**Effects of fermented soybean meal** **on carbon and nitrogen metabolism in the large intestine of piglets**

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**Table S1** Ingredients and chemical compositions of the diets

|  |  |  |  |
| --- | --- | --- | --- |
| Ingredients (%) | Control | WFSM | DFSM |
| Corn | 62.90 | 58.62 | 63.10 |
| Puffing soybean | 6.00 | 6.00 | 6.00 |
| WFSM | 0.00 | 7.33 | 0.00 |
| DFSM | 0.00 | 0.00 | 5.00 |
| Fish meal | 2.50 | 2.50 | 2.50 |
| Soybean oil | 2.50 | 3.90 | 2.50 |
| Soybean meal | 22.10 | 17.65 | 16.90 |
| Premix a | 4.00 | 4.00 | 4.00 |
| Total | 100.00 | 100.00 | 100.00 |
| Nutrient levels (%) b |
| Digestible energy (MJ/kg) | 14.52 | 14.52 | 14.52 |
| TOC | 52.59 | 52.59 | 52.59 |
| CP | 18.87 | 18.88 | 18.88 |
| Calcium | 0.79 | 0.79 | 0.79 |
| Phosphorus | 0.64 | 0.63 | 0.64 |
| Available phosphorus | 0.42 | 0.41 | 0.42 |
| Lysine | 1.35 | 1.35 | 1.34 |
| Threonine | 0.81 | 0.81 | 0.81 |
| Methionine + Cystine | 0.67 | 0.68 | 0.68 |

a Provided the following (kg−1 diet): vitamin A, 3500 IU; vitamin D3, 1500 IU; vitamin E, 3 mg; vitamin K3, 1 mg; vitamin B1, 4 mg; vitamin B2, 2.5 mg; vitamin B3, 15 mg; vitamin B5, 5.5 mg; vitamin B6, 0.02 mg; vitamin B7, 50 mg; vitamin B9, 0.05 mg; vitamin B12, 35 mg; vitamin C, 300 mg; iron, 165 mg; zinc, 165 mg; manganese, 30 mg; copper, 16 mg; iodine, 0.5 mg; and selenium, 0.15 mg. WFSM, DFSM, TOC and CP represent wet-fermented soybean meal, dry-fermented soybean meal, total organic carbon and crude protein, respectively.

b Calculated values.

**Table S2** Variation of metabolites in the large intestine of piglets

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Metabolites | RT(min) | WFSM-M/DFSM-M | WFSM-S/DFSM-S | WFSM-X/DFSM-X | WFSM-Z/DFSM-Z |
| VIP | *P* value | Fold change | VIP | *P* value | Fold change | VIP | *P* value | Fold change | VIP | *P* value | Fold change |
| 1,3-Diaminopropane | 11.97 |  |  |  |  |  |  |  |  |  | 3.02 | 0.05 | 0.55 |
| 1-Aminocyclopropanecarboxylic acid | 6.16 |  |  |  |  |  |  |  |  |  | 1.44 | 0.00 | 4.54 |
| 2,6-Diaminopimelic acid | 10.32 |  |  |  |  |  |  | 2.95 | 0.00 | 0.12 |  |  |  |
| 2-Amino-3-(4-hydroxyphenyl) propanoic acid | 13.41 |  |  |  | 2.24 | 0.05 | 3.42 | 2.88 | 0.01 | 3.42 | 3.21 | 0.01 | 4.04 |
| 2-Furoic acid | 6.09 | 1.06 | 0.00 | 0.16 |  |  |  |  |  |  |  |  |  |
| 2-Hydroxybiphenyl | 6.33 | 1.95 | 0.04 | 0.00 | 2.21 | 0.05 | 0.29 |  |  |  |  |  |  |
| 2-Ketoadipate | 6.65 |  |  |  |  |  |  |  |  |  | 1.15 | 0.00 | 0.36 |
| 3,4-Dihydroxyphenylglycol | 8.06 |  |  |  |  |  |  | 1.06 | 0.00 | 1.91 |  |  |  |
| 3,5-Dihydroxy phenylglycine | 5.59 | 2.47 | 0.00 | 0.00 |  |  |  |  |  |  |  |  |  |
| 3-Aminoisobutyric acid | 6.14 |  |  |  |  |  |  | 1.04 | 0.00 | 1.47 | 1.17 | 0.00 | 1.40 |
| 3-β-Hydroxy-5-β-pregnane-20-one | 18.51 |  |  |  | 2.96 | 0.00 | 6.54 |  |  |  |  |  |  |
| 4-Aminobutanoate | 10.37 | 1.15 | 0.00 | 6.99 |  |  |  |  |  |  |  |  |  |
| 4-Hydroxyphenylethanol | 8.62 | 1.88 | 0.04 | 0.00 |  |  |  |  |  |  |  |  |  |
| 5-Hydroxyindole-3-acetic acid | 19.87 |  |  |  | 1.05 | 0.05 | 0.34 |  |  |  |  |  |  |
| 8-Aminocaprylic acid | 7.51 |  |  |  |  |  |  |  |  |  | 1.24 | 0.00 | 0.58 |
| Aminomalonic acid | 9.56 |  |  |  |  |  |  | 1.14 | 0.00 | 0.25 | 1.42 | 0.00 | 0.21 |
| Caprylic acid | 6.92 | 2.00 | 0.04 | 0.26 |  |  |  |  |  |  |  |  |  |
| Carbazole | 5.86 | 2.07 | 0.04 | 0.00 |  |  |  |  |  |  |  |  |  |
| Citramalic acid | 10.96 |  |  |  |  |  |  |  |  |  | 1.18 | 0.01 | 0.27 |
| Creatine | 10.69 |  |  |  |  |  |  | 2.95 | 0.00 | 0.13 |  |  |  |
| Cumic acid | 28.94 |  |  |  | 2.23 | 0.03 | 5.45 |  |  |  |  |  |  |
| DL-Dihydrosphingosine | 5.89 |  |  |  |  |  |  | 2.53 | 0.03 | 0.12 |  |  |  |
| D-Talose | 15.83 |  |  |  | 1.35 | 0.00 | 0.13 |  |  |  |  |  |  |
| Ethanolamine | 6.93 |  |  |  | 1.23 | 0.00 | 0.20 |  |  |  |  |  |  |
| Flavone | 12.73 |  |  |  |  |  |  |  |  |  | 2.63 | 0.04 | 4.02 |
| Fructose-6-phosphate | 11.87 | 3.03 | 0.00 | 0.00 |  |  |  |  |  |  |  |  |  |
| Galactonic acid | 16.08 |  |  |  |  |  |  | 2.92 | 0.00 | 0.17 |  |  |  |
| Galactose | 19.45 | 2.34 | 0.01 | 0.06 |  |  |  |  |  |  |  |  |  |
| Gluconic acid | 17.50 |  |  |  | 2.33 | 0.04 | 0.13 |  |  |  |  |  |  |
| Glucose | 19.67 |  |  |  |  |  |  |  |  |  | 1.01 | 0.00 | 0.43 |
| Glutaconic acid | 24.40 | 1.87 | 0.04 | 0.33 |  |  |  |  |  |  |  |  |  |
| Glutamine | 12.92 | 1.38 | 0.00 | 13.06 | 1.37 | 0.00 | 6.86 | 1.12 | 0.01 | 2.67 | 1.78 | 0.00 | 10.89 |
| Glycocyamine | 11.18 |  |  |  |  |  |  | 2.32 | 0.03 | 0.21 |  |  |  |
| Gly-pro | 17.25 |  |  |  |  |  |  |  |  |  | 1.11 | 0.00 | 0.00 |
| Guanidinoacetate | 16.15 |  |  |  |  |  |  | 2.20 | 0.05 | 0.30 |  |  |  |
| Guanosine | 26.20 |  |  |  |  |  |  | 1.03 | 0.00 | 0.00 |  |  |  |
| Hydantoin | 22.84 | 2.06 | 0.03 | 0.14 |  |  |  |  |  |  |  |  |  |
| Hypoxanthine | 14.48 |  |  |  |  |  |  | 1.05 | 0.00 | 0.34 |  |  |  |
| Iminodiacetic acid | 9.57 |  |  |  |  |  |  |  |  |  | 1.09 | 0.00 | 0.38 |
| Inosine | 24.07 |  |  |  |  |  |  | 1.32 | 0.00 | 0.19 |  |  |  |
| Isopropyl-β-D-thiogalactopyranoside | 17.23 |  |  |  | 2.96 | 0.00 | 0.00 |  |  |  |  |  |  |
| Lactic acid | 8.81 |  |  |  |  |  |  |  |  |  | 1.01 | 0.00 | 0.41 |
| Leucrose | 23.68 |  |  |  |  |  |  | 3.09 | 0.00 | 5.94 |  |  |  |
| L-Gulonolactone | 14.33 | 2.01 | 0.05 | 0.26 |  |  |  |  |  |  |  |  |  |
| Linolenic acid | 17.86 | 2.27 | 0.00 | 0.10 |  |  |  |  |  |  |  |  |  |
| Maltotriitol | 25.69 | 2.19 | 0.04 | 0.00 | 3.11 | 0.00 | 0.00 | 3.34 | 0.00 | 0.00 | 3.59 | 0.00 | 0.00 |
| Mannitol | 16.46 |  |  |  |  |  |  |  |  |  | 2.41 | 0.05 | 3.11 |
| Methyl Phosphate | 5.71 |  |  |  |  |  |  |  |  |  | 1.02 | 0.02 | 0.40 |
| Myristic Acid | 15.24 |  |  |  |  |  |  | 1.03 | 0.00 | 0.00 |  |  |  |
| N-Acetyl-D-galactosamine | 18.60 | 2.60 | 0.00 | 0.13 |  |  |  |  |  |  |  |  |  |
| N-Ethylmaleamic acid | 13.64 | 2.23 | 0.01 | 0.21 |  |  |  |  |  |  |  |  |  |
| Nicotianamine | 20.07 |  |  |  |  |  |  |  |  |  | 2.64 | 0.05 | 3.61 |
| Norvaline | 21.92 | 1.77 | 0.04 | 0.00 |  |  |  |  |  |  |  |  |  |
| Orotic acid | 8.91 | 2.06 | 0.03 | 0.12 |  |  |  |  |  |  |  |  |  |
| Panthenol | 8.35 |  |  |  |  |  |  |  |  |  | 1.11 | 0.00 | 0.00 |
| Phytol | 16.80 |  |  |  | 2.40 | 0.03 | 8.63 |  |  |  |  |  |  |
| Piceatannol | 7.39 | 2.64 | 0.00 | 0.01 | 2.30 | 0.03 | 0.12 |  |  |  |  |  |  |
| Pyridoxine | 12.77 |  |  |  |  |  |  | 1.12 | 0.00 | 0.26 | 1.23 | 0.03 | 0.28 |
| Quinic acid | 12.84 | 2.07 | 0.05 | 0.27 |  |  |  |  |  |  |  |  |  |
| Ribonic acid | 11.81 |  |  |  | 2.02 | 0.04 | 0.21 |  |  |  |  |  |  |
| Sarcosine | 5.22 |  |  |  |  |  |  |  |  |  | 1.07 | 0.02 | 0.32 |
| Sophorose | 17.95 |  |  |  | 2.51 | 0.02 | 0.07 |  |  |  |  |  |  |
| Tagatose | 16.60 |  |  |  |  |  |  |  |  |  | 1.10 | 0.00 | 518217.82 |
| Threitol | 10.02 |  |  |  |  |  |  |  |  |  | 1.14 | 0.00 | 3.29 |
| Urocanic acid | 17.55 |  |  |  |  |  |  | 1.22 | 0.00 | 0.00 |  |  |  |
| β-Alanine | 5.93 |  |  |  |  |  |  |  |  |  | 1.03 | 0.00 | 2.25 |
| Metabolites | RT(min) | DFSM-M/Control-M | DFSM-S/Control-S | DFSM-X/Control-X | DFSM-Z/Control-Z |
| VIP | *P* value | Fold change | VIP | *P* value | Fold change | VIP | *P* value | Fold change | VIP | *P* value | Fold change |
| 1-Hydroxy-2-naphthoic acid | 18.29 |  |  |  |  |  |  |  |  |  | 1.03 | 0.00 | 4.87 |
| 2-Amino-3-(4-hydroxyphenyl) propanoic acid | 13.41 |  |  |  |  |  |  | 2.90 | 0.01 | 0.30 | 2.51 | 0.01 | 0.26 |
| 2-Aminoethanethiol | 19.95 |  |  |  |  |  |  | 2.43 | 0.04 | 0.00 |  |  |  |
| 2-Hydroxy-3-isopropylbutanedioic acid | 13.29 |  |  |  | 2.88 | 0.00 | 208227.68 |  |  |  |  |  |  |
| 2-Monopalmitin | 18.17 |  |  |  |  |  |  | 2.28 | 0.05 | 0.26 |  |  |  |
| 3,4-Dihydroxymandelic acid | 16.49 |  |  |  |  |  |  |  |  |  | 2.03 | 0.05 | 0.34 |
| 3-Methylamino-1,2-propanediol | 6.73 |  |  |  | 2.35 | 0.04 | 0.15 |  |  |  |  |  |  |
| 3-Phenylcatechol | 17.69 |  |  |  |  |  |  | 2.60 | 0.04 | 2.85 |  |  |  |
| 3-Phenyllactic acid | 11.10 |  |  |  |  |  |  | 1.07 | 0.00 | 3.38 | 1.25 | 0.00 | 7.93 |
| 4-Aminobutanoate | 10.37 |  |  |  | 2.59 | 0.00 | 43.36 |  |  |  |  |  |  |
| 4-Hydroxybutyrate | 6.56 | 1.02 | 0.02 | 5.35 |  |  |  |  |  |  | 1.04 | 0.00 | 4.11 |
| 4-Nitrocatechol | 11.47 |  |  |  |  |  |  |  |  |  | 2.20 | 0.04 | 2.38 |
| 5-Hydroxyindole-2-carboxylic acid | 21.51 |  |  |  |  |  |  | 1.35 | 0.02 | 0.24 | 1.10 | 0.03 | 0.33 |
| 6-Hydroxy caproic acid | 8.11 | 2.25 | 0.03 | 0.23 |  |  |  |  |  |  |  |  |  |
| 6-hydroxy caproic acid trimer | 17.38 |  |  |  |  |  |  |  |  |  | 2.14 | 0.04 | 0.21 |
| Androsterone | 30.70 | 3.26 | 0.00 | 0.00 |  |  |  |  |  |  | 1.08 | 0.03 | 9.44 |
| Cholic acid | 31.22 | 1.14 | 0.01 | 0.10 |  |  |  |  |  |  |  |  |  |
| Cis-gondoic acid | 20.04 |  |  |  |  |  |  | 3.09 | 0.00 | 502810.83 | 2.62 | 0.00 | 422445.72 |
| Citramalic acid | 10.96 |  |  |  | 1.34 | 0.00 | 8.26 | 1.08 | 0.03 | 5.09 | 1.31 | 0.00 | 10.94 |
| Creatine | 10.69 | 2.30 | 0.04 | 0.30 |  |  |  |  |  |  |  |  |  |
| Creatinedegr | 22.53 |  |  |  |  |  |  | 2.44 | 0.04 | 0.18 |  |  |  |
| Cresol | 5.47 |  |  |  | 1.10 | 0.01 | 0.14 |  |  |  |  |  |  |
| Cumic Acid | 28.94 |  |  |  | 2.21 | 0.03 | 0.16 |  |  |  |  |  |  |
| Deoxyadenosine | 24.80 | 2.12 | 0.04 | 0.00 |  |  |  |  |  |  |  |  |  |
| Deoxyguanosine | 26.30 |  |  |  |  |  |  |  |  |  | 1.14 | 0.03 | 0.06 |
| D-Erythronolactone | 6.46 | 1.01 | 0.03 | 6.11 | 1.04 | 0.01 | 4.35 | 1.03 | 0.01 | 3.33 | 1.21 | 0.00 | 7.47 |
| D-Erythro-sphingosine | 21.20 |  |  |  | 1.41 | 0.00 | 0.14 |  |  |  |  |  |  |
| DL-p-Hydroxyphenyllactic acid | 16.00 |  |  |  |  |  |  |  |  |  | 1.19 | 0.00 | 6.71 |
| D-Talose | 15.83 |  |  |  | 1.13 | 0.00 | 0.28 |  |  |  | 1.31 | 0.01 | 0.18 |
| Erythrose | 13.55 |  |  |  |  |  |  | 3.07 | 0.01 | 0.29 | 2.68 | 0.00 | 0.12 |
| Galactonic acid | 16.08 |  |  |  |  |  |  |  |  |  | 2.33 | 0.00 | 0.18 |
| Glucose-6-phosphate | 21.61 |  |  |  |  |  |  |  |  |  | 1.07 | 0.04 | 7.38 |
| Glutamine | 12.92 |  |  |  | 1.67 | 0.00 | 15.81 | 1.45 | 0.00 | 11.86 |  |  |  |
| Glutaraldehyde | 7.11 |  |  |  |  |  |  | 2.84 | 0.00 | 4.74 |  |  |  |
| Glycine | 7.52 |  |  |  |  |  |  | 1.47 | 0.01 | 0.29 |  |  |  |
| Isomaltose | 27.08 |  |  |  |  |  |  | 3.09 | 0.01 | 0.25 |  |  |  |
| Lactic acid | 8.81 | 2.18 | 0.04 | 32342.79 |  |  |  |  |  |  |  |  |  |
| Lactitol | 12.82 | 2.80 | 0.00 | 0.00 |  |  |  | 3.70 | 0.00 | 0.00 | 2.53 | 0.01 | 0.24 |
| L-dopa | 8.33 |  |  |  |  |  |  |  |  |  | 1.98 | 0.04 | 0.00 |
| L-Glutamic acid | 10.40 | 2.58 | 0.04 | 0.31 |  |  |  |  |  |  |  |  |  |
| Maltotriose | 24.26 |  |  |  | 1.72 | 0.00 | 0.05 | 2.13 | 0.05 | 0.03 |  |  |  |
| Mannitol | 16.46 |  |  |  |  |  |  |  |  |  | 1.88 | 0.05 | 0.30 |
| Methoxamedrine | 7.33 |  |  |  | 3.04 | 0.00 | 0.13 |  |  |  |  |  |  |
| N-Acetylisatin | 20.54 |  |  |  | 2.18 | 0.04 | 3.86 |  |  |  | 2.49 | 0.00 | 0.18 |
| N-Acetyl-β-D-mannosamine | 18.71 |  |  |  |  |  |  | 3.27 | 0.00 | 0.00 | 2.84 | 0.00 | 0.00 |
| Nicotianamine | 20.07 |  |  |  | 3.63 | 0.00 | 386073.63 |  |  |  | 2.17 | 0.04 | 0.25 |
| N-Methylanthranilic acid | 23.34 | 2.57 | 0.00 | 6.09 |  |  |  |  |  |  |  |  |  |
| N-ω-Acetylhistamine | 5.87 | 2.34 | 0.04 | 0.34 |  |  |  |  |  |  |  |  |  |
| Oxalic acid | 5.54 | 1.28 | 0.01 | 20.39 | 1.06 | 0.01 | 4.39 |  |  |  | 1.16 | 0.00 | 5.77 |
| Panthenol | 8.35 |  |  |  |  |  |  | 3.07 | 0.00 | 0.00 |  |  |  |
| Phytanic acid | 15.96 |  |  |  |  |  |  |  |  |  | 2.28 | 0.04 | 0.00 |
| Sophorose | 17.95 |  |  |  | 1.28 | 0.00 | 0.18 | 1.38 | 0.04 | 0.36 | 2.84 | 0.01 | 0.16 |
| Tyramine | 10.83 |  |  |  | 2.53 | 0.02 | 3.50 |  |  |  |  |  |  |
| Metabolites | RT(min) | WFSM-M/Control-M | WFSM-AS/Control-S | WFSM-X/Control-X | WFSM-Z/Control-Z |
| VIP | *P* value | Fold change | VIP | *P* value | Fold change | VIP | *P* value | Fold change | VIP | *P* value | Fold change |
| 1,2-Cyclohexanedione | 11.68 |  |  |  | 2.21 | 0.00 | 216204.71 |  |  |  |  |  |  |
| 1,3-Diaminopropane | 11.97 |  |  |  |  |  |  |  |  |  | 3.00 | 0.04 | 0.41 |
| 2,3-Dihydroxypyridine | 7.97 |  |  |  |  |  |  | 2.87 | 0.00 | 0.00 |  |  |  |
| 2,3-Dimethylsuccinic acid | 7.72 |  |  |  |  |  |  |  |  |  | 1.23 | 0.01 | 3.19 |
| 2-Aminoethanethiol | 19.95 |  |  |  |  |  |  |  |  |  | 1.15 | 0.00 | 0.01 |
| 2-Hydroxy-3-isopropylbutanedioic acid | 13.29 |  |  |  |  |  |  | 2.51 | 0.04 | 0.18 |  |  |  |
| 2-Ketoadipate | 6.65 |  |  |  |  |  |  |  |  |  | 1.29 | 0.00 | 0.26 |
| 2-Monopalmitin | 18.17 |  |  |  | 2.47 | 0.00 | 0.00 | 3.71 | 0.00 | 0.00 |  |  |  |
| 3-Aminoisobutyric acid | 6.14 |  |  |  |  |  |  | 1.01 | 0.00 | 1.70 | 1.16 | 0.00 | 1.32 |
| 3-Hydroxypyridine | 5.27 | 1.92 | 0.05 | 0.29 |  |  |  |  |  |  |  |  |  |
| 3-Methylamino-1,2-propanediol | 6.73 |  |  |  |  |  |  | 2.64 | 0.04 | 0.27 |  |  |  |
| 3-Phenyllactic acid | 11.10 |  |  |  |  |  |  | 1.15 | 0.00 | 4.06 | 1.44 | 0.00 | 5.02 |
| 3-β-Hydroxy-5-β-pregnane-20-one | 18.51 |  |  |  | 2.90 | 0.00 | 595137.88 |  |  |  | 2.75 | 0.04 | 3.21 |
| 4-Aminobutanoate | 10.37 | 1.75 | 0.00 | 21.42 | 3.06 | 0.00 | 68.07 |  |  |  |  |  |  |
| 4-Hydroxybenzoic acid | 10.11 |  |  |  |  |  |  |  |  |  | 1.07 | 0.00 | 262256.61 |
| 4-Hydroxybutyrate | 6.56 |  |  |  |  |  |  |  |  |  | 1.46 | 0.00 | 5.04 |
| 4-Hydroxyphenylethanol | 8.62 | 2.07 | 0.00 | 0.00 |  |  |  |  |  |  |  |  |  |
| 5-Aminoimidazole-4-carboxamide | 14.26 | 2.07 | 0.00 | 0.00 |  |  |  |  |  |  |  |  |  |
| 5-Aminopentanoate | 8.97 |  |  |  |  |  |  | 1.13 | 0.00 | 3.91 |  |  |  |
| 5-Hydroxyindole-2-carboxylic acid | 21.51 |  |  |  |  |  |  | 1.29 | 0.00 | 0.20 | 1.65 | 0.03 | 0.21 |
| 5-Hydroxytryptophan | 15.11 |  |  |  |  |  |  |  |  |  | 1.12 | 0.00 | 3.17 |
| 6-Hydroxy caproic acid dimer | 12.79 |  |  |  | 1.92 | 0.04 | 4.40 |  |  |  |  |  |  |
| 6-Hydroxy caproic acid trimer | 17.38 |  |  |  | 2.30 | 0.00 | 0.07 |  |  |  |  |  |  |
| Aminomalonic acid | 9.56 | 1.05 | 0.00 | 0.12 |  |  |  | 1.20 | 0.00 | 0.23 | 1.03 | 0.00 | 0.44 |
| Androsterone | 30.70 | 2.59 | 0.00 | 0.00 |  |  |  |  |  |  |  |  |  |
| Azelaic acid | 14.36 | 2.25 | 0.00 | 0.06 |  |  |  |  |  |  |  |  |  |
| Carbazole | 5.86 | 2.16 | 0.00 | 0.00 | 2.23 | 0.00 | 0.10 |  |  |  |  |  |  |
| Cellobiotol | 24.72 |  |  |  |  |  |  |  |  |  | 1.11 | 0.00 | 3263342.74 |
| Cholic acid | 31.22 | 1.07 | 0.00 | 0.06 |  |  |  |  |  |  |  |  |  |
| Citramalic acid | 10.96 |  |  |  |  |  |  | 1.04 | 0.00 | 4.05 | 1.09 | 0.01 | 2.98 |
| Cortexolone | 21.71 |  |  |  | 1.94 | 0.05 | 3.60 |  |  |  |  |  |  |
| Creatine | 10.69 |  |  |  |  |  |  | 2.84 | 0.00 | 0.08 |  |  |  |
| Creatinedegr | 22.53 | 1.67 | 0.04 | 0.00 |  |  |  |  |  |  |  |  |  |
| Cumic Acid | 28.94 | 1.65 | 0.04 | 2.05 |  |  |  |  |  |  |  |  |  |
| Cycloleucine | 6.31 |  |  |  |  |  |  |  |  |  | 1.10 | 0.00 | 0.17 |
| Cytosin | 10.27 |  |  |  |  |  |  |  |  |  | 1.01 | 0.00 | 0.44 |
| Deoxyadenosine | 24.80 | 1.73 | 0.04 | 0.00 | 2.27 | 0.00 | 0.10 |  |  |  |  |  |  |
| Deoxyguanosine | 26.30 | 1.57 | 0.04 | 0.00 |  |  |  |  |  |  |  |  |  |
| D-Erythronolactone | 6.46 | 1.03 | 0.00 | 9.03 | 1.13 | 0.00 | 8.17 | 1.20 | 0.00 | 4.65 | 1.49 | 0.00 | 5.83 |
| Digitoxose | 24.46 | 1.70 | 0.04 | 0.22 |  |  |  |  |  |  |  |  |  |
| DL-Dihydrosphingosine | 5.89 |  |  |  |  |  |  | 2.69 | 0.03 | 0.12 |  |  |  |
| D-Talose | 15.83 |  |  |  | 1.46 | 0.00 | 0.04 | 1.24 | 0.01 | 0.11 | 1.78 | 0.00 | 0.08 |
| Erythrose | 13.55 |  |  |  |  |  |  | 1.13 | 0.00 | 0.00 | 1.29 | 0.00 | 0.00 |
| Ethanolamine | 6.93 |  |  |  | 1.15 | 0.00 | 0.13 | 1.30 | 0.00 | 0.17 | 1.19 | 0.04 | 0.39 |
| Formononetin | 15.94 |  |  |  |  |  |  |  |  |  | 1.06 | 0.00 | 3.91 |
| Fructose-6-phosphate | 11.87 | 2.67 | 0.00 | 0.00 |  |  |  | 1.17 | 0.00 | 0.23 | 1.23 | 0.00 | 0.27 |
| Galactinol | 14.44 |  |  |  |  |  |  |  |  |  | 1.17 | 0.02 | 0.20 |
| Gluconic acid | 17.50 |  |  |  | 1.91 | 0.03 | 0.10 |  |  |  |  |  |  |
| Glutamine | 12.92 | 1.94 | 0.02 | 118.48 | 1.72 | 0.00 | 108.52 | 1.83 | 0.00 | 31.62 | 1.82 | 0.00 | 14.39 |
| Glutathione | 25.24 |  |  |  |  |  |  |  |  |  | 1.01 | 0.04 | 52972.66 |
| Glycine | 7.52 |  |  |  | 1.38 | 0.00 | 0.05 |  |  |  |  |  |  |
| Guanidinoacetate | 16.15 |  |  |  |  |  |  | 2.40 | 0.05 | 0.30 |  |  |  |
| Guanine | 19.28 | 1.82 | 0.05 | 0.25 |  |  |  |  |  |  |  |  |  |
| Guanosine | 26.20 |  |  |  |  |  |  | 1.13 | 0.00 | 0.00 |  |  |  |
| Hydantoin | 22.84 | 1.90 | 0.02 | 0.04 |  |  |  |  |  |  |  |  |  |
| Hydroxyphenyllactic acid | 16.00 |  |  |  |  |  |  | 1.14 | 0.00 | 3.98 | 1.35 | 0.00 | 4.23 |
| Inosine | 24.07 |  |  |  |  |  |  | 1.06 | 0.01 | 0.23 |  |  |  |
| Isomaltose | 27.08 |  |  |  |  |  |  | 3.65 | 0.00 | 0.00 | 3.45 | 0.00 | 0.00 |
| Isopropyl-β-D-thiogalactopyranoside | 17.23 |  |  |  | 2.91 | 0.00 | 0.00 |  |  |  | 2.81 | 0.04 | 0.03 |
| Lactitol | 12.82 | 2.25 | 0.00 | 0.00 |  |  |  | 1.13 | 0.00 | 0.00 | 1.28 | 0.00 | 0.00 |
| Leucrose | 23.68 |  |  |  |  |  |  | 2.28 | 0.05 | 1.87 |  |  |  |
| Linoleic acid | 20.41 |  |  |  | 1.24 | 0.00 | 10.34 |  |  |  |  |  |  |
| Linolenic acid | 17.86 |  |  |  |  |  |  | 1.09 | 0.03 | 0.24 |  |  |  |
| Maltotriitol | 25.69 | 2.85 | 0.00 | 0.00 | 3.08 | 0.00 | 0.00 | 3.93 | 0.00 | 0.00 | 4.50 | 0.00 | 0.00 |
| Maltotriose | 24.26 |  |  |  | 1.41 | 0.00 | 0.04 | 1.09 | 0.00 | 0.23 |  |  |  |
| Melatonin | 10.61 |  |  |  | 2.04 | 0.04 | 3.91 |  |  |  |  |  |  |
| Methoxamedrine | 7.33 |  |  |  | 2.37 | 0.00 | 0.17 |  |  |  |  |  |  |
| Myristic Acid | 15.24 |  |  |  |  |  |  | 1.13 | 0.00 | 0.00 |  |  |  |
| N-Acetyl-D-galactosamine | 18.60 | 2.39 | 0.00 | 0.08 |  |  |  | 1.11 | 0.00 | 0.29 |  |  |  |
| N-Acetylisatin | 20.54 |  |  |  | 1.69 | 0.04 | 4.74 |  |  |  |  |  |  |
| N-Acetyl-β-D-mannosamine | 18.71 | 2.36 | 0.00 | 0.00 |  |  |  |  |  |  | 1.01 | 0.00 | 0.00 |
| Nicotianamine | 20.07 |  |  |  | 2.88 | 0.00 | 524320.75 |  |  |  |  |  |  |
| Norvaline | 21.92 | 1.85 | 0.00 | 0.00 |  |  |  |  |  |  |  |  |  |
| N-ω-Acetylhistamine | 5.87 | 1.73 | 0.03 | 0.14 |  |  |  |  |  |  |  |  |  |
| Octadecanol | 18.82 |  |  |  | 1.92 | 0.04 | 4.42 |  |  |  |  |  |  |
| Orotic acid | 8.91 | 1.79 | 0.03 | 0.10 |  |  |  |  |  |  |  |  |  |
| Oxalic acid | 5.54 | 1.03 | 0.00 | 11.69 | 1.17 | 0.00 | 9.45 | 1.09 | 0.00 | 3.64 | 1.49 | 0.00 | 5.86 |
| Panthenol | 8.35 |  |  |  |  |  |  |  |  |  | 1.08 | 0.00 | 0.00 |
| Phytol | 16.80 |  |  |  | 2.13 | 0.04 | 5.02 |  |  |  |  |  |  |
| Piceatannol | 7.39 | 2.20 | 0.00 | 0.07 | 1.83 | 0.02 | 0.10 |  |  |  |  |  |  |
| Quinic acid | 12.84 | 1.84 | 0.04 | 0.17 |  |  |  |  |  |  |  |  |  |
| Scopoletin | 12.24 |  |  |  |  |  |  | 2.11 | 0.04 | 0.25 |  |  |  |
| Sophorose | 17.95 |  |  |  | 2.23 | 0.01 | 0.01 | 2.87 | 0.02 | 0.04 | 2.89 | 0.04 | 0.03 |
| Sorbose | 18.48 | 2.10 | 0.00 | 0.00 |  |  |  |  |  |  |  |  |  |
| Sulfuric acid | 8.43 |  |  |  | 1.84 | 0.04 | 4.91 |  |  |  |  |  |  |
| Tagatose | 16.60 |  |  |  |  |  |  |  |  |  | 1.10 | 0.00 | 518217.82 |
| Trans-4-hydroxy-L-proline | 14.54 |  |  |  | 1.25 | 0.00 | 7.68 |  |  |  |  |  |  |
| Urocanic acid | 17.55 |  |  |  |  |  |  | 3.64 | 0.00 | 0.00 |  |  |  |
| α-Ecdysone | 9.29 |  |  |  |  |  |  |  |  |  | 1.05 | 0.00 | 0.42 |
| β-Alanine | 5.93 |  |  |  |  |  |  | 1.05 | 0.00 | 3.18 | 1.03 | 0.00 | 2.31 |
| β-Mannosylglycerate | 12.00 |  |  |  |  |  |  |  |  |  | 1.12 | 0.00 | 0.35 |

WFSM, DFSM, RT and VIP represent wet-fermented soybean meal, dry-fermented soybean meal, residence time and variable influence on projection, respectively. M, S, X and Z represent the cecum, upper colon, lower colon and rectum, respectively.