Supplemental Table 1. Characteristics of stool samples provided by each participant. The results are shown as mean (range) for each participant. Stool characteristics were not assessed on one occasion for Participant 1, and on three occasions for Participant 2.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Participant 1** | **Participant 2** | **Participant 3** |
| Total samples provided  | 8 | 9 | 7 |
| BSC score (range) | 5.1 (4 – 6) a | 3.8 (3 – 4) b | 2.3 (1 – 4) c |
| Weight, g (range) | 142.3 (42 - 216) ab | 234.7 (53.5) ab | 117.2 (41.3) b |

Differences in Bristol stool chart score and stool weight between participants were evaluated using mixed-effects ANOVA. Significant differences (*P* < 0.05; Fisher’s Least Significant Difference) between fibres are highlighted with the use of superscripts: values that share superscript within each column are not significantly different. Abbreviations: BSC, Bristol Stool Chart.

Supplemental Table 2. Dietary intake of each participant, 24 hours preceding each experiment as assessed by food record. Values are expressed as absolute values and as the percentage of total energy intake. The results are shown as mean (SEM) for each participant (n=7). Food records from 2 experiments were not obtained.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Participant 1** | **Participant 2** | **Participant 3** |
| Energy (kJ) | 9719 (433) a | 9128 (438) ab | 11109 (478) b |
| *Absolute values* |
| Protein (g) | 112 (8) | 126 (6) | 108 (7) |
| Carbohydrate (g) | 291 (18) a | 208 (13) b | 326 (18) a |
| Fat (g) | 82 (8) | 85 (8) | 101 (7) |
| Fibre (g) | 30 (3) | 27 (3) | 35 (3) |
| *Percentage values* |
| Protein (%) | 19.5 (2.2) a | 23.6 (1.1) b | 16.8 (1.2) a |
| Carbohydrate (%) | 51.3 (3.1) a | 38.8 (1.8) b | 49.9 (1.9) a |
| Fat (%) | 30.7 (2.2) | 34.1 (2.0) | 33.5 (1.8) |
| Fibre (%) | 2.5 (0.2) | 2.4 (0.2) | 2.5 (0.3) |

Differences in nutritional intake between participants were evaluated using mixed ANOVA. Significant differences (*P* < 0.05; Fisher’s Least Significant Difference) between fibres are highlighted with the use of superscripts: values that share superscript within each column are not significantly different.

Supplemental Table 3. Proportions of short-chain fatty acid (SCFA) and branched-chain fatty acid (BCFA) in the supernatants after 4-hour incubation, expressed as percentage of total SCFA content. The results are shown as mean (SEM) from 3 samples provided by 3 independent participants.

| **Fibre Added** | **Acetate** | **Propionate** | **Butyrate** | **Iso-butyrate** | **Iso-valerate** | **Valerate** | **Caproate** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Blank control  | 50.3 (1.1) abcf | 19.8 (2.1) aefg | 23.2 (1.1) aefghi | 1.9 (0.2) ace | 3.5 (0.5) acfg | 1.5 (0.5) abde | 0.1 (0.0) a |
| FOS | 53.8 (2.3) abcfg | 11.8 (1.5) bcdh | 33.5 (2.9) bcdfghi | 0.3 (0.1) bd | 0.4 (0.1) bde | 0.5 (0.2) bcf | 0.0 (0.0) a |
| Inulin; medium-chain  | 52.9 (2.7) abcf | 14.4 (1.3) bcdeh | 30.9 (1.6) bcdi | 0.4 (0.0) bd | 0.5 (0.0) bde | 0.8 (0.1) abcdf | 0.1 (0.0) a |
| Inulin; long-chain  | 50.4 (2.7) abcf | 12.8 (2.2) bcdeh | 34.5 (1.5) bcdi | 0.6 (0.1) bd | 0.8 (0.1) bde | 0.9 (0.1) abcdf | 0.1 (0. 0) a |
| Carrot fibre | 62.7 (1.4) defg | 13.3 (0.8) bcdeh | 22.2 (2.0) aefghi | 0.4 (0.0) bd | 0.5 (0.0) bde | 0.7 (0.2) abcdf | 0.0 (0.0) a |
| Xylo-oligosaccharide; corn-derived | 65.7 (1.0) deg | 11.0 (1.5) bcdh | 21.8 (2.8) aefghi | 0.4 (0.1) bd | 0.5 (0.1) bde | 0.5 (0.2) bcf | 0.1 (0.0) a |
| Xylo-oligosaccharide; almond shell-derived | 68.3 (2.3) de | 11.5 (2.4) bcdh | 18.9 (3.6) aefgh | 0.4 (0.0) bd | 0.5 (0.1) bde | 0.4 (0.1) bcf | 0.0 (0.0) a |
| Partially hydrolyzed guar gum  | 54.9 (1.2) abcfg | 17.2 (0.5) aefgh | 25.7 (0.8) abefghi | 0.6 (0.1) bd | 0.8 (0.1) bde | 0.8 (0.1) abcdf | 0.1 (0.0) a |
| Sugarcane bagasse | 48.6 (1.8) abcfg | 18.9 (3.1) aefgh | 26.3 (3.2) abdefghi | 1.7 (0.4) ace | 2.9 (0.7) acfg | 1.4 (0.4) acdf | 0.0 (0.0) a |
| Acacia gum | 55.1 (0.7) abcfg | 20.6 (2.8) aefg | 19.7 (2.6) aefghi | 1.5 (0.6) acde | 2.3 (1.0) acdefg | 0.9 (0.5) abcdf | 0.0 (0.0) a |
| Methylcellulose | 48.0 (1.5) abcf | 20.4 (1.7) aefg | 23.2 (2.7) aefghi | 1.8 (0.4) ace | 3.1 (0.8) acfg | 2.2 (0.4) ade | 0.2 (0.1) a |
| Hi-Maize 260 | 58.8 (5.1) bdfg | 13.9 (1.8) bcdefh | 25.6 (5.8) abefghi | 0.5 (0.1) bd | 0.7 (0.2) bde | 0.5 (0.2) bcdf | 0.0 (0.0) a |
| Hi-Maize 1043 | 53.7 (6.3) abcfg | 15.3 (2.1) abcdefh | 27.8 (5.4) abcdfghi | 1.0 (0.1) bcde | 1.5 (0.1) bcde | 0.8 (0.3) abcdf | 0.0 (0.0) a |
| Acetylated resistant starch 2 (Hylon VII) | 59.0 (2.4) bc | 14.4 (0.5) bcdefh | 23.0 (2.6) aefghi | 1.0 (0.2) bcde | 1.4 (0.3) bcdefg | 1.2 (0.1) abcdf | 0.0 (0.1) a |
| Butyrylated resistant starch 2 (Hylon VII) | 52.3 (3.8) bdfg | 17.1 (1.6) acefgh | 24.6 (2.7) aefghi | 1.6 (0.2) acde | 2.6 (0.4) acdefg | 1.6 (0.5) acde | 0.1 (0.1) a |
| Resistant starch 4 | 51.6 (0.2) abcfg | 18.2 (2.8) acefgh | 25.3 (1.6) abefghi | 1.6 (0.2) acde | 2.5 (0.4) acdefg | 0.8 (0.8) abcdf | 0.0 (0.0) a |

Differences between fibres were evaluated using mixed-model ANOVA. Significant differences (*P* < 0.05; Fisher’s Least Significant Difference) between fibres are highlighted with the use of superscripts: values that share superscript within each column are not significantly different.



Supplemental Figure 1. Raw data (as psi) from a validation experiment involving Participant 1 and three replicate fermentations of fructo-oligosaccharide (Orafti P95). Variations in total gas production between replicates was minimal, with the coefficient of variation in total gas produced at the end of the 4-hour fermentation period shown to be 3.92%.



Supplemental Figure 2. Correlation matrix highlighting relationships between fermentation characteristics, dietary intake in the 24-hours preceding sample collection and faecal sample characteristics across all blank controls. Pink colours illustrate positive correlations while blue illustrates negative correlations. The size of each circle and shade of colour is proportional to each ρ value, with wider widths and deeper shades indicating higher ρ values. Correlation analyses undertaken through repeated measures correlation. Significant correlations with P values < 0.05 are marked with asterisks as follows: \*, P < 0.05; \*\*. P < 0.01; \*\*\*, P < 0.001.

Labels: gas\_tot, total gas concentrations (ml/g); scfa\_tot, total short chain fatty acid (SCFA) concentrations (umol/g); ammonia\_tot, total ammonia concentrations (umol/g); acetate\_perc, percentage of fatty acids generated as acetate (%); propionate\_perc, percentage of fatty acids generated as propionate (%); butyrate\_perc, percentage of fatty acids generated as butyrate (%); iso\_butyrate\_perc, percentage of fatty acids generated as iso-butyrate (%); iso\_valerate\_perc, percentage of fatty acids generated as iso-valerate (%); valerate\_perc, percentage of fatty acids generated as valerate (%); caproate\_perc, percentage of fatty acids generated as caproate (%); scfa\_bcfa\_ratio, ratio of SCFAs and branched chain fatty acids, as a percentage of total fatty acids generated; ph\_post, ph value post fermentation; energy, energy intake (kJ); cho\_tot, carbohydrate intake (grams); pro\_tot, protein intake (grams); fat\_tot, fat intake (grams); fibre\_tot, fibre intake (grams); bsc, Bristol Stool Chart rating of provided sample; sample\_wt, weight of sample provided (grams).



Supplemental Figure 3. Correlation matrix highlighting relationships between fermentation characteristics, dietary intake in the 24-hours preceding sample collection, donors and faecal sample characteristics across all experiments undertaken. Pink colours illustrate positive correlations while blue illustrates negative correlations. The size of each circle and shade of colour is proportional to each ρ value, with wider widths and deeper shades indicating higher ρ values. Correlation analyses undertaken through repeated measures correlation. Significant correlations with P values < 0.05 are marked with asterisks as follows: \*, P < 0.05; \*\*. P < 0.01; \*\*\*, P < 0.001.

Labels: gas\_tot, total gas concentrations (ml/g); scfa\_tot, total short chain fatty acid (SCFA) concentrations (umol/g); ammonia\_tot, total ammonia concentrations (umol/g); acetate\_perc, percentage of fatty acids generated as acetate (%); propionate\_perc, percentage of fatty acids generated as propionate (%); butyrate\_perc, percentage of fatty acids generated as butyrate (%); iso\_butyrate\_perc, percentage of fatty acids generated as iso-butyrate (%); iso\_valerate\_perc, percentage of fatty acids generated as iso-valerate (%); valerate\_perc, percentage of fatty acids generated as valerate (%); caproate\_perc, percentage of fatty acids generated as caproate (%); scfa\_bcfa\_ratio, ratio of SCFAs and branched chain fatty acids, as a percentage of total fatty acids generated; ph\_post, ph value post fermentation; energy, energy intake (kJ); cho\_tot, carbohydrate intake (grams); pro\_tot, protein intake (grams); fat\_tot, fat intake (grams); fibre\_tot, fibre intake (grams); bsc, Bristol Stool Chart rating of provided sample; sample\_wt, weight of sample provided (grams).