $^1\text{H}$  (600 MHz)- and  $^{13}\text{C}$  (150 MHz) NMR-Data of VD ( $\text{CD}_3\text{CN}$ ).

**Table S2:**  $^1\text{H}$  (600 MHz)- and  $^{13}\text{C}$  (150 MHz) NMR-data of M2 ( $\text{CD}_3\text{CN}$ ).

**Table S3:**  $^1\text{H}$  (600 MHz)- and  $^{13}\text{C}$  (150 MHz) NMR-data of M5 ( $\text{CD}_3\text{CN}$ ).

**Table S4:**  $^1\text{H}$  (600 MHz)- and  $^{13}\text{C}$  (150 MHz) NMR-data of M15 ( $\text{CD}_3\text{CN}$ ).

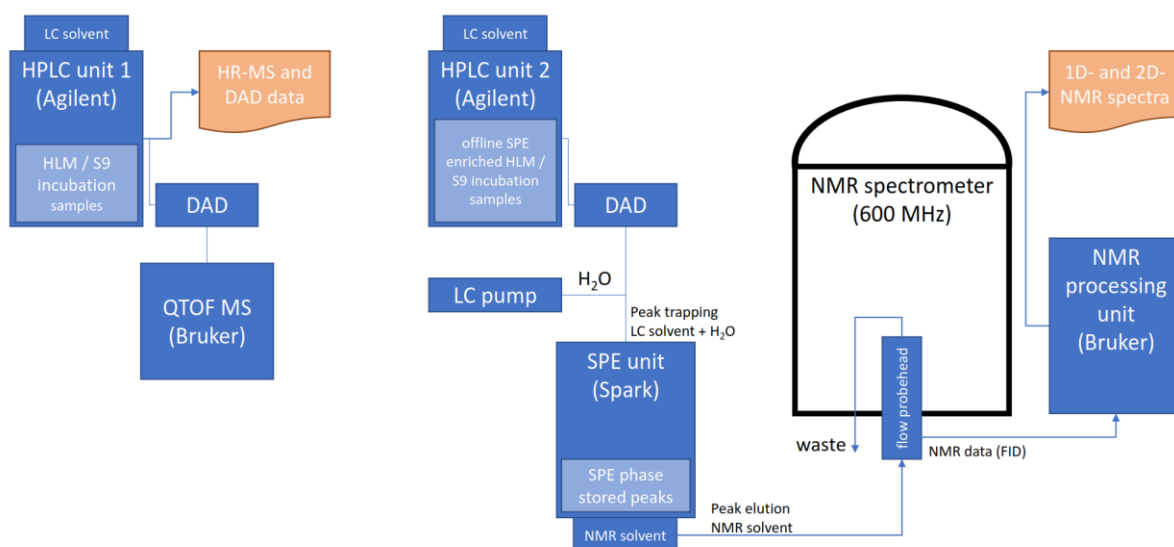
**Table S5:**  $^1\text{H}$  (600 MHz)- and  $^{13}\text{C}$  (150 MHz) NMR-data of M16 ( $\text{CD}_3\text{CN}$ ).

**Table S6:**  $^1\text{H}$  (600 MHz)- and  $^{13}\text{C}$  (150 MHz) NMR-data of M17 ( $\text{CD}_3\text{CN}$ ).

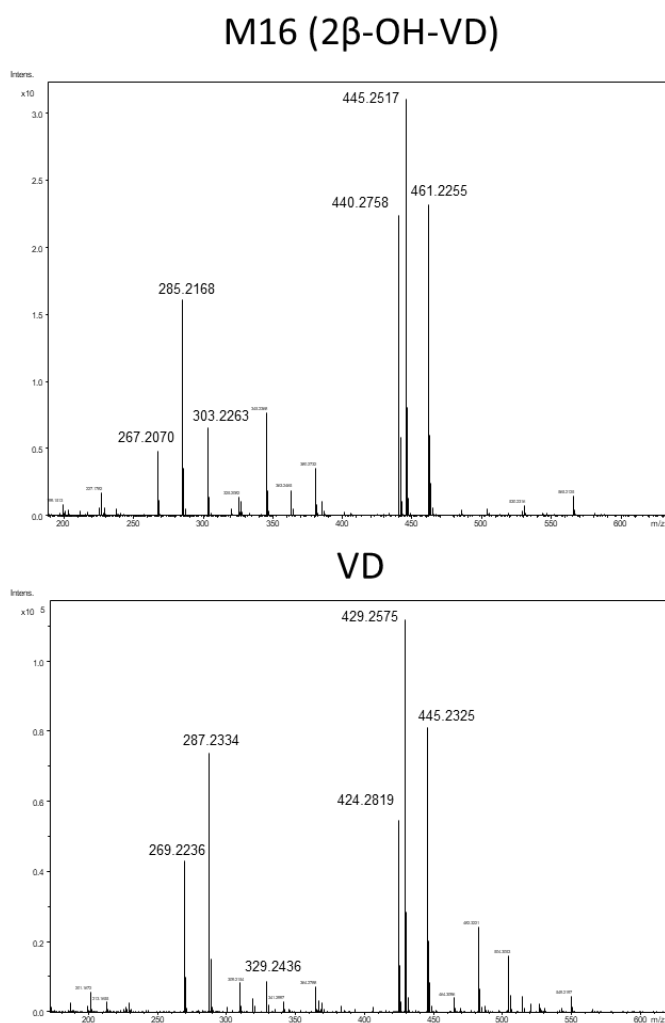
**Table S7:**  $^1\text{H}$  (600 MHz)- and  $^{13}\text{C}$  (150 MHz) NMR-data of M19 ( $\text{CD}_3\text{CN}$ ).

**Table S8:**  $^1\text{H}$  (600 MHz)- and  $^{13}\text{C}$  (150 MHz) NMR-data of M20 ( $\text{CD}_3\text{CN}$ ).

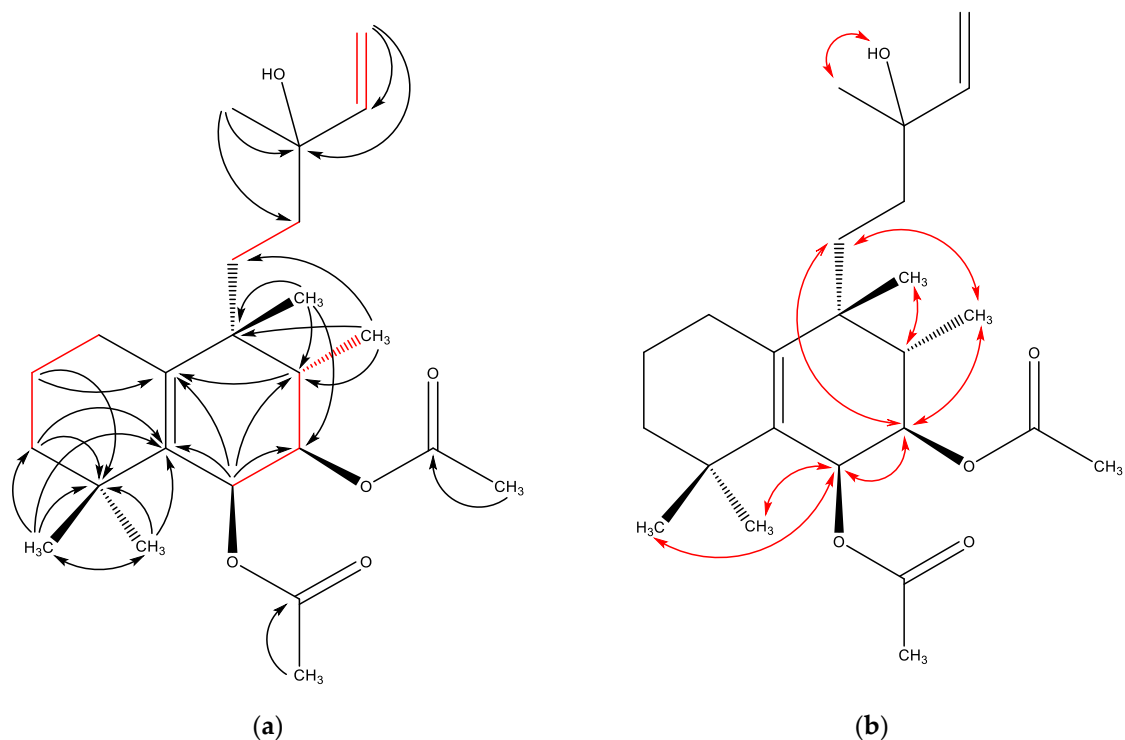
**Table S9:**  $^1\text{H}$  (600 MHz)- and  $^{13}\text{C}$  (150 MHz) NMR-data of M22 ( $\text{CD}_3\text{CN}$ ).



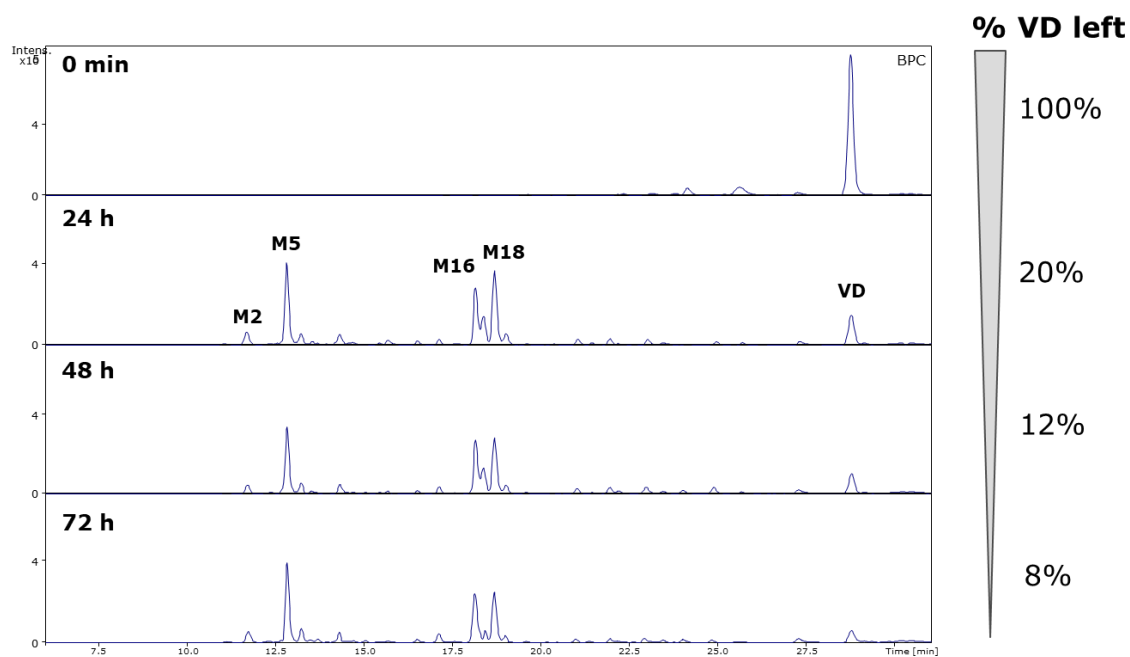
**Scheme S1:** Workflow sketch for the hyphenate instrument setups HPLC-DAD-QTOF-MS and HPLC-SPE-NMR utilized in this study.



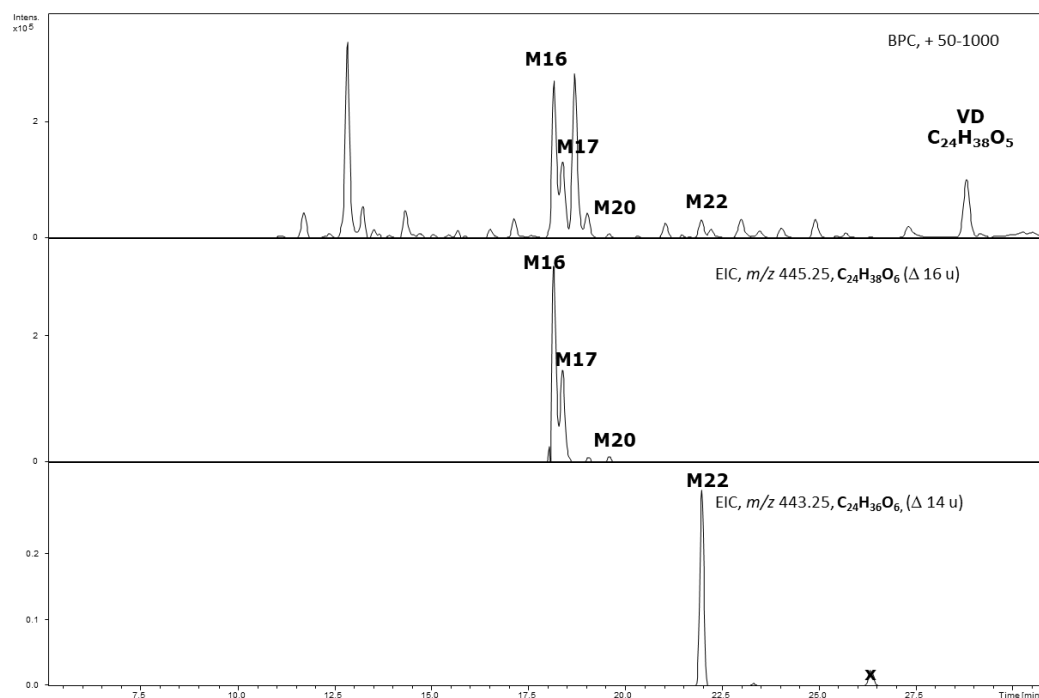
**Scheme S2:** HPLC-DAD-QTOF-MS derived mass spectra of 2 $\beta$ -OH-VD (M16) and VD.



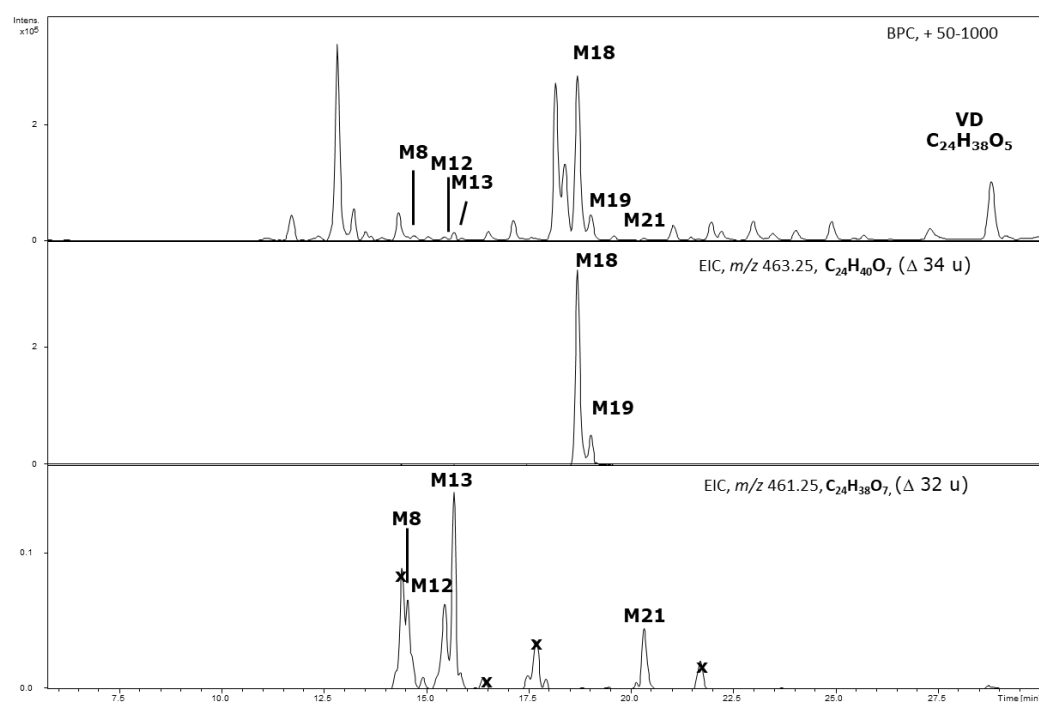
**Scheme S3:** LC-SPE-NMR ( $^1\text{H}$  (600 MHz) /  $^{13}\text{C}$  (150 MHz),  $\text{CD}_3\text{CN}$ ) derived correlations of VD: (a) multi-bond HMBC correlations (arrows) and COSY-correlations (red bonds); (b) NOESY correlation contacts.



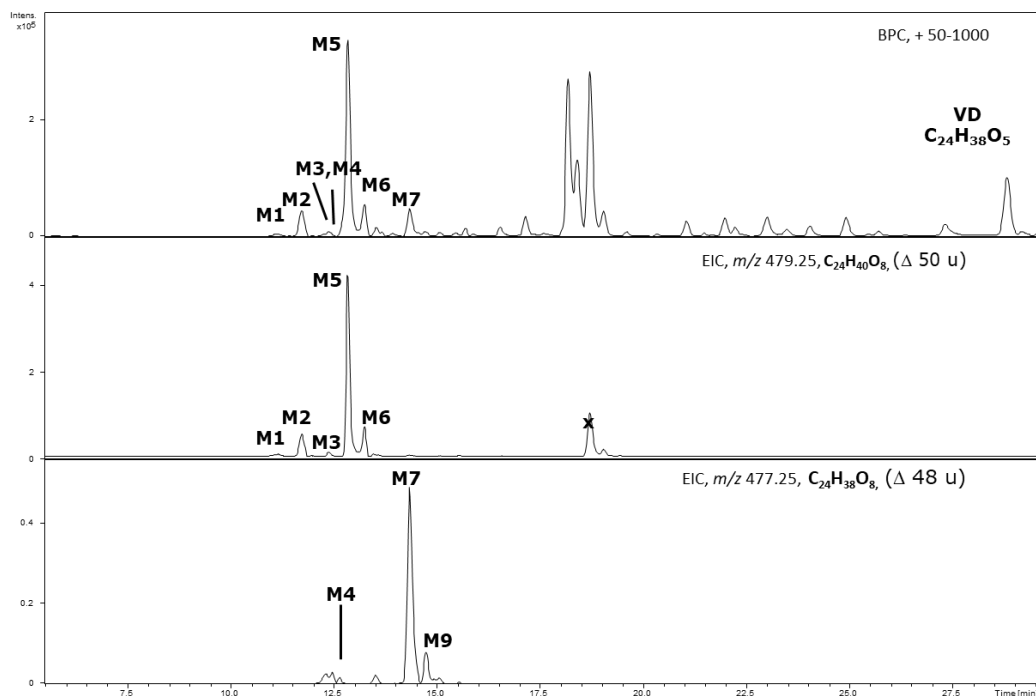
**Figure S1:** HLM incubation experiment with 100  $\mu\text{M}$  VD. Base peak chromatograms (BPCs) of different sampling timepoints showing a stable metabolite profile after 24 h incubation time.



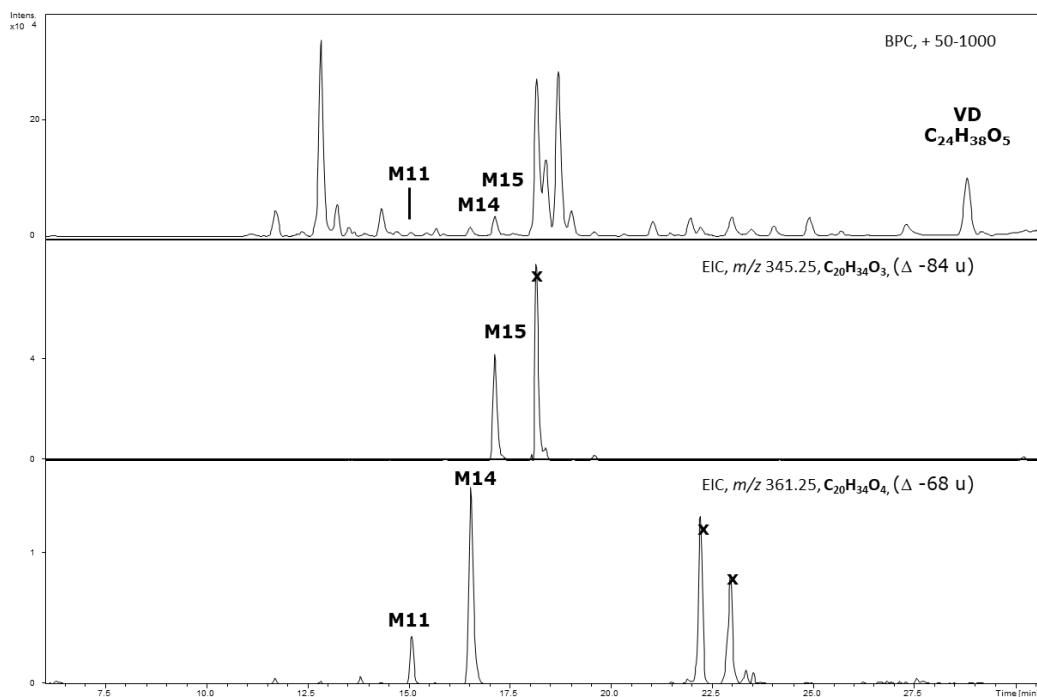
**Figure S2:** HPLC-DAD-QTOF-MS derived extracted ion chromatograms (EICs) for single fold oxidized metabolites generated in the HLM incubation experiment with 100  $\mu$ M VD.



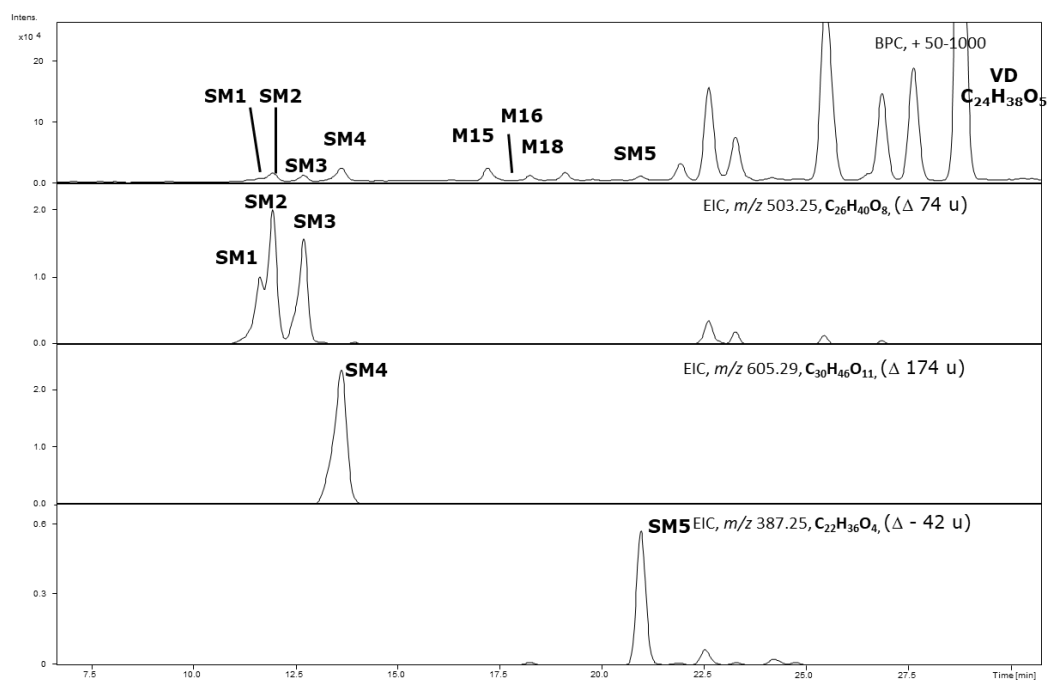
**Figure S3:** HPLC-DAD-QTOF-MS derived extracted ion chromatograms (EICs) for twofold oxidized metabolites generated in the HLM incubation experiment with 100  $\mu$ M VD.



**Figure S4:** HPLC-DAD-QTOF-MS derived extracted ion chromatograms (EICs) for threefold oxidized metabolites generated in the HLM incubation experiment with 100  $\mu$ M VD.



**Figure S5:** HPLC-DAD-QTOF-MS derived extracted ion chromatograms (EICs) for hydrolyzed metabolites generated in the HLM incubation experiment with 100  $\mu$ M VD.



**Figure S6:** HPLC-DAD-QTOF-MS derived extracted ion chromatograms (EICs) for glucuronated metabolites generated in the S9-UGT incubation experiment with 100  $\mu$ M VD.

**Table S1:** <sup>1</sup>H (600 MHz)- and <sup>13</sup>C (150 MHz) NMR-Data of VD (CD<sub>3</sub>CN).

| Position | δ <sub>H</sub> [ppm] | δ <sub>H</sub> Multiplizität | <i>J</i> [Hz] | δ <sub>C</sub> [ppm]      |
|----------|----------------------|------------------------------|---------------|---------------------------|
| 1        | 2.04                 | m                            | -             | 26.9 (CH <sub>2</sub> )   |
|          | 2.04                 | m                            | -             |                           |
| 2        | 1.62                 | m                            | -             | 20.5 (CH <sub>2</sub> )   |
|          | 1.62                 | m                            | -             |                           |
| 3        | 1.49                 | m                            | -             | 40.5 (CH <sub>2</sub> )   |
|          | 1.49                 | m                            | -             |                           |
| 4        | -                    | -                            | -             | 35.8 (C)                  |
| 5        | -                    | -                            | -             | 133.5 (C)                 |
| 6        | 5.57                 | d                            | 3.2           | 67.1 (CH)                 |
| 7        | 4.77                 | dd                           | 3.2, 13.0     | 73.9 (CH)                 |
| 8        | 2.04                 | m                            | -             | 37.8 (CH)                 |
| 9        | -                    | -                            | -             | 44.1 (C)                  |
| 10       | -                    | -                            | -             | 143.4 (C)                 |
| 11       | 1.43                 | m                            | -             | 30.6 (CH <sub>2</sub> )   |
|          | 1.43                 | m                            | -             |                           |
| 12       | 1.11                 | m                            | -             | 40.5 (CH <sub>2</sub> )   |
|          | 1.43                 | m                            | -             |                           |
| 13       | -                    | -                            | -             | 73.6 (C)                  |
| 14       | 5.85                 | dd                           | 10.7, 17.4    | 146.4 (CH)                |
| 15       | 4.99                 | dd                           | 1.7, 10.8     | 112.1 (CH <sub>2</sub> )  |
|          | 5.12                 | dd                           | 1.7, 17.4     |                           |
| 16       | 1.16                 | s                            | -             | 28.2 (CH <sub>3</sub> )   |
| 17       | 0.92                 | d                            | 7.0           | 11.7 (CH <sub>3</sub> )   |
| 18       | 1.03                 | s                            | -             | 29.9 (CH <sub>3</sub> )   |
| 19       | 0.88                 | s                            | -             | 28.7 (CH <sub>3</sub> )   |
| 20       | 1.04                 | s                            | -             | 28.9 (CH <sub>3</sub> )   |
| 21       | -                    | -                            | -             | 172.1 (CO)                |
| 22       | 1.97                 | s                            | -             | 21.8 (COCH <sub>3</sub> ) |
| 23       | -                    | -                            | -             | 171.9 (CO)                |
| 24       | 1.91                 | s                            | -             | 21.4 (COCH <sub>3</sub> ) |
| OH (C13) | 2.62                 | -                            | -             | -                         |



**Table S2:** <sup>1</sup>H (600 MHz)- and <sup>13</sup>C (150 MHz) NMR-Data of M2 (CD<sub>3</sub>CN).

| Position | δ <sub>H</sub> [ppm] | δ <sub>H</sub> Multiplicity | J [Hz]         | δ <sub>C</sub> [ppm]      |
|----------|----------------------|-----------------------------|----------------|---------------------------|
| 1        | 1.85                 | m                           | -              | 36.7 (CH <sub>2</sub> )   |
|          | 2.42                 | dd                          | 4.3, 16.4      |                           |
| 2        | 3.82                 | m                           | -              | 65.0 (C)                  |
|          | 1.38                 | t                           | 12.1           |                           |
| 3        | 1.71                 | ddd                         | 2.1, 3.6, 12.1 | 48.9 (CH <sub>2</sub> )   |
|          | -                    | -                           | -              |                           |
| 4        | -                    | -                           | -              | 38.3 (C)                  |
| 5        | -                    | -                           | -              | 133.5 (C)                 |
| 6        | 5.51                 | d                           | 3.1            | 66.4 (CH)                 |
| 7        | 4.82                 | dd                          | 3.3, 12.9      | 73.6 (CH)                 |
| 8        | 2.07                 | dd                          | 6.2, 13.0      | 37.6 (CH)                 |
| 9        | -                    | -                           | -              | 44.3 (C)                  |
| 10       | -                    | -                           | -              | 140.9 (C)                 |
| 11       | 1.59                 | m                           | -              | 29.5 (CH <sub>2</sub> )   |
|          | 1.59                 | m                           |                |                           |
| 12       | 0.93                 | m                           | -              | 36.2 (CH <sub>2</sub> )   |
|          | 1.59                 | m                           |                |                           |
| 13       | -                    | -                           | -              | 74.5 (C)                  |
| 14       | 3.35                 | ddd                         | 3.8, 5.1, 7.4  | 77.5 (CH)                 |
| 15       | 3.42                 | ddd                         | 5.1, 7.4, 10.9 | 63.8 (CH <sub>2</sub> )   |
|          | 3.60                 | ddd                         | 3.9, 6.0, 10.8 |                           |
| 16       | 1.06                 | s                           | -              | 23.2 (CH <sub>3</sub> )   |
| 17       | 0.96                 | d                           | 7.1            | 11.7 (CH <sub>3</sub> )   |
| 18       | 1.06                 | s                           | -              | 30.4 (CH <sub>3</sub> )   |
| 19       | 0.90                 | s                           | -              | 28.7 (CH <sub>3</sub> )   |
| 20       | 1.08                 | s                           | -              | 28.5 (CH <sub>3</sub> )   |
| 21       | -                    | -                           | -              | 172.1 (CO)                |
| 22       | 1.98                 | s                           | -              | 22.1 (COCH <sub>3</sub> ) |
| 23       | -                    | -                           | -              | 171.9 (CO)                |
| Ac-23    | 1.91                 | s                           | -              | 21.6 (COCH <sub>3</sub> ) |
| OH (C2)  | 2.79                 | -                           | -              | -                         |
| OH (C13) | 2.78                 | -                           | -              | -                         |
| OH (C14) | 3.05                 | d                           | 5.1            | -                         |
| OH (C15) | 2.84                 | dd                          | 5.1            | -                         |

**Table S3:** <sup>1</sup>H (600 MHz)- and <sup>13</sup>C (150 MHz) NMR-Data of M5 (CD<sub>3</sub>CN).

| Position | $\delta_{\text{H}}$ [ppm] | $\delta_{\text{H}}$ Multiplicity | $J$ [Hz]       | $\delta_{\text{C}}$ [ppm] |
|----------|---------------------------|----------------------------------|----------------|---------------------------|
| 1        | 2.07                      | m                                | -              | (CH <sub>2</sub> )        |
|          | 2.29                      | ddd                              | 5.9, 9.2, 17.4 |                           |
| 2        | 1.64                      | m                                | -              | (CH <sub>2</sub> )        |
|          | 1.81                      | m                                |                |                           |
| 3        | 3.45                      | m                                | -              | 75.5 (C)                  |
| 4        | -                         | -                                | -              | 40.6 (C)                  |
| 5        | -                         | -                                | -              | 131.8 (C)                 |
| 6        | 5.57                      | d                                | 3.3            | 66.8 (CH)                 |
| 7        | 4.84                      | dd                               | 3.3, 12.9      | 74.3 (CH)                 |
| 8        | 2.07                      | m                                | -              | 38.2 (CH)                 |
| 9        | -                         | -                                | -              | 43.5 (C)                  |
| 10       | -                         | -                                | -              | 142.3 (C)                 |
| 11       | 1.51                      | m                                | -              | 29.9 (CH <sub>2</sub> )   |
|          | 1.51                      | m                                |                |                           |
| 12       | 0.95                      | m                                | -              | 38.3 (CH <sub>2</sub> )   |
|          | 1.51                      | m                                |                |                           |
| 13       | -                         | -                                | -              | 75.2 (C)                  |
| 14       | 3.35                      | ddd                              | 3.8, 5.1, 7.4  | 76.7 (CH)                 |
| 15       | 3.41                      | ddd                              | 5.1, 7.4, 10.8 | (CH <sub>2</sub> )        |
|          | 3.59                      | ddd                              | 3.8, 6.0, 10.8 |                           |
| 16       | 1.04                      | s                                | -              | 23.1 (CH <sub>3</sub> )   |
| 17       | 0.95                      | d                                | 7.0            | 11.3 (CH <sub>3</sub> )   |
| 18       | 1.02                      | s                                | -              | 28.9 (CH <sub>3</sub> )   |
| 19       | 0.89                      | s                                | -              | 22.4 (CH <sub>3</sub> )   |
| 20       | 1.09                      | s                                | -              | 28.6 (CH <sub>3</sub> )   |
| 21       | -                         | -                                | -              | 171.6 (CO)                |
| 22       | 1.98                      | s                                | -              | 21.0 (COCH <sub>3</sub> ) |
| 23       | -                         | -                                | -              | 171.5 (CO)                |
| 24       | 1.91                      | s                                | -              | 20.9 (COCH <sub>3</sub> ) |
| OH (C3)  | 2.68                      | -                                | -              | -                         |
| OH (C13) | 2.76                      | -                                | -              | -                         |
| OH (C14) | 3.04                      | d                                | 5.1            | -                         |
| OH (C15) | 2.82                      | dd                               | 5.1            | -                         |

**Table S4:** <sup>1</sup>H (600 MHz)- and <sup>13</sup>C (150 MHz) NMR-Data of M15 (CD<sub>3</sub>CN).

| Position | δ <sub>H</sub> [ppm] | δ <sub>H</sub> Multiplicity | J [Hz]         | δ <sub>C</sub> [ppm]     |
|----------|----------------------|-----------------------------|----------------|--------------------------|
| 1        | 1.98                 | m                           | -              | 27.1 (CH <sub>2</sub> )  |
|          | 1.98                 | m                           |                |                          |
| 2        | 1.60                 | m                           | -              | 21.1 (CH <sub>2</sub> )  |
|          | 1.60                 | m                           |                |                          |
| 3        | 1.48                 | m                           | -              | 41.2 (CH <sub>2</sub> )  |
|          | 1.48                 | m                           |                |                          |
| 4        | -                    | -                           | -              | 35.6 (C)                 |
| 5        | -                    | -                           | -              | 137.9 (C)                |
| 6        | 3.96                 | m                           | -              | 67.9 (CH)                |
| 7        | 3.34                 | ddd                         | 3.6, 8.4, 12.2 | 72.9 (CH)                |
| 8        | 1.69                 | m                           | -              | 40.6 (CH)                |
| 9        | -                    | -                           | -              | 43.5 (C)                 |
| 10       | -                    | -                           | -              | 139.7 (C)                |
| 11       | 1.34                 | m                           | -              | 30.9 (CH <sub>2</sub> )  |
|          | 1.40                 | m                           |                |                          |
| 12       | 1.07                 | m                           | -              | 40.7 (CH <sub>2</sub> )  |
|          | 1.37                 |                             |                |                          |
| 13       | -                    | -                           | -              | 73.8 (C)                 |
| 14       | 5.85                 | dd                          | 10.7, 17.4     | 147.2 (CH)               |
| 15       | 4.97                 | dd                          | 1.7, 10.7      | 112.1 (CH <sub>2</sub> ) |
|          | 5.11                 | dd                          | 1.7, 17.4      |                          |
| 16       | 1.14                 | s                           | -              | 28.6 (CH <sub>3</sub> )  |
| 17       | 0.99                 | d                           | 6.9            | 12.5 (CH <sub>3</sub> )  |
| 18       | 1.13                 | s                           | -              | 30.4 (CH <sub>3</sub> )  |
| 19       | 1.04                 | s                           | -              | 30.4 (CH <sub>3</sub> )  |
| 20       | 0.97                 | s                           | -              | 29.2 (CH <sub>3</sub> )  |
| OH (C6)  | 2.46                 | -                           | -              | -                        |
| OH (C7)  | 2.54                 | -                           | -              | -                        |

**Table S5:** <sup>1</sup>H (600 MHz)- and <sup>13</sup>C (150 MHz) NMR-Data of M16 (CD<sub>3</sub>CN).

| Position | δ <sub>H</sub> [ppm] | δ <sub>H</sub> Multiplicity | J [Hz]     | δ <sub>C</sub> [ppm]      |
|----------|----------------------|-----------------------------|------------|---------------------------|
| 1        | 1.82                 | dd                          | 6.0, 16.4  | 36.9 (CH <sub>2</sub> )   |
|          | 2.40                 | dd                          | 4.4, 16.4  |                           |
| 2        | 3.83                 | m                           | -          | 65.3 (C)                  |
| 3        | 1.37                 | t                           | 12.1       | 49.3 (CH <sub>2</sub> )   |
|          | 1.71                 | ddd                         | 3.4, 12.3  |                           |
| 4        | -                    | -                           | -          | 38.4 (C)                  |
| 5        | -                    | -                           | -          | 133.5 (C)                 |
| 6        | 5.51                 | d                           | 3.20       | 66.7 (CH)                 |
| 7        | 4.76                 | dd                          | 3.2, 13.0  | 74.0 (CH)                 |
| 8        | 2.06                 | dd                          | 6.2, 13.0  | 37.8 (CH)                 |
| 9        | -                    | -                           | -          | 44.0 (C)                  |
| 10       | -                    | -                           | -          | 141.3 (C)                 |
| 11       | 1.45                 | m                           | -          | 30.3 (CH <sub>2</sub> )   |
|          | 1.45                 | m                           |            |                           |
| 12       | 1.07                 | m                           | -          | 40.5 (CH <sub>2</sub> )   |
|          | 1.45                 | m                           |            |                           |
| 13       | -                    | -                           | -          | 73.8 (C)                  |
| 14       | 5.85                 | dd                          | 10.7, 17.4 | 146.8 (CH)                |
| 15       | 5.00                 | dd                          | 1.7, 10.7  | 112.3 (CH <sub>2</sub> )  |
|          | 5.13                 | dd                          | 1.7, 17.4  |                           |
| 16       | 1.16                 | s                           | -          | 28.4 (CH <sub>3</sub> )   |
| 17       | 0.92                 | d                           | 7.0        | 11.9 (CH <sub>3</sub> )   |
| 18       | 1.06                 | s                           | -          | 30.6 (CH <sub>3</sub> )   |
| 19       | 0.92                 | s                           | -          | 28.9 (CH <sub>3</sub> )   |
| 20       | 1.05                 | s                           | -          | 28.7 (CH <sub>3</sub> )   |
| 21       | -                    | -                           | -          | 172.2 (CO)                |
| 22       | 1.97                 | s                           | -          | 21.9 (COCH <sub>3</sub> ) |
| 23       | -                    | -                           | -          | 171.9 (CO)                |
| 24       | 1.91                 | s                           | -          | 21.5 (COCH <sub>3</sub> ) |
| OH (C2)  | 2.77                 | dd                          | 1.2, 4.7   | -                         |
| OH (C13) | 2.62                 | -                           | -          | -                         |

**Table S6:** <sup>1</sup>H (600 MHz)- and <sup>13</sup>C (150 MHz) NMR-Data of M17 (CD<sub>3</sub>CN).

| Position | δ <sub>H</sub> [ppm] | δ <sub>H</sub> Multiplicity | J [Hz]         | δ <sub>C</sub> [ppm]      |
|----------|----------------------|-----------------------------|----------------|---------------------------|
| 1        | 1.99                 | m                           | -              | 22.8 (CH <sub>2</sub> )   |
|          | 2.27                 | ddd                         | 5.9, 9.2, 17.4 |                           |
| 2        | 1.64                 | m                           | -              | 27.5 (CH <sub>2</sub> )   |
|          | 1.81                 | m                           |                |                           |
| 3        | 3.44                 | m                           | -              | 75.1 (C)                  |
| 4        | -                    | -                           | -              | 40.4 (C)                  |
| 5        | -                    | -                           | -              | 132.7 (C)                 |
| 6        | 5.57                 | d                           | 3.1            | 67.3 (CH)                 |
| 7        | 4.78                 | dd                          | 3.2, 12.9      | 74.0 (CH)                 |
| 8        | 2.05                 | ddd                         | 7.1, 7.1, 13.0 | 37.9 (CH)                 |
| 9        | -                    | -                           | -              | 44.1 (C)                  |
| 10       | -                    | -                           | -              | 143.0 (C)                 |
| 11       | 1.44                 | m                           | -              | 30.6 (CH <sub>2</sub> )   |
|          | 1.44                 | m                           |                |                           |
| 12       | 1.11                 | m                           | -              | 40.9 (CH <sub>2</sub> )   |
|          | 1.44                 | m                           |                |                           |
| 13       | -                    | -                           | -              | 73.5 (C)                  |
| 14       | 5.85                 | dd                          | 10.8, 17.3     | 146.8 (CH)                |
| 15       | 4.98                 | dd                          | 1.5, 10.8      | 111.9 (CH <sub>2</sub> )  |
|          | 5.12                 | dd                          | 1.5, 17.3      |                           |
| 16       | 1.16                 | s                           | -              | 28.5 (CH <sub>3</sub> )   |
| 17       | 0.92                 | d                           | 7.1            | 11.9 (CH <sub>3</sub> )   |
| 18       | 1.03                 | s                           | -              | 29.1 (CH <sub>3</sub> )   |
| 19       | 0.88                 | s                           | -              | 22.9 (CH <sub>3</sub> )   |
| 20       | 1.06                 | s                           | -              | 29.1 (CH <sub>3</sub> )   |
| 21       | -                    | -                           | -              | 171.9 (CO)                |
| 22       | 1.98                 | s                           | -              | 21.9 (COCH <sub>3</sub> ) |
| 23       | -                    | -                           | -              | 171.9 (CO)t               |
| 24       | 1.91                 | s                           | -              | 21.6 (COCH <sub>3</sub> ) |
| OH (C3)  | 2.67                 | -                           | -              | -                         |
| OH (C13) | 2.62                 | -                           | -              | -                         |

**Table S7:** <sup>1</sup>H (600 MHz)- and <sup>13</sup>C (150 MHz) NMR-Data of M19 (CD<sub>3</sub>CN).

| Position | $\delta_{\text{H}}$ [ppm] | $\delta_{\text{H}}$ Multiplicity | $J$ [Hz]       | $\delta_{\text{C}}$ [ppm] |
|----------|---------------------------|----------------------------------|----------------|---------------------------|
| 1        | 2.04                      | m                                | -              | 27.0 (CH <sub>2</sub> )   |
|          | 2.10                      | m                                |                |                           |
| 2        | 1.62                      | m                                | -              | 20.5 (CH <sub>2</sub> )   |
|          | 1.62                      | m                                |                |                           |
| 3        | 1.49                      | m                                | -              | 40.5 (CH <sub>2</sub> )   |
|          | 1.49                      | m                                |                |                           |
| 4        | -                         | -                                | -              | 35.6 (C)                  |
| 5        | -                         | -                                | -              | 133.7 (C)                 |
| 6        | 5.57                      | d                                | 3.2            | 67.1 (CH)                 |
| 7        | 4.81                      | dd                               | 3.3, 12.7      | 74.4 (CH)                 |
| 8        | 2.05                      | m                                | -              | 37.8 (CH)                 |
| 9        | -                         | -                                | -              | 44.3 (C)                  |
| 10       | -                         | -                                | -              | 143.6 (C)                 |
| 11       | 1.49                      | m                                | -              | 30.2 (CH <sub>2</sub> )   |
|          | 1.49                      | m                                |                |                           |
| 12       | 1.05                      | m                                | -              | 41.1 (CH <sub>2</sub> )   |
|          | 1.49                      | m                                |                |                           |
| 13       | -                         | -                                | -              | 75.0 (C)                  |
| 14       | 3.35                      | ddd                              | 3.6, 5.5, 7.4  | 76.8 (CH)                 |
| 15       | 3.46                      | ddd                              | 4.7, 7.4, 11.2 | 64.5 (CH <sub>2</sub> )   |
|          | 3.56                      | ddd                              | 3.4, 6.4, 10.8 |                           |
| 16       | 1.03                      | s                                | -              | 23.4 (CH <sub>3</sub> )   |
| 17       | 0.94                      | d                                | 7.1            | 12.0 (CH <sub>3</sub> )   |
| 18       | 1.04                      | s                                | -              | 30.1 (CH <sub>3</sub> )   |
| 19       | 0.88                      | s                                | -              | 29.1 (CH <sub>3</sub> )   |
| 20       | 1.06                      | s                                | -              | 29.3 (CH <sub>3</sub> )   |
| 21       | -                         | -                                | -              | 171.9 (CO)                |
| 22       | 1.98                      | s                                | -              | 21.6 (COCH <sub>3</sub> ) |
| 23       | -                         | -                                | -              | 171.8 (CO)                |
| 24       | 1.91                      | s                                | -              | 21.6 (COCH <sub>3</sub> ) |
| OH (C14) | 3.02                      | -                                | -              | -                         |

**Table S8:** <sup>1</sup>H (600 MHz)- and <sup>13</sup>C (150 MHz) NMR-Data of M20 (CD<sub>3</sub>CN).

| Position | δ <sub>H</sub> [ppm] | δ <sub>H</sub> Multiplicity | <i>J</i> [Hz] | δ <sub>C</sub> [ppm]      |
|----------|----------------------|-----------------------------|---------------|---------------------------|
| 1        | n.d. <sup>a</sup>    | -                           | -             | n.d. <sup>a</sup>         |
| 2        | n.d. <sup>a</sup>    | -                           | -             | n.d. <sup>a</sup>         |
| 3        | 3.42                 | m                           | -             | 75.7 (CH) <sup>b</sup>    |
| 4        | -                    | -                           | -             | 40.6 (C)                  |
| 5        | -                    | -                           | -             | 133.7 (C)                 |
| 6        | 5.53                 | d                           | 3.3           | n.d. <sup>a</sup>         |
| 7        | 4.78                 | dd                          | 3.3, 13.0     | 75.8 (CH) <sup>b</sup>    |
| 8        | 2.05                 | m                           | -             | 37.2 (CH)                 |
| 9        | -                    | -                           | -             | 43.2 (C)                  |
| 10       | -                    | -                           | -             | 141.8 (C)                 |
| 11       | ┐ <sup>b</sup>       | ┐ <sup>b</sup>              | -             | 30.6 (CH <sub>2</sub> )   |
| 12       | ┐ <sup>b</sup>       | ┐ <sup>b</sup>              | -             | 39.8 (CH <sub>2</sub> )   |
| 13       | -                    | -                           | -             | 73.0 (C)                  |
| 14       | 5.84                 | ddd                         | 10.8, 17.4    | 146.1 (CH)                |
| 15       | 4.98                 | dd                          | 1.6, 10.7     | n.d. <sup>a</sup>         |
|          | 5.12                 | dd                          | 1.6, 17.4     |                           |
| 16       | 1.16                 | s                           | -             | 28.2 (CH <sub>3</sub> )   |
| 17       | 0.92                 | d                           | 7.1           | 11.6 (CH <sub>3</sub> )   |
| 18       | 0.95                 | s                           | -             | 22.8 (CH <sub>3</sub> )   |
| 19       | 0.91                 | s                           | -             | 24.4 (CH <sub>3</sub> )   |
| 20       | 1.04                 | s                           | -             | 28.8 (CH <sub>3</sub> )   |
| 21       | -                    | -                           | -             | 171.3 (CO)                |
| 22       | 1.98                 | s                           | -             | 21.5 (COCH <sub>3</sub> ) |
| 23       | -                    | -                           | -             | 171.7 (CO)                |
| 24       | 1.91                 | s                           | -             | 21.2 (COCH <sub>3</sub> ) |

<sup>a</sup> not detected, <sup>b</sup> interchangeable

**Table S9:** <sup>1</sup>H (600 MHz)- and <sup>13</sup>C (150 MHz) NMR-Data of M22 (CD<sub>3</sub>CN).

| Position           | δ <sub>H</sub> [ppm] | δ <sub>H</sub> Multiplicity | <i>J</i> [Hz] | δ <sub>C</sub> [ppm]      |
|--------------------|----------------------|-----------------------------|---------------|---------------------------|
| 1                  | n.d. <sup>a</sup>    | -                           | -             | n.d. <sup>a</sup>         |
| 2                  | n.d. <sup>a</sup>    | -                           | -             | n.d. <sup>a</sup>         |
| 3                  | -                    | -                           | -             | 215.0 (C)                 |
| 4                  | -                    | -                           | -             | 48.7 (C)                  |
| 5                  | -                    | -                           | -             | 132.7 (C)                 |
| 6                  | 5.58                 | d                           | 3.2           | 66.9 (CH)                 |
| 7                  | 4.85                 | dd                          | 3.2, 13.0     | 74.2 (CH)                 |
| 8                  | 2.01                 | m                           | -             | 38.4 (CH)                 |
| 9                  | -                    | -                           | -             | 44.6 (C)                  |
| 10                 | -                    | -                           | -             | 145.6 (C)                 |
| 11                 | 1.48                 | m                           | -             | 30.4 (CH <sub>2</sub> )   |
|                    | 1.48                 | m                           |               |                           |
|                    | 1.13                 | m                           |               |                           |
| 12                 | 1.48                 | m                           | -             | 40.4 (CH <sub>2</sub> )   |
|                    | -                    | -                           |               |                           |
| 13                 | -                    | -                           | -             | 73.6 (C)                  |
| 14                 | 5.85                 | dd                          | 10.8, 17.4    | 147.7 (CH)                |
| 15                 | 4.99                 | dd                          | 1.6, 10.7     | 112.0 (CH <sub>2</sub> )  |
|                    | 5.14                 | dd                          | 1.6, 17.4     |                           |
| 16                 | 1.16                 | s                           | -             | 29.3 (CH <sub>3</sub> )   |
| 17                 | 0.95                 | d                           | 7.0           | 11.5 (CH <sub>3</sub> )   |
| 18/19 <sup>b</sup> | 1.16                 | s                           | -             | 25.6 (CH <sub>3</sub> )   |
| 18/19 <sup>b</sup> | 1.04                 | s                           | -             | 24.6 (CH <sub>3</sub> )   |
| 20                 | 1.13                 | s                           | -             | 28.8 (CH <sub>3</sub> )   |
| 21                 | -                    | -                           | -             | 171.9 (CO)                |
| 22                 | 1.99                 | s                           | -             | 21.8 (COCH <sub>3</sub> ) |
| 23                 | -                    | -                           | -             | 171.0 (CO)                |
| 24                 | 1.93                 | s                           | -             | 21.3 (COCH <sub>3</sub> ) |

<sup>a</sup> not detected