**Online Supporting Material**

**Supplemental Table 1.** Ingredient composition of diets (as fed basis)

|  |  |
| --- | --- |
| Items | Concentration |
| Ingredients | *g/kg*  |
| Corn | 570·5 |
| Soybean meal (44% CP) | 224 |
| Wheat middling | 50 |
| Fish meal | 36 |
| Soy protein concentrate  | 14 |
| Fat powder\* | 20 |
| Defatted milk-replacer powder | 30 |
| Limestone | 9·4 |
| Dicalcium phosphate | 12·2 |
| Salt | 3·4 |
| Alanine† | 13·5 |
| Acidifier‡ | 2·0 |
| L-Lysine. HCl (78·8% Lysine) | 2·7 |
| DL-Methionine (99% methionine) | 1·0 |
| L-Threonine (98% threonine) | 0·8 |
| Butylated hydroquinone | 0·5 |
| Vitamin and mineral premix§ | 10 |
| Nutrient composition | *g/kg* |
| Digestible energy**|**|,¶ (MJ/kg) | 13·6 |
| Crude protein\*\* | 203 |
| Crude fat\*\* | 44 |
| Calcium\*\* | 8·0 |
| Total phosphorus\*\* | 7·0 |
| Amino acid concentrations\*\* | *g/kg* |
| Total aspartate + asparagine | 16·9 |
| Total glutamate + glutamine | 30 |
| Arginine | 9·8 |
| Lysine | 11·1 |
| Serine | 9·1 |
| Threonine | 7·3 |
| Proline | 11·2 |
| Glycine | 7·5 |
| Alanine | 26 |
| Histidine | 4·9 |
| Leucine | 15 |
| Isoleucine | 5·6 |
| Tyrosine | 4·5 |
| Phenylalanine | 7·1 |
| Valine | 6·4 |

\* A rumen-stable fat powder, purchased from Berg + Schmidt, German.

†In the 0·5% Asn diet, 1·35% alanine were replaced by 0·5% Asn, 0·68% alanine and 0·17% cornstarch. In the 1·0% Asn diet, 1·35% alanine was replaced by 1·0% Asn and 0·35% cornstarch. All diets were isonitrogenous.

‡A compound acidifier including lactic acid and phosphoric acid, provided by Wuhan Fanhua Biotechnology Company, Wuhan, China.

§The vitamin and mineral premix (defatted rice bran as carrier) provided the following amounts per kilogram of complete diet: retinol acetate, 2700 μg; cholecalciferol, 62·5 μg; dl-α-tocopheryl acetate, 20 mg; menadione, 3 mg; vitamin B12, 18 μg; riboflavin, 4 mg; niacin, 40 mg; pantothenic acid, 15 mg; choline chloride, 400 mg; folic acid, 700 μg; thiamin, 1·5 mg; pyridoxine, 3 mg; biotin, 100 μg; Zn, 80 mg (ZnSO4·7H2O); Mn, 20 mg (MnSO4·5H2O); Fe, 83 mg (FeSO4·H2O); Cu, 25 mg (CuSO4·5H2O); I, 0.48 mg (KI); Se, 0·36 mg (Na2SeO3·5H2O).

**|**| Based on diets containing cornstarch.

¶ Calculated.

\*\* Analyzed.

**Supplemental Table 2**. Primer sequences used for real-time PCR

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| --- | --- | --- |
| Gene | Forward (5′-3′) | Reverse (5′-3′) |
| Akt1 | GAAGAAGGAGGTCATCGT | GGACAGGTGGAAGAAGAG |
| AMPKα1 | AAATCGGCCACTACATCCTG | GGATGCCTGAAAAGCTTGAG |
| AMPKα2 | AACATGGACGGGTTGAAGAG | CGCAGAAACTCACCATCTGA |
| CENTB1 | GAAGCCGAAGTGTCCGAATT | AGGTCACAGATGCCAAGAATG |
| ERBB2IP | ACAATTCAGCGACAGAGTAGTG | TGACATCATTGGAGGAGTTCTTC |
| FOXO1 | TTCACCAGGCACCATCAT | GAGGAGAGTCGGAAGTAAGT |
| FOXO4 | TGGAGTGTGACATGGATAAC | CTCATCTCTGAAGCAAGGAA |
| GAPDH | CGTCCCTGAGACACGATGGT | GCCTTGACTGTGCCGTGGAAT |
| IRAK1 | CAAGGCAGGTCAGGTTTCGT | TTCGTGGGGCGTGTAGTGT |
| MAFbx | TCACAGCTCACATCCCTGAG | GACTTGCCGACTCTCTGGAC |
| MuRF1 | ATGGAGAACCTGGAGAAGCA | ACGGTCCATGATCACCTCAT |
| MyD88 | GATGGTAGCGGTTGTCTCTGAT | GATGCTGGGGAACTCTTTCTTC |
| NF-κB p65 | AGTACCCTGAGGCTATAACTCGC | TCCGCAATGGAGGAGAAGTC |
| NOD1 | CTGTCGTCAACACCGATCCA | CCAGTTGGTGACGCAGCTT |
| NOD2 | GAGCGCATCCTCTTAACTTTCG | ACGCTCGTGATCCGTGAAC |
| RIPK2 | CAGTGTCCAGTAAATCGCAGTTG | CAGGCTTCCGTCATCTGGTT |
| RP105 | CGAGGCTTCTGACTGTTGTG | GGTGCTGATTGCTGGTGTC |
| SIGIRR | ACCTTCACCTGCTCCATCCA | TTCCGTCATTCATCTCCACCTC |
| SOCS1 | GCGTGTAGGATGGTAGCA | GAGGAGGAGGAGGAGGAAT |
| TLR4 | TCAGTTCTCACCTTCCTCCTG | GTTCATTCCTCACCCAGTCTTC |
| TNF-α | TCCAATGGCAGAGTGGGTATG | AGCTGGTTGTCTTTCAGCTTCAC |
| Tollip | GCAGCAGCAACAGCAGAT | GGTCACGCCGTAGTTCTTC |
| TRAF6 | CAAGAGAATACCCAGTCGCACA | ATCCGAGACAAAGGGGAAGAA |

AMPK, AMP-activated protein kinase; CENTB1, centaurin β1; ERBB2IP, Erbb2 interacting protein; FOXO, Forkhead Box O; IRAK1, IL-1 receptor-associated kinase 1; MAFbx, muscle atrophy F-box; MuRF1, muscle RING finger 1; MyD88, myeloid differentiation factor 88; NF-κB, nuclear factor-κB; NOD, nucleotide-binding oligomerization domain protein; RIPK2, receptor-interacting serine/threonine-protein kinase 2; RP105, radioprotective 105; SIGIRR, single immunoglobulin IL-1 R-related molecule; SOCS1, suppressor of cytokine signalling 1; TLR, Toll-like receptor; TNF-α, tumor necrosis factor-α; Tollip, toll-interacting protein; TRAF6, TNF receptor-associated factor 6