Table S1 Composition and nutrient levels of experimental diets (air-dry basis, calculated level)

|  |  |  |  |
| --- | --- | --- | --- |
| Items\* | Diets (SID Trp to Lys ratio) | | |
| 0.16 | 0.18 | 0.20 |
| Ingredient,% | | | |
| Corn | 60.73 | 60.71 | 60.68 |
| Wheat | 15 | 15 | 15 |
| Bran | 3.2 | 3.3 | 3.3 |
| Soybean meal | 16.4 | 16.3 | 16.3 |
| Sodium chloride | 0.37 | 0.37 | 0.37 |
| Stone powder | 1.07 | 1.07 | 1.07 |
| Dicalcium phosphate | 0.49 | 0.49 | 0.49 |
| L-lysine sulfate | 0.52 | 0.52 | 0.53 |
| DL-Methionine | 0.03 | 0.03 | 0.03 |
| L-Threonine | 0.09 | 0.09 | 0.09 |
| L-Tryptophan | 0.00 | 0.02 | 0.04 |
| Premix 1%† | 0.6 | 0.6 | 0.6 |
| Total | 100.000 | 100.000 | 100.000 |
| Calculated nutrient levels | | | |
| Crude protein,% | 14.51 | 14.49 | 14.52 |
| EE,% | 2.27 | 2.27 | 2.26 |
| Crude fiber,% | 2.34 | 2.34 | 2.34 |
| Calcium,% | 0.60 | 0.60 | 0.60 |
| Total phosphorus,% | 0.42 | 0.42 | 0.42 |
| Available phosphorus,% | 0.18 | 0.18 | 0.18 |
| DE, MJ/kg | 3334.88 | 3334.48 | 3335.09 |
| ME, MJ/kg | 3119.67 | 3119.46 | 3120.00 |
| NE, MJ/kg | 2387.66 | 2387.69 | 2388.10 |
| SID Lysine,% | 0.85 | 0.85 | 0.85 |
| SID Threonine,% | 0.53 | 0.53 | 0.53 |
| SID Methionine,% | 0.25 | 0.25 | 0.25 |
| SID Sulfur-containing amino acid,% | 0.49 | 0.49 | 0.49 |
| SID Tryptophan,% | 0.13 | 0.15 | 0.17 |
| SID Valine,% | 0.60 | 0.59 | 0.59 |
| SID AA ratio | | | |
| SID Tryptophan: Lysine | 0.16 | 0.18 | 0.20 |

\* EE,Crude fat; SID,standardised ileal digestible; DE,Digestible Energy; ME,Metabolic energy;NE, net energy; AA,amino acids;

†Provided per kg of diet (as-fed basis): VA, 3000 IU; VD, 200 IU; VE, 20 mg; VB1, 3 mg; VB2, 7 mg; VB6, 3 mg; VB12, 0.02 mg; VK3,1mg;niacin, 30mg; folate, 2 mg; pantothenic acid, 10 mg; biotin, 0.2 mg; choline chloride, 500 mg; Cu, 16 mg; Fe, 100 mg; Mn, 20 mg; Zn, 60 mg; I, 0.5 mg; Se, 0.2 mg.

Table S2 Nutrient levels of experimental diets (Actual measured level )

|  |  |  |  |
| --- | --- | --- | --- |
| Items\* | Diets (SID Trp to Lys ratio) | | |
| 0.16 | 0.18 | 0.20 |
| Measured levels of nutrients (%) | | | |
| Crude protein,% | 14.28 | 14.37 | 14.10 |
| Crude fiber,% | 2.96 | 3.00 | 2.86 |
| Total phosphorus,% | 0.47 | 0.46 | 0.44 |
| Total Ca,% | 0.68 | 0.66 | 0.63 |
| Lysine,% | 0.83 | 0.90 | 0.83 |
| Threonine,% | 0.65 | 0.65 | 0.70 |
| Methionine,% | 0.22 | 0.21 | 0.30 |
| Tryptophan,% | 0.16 | 0.19 | 0.21 |
| Valine,% | 0.70 | 0.71 | 0.70 |
| Aspartate,% | 1.29 | 1.33 | 1.26 |
| Serine,%  Glutamic acid  glycine  histidine  arginine | 0.75 | 0.73 | 0.74 |
| Glutamic acid,% | 2.94 | 2.97 | 2.89 |
| Glycine,% | 0.64 | 0.64 | 0.63 |
| Histidine,% | 0.38 | 0.38 | 0.38 |
| Arginine,% | 0.94 | 0.94 | 0.94 |
| Alanine,% | 0.72 | 0.75 | 0.71 |
| Proline,% | 1.00 | 1.04 | 1.00 |
| Cystine,% | 0.15 | 0.14 | 0.16 |
| Tyrosine,% | 0.49 | 0.40 | 0.49 |
| Isoleucine,% | 0.64 | 0.64 | 0.63 |
| Leucine,% | 1.26 | 1.29 | 1.26 |
| Phenylalanine,% | 0.73 | 0.73 | 0.73 |
| Total amino acid,% | 14.28 | 14.37 | 14.10 |

Table S3. Primers used for RT-qPCR analyses

|  |  |  |
| --- | --- | --- |
| Genes | Sequences (5'–3') | Amplified Size (bp) |
| β-Actin | TGCGGGACATCAAGGAGAAG | 216 |
| AGTTGAAGGTGGTCTCGTGG |
| NPY | CGTACCCCTCCAAGCCCGACAAC | 176 |
| AACATTTTCCGTGCCTTCTCT |
| AgRP | CGTCGCTGCGT AAGGCT | 99 |
| GCAGAAGGCGTTGAAGAAA |
| POMC | TCCGAGAAGAGCCAGACG | 126 |
| GGCTTTGGGGTCGGCTTC |
| CART | CCGCCCTGCTGCTGCTGCT AC | 200 |
| AGGGACTTGGCCATACTTCTTCTC |
| MC4R | CCCAGAA TCCATACTGTGT | 130 |
| TCTTTGAAGGTTTTCCTCAG |
| Ghrelin | AGAAGCCAGCAGCCAAACTG | 148 |
| GACTGAGCCCCTGACAACTT |
| PYY | CCTCTGGAGCTGTCGCTATG | 218 |
| ACGTTTCCCATACCTCTGCC |
| LepR | AATCCACCAGTCTCCCGGT | 82 |
| TAGCCCAGTCCATCTAGCCT |
| TPH1 | TGGATCTGAACTGGATGCTG | 155 |
| CGGTTCCCCAGGTCTTAATC |
| TPH2 | CGCACCACGAACACAGATAACC | 242 |
| GGCAATATCAGCACGGCAGAGA |
| AADC | GCGTGTCACCCCAAAGCTG | 146 |
| AGGGCTGTCATCTTCCTCCT |
| 5-HT1B | TGTGATCGCCACTGTGTACC | 191 |
| AACAGGTGATGTCCGACGAC |
| IDO1 | ATGGCACTTGATTGGTGGTCT | 127 |
| AAGCATCGTAAGGGTGAGGC |
| IDO2 | GCGGTACGGCAGTTCTGAGATT | 242 |
| GCCACAGCCACAGCAACACT |
| TDO2 | CTGCGCTCAACAGTGAGTGA | 91 |
| CTGCGCTCAACAGTGAGTGA |
| KAT | GGCAAGGTGTTCTCCAAG | 115 |
| GCTGGTACTGGTCGTAGA |
| KMO | CTGTCATTGGTGGTGGCTTGG | 88 |
| TCCCTGGATTCATATACATCAACTTGG |
| KYNU | ACCTGCCATCACAAAAGCTGG | 126 |
| TAGGAGCACCAGCAGGCAAA |
| HAAO | AGCAGCCACAGGGTATGTCC | 82 |
| CTTGGCAGCAGCACACGTAG |
| AHR | GAGTTCTTGCTACAGGCTCTAA | 105 |
| CTGCTGAAATCCCAGGTAATCT |

AgRP, agouti-related peptide; NPY, co-express neuropeptide Y; POMC, pro-opiomelanocortin; MC4R, melanocortin-4 receptor;

CART, cocaine- and amphetamine-regulated transcript; LepR, Leptin receptor; PYY, peptide YY; TPH1, tryptophan hydroxylase 1;

TPH2, tryptophan hydroxylase 2; AADC, L-aromatic dopa decarboxylase;5-HT1B, 5-hydroxytryptamine receptor 1B; IDO1,indoleamine 2,3-dioxygenase 1;IDO2, indoleamine 2,3-dioxygenase 2;TDO2, tryptophan 2,3-dioxygenase;KAT, kynurenine aminotransferase; KMO, kynurenine 3-monooxygenase;KYNU, kynureninase; HAAO, 3-hydroxyanthranilate 3,4-dioxygenase;AHR, aryl hydrocarbon receptor.

Table S4 Growth performance of growing pigs fed with Trp supplemented diets

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Items\* | Diets (SID Trp to Lys ratio) | | | SEM | *P value* |
| 0.16 | 0.18 | 0.20 |
| First week |  |  |  |  |  |
| ADG (kg/d) | 0.92b | 1.18a | 0.91b | 0.043 | 0.010 |
| ADFI (kg/d) | 2.61b | 3.00a | 2.94a | 0.057 | 0.008 |
| F/G | 3.10a | 2.56b | 3.24a | 0.103 | 0.010 |
| Second week |  |  |  |  |  |
| ADG (kg/d) | 0.90 | 0.73 | 0.86 | 0.041 | 0.227 |
| ADFI (kg/d) | 2.67x,y | 2.97 x,y | 2.99 x,y | 0.064 | 0.082 |
| F/G | 3.64 | 4.09 | 3.56 | 0.237 | 0.617 |
| Third week |  |  |  |  |  |
| ADG (kg/d) | 0.60b | 0.69b | 0.89a | 0.043 | 0.018 |
| ADFI (kg/d) | 2.71 | 3.02 | 2.95 | 0.063 | 0.120 |
| F/G | 3.60b | 4.63a | 3.41b | 0.180 | 0.003 |
| Fourth week |  |  |  |  |  |
| ADG (kg/d) | 0.81a | 0.76a | 0.53b | 0.041 | 0.010 |
| ADFI (kg/d) | 2.81 x,y | 3.14 x,y | 3.04 x,y | 0.066 | 0.098 |
| F/G | 3.55b | 4.23ab | 4.58a | 0.163 | 0.039 |
| Fifth week |  |  |  |  |  |
| ADG (kg/d) | 0.89a | 0.70b | 0.64b | 0.037 | 0.012 |
| ADFI (kg/d) | 2.85 | 3.03 | 3.04 | 0.051 | 0.243 |
| F/G | 3.45b | 4.45a | 4.33a | 0.162 | 0.013 |
| Sixth week |  |  |  |  |  |
| ADG (kg/d) | 0.75b | 0.64b | 0.95a | 0.037 | 0.001 |
| ADFI (kg/d) | 2.72 | 2.86 | 2.94 | 0.059 | 0.325 |
| F/G | 3.55b | 4.48a | 3.23b | 0.157 | 0.001 |
| Seventh week |  |  |  |  |  |
| ADG (kg/d) | 0.91 | 0.76 | 1.01 | 0.053 | 0.163 |
| ADFI (kg/d) | 2.86 | 2.89 | 3.04 | 0.068 | 0.525 |
| F/G | 3.37 | 3.81 | 3.19 | 0.204 | 0.472 |

BW= body weight; SEM = standard error of the mean; ADG: average daily gain; ADFI: average daily food intake; F/G: feed intake: gain. Results were presented by mean ± standard deviation (n=12/group). a,b Mean values within a row with unlike superscript letters were significantly different(P < 0·05). x,y Mean values within a row were not significantly different, but exhibited a trend (0.05<*P* < 0.10).