Supplementary

Supplemental Table 1 Ingredient and nutrient composition of experimental diets in experiment 1 (as fed basis)[1]

Items	Ctr + AGP	LP + AGP	LP	LP110	LP110 + AA
Ingredient, %					
Corn	34.93	46.52	46.52	46.88	46.81
Extruded corn	20.00	20.00	20.00	20.00	20.00
Dehulled soybean meal	21.30	9.08	9.08	7.55	7.16
Fish meal	5.00	5.00	5.00	5.00	5.00
Whey powder	10.00	10.00	10.00	10.00	10.00
Concentrated soybean protein	3.00	3.00	3.00	3.00	3.00
Soybean oil	2.23	1.46	1.46	1.74	1.87
Salt	0.30	0.30	0.30	0.30	0.30
Limestone	0.71	0.70	0.70	0.69	0.69
Zinc oxide	0.30	0.30	0.30	0.30	0.30
Monocalcium phosphate	0.60	0.85	0.85	0.89	0.91
L-Lysine HCl	0.33	0.72	0.72	0.94	0.95
DL-Methionine	0.20	0.32	0.32	0.42	0.54
L-Threonine	0.09	0.28	0.28	0.39	0.51
L-Tryptophan	0.01	0.11	0.11	0.15	0.19
L-Valine	-	0.19	0.19	0.30	0.31
L-Leucine	-	0.04	0.04	0.22	0.23
L-Isoleucine	-	0.13	0.13	0.23	0.23
Vitamin-mineral premix[2]	1.00	1.00	1.00	1.00	1.00
Total	100.00	100.00	100.00	100.00	100.00
Analyzed content, %					
Dry matter	89.66	89.44	89.67	89.84	89.95
Crude protein	21.42	17.29	17.49	17.37	17.66
Calcium	0.76	0.75	0.78	0.74	0.75
Total phosphorus	0.62	0.64	0.63	0.63	0.65
Calculated composition, %					
Net energy	2560	2560	2560	2560	2560
Available phosphorus	0.48	0.50	0.50	0.51	0.51
SID Lysine	1.29	1.30	1.30	1.43	1.43
SID Methionine	0.50	0.56	0.56	0.65	0.77
SID Methionine + Cysteine	0.77	0.78	0.78	0.86	0.97
SID Threonine	0.79	0.81	0.81	0.89	1.00
SID Tryptophan	0.24	0.27	0.27	0.30	0.34
SID Valine	0.84	0.83	0.83	0.91	0.91
SID Leucine	1.55	1.30	1.30	1.43	1.43

SID Isoleucine	0.77	0.69	0.69	0.76	0.76
SID Arginine	1.11	0.80	0.80	0.76	0.75
SID Phenylalanine	0.82	0.62	0.62	0.59	0.58
SID Histidine	0.46	0.35	0.35	0.34	0.33

[1]Ctr + AGP = normal protein diet with antibiotics (75 mg/kg chlortetracycline); LP + AGP = amino acid balanced low protein diet with antibiotics (75 mg/kg chlortetracycline); LP = amino acid balanced low protein diet without antibiotics; LP110 = the LP diet with 10% dietary standardized ileal digestible (SID) essential amino acids contents including Lys, Trp, Thr, Leu, Ile, Val and Met + Cys; LP110 + AA = the LP110 diet with 12% dietary SID Met + Cys, Thr and Trp contents.

[2]Supplied per kg of diet: 12,000 IU vitamin A as vitamin A acetate, 2,500 IU vitamin D as vitamin D_3, 30 IU vitamin E as DL-α-tocopheryl acetate, 12 μg of vitamin B_{12}, 3 mg vitamin K as menadione sodium bisulfate, 15 mg D-pantothenic acid as calcium pantothenate, 40 mg of nicotinic acid, 400 mg choline as choline chloride, 30 mg Mn as manganese oxide, 90 mg Fe as iron sulfate, 10 mg Cu as copper sulfate, 0.35 mg I as ethylenediamine dihydroiodide, and 0.3 mg Se as sodium selenite.

Supplementary

Supplemental Table 2 Ingredient and nutrient composition of experimental diets in experiment 2 (as fed basis)[1]

Items	Ctr + AGP	LP + AGP	LP	LP105	LP105 + AA	LP110	LP110 + AA
Ingredient, %							
Corn	34.62	46.55	46.55	46.68	46.71	46.78	46.82
Extruded corn	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Dehulled soybean meal	22.05	9.42	9.42	8.73	8.49	8.04	7.53
Fish meal	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Whey powder	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Concentrated soybean protein	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Soybean oil	2.50	1.79	1.79	1.93	1.99	2.08	2.21
Salt	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Limestone	0.73	0.76	0.76	0.75	0.75	0.75	0.75
Monocalcium phosphate	0.64	0.84	0.84	0.86	0.86	0.87	0.89
L-Lysine HCl	0.35	0.74	0.74	0.85	0.86	0.95	0.97
DL-Methionine	0.17	0.30	0.30	0.35	0.40	0.40	0.51
L-Threonine	0.11	0.31	0.31	0.36	0.41	0.41	0.53
L-Tryptophan	0.03	0.13	0.13	0.14	0.16	0.17	0.21
L-Valine	-	0.18	0.18	0.24	0.24	0.29	0.30
L-Leucine	-	0.05	0.05	0.14	0.15	0.23	0.24
L-Isoleucine	-	0.13	0.13	0.17	0.18	0.23	0.24
Vitamin-mineral premix[2]	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Analyzed content, %							
Dry matter	89.87	89.85	89.65	89.78	90.01	89.87	89.77
Crude protein	21.18	17.08	16.89	16.90	17.04	17.13	16.98
Calcium	0.76	0.74	0.75	0.76	0.75	0.75	0.74
Total phosphorus	0.65	0.64	0.63	0.65	0.65	0.66	0.65
Calculated composition, %							
Net energy	2560	2560	2560	2560	2560	2560	2560
Available phosphorus	0.50	0.48	0.49	0.48	0.49	0.50	0.49
SID Lysine	1.29	1.30	1.30	1.37	1.37	1.43	1.43
SID Methionine	0.50	0.56	0.56	0.60	0.66	0.65	0.77
SID Methionine + Cysteine	0.77	0.78	0.78	0.82	0.87	0.86	0.97
SID Threonine	0.79	0.81	0.81	0.85	0.90	0.89	1.00
SID Tryptophan	0.24	0.27	0.27	0.28	0.30	0.30	0.34
SID Valine	0.86	0.83	0.83	0.87	0.87	0.91	0.91
SID Leucine	1.53	1.30	1.30	1.37	1.37	1.43	1.43

SID Isoleucine	0.77	0.69	0.69	0.72	0.72	0.76	0.76
SID Arginine	1.11	0.80	0.80	0.78	0.77	0.76	0.75
SID Phenylalanine	0.82	0.62	0.62	0.61	0.60	0.59	0.58
SID Histidine	0.46	0.35	0.35	0.35	0.34	0.34	0.33

[1]Ctr + AGP = normal protein diet with antibiotics (75 mg/kg chlortetracycline); LP + AGP = amino acid balanced low protein diet with antibiotics (75 mg/kg chlortetracycline); LP = amino acid balanced low protein diet without antibiotics; LP105 = the LP diet with 5% dietary standardized ileal digestible (SID) essential amino acids contents including Lys, Trp, Thr, Leu, Ile, Val and Met + Cys; LP105 + AA = the LP105 diet with 6% dietary SID Met + Cys, Thr and Trp contents; LP110 = the LP diet with 10% dietary SID essential amino acids contents including Lys, Trp, Thr, Leu, Ile, Val and Met + Cys; LP110 + AA = the LP110 diet with 12% dietary SID Met + Cys, Thr and Trp contents.

[2]Supplied per kg of diet: 12,000 IU vitamin A as vitamin A acetate, 2,500 IU vitamin D as vitamin D_3, 30 IU vitamin E as DL-α-tocopheryl acetate, 12 μg of vitamin B_{12}, 3 mg vitamin K as menadione sodium bisulfate, 15 mg D-pantothenic acid as calcium pantothenate, 40 mg of nicotinic acid, 400 mg choline as choline chloride, 30 mg Mn as manganese oxide, 80 mg Zn as zinc oxide, 90 mg Fe as iron sulfate, 10 mg Cu as copper sulfate, 0.35 mg I as ethylenediamine dihydroiodide, and 0.3 mg Se as sodium selenite.

Supplementary

Supplemental Table 3 Body weight and average daily feed intake of pigs in experiment 1[1]

Traits	Ctr + AGP	LP + AGP	LP	LP110	LP110 + AA	SEM[2]	*P*-value
Body weight, kg							
Day 0	8.15	8.14	8.15	8.15	8.14	0.45	0.99
Day 14	13.73	13.58	13.21	12.73	12.27	0.57	0.37
Day 28	18.44	18.08	17.74	17.34	16.89	0.70	0.62
Average daily feed intake, g/d							
Days 0-14	582	617	589	589	580	21	0.42
Days 15-28	708	656	635	663	661	47	0.63
Days 0-28	643	636	610	625	619	36	0.83

[1]Ctr + AGP = normal protein diet with antibiotics (75 mg/kg chlortetracycline); LP + AGP = amino acid balanced low protein diet with antibiotics (75 mg/kg chlortetracycline); LP = amino acid balanced low protein diet without antibiotics; LP110 = the LP diet with 10% dietary standardized ileal digestible (SID) essential amino acids contents including Lys, Trp, Thr, Leu, Ile, Val and Met + Cys; LP110 + AA = the LP110 diet with 12% dietary SID Met + Cys, Thr and Trp contents.

[2]n = 6.

Supplementary

Supplemental Table 4 Body weight and average daily feed intake of weaned pigs in experiment 2[1]

Traits	Ctr + AGP	LP + AGP	LP	LP105	LP105 + AA	LP110	LP110 + AA	SEM[2]	*P*-value
Body weight, kg									
Day 0	7.26	7.23	7.22	7.22	7.22	7.22	7.22	0.44	0.99
Day 14	11.00	10.84	10.63	10.64	10.45	10.45	10.86	0.40	0.95
Day 35	20.11	20.09	19.15	20.36	19.43	18.45	19.18	1.09	0.88
Average daily feed intake, g/d									
Days0-14	373	397	403	371	363	379	395	18	0.59
Days 15-35	759	786	746	795	750	789	812	51	0.96
Days 0-35	623	629	596	636	610	631	636	36	0.80

[1]Ctr + AGP = normal protein diet with antibiotics (75 mg/kg chlortetracycline); LP + AGP = amino acid balanced low protein diet with antibiotics (75 mg/kg chlortetracycline); LP = amino acid balanced low protein diet without antibiotics; LP105 = the LP diet with 5% dietary standardized ileal digestible (SID) essential amino acids contents including Lys, Trp, Thr, Leu, Ile, Val and Met + Cys; LP105 + AA = the LP105 diet with 6% dietary SID Met + Cys, Thr and Trp contents; LP110 = the LP diet with 10% dietary SID essential amino acids contents including Lys, Trp, Thr, Leu, Ile, Val and Met + Cys; LP110 + AA = the LP110 diet with 12% dietary SID Met + Cys, Thr and Trp contents.

[2]n = 5.

Supplementary

Supplemental Table 5 Growth performance at subsequent growth stages in experiment 2[1]

Traits	Ctr + AGP	LP + AGP	LP	LP105	LP105 + AA	LP110	LP110 + AA	SEM[2]	*P*-value
Body weight, kg									
Day 36	20.11	20.09	19.15	20.36	19.43	18.45	19.18	1.09	0.88
Day 64	38.02	37.24	36.21	39.01	37.56	36.13	37.11	2.18	0.95
Day 92	55.53	54.78	54.35	56.98	54.89	53.67	54.56	1.54	0.90
Average daily gain, g/d									
Days 36-64	638	614	630	662	665	628	651	33	0.92
Days65-92	632	621	645	652	612	626	612	31	0.97
Days 36-92	637	616	637	656	638	627	637	26	0.97
Average daily feed intake, g/d									
Days 36-64	1399	1358	1376	1415	1432	1325	1364	65	0.98
Days65-92	1770	1736	1816	1843	1766	1769	1753	67	0.96
Days 36-92	1585	1547	1596	1629	1599	1547	1558	66	0.96
Feed conversion ratio, g/g									
Days 36-64	2.20	2.20	2.18	2.13	2.16	2.11	2.10	0.07	0.85
Days65-92	2.80	2.80	2.82	2.82	2.89	2.83	2.88	0.11	0.95
Days 36-92	2.49	2.51	2.51	2.48	2.51	2.47	2.45	0.07	0.94

[1]Ctr + AGP = normal protein diet with antibiotics (75 mg/kg chlortetracycline); LP + AGP = amino acid balanced low protein diet with antibiotics (75 mg/kg chlortetracycline); LP = amino acid balanced low protein diet without antibiotics; LP105 = the LP diet with 5% dietary standardized ileal digestible (SID) essential amino acids contents including Lys, Trp, Thr, Leu, Ile, Val and Met + Cys; LP105 + AA = the LP105 diet with 6% dietary SID Met + Cys, Thr and Trp contents; LP110 = the LP diet with 10% dietary SID essential amino acids contents including Lys, Trp, Thr, Leu, Ile, Val and Met + Cys; LP110 + AA = the LP110 diet with 12% dietary SID Met + Cys, Thr and Trp contents.

[2]n = 5.

Supplementary

Supplemental Table 6 Apparent total tract nutrient digestibility at subsequent growth stages in experiment 2[1]

Traits	Ctr + AGP	LP + AGP	LP	LP105	LP105 + AA	LP110	LP110 + AA	SEM[2]	*P*-value
Protein									
Days 43-49	71.01	72.96	71.84	71.97	71.68	71.62	74.48	1.16	0.54
Days 64-70	73.26	73.24	73.55	73.61	73.33	72.98	73.68	0.33	0.63
Energy									
Days 43-49	75.04	75.78	73.20	74.79	75.17	76.04	75.86	0.70	0.09
Days 64-70	80.91	80.21	79.96	80.28	80.69	80.43	81.08	0.51	0.71
Dry matter									
Days 43-49	79.64	80.12	78.35	79.45	79.72	79.25	80.15	0.67	0.57
Days 64-70	83.64	82.97	82.99	83.05	83.12	83.14	84.03	0.42	0.49
Organic matter									
Days 43-49	80.38	80.90	78.98	79.42	80.49	80.96	80.35	0.55	0.17
Days 64-70	84.51	83.99	84.02	83.91	84.20	84.11	84.84	0.39	0.62

[1]Ctr + AGP = normal protein diet with antibiotics (75 mg/kg chlortetracycline); LP + AGP = amino acid balanced low protein diet with antibiotics (75 mg/kg chlortetracycline); LP = amino acid balanced low protein diet without antibiotics; LP105 = the LP diet with 5% dietary standardized ileal digestible (SID) essential amino acids contents including Lys, Trp, Thr, Leu, Ile, Val and Met + Cys; LP105 + AA = the LP105 diet with 6% dietary SID Met + Cys, Thr and Trp contents; LP110 = the LP diet with 10% dietary SID essential amino acids contents including Lys, Trp, Thr, Leu, Ile, Val and Met + Cys; LP110 + AA = the LP110 diet with 12% dietary SID Met + Cys, Thr and Trp contents.

[2]n = 5.

Supplementary

Supplemental Table 7 The α diversity of the fecal bacterial community on d 35 in experiment 2[1]

Traits	Ctr + AGP	LP + AGP	LP	LP105	LP105 + AA	LP110	LP110 + AA	SEM[2]	P-value
Shannon	4.44	4.44	4.35	4.69	4.65	4.48	4.15	0.32	0.19
Sobs	559.12	540.33	531.51	557.89	558.21	503.19	498.18	61.62	0.52
Chao	659.16	635.51	626.35	665.99	649.83	596.78	587.08	69.09	0.47
Ace	645.43	632.01	617.87	646.95	646.52	583.19	582.09	67.49	0.51

[1]Ctr + AGP = normal protein diet with antibiotics (75 mg/kg chlortetracycline); LP + AGP = amino acid balanced low protein diet with antibiotics (75 mg/kg chlortetracycline); LP = amino acid balanced low protein diet without antibiotics; LP105 = the LP diet with 5% dietary standardized ileal digestible (SID) essential amino acids contents including Lys, Trp, Thr, Leu, Ile, Val and Met + Cys; LP105 + AA = the LP105 diet with 6% dietary SID Met + Cys, Thr and Trp contents; LP110 = the LP diet with 10% dietary SID essential amino acids contents including Lys, Trp, Thr, Leu, Ile, Val and Met + Cys; LP110 + AA = the LP110 diet with 12% dietary SID Met + Cys, Thr and Trp contents.

[2]n = 5.