

1 **Supplementary Material**

2 The sugar composition of the fibre in selected plant foods modulates weaning infants' gut microbiome
3 composition and fermentation metabolites *in vitro*.

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33 **Table S1.** Nutrient compositional analysis of the infant complementary foods included in this study.

| Ingredient | | Oats | Blackcurrant | Carrot | Apple | Green-fleshed kiwi fruit | Gold-fleshed kiwi fruit | Pumpkin | Sweetcorn |
|-------------------|----------|-------------|------------------------------|-----------------------|--------------|---------------------------------|--------------------------------|-----------------------|-------------------------|
| Product name | | Oat flour | Blackcurrant puree, seedless | Carrot puree, aseptic | Apple puree | Green kiwifruit puree, seed-out | Gold kiwifruit puree, seed-out | Pumpkin puree, frozen | Sweetcorn puree, frozen |
| Product code | | F00005 | BLC2001 | CAR5100 | Royal Gala | SP-01-016 | SP-01-005 | Frozen squash puree | Frozen corn puree |
| Supplier | | Harraways | JP-NZ | JP-NZ | Frupak | Kiwifruitz | Kiwifruitz | Cedenco | Cedenco |
| Quantity | | 100 g | 100 g | 100 g | 100 g | 100 g | 100 g | 100 g | 100 g |
| | Unit | | | | | | | | |
| Energy | kJ | 1468 | 184 | 167 | 143 | 186 | 216 | 249 | 292 |
| Total nitrogen | % m/m | 2.254 | 0.079 | 0.124 | 0.022 | 0.087 | 0.119 | 0.184 | 0.359 |
| Protein | g | 13.14 | 0.49 | 0.78 | 0.14 | 0.54 | 0.74 | 1.15 | 2.24 |
| Fat - total | g | 6.5 | < 0.1 | 0.2 | < 0.1 | < 0.1 | 0.1 | 0.1 | 1.4 |
| Fat - saturated | g | 1.2 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | 0.3 |

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|------------------------|----------|-------|-------|-------|-------|-------|-------|-------|-------|
| Fat - mono-unsaturated | g | 2.6 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | 0.6 |
| Fat - polyunsaturated | g | 2.7 | < 0.1 | 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | 0.6 |
| Sugar - total | g | 0.8 | 9.3 | 7.6 | 7.6 | 9.6 | 11.4 | 5.7 | 6.4 |
| Sugar - glucose | % m/m | < 0.1 | 1.6 | < 0.5 | 3.4 | 4.6 | 5.4 | 1.9 | < 0.5 |
| Sugar - fructose | % m/m | < 0.1 | 6.3 | < 0.5 | 4.2 | 5 | 6 | 1.7 | < 0.5 |
| Sugar - maltose | % m/m | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Sugar - lactose | % m/m | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Sugar - sucrose | % m/m | 0.8 | 1.4 | 7.1 | < 0.1 | < 0.1 | < 0.1 | 2.1 | 6.1 |
| Starch | g | 54.3 | < 0.1 | 0.2 | < 0.1 | 0.2 | 0.1 | 6.6 | 4.4 |
| Fibre - total | g | 8.4 | 2.2 | 1.7 | 1.5 | 1.3 | 1.0 | 2.6 | 2.3 |
| Fibre - insoluble | g | 5.4 | 1.3 | 0.8 | 1.0 | 0.7 | 0.7 | 2.1 | 2.0 |
| Fibre - soluble | g | 3.1 | 0.9 | 0.8 | 0.4 | 0.5 | 0.3 | 0.5 | 0.3 |
| Fibre - beta-glucan | g | 3.3 | - | - | - | - | - | - | - |
| Sodium | mg | 2.6 | 3.1 | 54 | 2.5 | 3.1 | 2.6 | 0.45 | 0.48 |
| Potassium | mg | 340 | 230 | 400 | 100 | 310 | 300 | 320 | 240 |
| Calcium | mg | 61 | 21 | 29 | 4.7 | 19 | 12 | 12 | 2 |
| Magnesium | mg | 120 | 8.6 | 16 | 4 | 8.7 | 9.3 | 13 | 23 |

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|-------------------------|-----------|-------|-------|------|--------|--------|-------|--------|-------|
| Iron | mg | 4 | 0.76 | 0.87 | 0.098 | 0.16 | 0.23 | 0.44 | 0.4 |
| Phosphorous | mg | 380 | 18 | 42 | 8 | 15 | 16 | 23 | 68 |
| Vitamin A | µg RE* | 0.363 | 8.95 | 1783 | 0.38 | 3.9 | 4.7 | 228.72 | 4.36 |
| Thiamin (Vitamin B1) | mg | 0.63 | 0.02 | 0.04 | 0.01 | < 0.01 | 0.01 | 0.05 | 0.07 |
| Riboflavin (Vitamin B2) | mg | 0.08 | 0.03 | 0.06 | 0.07 | 0.08 | 0.07 | 0.08 | 0.08 |
| Niacin (Vitamin B3) | mg | 0.52 | 0.73 | 0.56 | < 0.01 | 0.12 | 0.17 | 0.94 | 1.655 |
| Vitamin C | mg | < 1 | 125.3 | < 1 | < 1 | 63.25 | 82.24 | < 1 | < 1 |
| Moisture | % m/m | 12.96 | 84.0 | 87.5 | 86.8 | 84.1 | 82.5 | 80.5 | 81.3 |
| Ash | % m/m | 1.7 | 0.4 | 0.8 | 0.2 | 0.4 | 0.4 | 0.6 | 0.5 |

34 *RE = retinol equivalent.

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41 **Table S2.** Molar percentages and ratios of neutral sugar and uronic acid composition of the digested foods. Values (mol %) are mean values or ratios
 42 calculated from absolute concentrations in Table 2 of the main paper. Rha = rhamnose, fuc = fucose, Ara = arabinose, Xyl = xylose, Man = mannose, Gal =
 43 galactose, Glc = glucose, UA = uronic acid, KF = kiwifruit.

| Sugar | Apple | Blackcurrant | Carrot | Green-fleshed kiwifruit | Gold-fleshed kiwifruit | Inulin | Oats | Pumpkin | Sweetcorn |
|------------------|-------|--------------|--------|-------------------------|------------------------|--------|------|---------|-----------|
| Molar percentage | | | | | | | | | |
| Rhamnose | 2.5 | 6.2 | 3.5 | 1.8 | 1.8 | 0.6 | 0.1 | 1.4 | 0.6 |
| Fucose | 1.4 | 0.5 | 0.3 | 0.6 | 0.5 | 0.8 | 0.0 | 0.2 | 0.1 |
| Arabinose | 9.4 | 5.7 | 11.2 | 3.3 | 3.1 | 3.9 | 2.9 | 3.3 | 6.6 |
| Xylose | 5.8 | 5.7 | 1.4 | 5.9 | 5.6 | 0.6 | 2.4 | 1.6 | 5.1 |
| Mannose | 1.9 | 1.9 | 2.2 | 2.2 | 2.7 | 4.6 | 0.7 | 1.5 | 0.8 |
| Galactose | 7.3 | 6.9 | 16.5 | 9.7 | 9.5 | 16.0 | 2.4 | 9.3 | 5.4 |
| Glucose | 34.8 | 36.4 | 30.0 | 41.1 | 44.3 | 58.0 | 86.8 | 65.6 | 68.8 |
| UA | 36.9 | 36.6 | 34.9 | 35.4 | 32.5 | 15.5 | 4.7 | 17.1 | 12.5 |
| Molar ratio | | | | | | | | | |
| UA/Rha | 15.0 | 5.9 | 9.1 | 19.7 | 18.3 | 24.2 | 42.4 | 11.9 | 22.0 |
| Gal + Ara/Rha | 6.8 | 2.0 | 2.0 | 7.2 | 7.2 | 31.1 | 48.4 | 8.8 | 21.1 |
| Xylose/glucose | 0.2 | 0.2 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 |

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45 **Table S3.** Limits of detection (LoD) of the organic acids, measured as μmol organic acid/mL fermenta

| | Formate | Acetate | Propionate | Isobutyrate | Butyrate | Isovalerate | Valerate | Hexanoate | Heptanoate | Lactate | Succinate |
|-----|---------|---------|------------|-------------|----------|-------------|----------|-----------|------------|---------|-----------|
| LoD | 0.3 | 1 | 0.42 | 0.3 | 1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.25 | 0.3 |

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48 **Table S4.** Organic acid concentrations at each time point after fermentation. Values are average organic acid concentrations in $\mu\text{mol/mL}$ of fermenta (n=3).
 49 The average Coefficient of Variability (CV) expressed as a percentage is also presented. The significance value * $P = 0.028$; all other P values for each acid in
 50 terms of ingredient effect were < 0.001 .

| Group | Apple | Blackcurrant | Carrot | Digesta control | Gold-fleshed kiwi fruit | Green-fleshed kiwi fruit | Inulin | Oats | Pumpkin | Sweetcorn | Average CV |
|-------------|-------------------|-------------------|--------------------|--------------------|-------------------------|--------------------------|-------------------|--------------------|--------------------|--------------------|------------|
| 5 h | | | | | | | | | | | |
| Formate | 1.2 ^c | 0.6 ^a | 1.2 ^c | 2.2 ^d | 1.0 ^{bc} | 0.9 ^b | 2.1 ^d | 1.1 ^{bc} | 0.9 ^b | 1.2 ^c | 8.5 |
| Lactate | 1.5 ^b | 1.2 ^b | 3.5 ^{cd} | 0.3 ^a | 3.2 ^{cd} | 3.3 ^{cd} | 0.9 ^{bc} | 5.4 ^{de} | 6.6 ^e | 4.9 ^{de} | 27.3 |
| Acetate | 7.0 ^c | 4.8 ^a | 7.3 ^{cd} | 5.6 ^b | 8.0 ^d | 8.0 ^d | 6.4 ^{cd} | 9.8 ^e | 10.3 ^e | 9.5 ^e | 4.1 |
| Propionate | 1.2 ^{de} | 0.8 ^a | 1.1 ^{bc} | 1.4 ^f | 1.1 ^b | 1.2 ^{bcd} | 1.1 ^b | 1.2 ^{cde} | 1.2 ^{bcd} | 1.3 ^{ef} | 4.3 |
| 10 h | | | | | | | | | | | |
| Formate | 0.8 ^d | 0.5 ^{bc} | 0.7 ^{cd} | 2.8 ^e | 0.4 ^{ab} | 0.5 ^{bc} | 1.6 ^{cd} | 0.3 ^a | 0.4 ^{ab} | 0.5 ^{bc} | 14.3 |
| Lactate | 2.1 ^b | 0.3 ^a | 5.1 ^c | 0.3 ^a | 4.1 ^{bc} | 3.8 ^{bc} | 2.3 ^c | 5.0 ^{bc} | 8.7 ^c | 5.2 ^c | 31.1 |
| Acetate | 11.9 ^c | 9.6 ^b | 12.7 ^{cd} | 7.4 ^a | 12.0 ^c | 12.3 ^{cd} | 9.7 ^d | 11.9 ^c | 13.8 ^{cd} | 12.7 ^{cd} | 7.8 |
| Propionate | 3.2 ^e | 2.4 ^{cd} | 2.3 ^{bcd} | 2.0 ^{abc} | 2.4 ^{cd} | 2.6 ^{de} | 1.9 ^{ab} | 1.7 ^a | 1.6 ^a | 2.4 ^{cd} | 5.3 |
| 16 h | | | | | | | | | | | |
| Formate | 0.4 ^{ab} | 0.4 ^b | 0.3 ^a | 1.8 ^c | 0.3 ^a | 0.3 ^a | 1.0 ^{ab} | 0.3 ^a | 0.3 ^a | 0.3 ^a | 10.5 |
| Lactate | 0.4 ^a | 0.3 ^a | 2.5 ^b | 0.3 ^a | 2.5 ^b | 0.7 ^a | 2.5 ^{bc} | 5.9 ^{bc} | 9.0 ^c | 0.5 ^a | 43.5 |
| Acetate | 13.9 ^c | 12.5 ^b | 13.3 ^{bc} | 5.9 ^a | 14.1 ^c | 14.5 ^c | 10.2 ^d | 13.9 ^c | 14.5 ^c | 13.5 ^{bc} | 7.9 |
| Propionate* | 4.3 ^b | 3.4 ^{ab} | 3.1 ^{ab} | 2.2 ^{ab} | 2.4 ^{ab} | 4.0 ^b | 2.1 ^{ab} | 2.2 ^{ab} | 1.3 ^a | 3.7 ^{ab} | 16.2 |
| 24 h | | | | | | | | | | | |
| Formate | 0.3 ^a | 0.3 ^a | 0.3 ^a | 0.9 ^c | 0.3 ^a | 0.3 ^a | 0.6 ^b | 0.3 ^a | 0.3 ^a | 0.3 ^a | 4.2 |

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|------------|---------------------|-------------------|--------------------|------------------|---------------------|-------------------|-------------------|--------------------|-------------------|-------------------|------|
| Lactate | 0.3 ^a | 0.3 ^a | 0.3 ^a | 0.3 ^a | 0.6 ^a | 0.3 ^a | 2.7 ^b | 7.9 ^b | 10.1 ^b | 0.3 ^a | 28.8 |
| Acetate | 14.8 ^{bcd} | 14.0 ^b | 14.4 ^{bc} | 5.1 ^a | 15.2 ^{bcd} | 15.7 ^d | 10.2 ^e | 15.5 ^{cd} | 15.7 ^d | 14.0 ^b | 8.4 |
| Propionate | 4.9 ^f | 3.7 ^d | 3.9 ^d | 2.3 ^b | 4.3 ^e | 4.8 ^f | 2.2 ^b | 2.6 ^c | 1.8 ^a | 4.6 ^{ef} | 2.8 |
| Butyrate | 1.0 ^a | 1.0 ^a | 1.0 ^a | 1.1 ^b | 1.0 ^a | 1.0 ^a | 1.1 ^a | 1.0 ^a | 1.0 ^a | 1.0 ^a | 0.3 |

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69 **Table S5.** Change in glycosidase activities against colorimetric substrates by faecal microbiota fermented with substrates for 10 h. Data mean of three
70 replicates and expressed as percentage of activity at 0 h, with average standard error of mean. The enzymes included α -arabinofuranosidase (α -araF), α -
71 arabinopyranosidase(α -araP), α -fucopyranosidase (α -fucP), α - and β -glucopyranosidase (α -glcP, β -glcP), β -glucopyranosidase α - and β -galactopyranosidase
72 (α -galP, β -galP), and α -N-acetylgalactosaminidase (α -galNAc); β -N-acetylglucosaminidase (β -glcNAc); α -rhamnopyranosidase (α -rhaP), α -
73 mannopyranosidase (α -manP) and β -xylopyranosidase (β -xylP). The significance values are adjusted to the false discovery rate.

| Substrate | Apple | Blackcurrant | Carrot | Digesta control | Gold-fleshed kiwifruit | Green-fleshed kiwifruit | Inulin | Oats | Pumpkin | Sweetcorn | SEM | <i>P</i> value |
|------------------|-------------------|-------------------|-------------------|------------------|------------------------|-------------------------|-------------------|-------------------|-------------------|-------------------|-----|----------------|
| α -AraF | 57 ^{ab} | 57 ^{ab} | 49 ^a | 79 ^b | 59 ^{ab} | 49 ^a | 47 ^a | 54 ^a | 59 ^{ab} | 54 ^a | 5 | 0.01 |
| α -AraP | 121 ^{ab} | 103 ^{ab} | 120 ^{ab} | 97 ^a | 129 ^b | 109 ^{ab} | 110 ^{ab} | 101 ^{ab} | 100 ^{ab} | 110 ^{ab} | 6 | 0.02 |
| α -FucP | 107 ^a | 88 ^a | 104 ^a | 89 ^a | 103 ^a | 91 ^a | 98 ^a | 91 ^a | 87 ^a | 93 ^a | 5 | 0.04 |
| α -GalP | 72 ^{abc} | 53 ^a | 60 ^{ab} | 99 ^{bc} | 63 ^{ab} | 55 ^a | 106 ^c | 59 ^{ab} | 78 ^{abc} | 66 ^{abc} | 8 | 0.002 |
| α -GalNAc | 132 ^a | 97 ^a | 104 ^a | 102 ^a | 113 ^a | 109 ^a | 86 ^a | 121 ^a | 108 ^a | 96 ^a | 12 | 0.32 |
| α -GlcP | 76 ^{ab} | 67 ^a | 73 ^a | 95 ^b | 74 ^a | 67 ^a | 135 ^c | 67 ^a | 78 ^{ab} | 70 ^a | 4 | < 0.001 |
| α -ManP | 101 ^a | 88 ^a | 114 ^a | 89 ^a | 131 ^a | 124 ^a | 101 ^a | 119 ^a | 111 ^a | 112 ^a | 19 | 0.82 |
| α -RhaP | 139 ^a | 122 ^a | 108 ^a | 100 ^a | 122 ^a | 114 ^a | 76 ^a | 128 ^a | 105 ^a | 93 ^a | 16 | 0.27 |
| β -GalP | 101 ^{ab} | 92 ^{ab} | 105 ^{ab} | 88 ^a | 101 ^{ab} | 96 ^{ab} | 115 ^b | 88 ^a | 89 ^a | 102 ^{ab} | 5 | 0.01 |
| β -GlcP | 101 ^{ab} | 83 ^a | 92 ^a | 91 ^a | 101 ^{ab} | 91 ^a | 128 ^b | 96 ^{ab} | 94 ^{ab} | 96 ^{ab} | 7 | 0.02 |
| β -GlcNAc | 82 ^{bc} | 59 ^{ab} | 76 ^{abc} | 98 ^c | 74 ^{abc} | 66 ^{ab} | 79 ^{abc} | 52 ^a | 64 ^{ab} | 73 ^{abc} | 6 | 0.001 |
| β -XylP | 121 ^a | 110 ^a | 105 ^a | 92 ^a | 114 ^a | 104 ^a | 89 ^a | 112 ^a | 102 ^a | 93 ^a | 11 | 0.54 |

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80 **Table S6.** The average relative abundance of the bacterial phyla in the 0-h fermentation sample.

| Phylum | Relative Abundance | |
|------------------|--------------------|--------------------|
| | Average | Standard Deviation |
| Actinobacteria | 21.385 | 4.073 |
| Bacteroidetes | 28.951 | 5.810 |
| Proteobacteria | 9.594 | 1.134 |
| [Thermi] | 0.000 | 0.001 |
| Bacteria;Other | 0.000 | 0.000 |
| Unassigned;Other | 1.513 | 0.323 |
| Chloroflexi | 0.000 | 0.000 |
| Cyanobacteria | 0.001 | 0.001 |
| Firmicutes | 38.499 | 1.119 |
| Fusobacteria | 0.010 | 0.001 |
| Planctomycetes | 0.000 | 0.000 |
| Spirochaetes | 0.000 | 0.000 |
| TM7 | 0.002 | 0.001 |
| Tenericutes | 0.000 | 0.000 |
| Verrucomicrobia | 0.045 | 0.033 |
| WPS-2 | 0.000 | 0.000 |

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88 **Table S7.** The average relative abundance of the bacterial genera in the 0-h fermentation sample. A total of 250 genera or groups at level 6 taxonomic level
89 were identified. Genera with values greater than 0.05% relative abundance in at least one sample were included in the Table above.

| Genus | Relative Abundance | |
|--------------------------------|--------------------|--------------------|
| | Average | Standard Deviation |
| <i>Bifidobacterium</i> | 16.81 | 3.03 |
| <i>Collinsella</i> | 4.16 | 0.93 |
| <i>Bacteroides</i> | 19.57 | 6.52 |
| <i>Prevotella</i> | 8.11 | 0.96 |
| <i>Lactococcus</i> | 0.01 | 0.02 |
| <i>Clostridium</i> | 0.30 | 0.14 |
| [<i>Ruminococcus</i>] | 7.89 | 0.97 |
| <i>Ruminococcaceae</i> ;g__ | 5.59 | 2.32 |
| <i>Phascolarctobacterium</i> | 2.05 | 1.04 |
| <i>Veillonella</i> | 5.15 | 1.25 |
| <i>Enterobacteriaceae</i> ;g__ | 8.13 | 0.81 |

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99 **Table S8.** Average counts of taxonomic groups at family level that were significantly changed at the end of 5 h of fermentation. Values are average counts
 100 (n=3). The average Coefficient of Variability (CV) expressed as a percentage is presented. The significance values adjusted to the false discovery rate were *
 101 $P < 0.05$, ** $P < 0.005$, the likelihood ratio test adjusted for 32 tests. The inulin control values are not given as the sequence quality was poor and the data
 102 were disregarded.

| Group | Apple | Black currant | Carrot | Digesta control | Gold-fleshed kiwifruit | Green-fleshed kiwifruit | Oats | Pumpkin | Sweetcorn | Average CV |
|---------------------------------|---------------------|---------------------|-----------------------|---------------------|------------------------|-------------------------|---------------------|----------------------|---------------------|------------|
| <i>Not_Assigned</i> ** | 2,218 ^a | 826 ^b | 1,231 ^a | 1,581 ^a | 1,318 ^a | 1,229 ^{ab} | 1,297 ^a | 1,271 ^{ab} | 1,484 ^a | 35% |
| <i>Bifidobacterium</i> ** | 22,824 ^a | 17,056 ^a | 12,611 ^a | 9,538 ^b | 13,870 ^a | 18,419 ^a | 14,801 ^a | 13,592 ^{ab} | 15,606 ^a | 31% |
| <i>Collinsella</i> * | 2,091 ^{ab} | 1,933 ^a | 1,653 ^{ab} | 1,535 ^b | 1,510 ^{ab} | 1,814 ^{ab} | 1,508 ^{ab} | 1,607 ^{ab} | 1,853 ^{ab} | 31% |
| <i>Eggerthella</i> ** | 394 ^{ab} | 183 ^a | 259 ^b | 363 ^b | 210 ^{ab} | 273 ^{ab} | 248 ^{ab} | 242 ^{ab} | 296 ^{ab} | 37% |
| <i>Bacteroides</i> ** | 6,436 ^{ab} | 4,985 ^{ab} | 3,414 ^{ac} | 5,755 ^{ab} | 5,191 ^{ab} | 6,054 ^b | 3,248 ^c | 5,135 ^{ab} | 1,727 ^d | 34% |
| <i>Parabacteroides</i> ** | 513 ^{ab} | 368 ^{ab} | 284 ^{ac} | 550 ^b | 433 ^{ab} | 512 ^{ab} | 219 ^{cd} | 447 ^{ab} | 162 ^d | 37% |
| <i>Prevotella</i> ** | 5,067 ^a | 595 ^b | 4,152 ^a | 5,365 ^a | 3,201 ^a | 4,256 ^a | 5,286 ^a | 4,632 ^a | 4,839 ^a | 27% |
| <i>Enterococcus</i> ** | 992 ^{ab} | 175 ^c | 515 ^a | 1,178 ^d | 596 ^a | 699 ^a | 1,159 ^d | 883 ^b | 1,517 ^e | 31% |
| <i>Lactobacillus</i> ** | 166 ^{abc} | 66 ^a | 84 ^{ab} | 109 ^{ab} | 127 ^{bc} | 120 ^{abc} | 135 ^{bc} | 156 ^{bc} | 197 ^c | 31% |
| <i>Lactococcus</i> ** | 1.33 ^a | 2.67 ^a | 4,501.67 ^b | 3.67 ^a | 3.33 ^a | 3.33 ^a | 4.33 ^a | 2.00 ^a | 4.33 ^a | 63% |
| <i>Streptococcus</i> ** | 1,458 ^{ab} | 1,050 ^a | 762 ^c | 988 ^{bc} | 1,073 ^a | 1,108 ^{abc} | 983 ^{abc} | 989 ^{abc} | 1,133 ^{ab} | 33% |
| <i>Clostridiaceae; other</i> ** | 884 ^{ab} | 852 ^c | 578 ^a | 545 ^b | 648 ^a | 762 ^a | 577 ^{ab} | 596 ^{ab} | 648 ^{ab} | 34% |
| <i>Clostridiaceae</i> * | 382 ^{ab} | 317 ^a | 241 ^{ab} | 249 ^b | 283 ^{ab} | 329 ^{ab} | 236 ^b | 275 ^{ab} | 292 ^{ab} | 33% |
| <i>Clostridium</i> ** | 439 ^a | 40 ^b | 286 ^a | 1,297 ^c | 158 ^{de} | 147 ^d | 297 ^a | 188 ^e | 301 ^a | 31% |

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|--------------------------------------|-----------------------|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------------|----------------------|------|
| <i>Blautia</i> ** | 177 ^a | 191 ^b | 135 ^{ab} | 120 ^a | 121 ^a | 119 ^a | 126 ^a | 156 ^{ab} | 117 ^a | 35% |
| <i>Coprococcus</i> ** | 268 ^{ab} | 217 ^{ac} | 149 ^{bd} | 632 ^e | 255 ^c | 399 ^f | 137 ^d | 62 ^g | 91 ^h | 33% |
| <i>Dorea</i> ** | 1,599 ^{ab} | 541 ^c | 899 ^{ad} | 2,378 ^e | 650 ^{cf} | 766 ^f | 1,239 ^b | 1,136 ^{ab} | 888 ^d | 33% |
| [<i>Ruminococcus</i>]** | 5,108 ^{ab} | 2,238 ^a | 2,518 ^{ab} | 2,888 ^{ab} | 2,955 ^{ab} | 3,772 ^{ab} | 3,944 ^b | 3,613 ^{ab} | 3,639 ^{ab} | 28% |
| <i>Ruminococcaceae</i> ** | 486 ^{abc} | 382 ^{ab} | 385 ^a | 183 ^d | 293 ^{bc} | 310 ^c | 327 ^{abc} | 373 ^{abc} | 391 ^{abc} | 37% |
| <i>Faecalibacterium</i> ** | 79 ^a | 69 ^{ab} | 85 ^b | 39 ^c | 61 ^a | 57 ^{ac} | 73 ^{ab} | 76 ^{ab} | 113 ^b | 35% |
| <i>Oscillospira</i> ** | 340 ^{ab} | 153 ^c | 208 ^{ab} | 331 ^a | 204 ^{bc} | 251 ^{ab} | 234 ^{ab} | 243 ^{ab} | 229 ^{bc} | 34% |
| <i>Dialister</i> ** | 824 ^{ab} | 688 ^c | 538 ^{ac} | 481 ^b | 626 ^{ac} | 704 ^{ac} | 583 ^{ac} | 644 ^{ac} | 650 ^{ac} | 33% |
| <i>Phascolarctobacterium</i> * | 5,007 ^{ab} | 2,602 ^a | 2,962 ^{ab} | 4,299 ^b | 3,230 ^{ab} | 3,863 ^{ab} | 3,101 ^{ab} | 3,020 ^a | 3,432 ^{ab} | 35% |
| <i>Veillonella</i> ** | 11,178 ^{abc} | 8,044 ^a | 6,378 ^{abc} | 6,082 ^{abc} | 7,630 ^{ab} | 9,323 ^a | 5,341 ^{bc} | 5,281 ^c | 6,733 ^{abc} | 35% |
| <i>Erysipelotrichaceae; other</i> ** | 0.33 ^{ab} | 0.00 ^c | 0.00 ^{bc} | 0.00 ^a | 0.00 ^{bc} | 0.00 ^c | 0.00 ^a | 0.00 ^{ab} | 0.00 ^a | 173% |
| <i>Sutterella</i> ** | 181 ^a | 189 ^b | 139 ^{ab} | 80 ^c | 159 ^{ab} | 211 ^b | 154 ^{ab} | 152 ^{ab} | 127 ^a | 37% |
| <i>Enterobacteriaceae; g__</i> * | 17,361 ^{ab} | 11,739 ^a | 9,109 ^{ab} | 13,712 ^a | 10,001 ^{ab} | 12,239 ^{ab} | 12,050 ^{ab} | 9,566 ^b | 10,752 ^{ab} | 29% |

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113 **Table S9.** Average counts of taxonomic groups at genus level that were significantly changed at the end of 10 h of fermentation. Values are average of 3
 114 counts. The average Coefficient of Variability (CV) expressed as a percentage is presented. All the P values were < 0.005, with the likelihood ratio test,
 115 adjusted for 32 tests. Pairwise differences within each bacteria, adjusted for FDR among 36 pairwise comparisons.

| Group | Apple | Black currant | Carrot | Digesta control | Gold- fleshed kiwifruit | Green- fleshed kiwifruit | Inulin | Oats | Pumpkin | Sweetcorn | Average CV |
|-----------------------------|----------------------|-----------------------|------------------------|----------------------|-------------------------------|--------------------------------|----------------------|----------------------|---------------------|----------------------|---------------|
| <i>Not_Assigned</i> | 4,151 ^a | 2,570 ^{ab} | 3,522 ^a | 4,562 ^a | 3,048 ^{ab} | 3,148 ^{ab} | 2,990 ^a | 3,339 ^{ab} | 2,326 ^b | 4,162 ^{ab} | 23% |
| <i>Bifidobacterium</i> | 36,649 ^a | 43,968 ^{ab} | 40,331 ^{ab} | 19,439 ^c | 45,973 ^{ab} | 48,569 ^{ab} | 28,289 ^{ab} | 49,060 ^{ab} | 56,750 ^b | 57,693 ^{ab} | 16% |
| <i>Collinsella</i> | 3,580 ^a | 3,420 ^a | 3,977 ^a | 2,728 ^b | 4,292 ^a | 4,187 ^a | 1,635 ^b | 4,390 ^a | 4,059 ^a | 5,448 ^a | 19% |
| <i>Eggerthella</i> | 937 ^a | 431 ^b | 770 ^a | 1,588 ^c | 759 ^a | 761 ^a | 403 ^b | 1,068 ^a | 867 ^a | 1,196 ^a | 20% |
| <i>Bacteroides</i> | 11,239 ^{ab} | 10,787 ^{abc} | 8,612 ^a | 12,188 ^{bc} | 11,611 ^{abc} | 15,506 ^c | 19,588 ^d | 7,413 ^e | 11,950 ^a | 1,637 ^f | 19% |
| <i>Parabacteroides</i> | 678 ^{ab} | 622 ^{ab} | 551 ^{ab} | 984 ^a | 709 ^a | 978 ^a | 423 ^{ab} | 472 ^b | 651 ^{ab} | 181 ^c | 25% |
| <i>Prevotella</i> | 967 ^{abc} | 374 ^{ad} | 1,477 ^{bce} | 11,464 ^f | 1,685 ^{be} | 3,717 ^{eg} | 4,868 ^{fg} | 439 ^{ad} | 649 ^{acd} | 332 ^d | 31% |
| <i>Enterococcus</i> | 3,263 ^{ab} | 508 ^c | 2,386 ^{ad} | 2,140 ^d | 2,191 ^d | 2,095 ^d | 2,859 ^{be} | 3,919 ^{ab} | 2,766 ^{ad} | 7,449 ^e | 25% |
| <i>Lactobacillus</i> | 721 ^a | 244 ^b | 451 ^{cd} | 166 ^e | 794 ^a | 632 ^{ac} | 288 ^d | 1,647 ^f | 1,382 ^f | 3,268 ^g | 16% |
| <i>Lactococcus</i> | 3.67 ^{ab} | 1.67 ^a | 11,457.6 ^{2c} | 4.00 ^{ab} | 5.33 ^{ab} | 5.67 ^{ab} | 8.33 ^b | 10.33 ^b | 4.00 ^{ab} | 9.33 ^{ab} | 48% |
| <i>Streptococcus</i> | 2,051 ^{ab} | 1,617 ^{abc} | 2,042 ^a | 1,496 ^c | 2,352 ^a | 2,034 ^{abc} | 1,083 ^{bc} | 2,624 ^a | 2,534 ^a | 2,853 ^a | 18% |
| <i>Clostridiaceae;other</i> | 1,278 ^a | 1,340 ^{ab} | 1,483 ^{ab} | 840 ^c | 1,528 ^{ab} | 1,575 ^{ab} | 568 ^c | 1,809 ^{ab} | 1,883 ^b | 2,006 ^{ab} | 19% |
| <i>Clostridiaceae</i> | 831 ^a | 672 ^a | 758 ^a | 1,240 ^b | 708 ^a | 702 ^a | 553 ^a | 911 ^a | 918 ^a | 1,008 ^a | 17% |

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|--|---------------------|---------------------|---------------------|----------------------|----------------------|----------------------|--------------------------|---------------------|--------------------------|----------------------|------|
| <i>Clostridium</i> | 5,015 ^a | 210 ^{bc} | 414 ^b | 28,146 ^d | 208 ^{bc} | 247 ^{bc} | 7,730 ^a | 184 ^c | 194 ^c | 264 ^c | 28% |
| <i>Pseudoramibacter_</i> <i>Eubacterium</i> | 565 ^{abc} | 436 ^{ab} | 567 ^{ac} | 967 ^d | 593 ^{abc} | 567 ^{abc} | 320 ^b | 788 ^c | 707 ^{ac} | 708 ^{abc} | 12% |
| <i>Blautia</i> | 247 ^{abc} | 282 ^a | 196 ^{bcd} | 114 ^e | 182 ^{bd} | 203 ^{bd} | 235 ^a | 286 ^{abc} | 319 ^{ac} | 199 ^{de} | 19% |
| <i>Coprococcus</i> | 42 ^{ab} | 101 ^c | 38 ^{abd} | 4,309 ^e | 38 ^{abd} | 62 ^a | 20 ^{bd} | 30 ^{bd} | 38 ^{abd} | 28 ^d | 30% |
| <i>Dorea</i> | 147 ^{ab} | 226 ^c | 117 ^{ab} | 3,247 ^d | 103 ^a | 112 ^a | 153 ^{bc} | 119 ^a | 148 ^{ab} | 123 ^a | 20% |
| [<i>Ruminococcus</i>] | 5,475 ^{ab} | 4,161 ^a | 4,556 ^{ab} | 2,512 ^c | 6,153 ^{bd} | 5,852 ^{abd} | 4,510 ^{ab} d | 8,317 ^{de} | 9,693 ^e | 6,976 ^{ab} | 15% |
| Ruminococcaceae | 547 ^a | 654 ^{ab} | 730 ^{ab} | 234 ^c | 634 ^{ab} | 546 ^a | 625 ^b | 690 ^{ab} | 678 ^{ab} | 970 ^{ab} | 17% |
| <i>Faecalibacterium</i> | 154 ^{ab} | 171 ^{abc} | 236 ^{cd} | 67 ^e | 163 ^{ab} | 135 ^a | 155 ^{abc} | 260 ^{bcd} | 207 ^{abc} | 436 ^d | 20% |
| <i>Oscillospira</i> | 71 ^a | 41 ^{ab} | 15 ^c | 721 ^d | 23 ^{ce} | 35 ^{be} | 40 ^{ab} | 18 ^c | 19 ^c | 56 ^b | 27% |
| <i>Ruminococcus</i> | 50 ^{ab} | 63 ^a | 60 ^{ab} | 41 ^b | 69 ^a | 70 ^a | 35 ^{ab} | 75 ^{ab} | 83 ^a | 84 ^{ab} | 23% |
| <i>Dialister</i> | 2,389 ^a | 2,315 ^{ab} | 2,244 ^a | 1,342 ^c | 2,823 ^{ab} | 3,201 ^b | 1,745 ^a | 2,838 ^{ab} | 2,947 ^{ab} | 3,299 ^{ab} | 15% |
| <i>Megasphaera</i> | 735 ^{ab} | 560 ^a | 509 ^{ac} | 402 ^{cd} | 671 ^{ab} | 1,058 ^b | 473 ^a | 298 ^{de} | 229 ^e | 834 ^{ac} | 25% |
| <i>Phascolarctobacterium</i> | 8,980 ^{ab} | 6,968 ^{ab} | 7,434 ^{ab} | 12,177 ^a | 9,064 ^{ab} | 10,968 ^a | 5,272 ^b | 9,490 ^{ab} | 9,426 ^{ab} | 11,752 ^{ab} | 16% |
| <i>Veillonella</i> | 44,034 ab | 63,368 ^c | 30,443 ^a | 17,167 ^{de} | 39,771 ^{ab} | 49,181 ^b | 10,300 d | 24,758 e | 19,449 ^d e | 46,731 ^{ab} | 21% |
| <i>Erysipelotrichaceae;</i> <i>other</i> | 0.00 ^a | 0.00 ^b | 0.33 ^a | 0.00 ^a | 0.00 ^b | 0.33 ^b | 0.33 ^a | 0.00 ^a | 0.00 ^a | 0.33 ^a | 173% |
| <i>Sutterella</i> | 194 ^a | 280 ^b | 219 ^{abc} | 127 ^d | 282 ^{bc} | 281 ^{bc} | 73 ^d | 231 ^a | 223 ^a | 290 ^{ac} | 17% |
| <i>Enterobacteriaceae;</i> <i>other</i> | 28,892 a | 25,176 ^a | 26,703 ^a | 40,038 ^b | 27,391 ^a | 30,327 ^a | 28,061 b | 36,990 ab | 34,887 ^a b | 39,845 ^a | 20% |

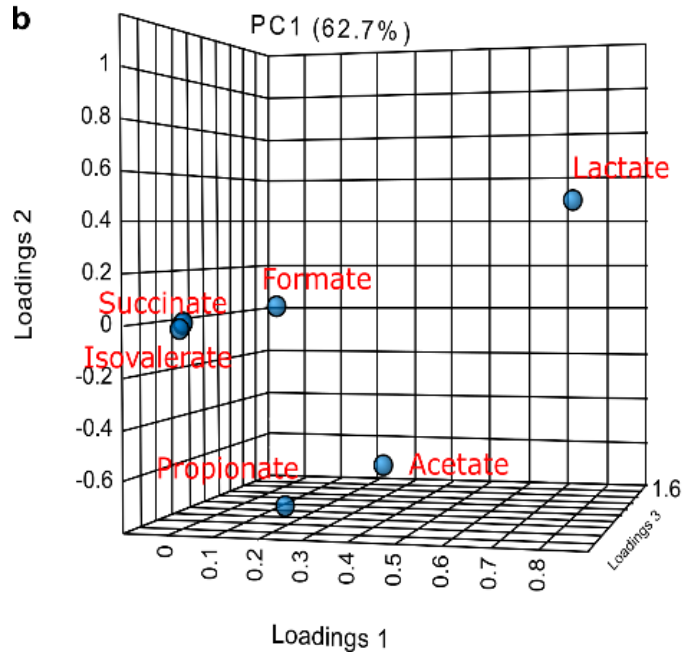
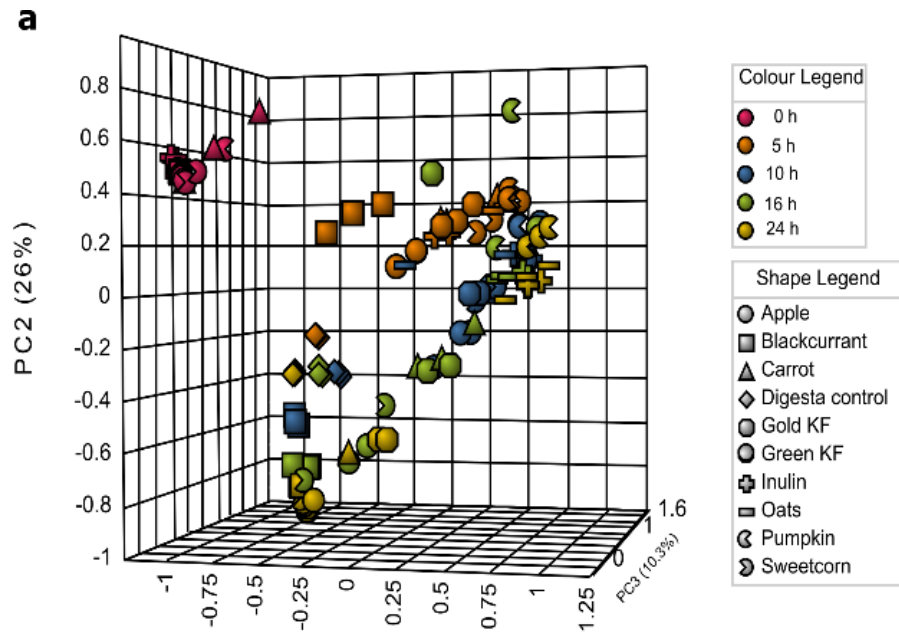
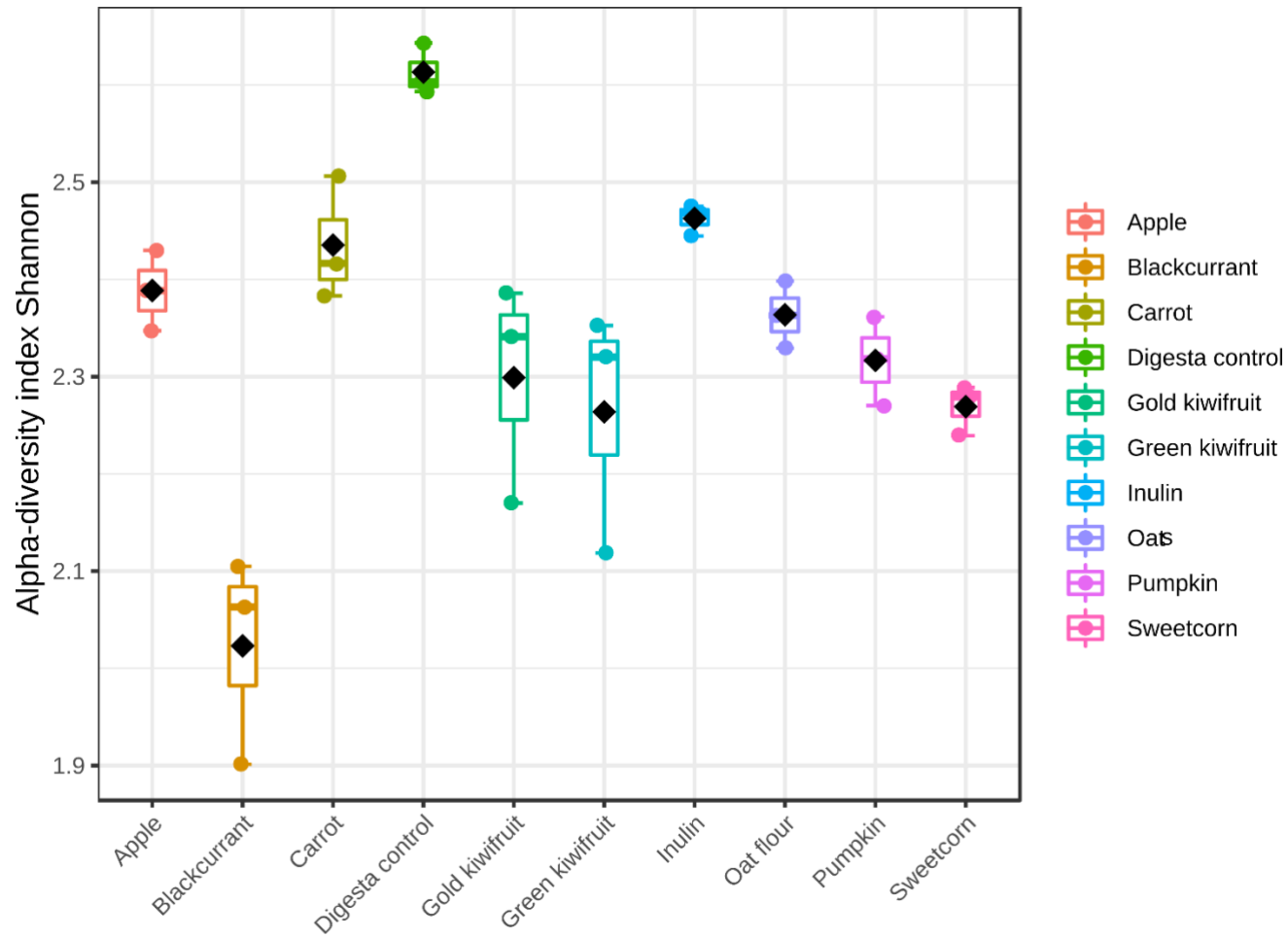


Figure S1. Principal components analysis plot (a) and the loading plot (b) visualising the significant changes in the organic acids (given in red) after fermentation of the foods and the two controls, inulin and water digesta. The colour legend denotes the time points, i.e., 0, 5, 10, 16 and 24 h of fermentation.

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120 **Figure S2.** Shannon index depicting changes in microbiome α -diversity 10 h after fermentation of foods and the two controls, digesta control and inulin. ($P =$
121 0.003, Kruskal-Wallis Test).