

Effects of food matrix on the prebiotic efficacy of inulin-type fructans: a randomised trial

Article

Supplemental Material

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Supplemental Data Table 1: Mean bacterial FLOW-FISH populations across the four interventions at Day 0 and Day 10

| Probe | Intervention Group | | | | | | | | | | | | P (b) |
|---------------------|---------------------|-------------|----------------|--------------------|-------------|----------------|------------------------|-------------|----------------|--------------------|-------------|----------------|--------------|
| | Pure inulin (n =24) | | | Shortbread (n =24) | | | Milk Chocolate (n =24) | | | Rice Drink (n =24) | | | |
| | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | |
| Eub I-II-III | 9.79 (.004) | 9.83 (0.04) | 0.002 | 9.78 (0.05) | 9.82 (0.05) | 0.01 | 9.62 (0.06) | 9.69 (0.06) | ≤ 0.001 | 9.73 (0.04) | 9.82 (0.04) | 0.00 | 0.315 |
| Bif164 | 8.49 (0.13) | 9.12 (0.11) | ≤ 0.001 | 8.37 (0.11) | 8.96 (0.11) | ≤ 0.001 | 8.24 (0.13) | 8.89 (0.12) | ≤ 0.001 | 8.34 (0.12) | 9.05 (0.07) | ≤ 0.001 | 0.641 |
| Bac303 | 8.07 (0.09) | 8.17 (0.10) | 0.243 | 8.06 (0.03) | 8.31 (0.04) | 0.001 | 8.09 (0.06) | 8.13 (0.08) | 0.57 | 8.13 (0.05) | 8.16 (0.09) | 0.64 | 0.201 |
| Erec482 | 9.20 (0.07) | 9.13 (0.08) | 0.582 | 9.18 (0.09) | 9.27 (0.07) | 0.25 | 9.11 (0.08) | 9.2 (0.07) | 0.35 | 9.18 (0.08) | 9.23 (0.08) | 0.53 | 0.291 |
| Rrec584 | 8.32 (0.08) | 8.33 (0.10) | 0.923 | 8.39 (0.07) | 8.61 (0.07) | 0.005 | 8.18 (0.12) | 8.16 (0.12) | 0.82 | 8.29 (0.10) | 8.4 (0.09) | 0.17 | 0.022 |
| Pro853 | 8.25 (0.08) | 8.32 (0.07) | 0.50 | 8.38 (0.09) | 8.39 (0.09) | 0.94 | 8.18 (0.13) | 8.11 (0.11) | 0.50 | 8.26 (0.11) | 8.36 (0.12) | 0.32 | 0.272 |
| Fprau655 | 8.6 (0.10) | 8.69 (0.10) | 0.58 | 8.73 (0.07) | 8.93 (0.07) | 0.004 | 8.62 (0.10) | 8.62 (0.10) | 0.35 | 8.77 (0.08) | 8.94 (0.08) | 0.012 | 0.029 |

FLOW-FISH results for probes total bacteria (Eub338 I-II-III), *Bifidobacterium* spp. (Bif164), most *Bacteroidaceae* and *Prevotellaceae* (Bac303), *Clostridium coccoides-Eubacterium rectale* group (Erec452), *Roseburia* (Rrec584), Clostridial cluster IX (Prop853) and *Faecalibacterium prausnitzii* (Fprau655). Reported as log₁₀ Cells/gram wet faeces. Mean and standard error (SE). (a) P values are as a result of planned Day 0 vs Day 10 comparisons (grey columns). (b) P values are as a result of Day 10 group comparisons utilising Day 0 values as a baseline covariate (orange column)

Supplemental Data Table 2: Relative microbiome profiling (RMP) abundances recorded across all four interventions at Day 0 and Day 10

| Phylum | Intervention | | | | | | | | | | | | P (b) |
|--|---------------------|------------------|-------------------|--------------------|-----------------|-------------------|------------------------|-----------------|-------------------|--------------------|-----------------|-------------------|-------|
| | Pure inulin (n =24) | | | Shortbread (n =24) | | | Milk Chocolate (n =24) | | | Rice Drink (n =24) | | | |
| | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | |
| <i>Actinomycetota</i> (<i>Actinobacteria</i>) | 23.13 (2.84) | 34.55 (4.05) | ≤ 0.001 | 17.57 (2.63) | 27.72 (3.84) | ≤ 0.001 | 18.51 (2.37) | 29.47 (3.39) | ≤ 0.001 | 16.16 (1.71) | 28.92 (3.37) | ≤ 0.001 | 0.82 |
| <i>Bacteroidota</i> (<i>Bacteroidetes</i>) | 3.07 (0.97) | 4.80 (1.57) | 0.96 | 1.97 (0.70) | 2.80 (0.76) | 0.42 | 2.53 (0.56) | 3.29 (0.98) | 0.46 | 1.97 (0.37) | 2.47 (0.62) | 0.34 | 0.62 |
| <i>Pseudomonadota</i> (<i>Proteobacteria</i>) | 2.88 (1.42) | 6.56 (3.48) | 0.16 | 1.32 (0.48) | 1.09 (0.36) | 0.93 | 1.53 (0.74) | 3.21 (1.74) | 0.52 | 4.43 (1.94) | 5.50 (2.78) | 0.68 | 0.45 |
| <i>Verrucomicrobiota</i> (<i>Verrucomicrobia</i>) | 2.69 (1.19) | 2.79 (0.90) | ≤ 0.001 | 1.35 (0.53) | 1.06 (0.31) | 0.83 | 4.38 (1.27) | 5.06 (1.99) | 0.63 | 3.45 (1.31) | 7.23 (3.26) | 0.01 | 0.09 |
| <i>Euryarchaeota</i> | 0.89 (0.33) | 0.90 (0.43) | 0.97 | 1.63 (0.61) | 0.84 (0.40) | 0.02 | 1.05 (0.51) | 0.32 (0.17) | 0.03 | 1.30 (0.51) | 1.37 (0.57) | 0.83 | 0.09 |
| <i>Cyanobacteria</i> | 0.01 (0.01) | 0.001 (0.001) | 0.61 | 0.03 (0.01) | 0.02 (0.02) | 0.84 | 0.04 (0.04) | 0.02 (0.02) | 0.38 | 0.02 (0.01) | 0.05 (0.04) | 0.37 | 0.54 |
| <i>Mycoplasmata</i> (<i>Tenericutes</i>) | 0.25 (0.08) | 0.24 (0.12) | 0.99 | 1.08 (0.76) | 1.26 (1.06) | 0.60 | 1.05 (0.62) | 0.09 (0.05) | 0.01 | 0.44 (0.16) | 0.38 (0.15) | 0.86 | 0.11 |
| <i>Bacillota</i> (<i>Firmicutes</i>) | 67.09 (3.19) | 50.20 (3.55) | ≤ 0.001 | 72.97 (3.16) | 59.05 (4.70) | ≤ 0.001 | 73.94 (2.14) | 62.55 (3.26) | 0.002 | 71.30 (3.26) | 56.26 (4.03) | ≤ 0.001 | 0.40 |

Relative Microbiome Profiling 16S rRNA (phylum level) from samples collected at Day 0 and Day 10 of the intervention phase. Mean and standard error (SE). (a) P values are as a result of planned Day 0 vs Day 10 comparisons (grey columns). (b) P values are as a result of Day 10 group comparisons using Day 0 values as a baseline covariate (orange column)

| Genus | Intervention | | | | | | | | | | | | P (b) |
|---|---------------------|-----------------|-------------------|--------------------|-----------------|-------------------|------------------------|-----------------|-------------------|--------------------|-----------------|-------------------|-------|
| | Pure inulin (n =24) | | | Shortbread (n =24) | | | Milk Chocolate (n =24) | | | Rice Drink (n =24) | | | |
| | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | |
| <i>Bifidobacterium</i> | 17.96 (3.04) | 31.45 (3.97) | ≤ 0.001 | 12.96 (2.53) | 24.7 (3.90) | ≤ 0.001 | 13.00 (2.24) | 25.43 (3.52) | ≤ 0.001 | 12.19 (1.79) | 25.22 (3.21) | ≤ 0.001 | 0.92 |
| <i>Bacteroides</i> | 1.59 (0.57) | 3.62 (1.34) | 0.18 | 1.20 (0.55) | 1.78 (0.55) | 0.44 | 1.48 (0.39) | 1.97 (0.71) | 0.52 | 1.06 (0.20) | 1.37 (0.40) | 0.69 | 0.28 |
| <i>Prevotella</i> | 0.16 (0.06) | 0.22 (0.08) | 0.70 | 0.26 (0.09) | 0.25 (0.07) | 0.96 | 0.41 (0.12) | 0.73 (0.34) | 0.04 | 0.32 (0.09) | 0.45 (0.16) | 0.40 | 0.64 |
| <i>Alistipes</i> | 1.12 (0.73) | 0.48 (0.16) | 0.10 | 0.43 (0.18) | 0.42 (0.14) | 0.97 | 0.49 (0.12) | 0.55 (0.15) | 0.87 | 0.4 (0.08) | 0.37 (0.10) | 0.95 | 0.82 |
| <i>Roseburia</i> | 2.96 (0.80) | 2.10 (0.41) | 0.29 | 2.61 (0.63) | 3.94 (0.92) | 0.10 | 2.80 (0.63) | 2.57 (0.42) | 0.77 | 2.48 (0.44) | 3.91 (1.32) | 0.08 | 0.64 |
| <i>Clostridium cluster IVXA + IVXB</i> | 0.77 (0.11) | 0.44 (0.07) | 0.04 | 0.76 (0.08) | 0.65 (0.09) | 0.46 | 1.07 (0.29) | 0.54 (0.12) | 0.001 | 0.85 (0.12) | 0.52 (0.09) | 0.04 | 0.31 |
| <i>Faecalibacterium prausnitziciand relatives</i> | 3.74 (1.10) | 3.73 (1.20) | 0.99 | 2.27 (0.74) | 4.11 (1.30) | 0.14 | 7.76 (2.44) | 6.67 (1.89) | 0.38 | 2.62 (0.76) | 3.72 (1.31) | 0.38 | 0.37 |
| <i>Ruminococcaceae (excluding Fprau)</i> | 12.04 (1.66) | 8.59 (1.27) | 0.02 | 14.02 (1.88) | 10.73 (1.55) | 0.03 | 13.89 (1.12) | 11.21 (0.94) | 0.08 | 18.01 (2.37) | 11.86 (1.45) | ≤ 0.001 | 0.21 |
| <i>Ruminococcus 2</i> | 2.06 (0.40) | 1.86 (0.52) | 0.66 | 2.83 (0.61) | 2.41 (0.63) | 0.35 | 3.20 (0.39) | 2.19 (0.42) | 0.03 | 2.68 (0.32) | 1.90 (0.27) | 0.09 | 0.41 |
| <i>Coprococcus</i> | 1.45 (0.29) | 1.02 (0.20) | 0.15 | 1.51 (0.22) | 1.30 (0.25) | 0.49 | 1.29 (0.19) | 1.15 (0.18) | 0.65 | 1.99 (0.35) | 1.67 (0.27) | 0.28 | 0.42 |
| <i>Blautia</i> | 16.33 (2.03) | 9.36 (1.73) | ≤ 0.001 | 17.54 (1.82) | 10.92 (1.57) | 0.001 | 18.37 (2.28) | 14.85 (1.97) | 0.08 | 16.21 (1.95) | 11.70 (1.57) | 0.03 | 0.24 |
| <i>Lactobacillus/Enterococcus</i> | 1.24 (0.51) | 1.03 (0.70) | 0.89 | 3.24 (1.25) | 5.4 (2.13) | 0.16 | 1.19 (0.51) | 3.64 (1.23) | 0.11 | 2.54 (1.18) | 1.38 (0.77) | 0.45 | 0.09 |

Relative Microbiome Profiling 16S rRNA (genus level) from samples collected at Day 0 and Day 10 of the intervention phase. Mean and standard error (SE). (a) P values are as a result of planned Day 0 vs Day 10 comparisons (grey columns). (b) P values are as a result of Day 10 group comparisons using Day 0 values as a baseline covariate (orange column)

| Genus (continued) | Intervention | | | | | | | | | | | | P (b) |
|--------------------------------------|---------------------|-------------|--------------|--------------------|-------------|------------------------|------------------------|-------------|-------|--------------------|-------------|------------------------|-------|
| | Pure inulin (n =24) | | | Shortbread (n =24) | | | Milk Chocolate (n =24) | | | Rice Drink (n =24) | | | |
| | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | |
| <i>Lactococcus</i> | 0.18 (0.10) | 0.15 (0.06) | 0.66 | 0.17 (0.09) | 0.01 (0.01) | 0.04 | 0.03 (0.02) | 0.04 (0.03) | 0.89 | 0.10 (0.03) | 0.03 (0.02) | 0.38 | 0.35 |
| <i>Dorea</i> | 2.51 (0.37) | 2.08 (0.36) | 0.32 | 3.88 (0.67) | 2.61 (0.47) | 0.003 | 3.75 (0.57) | 3.14 (0.53) | 0.16 | 4.54 (0.79) | 3.09 (0.54) | \leq 0.001 | 0.57 |
| <i>Anaerostipes</i> | 4.54 (1.17) | 4.68 (1.54) | 0.85 | 4.23 (0.88) | 3.85 (0.96) | 0.61 | 2.73 (0.62) | 3.25 (0.83) | 0.50 | 2.75 (0.52) | 2.99 (0.70) | 0.75 | 0.90 |
| <i>Lachnospiraceae incertae sedi</i> | 5.77 (0.59) | 3.89 (0.70) | 0.001 | 5.21 (0.75) | 3.10 (0.58) | \leq 0.001 | 3.91 (0.48) | 3.6 (0.49) | 0.60 | 4.00 (0.52) | 2.95 (0.40) | 0.07 | 0.42 |
| <i>Collinsella</i> | 3.00 (0.70) | 1.61 (0.51) | 0.05 | 2.11 (0.37) | 1.23 (0.25) | 0.22 | 2.52 (0.61) | 2.25 (0.53) | 0.70 | 1.60 (0.27) | 2.11 (1.02) | 0.47 | 0.80 |

Relative Microbiome Profiling 16S rRNA (genus level) from samples collected at Day 0 and Day 10 of the intervention phase. Mean and standard error (SE). (a) P values are as a result of planned Day 0 vs Day 10 comparisons (grey columns). (b) P values are as a result of Day 10 group comparisons using Day 0 values as a baseline covariate (orange column)

Supplemental Data Table 3: α -diversity measures recorded across all four interventions at Day 0 and Day 10

| Measure | Pure inulin (<i>n</i> =24) | | | Shortbread (<i>n</i> =24) | | | Milk Chocolate (<i>n</i> =24) | | | Rice Drink (<i>n</i> =24) | | | <i>P</i> values Intervention (b) |
|----------------------------------|-----------------------------|-----------------|--------------|----------------------------|------------------|--------------|--------------------------------|-----------------|--------------|----------------------------|------------------|--------------|----------------------------------|
| | Day 0 | Day 10 | <i>P</i> (a) | Day 0 | Day 10 | <i>P</i> (a) | Day 0 | Day 10 | <i>P</i> (a) | Day 0 | Day 10 | <i>P</i> (a) | |
| Shannon Index | 3.23 (0.08) | 2.86 (0.14) | 0.003 | 3.28 (0.11) | 3.06 (0.13) | 0.06 | 3.35 (0.09) | 3.14 (0.07) | 0.07 | 3.32 (0.12) | 3.06 (0.13) | 0.03 | 0.517 |
| Richness (no. of species) | 102.70 (6.58) | 86.46 (7.33) | 0.01 | 110.10 (8.12) | 101.40 (7.37) | 0.16 | 102.50 (6.80) | 97.58 (4.07) | 0.43 | 120.90 (7.63) | 106.70 (6.92) | 0.03 | 0.173 |
| Simpson Index | 0.08 (0.01) | 0.14 (0.03) | 0.01 | 0.08 (0.01) | 0.11 (0.02) | 0.12 | 0.07 (0.01) | 0.10 (0.01) | 0.28 | 0.09 (0.02) | 0.12 (0.02) | 0.20 | 0.631 |

α -diversity measures across the four interventions from samples collected at Day 0 and Day 10. Mean and Standard Error (SE). (a) *P* values are as a result of planned Day 0 vs Day 10 comparisons (grey columns). (b) *P* values are as a result of Day 10 group comparisons utilising Day 0 values as a baseline covariate (orange column)

Supplemental Data Table 4: Quantitative microbiome profiling (QMP) data recorded across all four interventions at Day 0 and Day 10

| Phylum | Intervention | | | | | | | | | | | | P (b) |
|--|---|---|--------------|---|---|---------------|---|---|-------------|---|---|--------------|-------------|
| | Pure inulin (n =24) | | | Shortbread (n =24) | | | Milk Chocolate (n =24) | | | Rice Drink (n =24) | | | |
| | Day 0 | D 10 | P (a) | Day 0 | D 10 | P (a) | Day 0 | D 10 | P (a) | Day 0 | Day 10 | P (a) | |
| <i>Actinomycetota</i> (<i>Actinobacteria</i>) | 1.83 x 10 ⁹ (3.82 x 10 ⁸) | 2.88 x 10 ⁹ (6.15 x 10 ⁸) | 0.003 | 1.23 x 10 ⁹ (2.37 x 10 ⁸) | 2.36 x 10 ⁹ (6.83 x 10 ⁸) | 0.001 | 1.05 x 10 ⁹ (1.83 x 10 ⁸) | 1.92 x 10 ⁹ (2.91 x 10 ⁸) | 0.02 | 1.05 x 10 ⁹ (1.80 x 10 ⁸) | 2.10 x 10 ⁹ (2.41 x 10 ⁸) | 0.003 | 0.61 |
| <i>Bacteroidota</i> (<i>Bacteroidetes</i>) | 3.00 x 10 ⁸ (1.42 x 10 ⁸) | 4.51 x 10 ⁸ (2.31 x 10 ⁸) | 0.19 | 1.63 x 10 ⁸ (8.50 x 10 ⁷) | 1.57 x 10 ⁸ (4.32 x 10 ⁷) | 0.96 | 1.27 x 10 ⁸ (3.00 x 10 ⁷) | 1.96 x 10 ⁸ (5.04 x 10 ⁷) | 0.54 | 1.24 x 10 ⁸ (2.54 x 10 ⁷) | 2.08 x 10 ⁸ (5.75 x 10 ⁷) | 0.46 | 0.34 |
| <i>Pseudomonadota</i> (<i>Proteobacteria</i>) | 1.63 x 10 ⁸ (7780 x 10 ⁷) | 3.92 x 10 ⁸ (2.15 x 10 ⁷) | 0.24 | 8.15 x 10 ⁷ (3.18 x 10 ⁷) | 5.51 x 10 ⁷ (1.87 x 10 ⁷) | 0.89 | 6.39 x 10 ⁷ (2.77 x 10 ⁷) | 1.00 x 10 ⁸ (7.00 x 10 ⁷) | 0.27 | 2.31 x 10 ⁸ (1.17 x 10 ⁸) | 4.49 x 10 ⁸ (2.69 x 10 ⁸) | 0.65 | 0.40 |
| <i>Verrucomicrobiota</i> (<i>Verrucomicrobia</i>) | 1.35 x 10 ⁸ (5.38 x 10 ⁷) | 1.37 x 10 ⁸ (4.60 x 10 ⁷) | 0.90 | 2.06 x 10 ⁸ (7.55 x 10 ⁷) | 4.22 x 10 ⁸ (1.66 x 10 ⁸) | 0.03 | 6.56 x 10 ⁷ (2.69 x 10 ⁷) | 6.25 x 10 ⁷ (2.38 x 10 ⁷) | 0.97 | 2.58 x 10 ⁸ (7.18 x 10 ⁷) | 4.12 x 10 ⁸ (1.79 x 10 ⁸) | 0.11 | 0.01 |
| <i>Euryarchaeota</i> | 3.97 x 10 ⁷ (1.31 x 10 ⁷) | 3.94 x 10 ⁷ (1.68 x 10 ⁷) | 0.99 | 7.90 x 10 ⁷ (2.81 x 10 ⁷) | 5.70 x 10 ⁷ (3.24 x 10 ⁷) | 0.46 | 3.97 x 10 ⁷ (1.85 x 10 ⁷) | 1.49 x 10 ⁷ (7.71 x 10 ⁶) | 0.40 | 6.90 x 10 ⁷ (2.88 x 10 ⁷) | 1.35 x 10 ⁸ (6.49 x 10 ⁷) | 0.03 | 0.13 |
| <i>Cyanobacteria</i> | 9.25 x 10 ⁵ (4.84 x 10 ⁵) | 4.52 x 10 ⁵ (4.52 x 10 ⁵) | 0.46 | 1.62 x 10 ⁶ (8.06 x 10 ⁵) | 9.57 x 10 ⁶ (7.11 x 10 ⁵) | 0.57 | 1.54 x 10 ⁶ (1.49 x 10 ⁶) | 9.50 x 10 ⁵ (8.72 x 10 ⁵) | 0.62 | 2.09 x 10 ⁶ (1.38 x 10 ⁶) | 1.73 x 10 ⁶ (1.30 x 10 ⁶) | 0.76 | 0.59 |
| <i>Mycoplasmata</i> (<i>Tenericutes</i>) | 1.36 x 10 ⁹ (5.00 x 10 ⁸) | 9.45 x 10 ⁸ (4.17 x 10 ⁸) | 0.85 | 3.60 x 10 ⁹ (2.38 x 10 ⁹) | 4.26 x 10 ⁹ (3.32 x 10 ⁹) | 0.77 | 5.82 x 10 ⁹ (4.03 x 10 ⁹) | 5.28 x 10 ⁸ (3.10 x 10 ⁸) | 0.02 | 2.63 x 10 ⁹ (8.04 x 10 ⁸) | 3.87 x 10 ⁹ (1.71 x 10 ⁸) | 0.58 | 0.38 |
| <i>Bacillota</i> (<i>Firmicutes</i>) | 4.64 x 10 ⁹ (5.87 x 10 ⁸) | 3.78 x 10 ⁹ (5.69 x 10 ⁸) | 0.02 | 5.26 x 10 ⁹ (7.83 x 10 ⁸) | 3.97 x 10 ⁹ (4.79 x 10 ⁹) | ≤0.001 | 4.26 x 10 ⁹ (6.41 x 10 ⁸) | 4.44 x 10 ⁹ (6.21 x 10 ⁸) | 0.61 | 4.78 x 10 ⁹ (6.51 x 10 ⁸) | 4.55 x 10 ⁹ (5.87 x 10 ⁸) | 0.51 | 0.74 |

Quantitative Microbiome Profiling 16S rRNA (phylum level) from samples collected at Day 0 and Day 10 of the intervention phase. Mean and standard error (SE). Numbers are expressed as cells per gram of faeces. (a) P values are as a result of planned Day 0 vs Day 10 comparisons (grey columns). (b) P values are as a result of Day 10 group comparisons using Day 0 counts as a baseline covariate (orange column)

| Genus | Intervention | | | | | | | | | | | | P (b) |
|---|---|---|--------------|---|---|-------------------|---|---|-------------|---|---|-------------|-------|
| | Pure inulin (n =24) | | | Shortbread (n =24) | | | Milk Chocolate (n =24) | | | Rice Drink (n =24) | | | |
| | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | |
| <i>Bifidobacterium</i> | 1.48 x 10 ⁹ (3.85 x 10 ⁸) | 2.68 x 10 ⁹ (6.16 x 10 ⁸) | 0.004 | 9.48 x 10 ⁸ (2.27 x 10 ⁸) | 2.41 x 10 ⁹ (7.9 x 10 ⁸) | ≤ 0.001 | 7.86 x 10 ⁸ (1.67 x 10 ⁸) | 1.64 x 10 ⁹ (2.92 x 10 ⁸) | 0.04 | 7.76 x 10 ⁸ (1.69 x 10 ⁸) | 1.81 x 10 ⁹ (2.07 x 10 ⁸) | 0.01 | 0.47 |
| <i>Bacteroides</i> | 1.42 x 10 ⁸ (7.57 x 10 ⁷) | 3.63 x 10 ⁷ (1.92 x 10 ⁸) | 0.38 | 1.15 x 10 ⁸ (7.54 x 10 ⁷) | 1.08 x 10 ⁸ (3.10 x 10 ⁷) | 0.93 | 7.63 x 10 ⁷ (2.13 x 10 ⁷) | 1.08 x 10 ⁸ (3.06 x 10 ⁷) | 0.69 | 6.41 x 10 ⁷ (1.46 x 10 ⁷) | 1.10 x 10 ⁸ (3.24 x 10 ⁷) | 0.56 | 0.19 |
| <i>Prevotella</i> | 9.85 x 10 ⁶ (4.04 x 10 ⁶) | 1.99 x 10 ⁷ (1.18 x 10 ⁷) | 0.54 | 1.28 x 10 ⁷ (4.62 x 10 ⁷) | 1.41 x 10 ⁷ (4.44 x 10 ⁶) | 0.93 | 1.84 x 10 ⁷ (3.80 x 10 ⁶) | 5.65 x 10 ⁷ (2.99 x 10 ⁷) | 0.02 | 2.83 x 10 ⁷ (1.33 x 10 ⁷) | 4.51 x 10 ⁷ (2.08 x 10 ⁷) | 0.31 | 0.36 |
| <i>Alistipes</i> | 1.38 x 10 ⁸ (1.12 x 10 ⁸) | 4.65 x 10 ⁷ (2.66 x 10 ⁷) | 0.12 | 2.93 x 10 ⁷ (1.27 x 10 ⁷) | 2.58 x 10 ⁷ (9.39 x 10 ⁶) | 0.95 | 2.40 x 10 ⁷ (5.88 x 10 ⁶) | 3.32 x 10 ⁷ (7.80 x 10 ⁶) | 0.87 | 2.43 x 10 ⁷ (5.82 x 10 ⁶) | 3.03 x 10 ⁷ (8.84 x 10 ⁶) | 0.92 | 0.80 |
| <i>Roseburia</i> | 1.89 x 10 ⁸ (5.00 x 10 ⁷) | 2.02 x 10 ⁸ (6.15 x 10 ⁷) | 0.89 | 1.88 x 10 ⁸ (6.40 x 10 ⁷) | 3.12 x 10 ⁸ (9.37 x 10 ⁷) | 0.03 | 2.24 x 10 ⁸ (6.51 x 10 ⁷) | 2.16 x 10 ⁸ (5.11 x 10 ⁷) | 0.88 | 1.54 x 10 ⁸ (3.09 x 10 ⁷) | 2.46 x 10 ⁸ (6.23 x 10 ⁷) | 0.10 | 0.68 |
| <i>Clostridium cluster IVXA + IVXB</i> | 5.88 x 10 ⁷ (1.15 x 10 ⁷) | 3.71 x 10 ⁷ (8.45 x 10 ⁶) | 0.01 | 5.33 x 10 ⁷ (8.37 x 10 ⁶) | 4.69 x 10 ⁷ (7.66 x 10 ⁶) | 0.42 | 5.40 x 10 ⁷ (1.13 x 10 ⁷) | 3.70 x 10 ⁷ (9.08 x 10 ⁶) | 0.03 | 5.43 x 10 ⁷ (8.70 x 10 ⁶) | 3.90 x 10 ⁷ (6.16 x 10 ⁶) | 0.06 | 0.79 |
| <i>Faecalibacterium prausnitzii and relatives</i> | 2.73 x 10 ⁸ (7.37 x 10 ⁷) | 3.83 x 10 ⁸ (1.18 x 10 ⁷) | 0.27 | 1.36 x 10 ⁸ (3.50 x 10 ⁷) | 2.54 x 10 ⁸ (5.96 x 10 ⁷) | 0.23 | 4.61 x 10 ⁸ (1.20 x 10 ⁸) | 4.94 x 10 ⁸ (1.44 x 10 ⁸) | 0.74 | 2.03 x 10 ⁸ (5.69 x 10 ⁷) | 3.09 x 10 ⁸ (8.04 x 10 ⁷) | 0.23 | 0.42 |
| <i>Ruminococcaceae (excluding Fprau)</i> | 7.78 x 10 ⁸ (1.25 x 10 ⁸) | 6.64 x 10 ⁸ (1.34 x 10 ⁷) | 0.43 | 1.02 x 10 ⁹ (2.51 x 10 ⁸) | 7.16 x 10 ⁸ (1.03 x 10 ⁸) | 0.04 | 7.74 x 10 ⁸ (1.19 x 10 ⁸) | 7.73 x 10 ⁸ (1.27 x 10 ⁸) | 0.99 | 1.28 x 10 ⁹ (2.28 x 10 ⁸) | 1.00 x 10 ⁸ (1.63 x 10 ⁷) | 0.06 | 0.30 |
| <i>Ruminococcus 2</i> | 1.60 x 10 ⁸ (4.56 x 10 ⁷) | 1.61 x 10 ⁸ (5.74 x 10 ⁷) | 1.00 | 2.53 x 10 ⁸ (9.56 x 10 ⁷) | 1.97 x 10 ⁸ (5.48 x 10 ⁷) | 0.25 | 2.03 x 10 ⁸ (4.31 x 10 ⁷) | 1.57 x 10 ⁸ (3.83 x 10 ⁷) | 0.34 | 1.67 x 10 ⁸ (2.31 x 10 ⁷) | 1.41 x 10 ⁸ (1.96 x 10 ⁷) | 0.59 | 0.85 |

Quantitative Microbiome Profiling 16S rRNA (genus level) from samples collected at Day 0 and Day 10 of the intervention phase. Mean and standard error (SE). Numbers are expressed as cells per gram of faeces. (a) P values are as a result of planned Day 0 vs Day 10 comparisons (grey columns). (b) P values are as a result of Day 10 group comparisons using Day 0 as a baseline covariate (orange column)

| Intervention | | | | | | | | | | | | | |
|--------------------------------------|---|---|---------------|---|---|--------------|---|---|-------|---|---|-------|-------|
| Genus (continued) | Pure inulin (n =24) | | | Shortbread (n =24) | | | Milk Chocolate (n =24) | | | Rice Drink (n =24) | | | P (b) |
| | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | |
| <i>Coprococcus</i> | 1.10 x 10 ⁸ (3.17 x 10 ⁷) | 6.74 x 10 ⁷ (1.25 x 10 ⁷) | 0.11 | 8.76 x 10 ⁷ (1.27 x 10 ⁷) | 8.69 x 10 ⁷ (1.71 x 10 ⁷) | 0.98 | 6.72 x 10 ⁷ (1.25 x 10 ⁷) | 8.12 x 10 ⁷ (1.76 x 10 ⁷) | 0.60 | 1.16 x 10 ⁸ (2.18 x 10 ⁷) | 1.56 x 10 ⁸ (3.65 x 10 ⁷) | 0.13 | 0.36 |
| <i>Blautia</i> | 1.15 x 10 ⁹ (2.04 x 10 ⁸) | 7.08 x 10 ⁸ (1.65 x 10 ⁸) | 0.01 | 1.39 x 10 ⁹ (2.83 x 10 ⁸) | 8.93 x 10 ⁷ (1.72 x 10 ⁸) | 0.003 | 1.11 x 10 ⁹ (2.57 x 10 ⁸) | 1.11 x 10 ⁹ (2.33 x 10 ⁸) | 0.98 | 1.00 x 10 ⁹ (1.41 x 10 ⁸) | 9.35 x 10 ⁸ (1.62 x 10 ⁸) | 0.83 | 0.50 |
| <i>Lactobacillus/Enterococcus</i> | 1.00 x 10 ⁸ (5.37 x 10 ⁷) | 4.77 x 10 ⁷ (2.60 x 10 ⁷) | 0.71 | 2.50 x 10 ⁸ (1.02 x 10 ⁸) | 4.56 x 10 ⁸ (2.16 x 10 ⁸) | 0.15 | 6.87 x 10 ⁷ (3.21 x 10 ⁷) | 2.70 x 10 ⁸ (1.12 x 10 ⁷) | 0.16 | 2.41 x 10 ⁸ (1.46 x 10 ⁸) | 1.00 x 10 ⁸ (5.41 x 10 ⁷) | 0.32 | 0.10 |
| <i>Lactococcus</i> | 1.29 x 10 ⁷ (7.92 x 10 ⁶) | 1.29 x 10 ⁷ (5.91 x 10 ⁶) | 1.00 | 1.18 x 10 ⁷ (7.14 x 10 ⁶) | 8.13 x 10 ⁵ (3.82 x 10 ⁵) | 0.09 | 1.03 x 10 ⁶ (6.61 x 10 ⁵) | 2.74 x 10 ⁶ (1.75 x 10 ⁶) | 0.80 | 7.27 x 10 ⁶ (3.18 x 10 ⁶) | 1.72 x 10 ⁶ (8.50 x 10 ⁵) | 0.39 | 0.21 |
| <i>Dorea</i> | 2.11 x 10 ⁸ (6.31 x 10 ⁷) | 1.70 x 10 ⁸ (3.58 x 10 ⁷) | 0.18 | 2.89 x 10 ⁸ (6.85 x 10 ⁷) | 2.25 x 10 ⁸ (5.28 x 10 ⁷) | 0.05 | 2.03 x 10 ⁸ (4.52 x 10 ⁷) | 2.06 x 10 ⁸ (4.46 x 10 ⁷) | 0.95 | 2.57 x 10 ⁸ (4.32 x 10 ⁷) | 2.40 x 10 ⁸ (4.15 x 10 ⁷) | 0.44 | 0.68 |
| <i>Anaerostipes</i> | 3.20 x 10 ⁸ (8.06 x 10 ⁷) | 2.86 x 10 ⁸ (7.38 x 10 ⁷) | 0.59 | 2.90 x 10 ⁸ (5.92 x 10 ⁷) | 3.16 x 10 ⁸ (9.73 x 10 ⁷) | 0.67 | 1.47 x 10 ⁸ (3.90 x 10 ⁷) | 2.05 x 10 ⁸ (5.46 x 10 ⁷) | 0.34 | 1.84 x 10 ⁸ (5.19 x 10 ⁷) | 2.46 x 10 ⁸ (7.32 x 10 ⁷) | 0.31 | 0.80 |
| <i>Lachnospiraceae incertae sedi</i> | 4.19 x 10 ⁸ (8.89 x 10 ⁷) | 2.76 x 10 ⁸ (6.58 x 10 ⁷) | ≤0.001 | 3.56 x 10 ⁸ (6.87 x 10 ⁷) | 2.42 x 10 ⁸ (5.01 x 10 ⁷) | 0.01 | 2.13 x 10 ⁸ (3.90 x 10 ⁷) | 2.41 x 10 ⁸ (4.57 x 10 ⁷) | 0.49 | 2.53 x 10 ⁸ (4.27 x 10 ⁷) | 2.26 x 10 ⁸ (3.69 x 10 ⁷) | 0.52 | 0.91 |
| <i>Collinsella</i> | 1.99 x 10 ⁸ (5.77 x 10 ⁷) | 1.00 x 10 ⁸ (3.50 x 10 ⁷) | 0.04 | 1.25 x 10 ⁸ (2.14 x 10 ⁷) | 8.52 x 10 ⁷ (1.65 x 10 ⁷) | 0.41 | 1.22 x 10 ⁸ (2.75 x 10 ⁷) | 1.52 x 10 ⁸ (4.56 x 10 ⁷) | 0.53 | 1.18 x 10 ⁸ (3.06 x 10 ⁷) | 1.60 x 10 ⁸ (6.33 x 10 ⁷) | 0.39 | 0.54 |

Quantitative Microbiome Profiling 16S rRNA (genus level) from samples collected at Day 0 and Day 10 of the intervention phase. Mean and standard error (SE). Numbers are expressed as cells per gram of faeces. (a) P values are as a result of planned Day 0 vs Day 10 comparisons (grey columns). (b) P values are as a result of Day 10 group comparisons using Day 0 as a baseline covariate (orange column)

Supplemental Data Table 5: Gastrointestinal sensation and bowel habit scores across the four interventions

| GI Sensation/ bowel habit | Intervention Group | | | | | | | | | | | | P (b) |
|------------------------------|---------------------|-------------|--------------|--------------------|-------------|-------|------------------------|-------------|-------|--------------------|-------------|-------|--------------|
| | Pure inulin (n =24) | | | Shortbread (n =24) | | | Milk Chocolate (n =24) | | | Rice Drink (n =24) | | | |
| | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | Day 0 | Day 10 | P (a) | |
| Flatulence | 0.80 (0.11) | 0.81 (0.12) | 0.0923 | 0.88 (0.10) | 0.88 (0.13) | 0.99 | 0.78 (0.11) | 0.66 (0.10) | 0.21 | 0.81 (0.12) | 0.95 (0.14) | 0.18 | 0.262 |
| Intestinal Bloating | 0.37 (0.09) | 0.32 (0.11) | 0.625 | 0.53 (0.10) | 0.58 (0.14) | 0.70 | 0.44 (0.11) | 0.39 (0.10) | 0.62 | 0.34 (0.08) | 0.39 (0.10) | 0.63 | 0.657 |
| Abdominal Pressure | 0.27 (0.10) | 0.23 (0.07) | 0.657 | 0.37 (0.08) | 0.34 (0.11) | 0.75 | 0.21 (0.06) | 0.18 (0.05) | 0.69 | 0.26 (0.07) | 0.31 (0.08) | 0.54 | 0.655 |
| Abdominal Pain | 0.19 (0.08) | 0.17 (0.05) | 0.744 | 0.26 (0.07) | 0.26 (0.09) | 0.93 | 0.08 (0.02) | 0.10 (0.05) | 0.79 | 0.13 (0.05) | 0.23 (0.07) | 0.15 | 0.576 |
| Feeling of Fullness | 0.65 (0.10) | 0.38 (0.07) | 0.002 | 0.72 (0.11) | 0.65 (0.15) | 0.39 | 0.63 (0.12) | 0.58 (0.12) | 0.56 | 0.77 (0.10) | 0.77 (0.11) | 0.96 | 0.058 |
| Stool Consistency | 3.74 (0.22) | 4.29 (0.21) | 0.001 | 3.69 (0.16) | 3.76 (0.22) | 0.60 | 3.60 (0.21) | 3.69 (0.21) | 0.57 | 3.18 (0.22) | 3.35 (0.21) | 0.31 | 0.017 |
| Stool Frequency | 1.62 (0.13) | 1.77 (0.15) | 0.08 | 1.58 (0.12) | 1.52 (0.10) | 0.45 | 1.55 (0.12) | 1.57 (0.11) | 0.84 | 1.50 (0.15) | 1.54 (0.15) | 0.58 | 0.759 |

Mean and Standard Error (SE). **(a)** P values are as a result of planned Day 0 vs Day 10 comparisons (grey columns). **(b)** P values are as a result of Day 10 group comparisons using Day 0 as a baseline covariate (orange column)