Supplementary Table 1. Composition and nutrient levels in the basal diets (dry matter basis).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Ingredients, % | Raw potato starch, % of diet weight | | | | | | |
| 1 - 14 days | | |  | 15 - 35 days | | |
| 0 | 12 | 24 |  | 0 | 12 | 24 |
| Corn | 59.82 | 44.85 | 29.88 |  | 69.25 | 53.72 | 38.19 |
| Raw potato starch | - | 12 | 24 |  | - | 12 | 24 |
| Soybean meal, % | 33.22 | 35.91 | 38.6 |  | 24.93 | 27.67 | 30.41 |
| Soybean oil | 0.5 | 1.5 | 2.5 |  | 0.5 | 1.7 | 2.9 |
| Calcium carbonate | 1.1 | 1.04 | 0.98 |  | 1.07 | 1.01 | 0.95 |
| Dicalcium phosphate | 1.74 | 1.82 | 1.89 |  | 1.65 | 1.74 | 1.82 |
| L-Lysine-HCL | 0.11 | 0.07 | 0.02 |  | 0.04 | - | - |
| DL-Methionine | 0.16 | 0.16 | 0.17 |  | 0.15 | 0.16 | 0.16 |
| Threonine | 0.02 | 0.01 | 0.01 |  | - | - | - |
| Tryptophan | - | - | - |  | 0.01 | 0.01 | 0.01 |
| Bentonite | 2.35 | 1.66 | 0.97 |  | 1.42 | 1.01 | 0.58 |
| Sodium chloride | 0.3 | 0.3 | 0.3 |  | 0.3 | 0.3 | 0.3 |
| Choline chloride | 0.15 | 0.15 | 0.15 |  | 0.15 | 0.15 | 0.15 |
| Vitamin premixa | 0.03 | 0.03 | 0.03 |  | 0.03 | 0.03 | 0.03 |
| Mineral premixb | 0.5 | 0.5 | 0.5 |  | 0.5 | 0.5 | 0.5 |
| Total | 100 | 100 | 100 |  | 100 | 100 | 100 |
| Nutrient and energy composition, calculated value | | | | | | | |
| ME, MJ/kg | 11.72 | 11.72 | 11.72 |  | 12.12 | 12.12 | 12.12 |
| Crude protein | 19.5 | 19.5 | 19.5 |  | 16.5 | 16.5 | 16.5 |

a Provided per kilogram of diet: vitamin A, 8,000 IU; cholecalciferol, 2,000 IU; vitamin E, 5 IU; vitamin K, 1 mg; thiamine, 0.4 mg; riboflavin, 3.2 mg; pyridoxine, 1.2 mg; vitamin B12, 6 μg; folicacid, 100 μg; niacin, 7 mg; calcium pantothenate, 5 mg.

b Provided per kilogram of diet: Cu (CuSO4∙5H2O), 8 mg; Fe (FeSO4∙7H2O), 80 mg; Zn (ZnSO4∙7H2O), 90 mg; Mn (MnSO4∙H2O), 70 mg; Se (NaSeO3), 0.3 mg; I (KI), 0.4 mg.

Supplementary Table 2. The primers for quantitative real-time PCR

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene | Gene ID | Primer | Sequence (5′-3′) | Size (bp) |
| *Gcg* | NM\_001190165.3 | Forward | gcgtcatgctgaatttgaga | 85 |
| Reverse | ttctttggcagcttgacctt |
| *ZO-1* | XM\_013104939.1 | Forward | tacgcctgtgaagaatgcag | 86 |
| Reverse | ggagtggtggtgtttgcttt |
| *MUC2* | XM\_005024513.3 | Forward | actagcacgagggaagtgga | 108 |
| Reverse | tgggatgttgcaatgagtgt |
| *Occludin* | XM\_013109403.1 | Forward | caggatgtggcagaggaatacaa | 160 |
| Reverse | ccttgtcgtagtcgctcaccat |
| *Claudin 1* | XM\_013108556.1 | Forward | tcatggtatggcaacagagtgg | 179 |
| Reverse | cgggtgggtggataggaagt |
| *β-actin* | NM\_001310408.1 | Forward | ccagccatctttcttgggta | 105 |
| Reverse | gtgttggcgtacaggtcctt |

*ZO-1*: zonula occludens; *Gcg*, proglucagon; *MUC2*, mucin-2.

**Supplementary Fig. 1.** Summary of bacterial taxa in duck cecal digesta observed by concentration of raw potato starch (RPS) in the diet. The relative abundances of bacterial 97% operational taxonomic units (OTUs) are shown for duck cecal digesta samples grouped by RPS concentration. (A) Depicts class level classifications for observed OTUs, (B) Depicts order level classifications for observed OTUs.

Supplementary Table 3. Effect of dietary RPS concentrations on body weight, daily feed intake in meat ducks of 35d.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Raw potato starch, % of diet weight | | | *P*-value |
| 0 | 12 | 24 |
| Body weight, g | 2014.24±28.63\* | 2071.86±20.61 | 1996.04±41.89 | 0.232 |
| Daily feed intake, g | 118.36±3.51 | 114.85±2.74 | 119.43±2.74 | 0.586 |

1Means represent 8 replicate cages, 15 ducks per cage.