**Supplementary material**

**Table S1:** Samples description and Code, NCBI Biosample\_acession (RPJNA573727), raw and sequences quality filters applied by Trimmomatic (0.36) software.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Code** | **NCBI****Biosample** | **Sequences** | **Sequences after merge\*** | **Quality-filtering\*\*** |
| Control period x reactor A | **EA1** | SAMN12649425 | 42429 | 41545 | 38545 |
| Control period x reactor A | **EA2** | SAMN12649426 | 38898 | 35627 | 33245 |
| Control period x reactor B | **EB1** | SAMN12649427 | 42494 | 38256 | 35573 |
| Control period x reactor B | **EB2** | SAMN12649428 | 39353 | 36600 | 34091 |
| Control period x reactor C | **EC1** | SAMN12649429 | 45931 | 41728 | 38870 |
| Control period x reactor C | **EC2** | SAMN12649430 | 37744 | 32527 | 30231 |
| Dietary supplement x reactor A | **BA1** | SAMN12649431 | 40800 | 38587 | 35912 |
| Dietary supplement x reactor A | **BA2** | SAMN12649432 | 34441 | 36617 | 33873 |
| Dietary supplement x reactor B | **BB1** | SAMN12649433 | 36822 | 45011 | 41462 |
| Dietary supplement x reactor B | **BB2** | SAMN12649440 | 37271 | 38405 | 35790 |
| Dietary supplement x reactor C | **BC1** | SAMN12649441 | 33107 | 37014 | 34206 |
| Dietary supplement x reactor C | **BC2** | SAMN12649442 | 37286 | 37397 | 34952 |
| Washout period x reactor A | **WA1** | SAMN12649449 | 39217 | 40024 | 37389 |
| Washout period x reactor A | **WA2** | SAMN12649461 | 38047 | 38906 | 36400 |
| Washout period x reactor B | **WB1** | SAMN12649462 | 39617 | 33914 | 31811 |
| Washout period x reactor B | **WB2** | SAMN12649463 | 47974 | 47139 | 44198 |
| Washout period x reactor C | **WC1** | SAMN12649464 | 38949 | 38268 | 35381 |
| Washout period x reactor C | **WC2** | SAMN12649465 | 33981 | 33309 | 30976 |
| Synbiotic ice cream x reactor A | **SA1** | SAMN12649466 | 34071 | 33385 | 29465 |
| Synbiotic ice cream x reactor A | **SA2** | SAMN12649467 | 37446 | 36600 | 32243 |
| Synbiotic ice cream x reactor B | **SB1** | SAMN12649468 | 26068 | 25544 | 22690 |
| Synbiotic ice cream x reactor B | **SB2** | SAMN12649469 | 35585 | 34559 | 31494 |
| Synbiotic ice cream x reactor C | **SC1** | SAMN12649470 | 39032 | 38036 | 32799 |
| Synbiotic ice cream x reactor C | **SC2** | SAMN12649471 | 35154 | 34394 | 30524 |

**Table S2**. Relative abundance of bacterial order inferred from 16S rRNA gene sequencing analysis.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Order** | **Control** | **D. Supplement** | **Washout** | **Ice Cream** |
| Bacteroidales | 26.30 + 3.57 aA | 27.28 + 5.12 aA | 26.62 + 0.99 aA | 20.04 +0.59 aA |
| Bifidobacteriales | 16.73 + 1.31 bA | 12.45 + 3.37 abA | 15,66 + 4.15 bA | 10.65 +0.68 bA |
| Coriobacteriales | 7.69 + 1.12 cB | 6.82 + 2.15 bcB | 9.77 + 1.02 bcB | 16.04 +2.65 aA |
| Clostridiales | 26.57 + 8.57 aA | 23.09 +10.20 aA | 28.11 + 5.28 aA | 17.38 +0.91 aA |
| Selenomonadales | 7.64 + 1.08 cB | 8.50 + 1.81 bcB | 6.88 + 0.71 cdB | 12.49 +0.45 bA |
| Unassigned;Other | 3.93 + 0.37 cB | 4.10 + 0.55 bcB | 4.11 + 0.30 cdeB | 5.91 + 0.25 cdA |
| Burkholderiales | 2.35 + 0.25 cB | 1.78 + 0.67 bcB | 2.37 + 0.59 deB | 5.38 + 0.66 cdA |
| Enterobacteriales |  2.64 + 0.91 cAB | 5.76 + 0.71 bcA | 2.24 + 1.27 deB | 3.15 + 1.20 deAB |
| Lactobacillales | 2.86 + 0.15 cB |  7.02 + 2.61 bcAB | 2.89 + 1.40 deB | 9.03 + 1.66 bcA |
| Rhizobiales | 0.53 + 0.11 cA | 0.45 + 0.07 cA | 0.29 + 0.02 deB | 0.22 + 0.03 eB |
| Caulobacterales | 0.41 + 0.04 cB | 0.71 + 0.16 cA | 0.12 + 0.01 eC | 0.13 + 0.10 eC |
| Sphingomonadales | 0.61 + 0.03 cA | 0.60 + 0.08 cA | 0.18 + 0.03 deB | 0.14 + 0.11 eB |
| Pseudomonadales | 0.33 + 0.19 cA | 0.63 + 0.09 cA | 0.18 + 0.03 deB | 0.39 + 0.09 eB |
| Xanthomonadales | 0.76 + 0.14 cA | 0.37 + 0.06 cB | 0.25 + 0.02 deB | 0.57 + 0.05 eA |
| Flavobacteriales | 0.09 + 0.05 cA | 0.00 + 0.00 cA | 0.00 + 0.00 eA | 0.06 + 0.05 eA |
| Erysipelotrichales | 0.12 + 0.06 cA |  0.05 + 0.02 cAB | 0.06 + 0.02 eAB | 0.01 + 0.01 eB |

\*Means followed by the same lower case letters in a column and capital letters on the lines do not differ significantly by the Tukey test (p < 0.05).