**Supporting Information**

Table S1. Descriptive data of Calibration, LOD and LOQ of SCFAs obtained by GC-FID.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Concentration  (μg/mL) | Analyte area/IS area | | | |
| **Acetic acid** | **Propionic acid** | **Butyric acid** | **Valeric acid** |
| 0.1 | 0.336 | 0.155 | 0.110 | 0.108 |
| 0.5 | 0.345 | 0.192 | 0.123 | 0.142 |
| 1 | 0.356 | 0.229 | 0.144 | 0.164 |
| 5 | 0.384 | 0.355 | 0.271 | 0.319 |
| 10 | 0.413 | 0.412 | 0.451 | 0.493 |
| 25 | 0.568 | 0.776 | 0.947 | 0.990 |
| 50 | 0.774 | 1.393 | 1.731 | 1.833 |
| 100 | 1.218 | 2.598 | 3.455 | 3.428 |
| Standard Error | 0.008 | 0.027 | 0.019 | 0.028 |
| Calibration Slop | 0.0088 | 0.0241 | 0.0333 | 0.0331 |
| LOD | **3.00** | **3.70** | **1.88** | **2.79** |
| LOQ | **9.09** | **11.20** | **5.71** | **8.46** |

Figure S1. Calibration curves of SCFAs

Table S2. Descriptive data of recovery experiment

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample**  **no.** | **Conc.**  **(ug/mL)** | **Propionic acid** | | | | **Butyric acid** | | | | **Valeric acid** | | | | |
| **Conc.**  **(ug/mL)** | **% Recovery** | **Average  % recovery** | **RSD**  **(%)** | **Conc.**  **(ug/mL)** | **% Recovery** | **Average  % recovery** | **RSD**  **(%)** | **Conc.**  **(ug/mL)** | **% Recovery** | **Average  % recovery** | **RSD (%)** |
| 1 | 5 | 5.02 | 100.40 | 103.52 | 1.95 | 5.26 | 105.16 | 104.72 | 1.33 | 5.01 | 100.36 | 98.47 | 3.18 |
| 2 | 5.12 | 102.40 | 5.35 | 107.10 | 4.69 | 93.82 |
| 3 | 5.31 | 106.20 | 5.15 | 102.90 | 4.78 | 95.64 |
| 4 | 5.25 | 105.00 | 5.24 | 104.84 | 5.07 | 101.45 |
| 5 | 5.18 | 103.60 | 5.18 | 103.55 | 5.05 | 101.09 |
| 6 | 25 | 24.57 | 98.28 | 102.75 | 4.08 | 23.55 | 94.20 | 96.51 | 1.75 | 27.03 | 108.13 | 108.83 | 3.14 |
| 7 | 25.75 | 103.00 | 23.95 | 95.80 | 28.80 | 115.21 |
| 8 | 27.60 | 110.40 | 24.68 | 98.72 | 27.24 | 108.98 |
| 9 | 25.58 | 102.32 | 24.55 | 98.20 | 26.56 | 106.23 |
| 10 | 24.94 | 99.76 | 23.91 | 95.64 | 26.40 | 105.60 |
| 11 | 50 | 52.76 | 105.52 | 108.50 | 3.36 | 54.05 | 108.10 | 108.38 | 2.33 | 48.93 | 97.86 | 99.86 | 3.76 |
| 12 | 54.95 | 109.90 | 56.62 | 113.24 | 49.59 | 99.18 |
| 13 | 52.26 | 104.52 | 53.79 | 107.58 | 48.45 | 96.90 |
| 14 | 57.38 | 114.76 | 53.05 | 106.10 | 49.07 | 98.14 |
| 15 | 53.89 | 107.78 | 53.44 | 106.88 | 53.62 | 107.24 |