**Supplemental Table 1. Validation results of simultaneous analysis of plasma free fatty acids by gas chromatography.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Compound****(Free fatty acids)** | **Cal. Range nmol/ml** | **Correlation coefficient R** | **Accuracy %** |  | **Precision %RSD, n=6** |
| **LLOQ** | **Low** | **Med** | **High** |  | **LLOQ** | **Low** | **Med** | **High** |
| Lauric (C12:0)1 | 20-2000 | 0.9999 | 95.0 | 102.2 | 99.1 | 100.9 |  | 1.1 | 0.9 | 0.5 | 0.7 |
| Myristic (C14:0)1 | 20-2000 | 0.9999 | 96.0 | 104.3 | 100.2 | 100.9 |  | 1.6 | 1.2 | 0.6 | 0.9 |
| Palmitic (C16:0)2 | 10-1200 | 0.9999 | 99.7 | 106.7 | 102.1 | 101.0 |  | 1.5 | 1.3 | 0.6 | 0.8 |
| Palmitoleic (C16:1)2 | 10-1200 | 0.9999 | 99.8 | 106.8 | 102.2 | 101.2 |  | 1.1 | 1.9 | 0.7 | 0.8 |
| Stearic (C18:0)2 | 10-1200 | 0.9999 | 100.0 | 109.2 | 103.3 | 100.7 |  | 0.8 | 1.2 | 0.4 | 0.7 |
| Oleic (C18:1)2 | 10-1200 | 0.9993 | 101.5 | 110.6 | 113.7 | 104.2 |  | 1.5 | 1.2 | 0.3 | 2.7 |
| Linoleic (C18:2)2 | 10-1200 | 0.9999 | 95.0 | 109.3 | 103.2 | 100.8 |  | 1.6 | 1.9 | 0.5 | 0.8 |
| Arachidonic (C20:4)2 | 10-1200 | 0.9999 | 100.2 | 106.5 | 102.5 | 100.4 |  | 2.1 | 2.5 | 0.6 | 0.7 |

Abbreviations: LLOQ, lower limit of quantification. Standard samples with a minimum of 4 different concentrations (LLOQ and low-, mid-, and high-levels) within the calibration range were prepared.

120 nmol/ml for LLOQ, 200 nmol/ml for Low, 1000 nmol/ml for Med, 2000 nmol/ml for High

210 nmol/ml for LLOQ, 150 nmol/ml for Low, 600 nmol/ml for Med, 1200 nmol/ml for High

**Supplemental Table 2. Validation results of simultaneous analysis of metabolites by liquid chromatography-mass spectrometry.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Compound****(Acylcarnitines)** | **Cal. Range nmol/ml** | **Correlation coefficient** **R** | **Accuracy %** |  | **Precision %RSD, n=6** |
| **LLOQ** | **Low** | **Med** | **High** |  | **LLOQ** | **Low** | **Med** | **High** |
| C21 | 1.0 - 1000 | 0.9905 | 93.6 | 104.5 | 95.1 | 104.2 |  | 4.3 | 2.1 | 4.9 | 2.6 |
| C32 | 0.24 – 240 | 0.9977 | 109.2 | 102.7 | 99.6 | 110.0 |  | 5.1 | 5.3 | 0.5 | 1.8 |
| C43 | 0.10 – 100 | 0.9991 | 98.4 | 98.2 | 104.5 | 103.5 |  | 1.5 | 6.8 | 2.1 | 1.4 |
| C54 | 0.06 – 60 | 0.9999 | 99.0 | 95.5 | 102.8 | 104.0 |  | 3.8 | 0.8 | 2.2 | 1.8 |
| C65 | 0.05 – 50 | 0.9999 | 91.5 | 108.5 | 101.5 | 101.0 |  | 3.0 | 3.3 | 1.5 | 2.1 |
| C86 | 0.05 – 50 | 0.9993 | 97.7 | 91.6 | 106.7 | 102.0 |  | 9.1 | 7.1 | 0.6 | 1.7 |
| C107 | 0.05 – 50 | 0.9999 | 91.5 | 94.7 | 106.6 | 96.8 |  | 3.0 | 6.2 | 0.7 | 1.5 |
| C128 | 0.05 – 50 | 0.9999 | 97.7 | 94.6 | 101.1 | 97.4 |  | 9.1 | 8.8 | 1.0 | 1.9 |

Abbreviations: LLOQ, lower limit of quantification. Standard samples with a minimum of 4 different concentrations (LLOQ and low-, mid-, and high-levels) within the calibration range were prepared.

11.0 nmol/ml for LLOQ, 3.3 nmol/ml for Low, 33.3 nmol/ml for Med, 1000 nmol/ml for High

20.24 nmol/ml for LLOQ, 0.8 nmol/ml for Low, 8.0 nmol/ml for Med, 240 nmol/ml for High

30.1 nmol/ml for LLOQ, 0.33 nmol/ml for Low, 3.33 nmol/ml for Med, 100 nmol/ml for High

40.06 nmol/ml for LLOQ, 0.2 nmol/ml for Low, 2.0 nmol/ml for Med, 60 nmol/ml for High

50.05 nmol/ml for LLOQ, 0.167 nmol/ml for Low, 1.67 nmol/ml for Med, 50 nmol/ml for High

60.05 nmol/ml for LLOQ, 0.167 nmol/ml for Low, 1.67 nmol/ml for Med, 50 nmol/ml for High

70.05 nmol/ml for LLOQ, 0.167 nmol/ml for Low, 1.67 nmol/ml for Med, 50 nmol/ml for High

80.05 nmol/ml for LLOQ, 0.167 nmol/ml for Low, 1.67 nmol/ml for Med, 50 nmol/ml for High

**Supplemental Table 3. Characteristics of subjects (n=11)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **PA trial** | **SEM** | **OA trial** | **SEM** | **P-value** |
| Age (years) | 22.3 | 0.3 |  |  |  |
| Height (cm) | 172.5 | 1.9 |  |  |  |
| Weight (kg) | 67.2 | 2.0 | 67.0 | 1.9 | 0.326 |
| BMI (kg/m2) | 22.6 | 0.6 | 22.5 | 0.6 | 0.351 |
| Body fat (%) | 14.9 | 1.6 | 15.2 | 1.4 | 0.352 |
| Body water (%) | 39.2 | 0.9 | 38.8 | 0.9 | 0.272 |
| Physical activity (counts/min) | 120.6 | 15.8 | 115.4 | 9.0 | 0.544 |

Abbreviations: PA trial, the session with meals rich in palmitic acid trial; OA trial, the session with meals rich in oleic acid trial. Parameters are indicated as follows: BMI, body mass index. Weight, BMI, and % body fat were measured before indirect calorimetry in each trial. Physical activity was measured from days 1 to 7 of the intervention period. Statistical analyses were performed by the paired *t*-test.