Effects of Synthetic Acaricides and *Nosema ceranae* (Microsporidia: Nosematidae) on Molecules Associated with Chemical Communication and Recognition in Honey Bees

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Supplementary Material

**Table S1.** Suppl. Material: CHC from honeybees in Experiment I.

| Compound ID | Compound | Retention Time | Retention index | CTRL | CTRL+EtOH | INF | INF+EtOH |
|-------------|----------|----------------|-----------------|------|-----------|-----|----------|
| 1           | IS (tridecane) | IS | 8.934 | 1300 |           |     |          |
| 2           | NI       | NI | 12.138 | 1476 | 0.3 ± 0.1 | 0.2 ± 0.1 | 0.3 ± 0.1 | 0.3 ± 0.1 |
| 3           | NI       | NI | 12.96  | 1521 | 0.3 ± 0.1 | 0.3 ± 0 | 0.4 ± 0.2 | 0.2 ± 0.1 |
| 4           | NI       | NI | 15.994 | 1521 | 0.4 ± 0.1 | 0.3 ± 0 | 0.5 ± 0.2 | 0.4 ± 0.1 |
| 5           | n-nonadecane | alkane | 19.874 | 1900 | 3.9 ± 0.6 | 1.9 ± 0.3 | 1.9 ± 0.6 | 1.8 ± 0.5 |
| 6           | NI       | NI | 20.351 | 1937 | 0.1 ± 0 | 0.1 ± 0 | 0.1 ± 0 | 0.1 ± 0 |
| 7           | n-eicosane | alkane | 21.147 | 2000 | 0.1 ± 0 | 0.1 ± 0 | 0.1 ± 0 | 0.1 ± 0 |
| 8           | n-heneicosane | alkane | 23.572 | 2100 | 4.9 ± 0.7 | 4.1 ± 0.4 | 2.9 ± 0.7 | 3 ± 0.7 |
| 9           | n-docosane | alkane | 25.324 | 2200 | 0.6 ± 0.2 | 0.7 ± 0.2 | 0.5 ± 0.2 | 0.4 ± 0.1 |
| 10          | tricosadiene | alkadiene | 26.542 | 2272 | 0.2 ± 0.1 | 0.1 ± 0 | 0.2 ± 0.1 | 0.2 ± 0.1 |
| 11          | 9-tricosene | alkene | 26.589 | 2274 | 2.6 ± 0.8 | 5.1 ± 2.7 | 2.2 ± 0.5 | 2.4 ± 0.6 |
| 12          | 7-tricosene | alkene | 26.704 | 2281 | 0.3 ± 0.1 | 0.4 ± 0.1 | 0.3 ± 0.1 | 0.3 ± 0.1 |
| 13          | n-tricosane | alkane | 27.023 | 2300 | 17.2 ± 2.2 | 17.4 ± 2.2 | 16.8 ± 1.6 | 17 ± 2.8 |
| 14          | n-tetracosane | alkane | 28.643 | 2400 | 1.4 ± 0.5 | 1.1 ± 0.1 | 1.6 ± 0.6 | 1.3 ± 0.3 |

*CTRL* = control group; *CTRL+EtOH* = control group + ethanol; *INF* = *Nosema ceranae* infected group; *INF+EtOH* = *Nosema ceranae* infected group + ethanol.
|   | Compound Type  | Name            | MW | T | S     | F     | E     | PE    |
|---|----------------|-----------------|----|---|-------|-------|-------|-------|
| 15| pentacosadiene| alkadiene       |     | 0.7 ± 0.3 | 1.5 ± 0.4 | 1.3 ± 0.5 | 1 ± 0.2 | 1.1 ± 0.3 | 1.1 ± 0.3 |
| 16| 9-pentacosene  | alkene          |     | 4.1 ± 1.1 | 1.4 ± 0.2  | 1 ± 0.2  | 2.3 ± 0.6 | 2 ± 0.5  |
| 17| 7-pentacosene  | alkene          |     | 2.3 ± 0.7 | 0.4 ± 0.3  | 0.2 ± 0.1 | 0.2 ± 0.1 | 0.2 ± 0.1 | 0.2 ± 0.1 |
| 18| n-pentacosane  | alkane          |     | 19.3 ± 2.7| 1.3 ± 0.5  | 1 ± 0.2  | 1.1 ± 0.3 | 1.1 ± 0.3 | 1.1 ± 0.3 |
| 19| methylpentacosanes| branched alkane|     | 1.3 ± 0.5 | 1 ± 0.2 | 1.1 ± 0.3 | 1.1 ± 0.3 | 1.1 ± 0.3 | 1.1 ± 0.3 |
| 20| n-hexacosane   | alkane          |     | 15 ± 0.6  | 1.3 ± 0.2  | 1.9 ± 0.7 | 1.7 ± 0.5 | 1.5 ± 0.4 | 1.5 ± 0.4 |
| 21| heptacosadiene | alkadiene       |     | 2 ± 1     | 2.2 ± 0.4  | 2.6 ± 0.9 | 1.5 ± 0.4 | 1.5 ± 0.4 | 1.5 ± 0.4 |
| 22| 9-heptacosene  | alkene          |     | 1.7 ± 0.7 | 2.1 ± 0.3  | 1.6 ± 0.3 | 2.2 ± 0.6 | 2.2 ± 0.6 | 2.2 ± 0.6 |
| 23| 7-heptacosene  | alkene          |     | 1.1 ± 0.4 | 0.8 ± 0.1  | 1 ± 0.3  | 0.9 ± 0.2 | 0.9 ± 0.2 | 0.9 ± 0.2 |
| 24| n-heptacosane  | alkane          |     | 9.9 ± 1.7 | 9 ± 1.1    | 10.2 ± 1.5 | 10.4 ± 2.1 | 10.4 ± 2.1 | 10.4 ± 2.1 |
| 25| methylheptacosanes| branched alkane|     | 3.2 ± 1   | 2.4 ± 0.3  | 2.8 ± 0.5 | 2.8 ± 0.7 | 2.8 ± 0.7 | 2.8 ± 0.7 |
| 26| n-octacosane   | alkane          |     | 0.3 ± 0.1 | 0.2 ± 0 | 0.2 ± 0.1 | 0.2 ± 0.1 | 0.2 ± 0.1 | 0.2 ± 0.1 |
| 27| nonacosadiene  | alkadiene       |     | 3.6 ± 0.7 | 2.9 ± 0.5  | 3 ± 0.6  | 3.2 ± 0.9 | 3.2 ± 0.9 | 3.2 ± 0.9 |
| 28| 9-nonacosene   | alkene          |     | 3.4 ± 0.7 | 2.6 ± 0.4  | 3 ± 0.6  | 3.2 ± 0.8 | 3.2 ± 0.8 | 3.2 ± 0.8 |
| 29| 7-nonacosene   | alkene          |     | 4.6 ± 1.2 | 3.9 ± 0.7  | 4.5 ± 0.7 | 5.5 ± 1.4 | 5.5 ± 1.4 | 5.5 ± 1.4 |
| 30| n-nonacosane   | alkane          |     | 1 ± 0.4  | 0.6 ± 0.1  | 0.8 ± 0.1 | 0.8 ± 0.2 | 0.8 ± 0.2 | 0.8 ± 0.2 |
| 31| methylnonacosanes| branched alkane| | 0.2 ± 0.1 | 0.2 ± 0 | 0.2 ± 0.1 | 0.2 ± 0.1 | 0.2 ± 0.1 | 0.2 ± 0.1 |
| 32| n-triacontane  | alkane          |     | 3.6 ± 0.7 | 2.9 ± 0.5  | 3 ± 0.6  | 3.2 ± 0.9 | 3.2 ± 0.9 | 3.2 ± 0.9 |
| 33| hentriacontadiene | alkadiene   |     | 3.4 ± 0.7 | 2.6 ± 0.4  | 3 ± 0.6  | 3.2 ± 0.8 | 3.2 ± 0.8 | 3.2 ± 0.8 |
| 34| 9-hentriacontene| alkene         |     | 4.6 ± 1.2 | 3.9 ± 0.7  | 4.5 ± 0.7 | 5.5 ± 1.4 | 5.5 ± 1.4 | 5.5 ± 1.4 |
| 35| 7-hentriacontene| alkene         |     | 1 ± 0.4  | 0.6 ± 0.1  | 0.8 ± 0.1 | 0.8 ± 0.2 | 0.8 ± 0.2 | 0.8 ± 0.2 |
| 36| n-hentriacontene| alkane         |     | 0.6 ± 0.2 | 0.5 ± 0.1  | 0.7 ± 0.2 | 0.9 ± 0.3 | 0.9 ± 0.3 | 0.9 ± 0.3 |
### Table S2. Suppl. Material: CHC from honeybees in Experiment II.

| Compound ID | Compound Class | Retention Time | Retention index | AMI   | COUM | CTRL | FLUM | FLUV |
|-------------|---------------|----------------|-----------------|-------|------|------|------|------|
| 1           | IS (tridecane) | IS             | 8.934           | 1300  |      |      |      |      |
| 2           | NI            | Ni             | 12.138          | 1476  | 2.6 ± 0.3 | 2.9 ± 0.3 | 2.6 ± 0.4 | 3.2 ± 0.7 | 2.7 ± 0.4 |
| 3           | NI            | Ni             | 12.96           | 1521  | 1.1 ± 0.4 | 2 ± 0.5  | 1.9 ± 0.7 | 1.5 ± 0.5 | 1.4 ± 0.7 |
| 4           | NI            | Ni             | 15.994          | 1687  | 1.4 ± 0.3 | 1 ± 0.1  | 1.6 ± 0.4 | 1.1 ± 0.4 | 0.9 ± 0   |
| 5           | n-nonadecane  | alkane         | 19.874          | 1900  | 3.5 ± 0.7 | 2.6 ± 0.5 | 2.6 ± 0.4 | 3.1 ± 0.7 | 2.8 ± 0.5 |
| 6           | NI            | Ni             | 20.351          | 1937  | 1.5 ± 0.2 | 1.5 ± 0.3 | 1.5 ± 0.4 | 1.7 ± 0.3 | 1.3 ± 0.1 |
| 7           | n-eicosane    | alkane         | 21.147          | 2000  | 0.8 ± 0.2 | 0.9 ± 0.2 | 1 ± 0.2  | 0.7 ± 0.3 | 0.8 ± 0.2 |
| 8           | n-heneicosane | alkane         | 23.572          | 2100  | 4.6 ± 0.6 | 4.3 ± 0.5 | 3.7 ± 0.5 | 5.1 ± 1.6 | 4.1 ± 0.3 |
| 9           | n-docosane    | alkane         | 25.324          | 2200  | 0.5 ± 0.1 | 0.5 ± 0.1 | 0.6 ± 0.1 | 0.4 ± 0.1 | 0.4 ± 0.1 |
| 10          | tricosadiene  | alkadiene      | 26.542          | 2272  | 0.1 ± 0   | 0.1 ± 0.1 | 0.1 ± 0  | 0 ± 0     | 0 ± 0     |
| 11          | 9-tricosene   | alkene         | 26.589          | 2274  | 1.2 ± 0.1 | 1.4 ± 0.3 | 1.1 ± 0.1 | 1.1 ± 0.2 | 0.9 ± 0.1 |
| 12          | 7-tricosene   | alkene         | 26.704          | 2281  | 0.2 ± 0   | 0.3 ± 0.1 | 0.2 ± 0  | 0.2 ± 0.1 | 0.2 ± 0   |
| 13          | n-tricosane   | alkane         | 27.023          | 2300  | 12.9 ± 1.7 | 11.8 ± 1.2 | 12.9 ± 1.5 | 11.5 ± 1.8 | 9.6 ± 0.8 |
| 14          | n-tetracosane | alkane         | 28.643          | 2400  | 1.6 ± 0.3 | 1.5 ± 0.2 | 1.9 ± 0.4 | 1.4 ± 0.3 | 1.1 ± 0.1 |
| 15          | pentacosadiene| alkadiene      | 29.775          | 2472  | 0.2 ± 0   | 0.3 ± 0   | 0.2 ± 0.1 | 0.2 ± 0.1 | 0.2 ± 0   |
| 16          | 9-pentacosene | alkene         | 29.831          | 2475  | 2.1 ± 0.2 | 2.2 ± 0.3 | 1.7 ± 0.2 | 2.1 ± 0.4 | 1.7 ± 0.2 |
| 17          | 7-pentacosene | alkene         | 29.945          | 2482  | 0.8 ± 0.1 | 1.1 ± 0.4 | 0.8 ± 0.1 | 1 ± 0.2   | 0.8 ± 0.1 |
| 18          | n-pentacosane | alkane         | 30.223          | 2500  | 20 ± 3.2 | 17.1 ± 1.3 | 21.2 ± 4.9 | 15.8 ± 2.7 | 13.2 ± 0.7 |
| 19          | methylpentacosanes | branched alkane | 30.736          | 2534  | 0.6 ± 0.1 | 0.6 ± 0.1 | 0.7 ± 0.2 | 0.5 ± 0.1 | 0.4 ± 0   |
| 20          | n-hexacosane  | alkane         | 31.724          | 2600  | 2.8 ± 0.7 | 2.1 ± 0.3 | 3.5 ± 1.1 | 2 ± 0.5   | 1.4 ± 0.1 |
| 21          | heptacosadiene| alkadiene      | 32.643          | 2662  | 0.1 ± 0.1 | 0.1 ± 0   | 0.2 ± 0  | 0.1 ± 0   | 0.1 ± 0   |
| 22          | 9-heptacosene | alkene         | 32.844          | 2676  | 0.9 ± 0.2 | 0.9 ± 0.2 | 0.6 ± 0.1 | 0.6 ± 0.1 | 0.6 ± 0.1 |
| 23          | 7-heptacosene | alkene         | 32.955          | 2684  | 0.3 ± 0.1 | 0.6 ± 0.4 | 0.4 ± 0.1 | 0.3 ± 0.1 | 0.3 ± 0.1 |
|     | Compound                  | Class       | Retention index | CTRL (ug/bee, D) | INF (ug/bee, D+N) | CTRL+COUM (ug/bee, C) | INF+COUM (ug/bee, C+N) |
|-----|---------------------------|-------------|----------------|------------------|------------------|-----------------------|-----------------------|
| 24  | n-heptacosane             | alkane      | 33.195         | 2700             | 53.4 ± 12.4      | 38.2 ± 5.7            | 34.9 ± 6.4            | 30.4 ± 1.6            |
| 25  | methylheptacosanes        | branched alkane | 33.641        | 2732             | 2.3 ± 0.4        | 2 ± 0.4               | 1.9 ± 0.2             | 2.3 ± 0.6             | 1.7 ± 0.1             |
| 26  | n-octacosane              | alkane      | 34.586         | 2800             | 3.5 ± 1          | 2.2 ± 0.4             | 3.6 ± 1.3             | 1.9 ± 0.5             | 1.6 ± 0.1             |
| 27  | nonacosadiene             | alkadiene   | 35.444         | 2863             | 0.2 ± 0.1        | 0.1 ± 0               | 0.2 ± 0.1             | 0.1 ± 0               | 0 ± 0                 |
| 28  | 9-nonacosene              | alkene      | 35.652         | 2878             | 0.5 ± 0.1        | 0.6 ± 0.1             | 0.4 ± 0.1             | 0.3 ± 0.1             | 0.4 ± 0.2             |
| 29  | 7-nonacosene              | alkene      | 35.708         | 2882             | 0.5 ± 0.1        | 0.5 ± 0.2             | 0.4 ± 0.1             | 0.4 ± 0.1             | 0.4 ± 0.1             |
| 30  | n-nonacosane              | alkane      | 35.952         | 2900             | 48.8 ± 10.7      | 35.2 ± 5.8            | 48.4 ± 10.4           | 32.5 ± 5.2            | 30.4 ± 0.9            |
| 31  | methylnonacosanes         | branched alkane | 36.359        | 2931             | 1.5 ± 0.5        | 1.1 ± 0.3             | 1.3 ± 0.1             | 1.1 ± 0.3             | 0.9 ± 0.1             |
| 32  | n-triacontane             | alkane      | 37.259         | 3000             | 2.5 ± 0.6        | 1.6 ± 0.3             | 2.5 ± 0.8             | 1.5 ± 0.4             | 4.8 ± 3.7             |
| 33  | hentriacontadiene         | alkadiene   | 38.069         | 3064             | 0.3 ± 0.1        | 0.2 ± 0.1             | 0.1 ± 0               | 0.2 ± 0.1             | 0.1 ± 0               |
| 34  | 9-hentriacontene          | alkene      | 38.241         | 3077             | 3.3 ± 0.7        | 2.7 ± 0.9             | 2.6 ± 0.3             | 2.8 ± 0.8             | 2.8 ± 0.7             |
| 35  | 7-hentriacontene          | alkene      | 38.328         | 3084             | 4 ± 0.9          | 3.2 ± 0.7             | 3.6 ± 0.4             | 3.4 ± 0.8             | 3.8 ± 1               |
| 36  | n-hentriacontane          | alkane      | 38.533         | 3100             | 40.2 ± 7.3       | 28.3 ± 4              | 41.8 ± 7              | 29.5 ± 4.6            | 28.1 ± 2.6            |
| 37  | methylhentriacontane      | branched alkane | 38.901        | 3115             | 0.4 ± 0.1        | 0.3 ± 0.1             | 0.4 ± 0.2             | 0.4 ± 0.1             | 0.5 ± 0.2             |
| 38  | tritriacontadiene         | alkadiene   | 40.496         | 3179             | 1.7 ± 0.8        | 1.1 ± 0.4             | 0.9 ± 0.2             | 1.2 ± 0.3             | 1 ± 0.3               |
| 39  | X-triacontene             | alkene      | 40.738         | 3189             | 13.5 ± 3.5       | 9.5 ± 2               | 11.3 ± 1.7            | 12.5 ± 3.2            | 10 ± 2                |
| 40  | n-tritriacontane          | alkane      | 41.015         | 3300             | 5.6 ± 1.2        | 4.7 ± 1.6             | 5.6 ± 1.3             | 3.5 ± 0.7             | 3.9 ± 0.8             |

### Table S3. Suppl. Material: CHC from honeybees in Experiment III.

| Compound No | Compound ID | Compound Class | Retention Time | Retention index | CTRL (ug/bee, D) | INF (ug/bee, D+N) | CTRL+COUM (ug/bee, C) | INF+COUM (ug/bee, C+N) |
|-------------|-------------|----------------|----------------|-----------------|------------------|------------------|-----------------------|-----------------------|
| 1           | IS (tridecane) | IS            | 8.934          | 1300            |                  |                  |                       |                      |
| 2           | NI          | NI             | 12.138         | 1476            | 0.2 ± 0.1        | 0.3 ± 0.1        | 0.3 ± 0.1             | 0.3 ± 0.1             |
| 3           | NI          | NI             | 12.96          | 1521            | 0.3 ± 0          | 0.2 ± 0.1        | 0.3 ± 0.1             | 0.3 ± 0.1             |

| Class       | Retention index | CTRL (ug/bee, D) | INF (ug/bee, D+N) | CTRL+COUM (ug/bee, C) | INF+COUM (ug/bee, C+N) |
|-------------|-----------------|------------------|------------------|-----------------------|-----------------------|
| Alkanes     |                 |                  |                  |                       |                      |
| 200.7 ± 39.4 | 151 ± 20.8      |                  |                  |                       |                      |
| Alkadienes  | 2.5 ± 1         | 1.8 ± 0.6        | 1.7 ± 0.4        | 1.8 ± 0.4             | 1.4 ± 0.4             |
| Alkene      | 27.4 ± 5.5      | 23.1 ± 5.2       | 23 ± 3.1         | 24.8 ± 6             | 21.9 ± 4.3             |
| Branched alkanes | 4.8 ± 1    | 4.1 ± 0.9        | 4.1 ± 0.7        | 4.3 ± 1.1             | 3.5 ± 0.4             |
| NI          | 6.5 ± 0.8       | 7.4 ± 1          | 7.6 ± 1.4        | 7.5 ± 1.6             | 6.3 ± 1.2             |
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 | Ni | Ni | 15.994 | 1687 | 0.3 ± 0 | 0.4 ± 0.1 | 0.4 ± 0.1 | 0.3 ± 0.1 |
| 5 | n-nonadecane | alkane | 19.874 | 1900 | 1.9 ± 0.3 | 1.8 ± 0.5 | 2.3 ± 0.5 | 1.5 ± 0.4 |
| 6 | Ni | Ni | 20.351 | 1937 | 0.1 ± 0 | 0.1 ± 0 | 0.1 ± 0 | 0.1 ± 0 |
| 7 | n-eicosane | alkane | 21.147 | 2000 | 0.1 ± 0 | 0.1 ± 0 | 0.1 ± 0 | 0.1 ± 0 |
| 8 | n-heneicosane | alkane | 23.572 | 2100 | 4.1 ± 0.4 | 3 ± 0.7 | 4.7 ± 1 | 2.9 ± 0.8 |
| 9 | n-docosane | alkane | 25.324 | 2200 | 0.7 ± 0.2 | 0.4 ± 0.1 | 0.5 ± 0.1 | 0.5 ± 0.1 |
| 10 | tricosadiene | alkadiene | 26.542 | 2272 | 0.1 ± 0 | 0.2 ± 0.1 | 0.1 ± 0 | 0.3 ± 0.1 |
| 11 | 9-tricosene | alkene | 26.589 | 2274 | 5.1 ± 2.7 | 2.4 ± 0.6 | 2.4 ± 0.4 | 2.6 ± 0.9 |
| 12 | 7-tricosene | alkene | 26.704 | 2281 | 0.4 ± 0.1 | 0.3 ± 0.1 | 0.4 ± 0.1 | 0.3 ± 0.1 |
| 13 | n-tricosene | alkane | 27.023 | 2300 | 17.4 ± 2.2 | 17 ± 2.8 | 17.5 ± 2 | 16.1 ± 4 |
| 14 | n-tetracosane | alkane | 28.643 | 2400 | 1.1 ± 0.1 | 1.3 ± 0.3 | 1.3 ± 0.2 | 1.3 ± 0.3 |
| 15 | pentacosadiene | alkadiene | 29.775 | 2472 | 0.6 ± 0.2 | 0.8 ± 0.3 | 0.8 ± 0.2 | 0.9 ± 0.4 |
| 16 | 9-pentacosene | alkene | 29.831 | 2475 | 4.6 ± 0.7 | 4.6 ± 1 | 4.4 ± 0.5 | 4.4 ± 1.2 |
| 17 | 7-pentacosene | alkene | 29.945 | 2482 | 1.4 ± 0.2 | 2 ± 0.5 | 1.5 ± 0.2 | 2.1 ± 0.6 |
| 18 | n-pentacosane | alkane | 30.223 | 2500 | 21.3 ± 1.9 | 23.8 ± 2.9 | 21.7 ± 2.5 | 21.1 ± 4.4 |
| 19 | methylpentacosanes | branched alkane | 30.736 | 2534 | 1 ± 0.2 | 1.1 ± 0.3 | 1.2 ± 0.3 | 1.1 ± 0.4 |
| 20 | n-hexacosane | alkane | 31.724 | 2600 | 1.3 ± 0.2 | 1.7 ± 0.5 | 1.5 ± 0.3 | 1.5 ± 0.4 |
| 21 | heptacosadiene | alkadiene | 32.643 | 2662 | 0.2 ± 0 | 0.1 ± 0 | 0.2 ± 0 | 0.2 ± 0 |
| 22 | 9-heptacosene | alkene | 32.844 | 2676 | 2.9 ± 0.5 | 3.2 ± 0.8 | 3.1 ± 0.6 | 2.8 ± 0.8 |
| 23 | 7-heptacosene | alkene | 32.955 | 2684 | 0.8 ± 0.1 | 1.1 ± 0.3 | 1 ± 0.2 | 0.9 ± 0.3 |
| 24 | n-heptacosane | alkane | 33.195 | 2700 | 22.9 ± 1.9 | 24.8 ± 3.6 | 22.4 ± 2.4 | 21.8 ± 4.6 |
| 25 | methylheptacosanes | branched alkane | 33.641 | 2732 | 4.3 ± 0.6 | 5 ± 1.2 | 5.2 ± 0.9 | 4.6 ± 1.4 |
| 26 | n-octacosane | alkane | 34.586 | 2800 | 0.6 ± 0.1 | 0.7 ± 0.2 | 0.8 ± 0.1 | 0.7 ± 0.2 |
| 27 | nonacosadiene | alkadiene | 35.444 | 2863 | 2.2 ± 0.4 | 1.5 ± 0.4 | 1.4 ± 0.3 | 1.6 ± 0.7 |
| 28 | 9-nonacosene | alkene | 35.652 | 2878 | 2.1 ± 0.3 | 2.2 ± 0.6 | 1.8 ± 0.3 | 2.1 ± 0.7 |
| 29 | 7-nonacosene | alkene | 35.708 | 2882 | 0.8 ± 0.1 | 0.9 ± 0.2 | 0.9 ± 0.1 | 0.7 ± 0.2 |
| 30 | n-nonacosane | alkane | 35.952 | 2900 | 9 ± 1.1 | 10.4 ± 2.1 | 9.9 ± 1 | 8.9 ± 2.4 |
| 31 | methylnonacosanes | branched alkane | 36.359 | 2931 | 2.4 ± 0.3 | 2.8 ± 0.7 | 2.8 ± 0.5 | 2.6 ± 0.8 |
|   | Name                  | Type     | Molecular Weight | m/z       | 1 nmol  | 5 nmol  | 10 nmol | 50 nmol |
|---|----------------------|----------|------------------|-----------|--------|--------|--------|--------|
| 32| n-triacontane alkane|          | 37.259           | 3000      | 0.2 ± 0| 0.2 ± 0| 0.2 ± 0| 0.2 ± 0|
| 33| hentriacontadiene   | alkadiene| 38.069           | 3064      | 0.2 ± 0| 0.2 ± 0| 0.2 ± 0| 0.5 ± 0.3|
| 34| 9-hentriacontene alkene|         | 38.241           | 3077      | 2.9 ± 0.5| 3.2 ± 0.9| 3.1 ± 0.5| 2.7 ± 0.8|
| 35| 7-hentriacontene alkene|         | 38.328           | 3084      | 2.6 ± 0.4| 3.2 ± 0.8| 2.8 ± 0.3| 2.7 ± 0.7|
| 36| n-hentriacontane alkane|          | 38.533           | 3100      | 3.9 ± 0.7| 5.5 ± 1.4| 4 ± 0.6| 3.6 ± 1.4|
| 37| methylhentriacontane branched alkane| | 38.901           | 3115      | 0.6 ± 0.1| 0.8 ± 0.2| 0.7 ± 0.1| 0.7 ± 0.2|
| 38| tritriacontadiene alkadiene|       | 40.496           | 3179      | 0.5 ± 0.1| 0.9 ± 0.3| 0.5 ± 0.1| 1.3 ± 0.6|
| 39| X-triacontene alkene|          | 40.738           | 3189      | 5.5 ± 0.8| 7.1 ± 1.7| 5.6 ± 0.5| 5.2 ± 2.1|
| 40| n-tritriacontane alkane|          | 41.015           | 3300      | 0.3 ± 0.1| 0.5 ± 0.1| 0.3 ± 0| 0.3 ± 0.1|

|          |          |          |          |          |          |          |          |          |
| Alkanes  |          |          |          |          |          |          |          |          |
|          | 6.1 ± 2  | 9.7 ± 2.4| 9.8 ± 1.7| 8.9 ± 2.8|
| Alkadienes |          |          |          |          |          |          |          |          |
|          | 21.9 ± 6.1| 30.2 ± 7.1| 26.8 ± 2.6| 26.5 ± 8.1|
| Alkene   | 0.7 ± 0.2| 0.9 ± 0.1| 1 ± 0.2  | 1 ± 0.1  |
| Branched alkanes |          |          |          |          |          |          |          |          |
| Ni       |          |          |          |          |          |          |          |          |
|          | 0.7 ± 0.2| 0.9 ± 0.1| 1 ± 0.2  | 1 ± 0.1  |
Figure S1. CHC profiles principal component analyses (PCA) run on scaled and centered data for experiment I (A), experiment II (B) and experiment III (C).