**Supplementary Table S1.** Nutrient composition of the control and test diets analysed post-manufacture

|  |  |  |
| --- | --- | --- |
| **Diet** | **Control** | **Test** |
| Ash % | 5.2 | 10.7 |
| Fat % | 12.5 | 11.9 |
| Protein % | 30.0 | 27.2 |
| Total dietary fibre % | 5.8 | 5.1 |
| Ca (g•4184 kJ-1) | 1.7 | 7.1 |
| P (g•4184 kJ-1) | 1.1 | 4.5 |
| Ca:P ratio | 1.6 | 1.6 |
| Na (g•4184 kJ-1) | 1.2 | 1.1 |
| K (g•4184 kJ-1) | 2.6 | 2.5 |
| Mg (mg•4184 kJ-1) | 376 | 541 |
| Fe (mg•4184 kJ-1) | 42.2 | 80.0 |
| Cu (mg•4184 kJ -1) | 2.3 | 2.7 |
| Mn (mg•4184 kJ -1) | 18.5 | 17.7 |
| Zn (mg•4184 kJ -1) | 51 | 53 |
| I (mg•4184 kJ -1) | 1.3 | 1.3 |
| Se (ug•4184 kJ -1) | 107 | 105 |
| Cl (g•4184 kJ -1) | 2.3 | 2.4 |
| Vitamin A (IU•4184 kJ -1) | 3586 | 4541 |
| Vitamin E (IU•4184 kJ -1) | 133 | 167 |
| Thiamin (mg•4184 kJ -1) | 1.7 | 2.0 |
| Riboflavin (mg•4184 kJ -1) | 1.2 | 1.0 |
| Niacin/nicotinic acid (mg•4184 kJ -1) | 13.3 | 11.8 |
| Pyridoxine (mg•4184 kJ -1) | 2.6 | 2.3 |
| Pantothenic acid (mg•4184 kJ -1) | 8.0 | 7.0 |
| Folic acid (ug•4184 kJ -1) | 483 | 358 |
| Cyanocobalamin (ug•4184 kJ -1) | 12 | 12 |
| Choline (g•4184 kJ -1) | 669 | 583 |
| Vitamin D3 (IU•1000 kcal -1) | 208 | 200 |
| Base excess (MEq•kg-1)\* | 175 | 175 |
|  |  |  |
| \*Base excess = ([Ca2+]+[Mg2+]+[Na+]+[K+])-([PO43-]+[SO42-]+[Cl-]) | | |

Table from Stockman *et al*., 2017, BrJNutr 117:1235. Diets were manufactured in single batches and diet analysis performed at the Mars Petcare Europe Central Laboratory. The analysis used 3 samples (each sample analysed in triplicate) from different parts of a 2kg batch of diet. The values here are the average of those data.

**Supplementary Table S2.** Effect significance thresholds. The table lists all effects that had more metabolites meeting the significance cut-off criteria. Most reflect changes from the fasted state in the postprandial (PP) time course. Note the time and diet effect in fasted samples at T6 and T7 compared to T1 discussed in more detail in the text.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Significance thresholds** | | | | **p < 0.05** | **p < 0.01** |
| **Description** | **Effect name** | **In** | **Type** |  |  |
| 4H PP vs fasted in Test Group T5 | 4H PP vs fasted | Test Group, T5 | Postprandial vs. fasted | **74** | **62** |
| 4H PP vs fasted in Test Group T1 | 4H PP vs fasted | Test Group, T1 | Postprandial vs. fasted | **63** | **53** |
| Intake | Intake | All | INTAKE | **62** | **38** |
| 3H PP vs fasted in Test Group T5 | 3H PP vs fasted | Test Group, T5 | Postprandial vs. fasted | **60** | **48** |
| 4H PP vs fasted in Test Group T2 | 4H PP vs fasted | Test Group, T2 | Postprandial vs. fasted | **58** | **47** |
| 2H PP vs fasted in Test Group T5 | 2H PP vs fasted | Test Group, T5 | Postprandial vs. fasted | **57** | **43** |
| 3H PP vs fasted in Test Group T1 | 3H PP vs fasted | Test Group, T1 | Postprandial vs. fasted | **56** | **46** |
| 3H PP vs fasted in Test Group T2 | 3H PP vs fasted | Test Group, T2 | Postprandial vs. fasted | **54** | **44** |
| 2H PP vs fasted in Test Group T1 | 2H PP vs fasted | Test Group, T1 | Postprandial vs. fasted | **50** | **44** |
| 2H PP vs fasted in Test Group T2 | 2H PP vs fasted | Test Group, T2 | Postprandial vs. fasted | **46** | **38** |
| 1H PP vs fasted in Test Group T5 | 1H PP vs fasted | Test Group, T5 | Postprandial vs. fasted | **23** | **17** |
| T7 vs T1 in fasted Test Group | T7 vs T1 | Fasted, Test Group | Time and Diet | **19** | **9** |
| T6 vs T1 in fasted Test Group | T6 vs T1 | Fasted, Test Group | Time and Diet | **18** | 4 |
| T5 vs T1 in Test Group 1H PP | T5 vs T1 | 1H PP, Test Group | Postprandial metabolome | **18** | **6** |
| 1H PP vs fasted in Test Group T1 | 1H PP vs fasted | Test Group, T1 | Postprandial vs. fasted | 15 | **8** |
| 1H PP vs fasted in Test Group T2 | 1H PP vs fasted | Test Group, T2 | Postprandial vs. fasted | 11 | **9** |

**Supplementary Table S3.** Metabolites from fasted samples differing to T1 (cut-off criteria of unadjusted p<0.05 and at least a 20% change from T1 on at least 3 (for test diet) or 2 (for control diet) occasions). Increases of >20% are dark red, white text, decreases of >20% are dark blue, white text. Values <20% but significant (unadjusted p<0.05) are in orange, black text. Metabolites in bold were significantly different (Table 1).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Comparison** | **Time and diet** | | | | | | **Time** | | | | |
|  |  | **Group** | **Fasted, Test** | | | | | | **Fasted, Control** | | | | |
|  |  | **Contrast** | **T2 vs T1** | **T3 vs T1** | **T4 vs T1** | **T5 vs T1** | **T6 vs T1** | **T7 vs T1** | **T3 vs T1** | **T4 vs T1** | **T5 vs T1** | **T6 vs T1** | **T7 vs T1** |
| **Ontology** | **Ontology Sub-group** | **Metabolite** | **Ratio** | **Ratio** | **Ratio** | **Ratio** | **Ratio** | **Ratio** | **Ratio** | **Ratio** | **Ratio** | **Ratio** | **Ratio** |
| Amino acids | Amino acids, basic | **Asparagine** | 1.31 | 1.23 | 1.29 | 1.20 | 1.21 | 1.28 | 1.19 | 1.15 | 1.08 | 1.06 | 1.18 |
| Amino acids | Amino acids, basic | **Lysine** | 1.17 | 1.11 | 1.21 | 1.21 | 1.28 | 1.24 | 0.96 | 1.13 | 0.99 | 1.02 | 1.05 |
| Amino acids | Amino acids, neutral | **Serine** | 1.25 | 1.24 | 1.17 | 1.13 | 1.20 | 1.20 | 1.00 | 1.13 | 1.00 | 1.02 | 1.00 |
| Amino acids | Amino acids, neutral | **Threonine** | 1.13 | 1.19 | 1.10 | 1.21 | 1.28 | 1.24 | 0.99 | 1.18 | 1.05 | 1.18 | 1.08 |
| Amino acids | Amino acids, S-containing | Methionine | 1.09 | 1.12 | 1.02 | 1.10 | 1.17 | 1.21 | 1.04 | 1.17 | 1.07 | 1.23 | 1.20 |
| Amino acids | Amino acids, S-containing | Taurine | 1.27 | 1.19 | 1.26 | 1.18 | 1.24 | 1.25 | 1.24 | 1.12 | 1.11 | 1.10 | 1.17 |
| Amino acids related | Methyl cycle | **Sarcosine** | 1.00 | 0.71 | 0.84 | 0.76 | 0.81 | 0.79 | 0.93 | 0.91 | 0.88 | 0.97 | 0.99 |
| Amino acids related | Tryptophan metabolism | 3-Hydroxyindole (additional: 3-Indoxylsulfate) | 1.00 | 0.77 | 1.08 | 0.99 | 0.80 | 0.79 | 0.74 | 0.74 | 0.76 | 0.81 | 0.88 |
| Amino acids related | Tryptophan metabolism | 3-Indoxylsulfate | 1.07 | 1.02 | 1.09 | 1.07 | 1.02 | 1.14 | 0.81 | 0.60 | 0.79 | 0.87 | 0.61 |
| Amino acids related | Tryptophan metabolism | Kynurenic acid | 1.24 | 0.90 | 1.00 | 1.19 | 1.35 | 1.19 | 1.01 | 1.36 | 1.31 | 1.35 | 1.32 |
| Amino acids related | Urea cycle and related | Citrulline | 0.98 | 1.22 | 1.11 | 1.21 | 1.21 | 1.17 | 1.20 | 1.13 | 1.14 | 1.14 | 1.23 |
| Amino acids related | Urea cycle and related | **Ornithine (additional: Arginine, Citrulline)** | 1.05 | 1.22 | 1.24 | 1.16 | 1.21 | 1.25 | 1.10 | 1.18 | 1.10 | 1.08 | 1.30 |
| Amino acids related | Urea cycle and related | Urea | 0.69 | 0.64 | 0.63 | 0.63 | 0.74 | 0.74 | 1.05 | 1.02 | 1.20 | 1.38 | 1.29 |
| Carbohydrates and related | Disaccharides | Sucrose | 0.90 | 1.24 | 0.64 | 0.77 | 0.82 | 1.24 | 1.32 | 1.93 | 1.63 | 1.39 | 1.94 |
| Complex lipids, fatty acids and related | Fatty acids, poly-unsaturated | **Docosatetraenoic acid (C22:cis[7,10,13,16]4)** | 0.87 | 0.99 | 0.79 | 0.75 | 0.73 | 0.70 | 0.89 | 0.82 | 0.79 | 0.74 | 0.79 |
| Complex lipids, fatty acids and related | Fatty acids, poly-unsaturated | **Eicosapentaenoic acid (C20:cis[5,8,11,14,17]5)** | 1.03 | 1.05 | 0.97 | 1.16 | 1.21 | 1.35 | 0.94 | 1.06 | 1.08 | 1.52 | 1.28 |
| Complex lipids, fatty acids and related | Fatty alcohols | Pentadecanol | 1.02 | 0.89 | 0.86 | 0.78 | 0.75 | 0.78 | 0.89 | 0.83 | 0.85 | 0.99 | 1.00 |
| Complex lipids, fatty acids and related | Lysophosphatidylcholines | **Lysophosphatidylcholine (C18:2)** | 1.04 | 0.98 | 1.00 | 1.06 |  | 1.21 | 1.05 | 1.07 | 1.17 | 1.24 | 1.23 |
| Complex lipids, fatty acids and related | Triacylglycerols | TAG (C18:2,C18:3) | 1.02 | 1.01 | 1.00 | 1.01 | 1.12 | 1.05 | 1.17 | 1.22 | 1.28 | 1.24 | 1.30 |
| Miscellaneous | Miscellaneous | 1,4-Hydroquinone | 0.85 | 1.21 | 1.03 | 0.86 | 0.84 | 0.77 | 0.56 | 0.53 | 0.70 | **0.45** | **0.47** |
| Unknown | Unknown lipid | **Unknown lipid (69600024)** | 1.04 | 1.17 | 0.96 | 1.16 | 1.34 | 1.36 | 0.94 | 0.93 | 0.97 | 1.35 | 1.32 |
| Unknown | Unknown polar | Unknown polar (39601551) | 0.90 | 1.09 | 1.15 | 1.21 | 1.03 | 1.19 | 1.62 | 1.53 | 1.46 | 1.26 | 1.62 |
| Vitamins, cofactors and related | Acyl-carriers and related | Pantothenic acid | 0.98 | 0.75 | 0.79 | 0.93 | 0.89 | 0.78 | 1.09 | 0.85 | 1.05 | 1.10 | 1.11 |

**Supplementary Table S4.** Legend to dendogram Supplementary Fig. 6(a)



**Supplementary Table S5.** Legend to dendogram Supplementary Fig. S6(b)

