

2023 JANUARY ISSUE



POULTRY NUTRITION NEWSLETTER

THE POULTRY NUTRITION NEWSLETTER IS BROUGHT TO YOU BY



Department of Poultry Science
College of Agricultural & Environmental Sciences
UNIVERSITY OF GEORGIA

NUTRIBINS

LATEST NUTRITION RESEARCH AT A GLANCE

POULTRY

Younger broiler breeder flocks produce smaller eggs containing smaller yolks, with potentially lower energy reserves for the developing chick. **In ovo supplementation of creatine monohydrate** in eggs from 27-29 weeks old breeder hens showed improved hatch rate numerically likely from improved energy status.

The University of Adelaide/Link

In broilers fed a low-protein diet, supplementing **Isoleucine** to 0.83% improved performance and meat quality, and lowered lipid deposition, likely through activating AMPK and JAK2/STAT3 signaling pathways.

Qingdao Agricultural University/Link

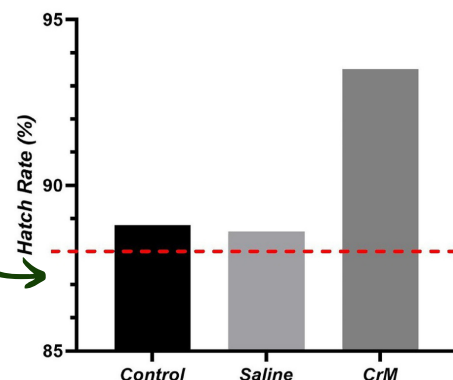


Fig. Hatch rate of Ross 308 given an in ovo injection at embryonic day 14

When comparing four commercially available broiler strains (2 standard yielding and 2 high yielding strains) fed high or low density diets, broilers fed the high-density diets had increased BW, decreased FCR, and improved carcass yields (in males); male HY strains provided the highest carcass yields compared to SY males, but no differences in females. Therefore, **strain and sex** impacted performance traits and carcass yields, and the use of specific strains and amino acid density for various market segments is beneficial for integrators to maximize return.

University of Arkansas/Link

Table 1. Experiment 1 - Nutrient and sinigrin content of CCWG-1-CuSO₄ (as is basis).

Analyte		
Dry matter, %	82.8	
ME, kcal kg ⁻¹ calculated ¹	3804	
Crude protein, %	20.6	
Crude fat ² , %	26.8	
Crude fiber, %	15.2	
Acid detergent fiber, %	20.8	
Neutral detergent fiber, %	21.1	
Carbohydrates, %	30.6	
Ash, %	4.3	
Calcium, %	0.69	
Phosphorus, %	0.66	
Magnesium, %	0.3	
Potassium, %	0.65	
Sodium, %	0	
Sulfur, %	0.82	
Chloride, ppm	159	
Iron, ppm	85	
Copper, ppm	587	
Manganese, ppm	25	
Zinc, ppm	31	
Indispensable Amino Acids		
Arginine	1.22	1.13 ³
Histidine	0.55	0.48 ³
Isoleucine	0.82	0.67 ³
Leucine	1.44	1.24 ³
Lysine	1.08	0.83 ³
Methionine	0.35	0.30 ³
Phenylalanine	0.92	0.80 ³
Threonine	0.91	0.72 ³
Tryptophan	0.32	0.28 ³
Valine	1.06	0.86 ³
Dispensable Amino Acids		
Alanine	0.96	0.79 ³
Aspartic acid	1.65	1.40 ³
Cysteine	0.29	0.21 ³
Glutamic acid	3.15	2.84 ³
Glycine	1.23	NA ⁴
Proline	1.03	0.85 ³
Tyrosine	0.49	0.41 ³
Serine	0.82	0.67 ³
Glucosinolates, μmoles g ⁻¹	82.2	

A new **pennycress grain** (low erucic acid, lower fiber) can be safely fed to broilers at 4% and with total glucosinolate levels not to exceed 4.9 μmoles g⁻¹.

HIC&Tyson etc./Link

In broilers under necrotic enteritis challenge, supplementing **spray-dried porcine plasma** during d 0-10 (prior to the challenge) enhanced feed efficiency and gut integrity

University of New England/Link

In LPS-challenged laying hens (32-44 weeks of age), supplementing **quercetin** (a flavonoid) at 0.4 mg/kg ameliorated the LPS challenge-induced intestinal inflammation and improved intestinal functions, possibly associated with its modulation on gut microbiota, particularly the increased population of SCFA-producing bacteria.

Northwest A&F University/Link

In broilers under heat stress, supplementing **glycine** (0.5, 1.0, 2.0%) improved performance and antioxidant capacity, showing its alleviative effect to heat stress-induced induced dysfunction of antioxidant status and intestinal barrier.

Jiangxi Agricultural University/Link

POULTRY

LATEST NUTRITION RESEARCH AT A GLANCE

Table 2. Effect of lipopolysaccharide and 25-hydroxyvitamin D on productive performance of laying hens after challenge (53 to 54 wk of age)

Treatment	25OHD	Egg laying rate, %	Egg weight, g	FCR	Feed intake, g	Broken egg rate, %
-	-	92.27 ^a	61.23	2.09 ^b	118 ^a	2.33 ^b
-	+	93.90 ^a	61.19	2.04 ^b	117 ^a	1.55 ^b
+	-	55.23 ^c	60.30	2.94 ^a	98 ^b	3.98 ^a
+	+	59.88 ^a	60.82	2.85 ^a	104 ^a	2.14 ^b
SEM		1.44	1.78	0.02	1.14	0.17
P-Value		0.01	0.74	0.04	0.05	0.04
P-Value						
LPS		<0.01	0.44	0.02	<0.01	<0.01
25OHD		0.19	0.69	0.13	0.44	<0.01
LPS×25OHD		0.01	0.78	0.03	0.48	0.03

In laying hens under LPS challenge, supplementing **25-OH-D3** at 80 µg/kg improved laying performance and egg quality likely through the improvement of intestinal barrier function, antioxidant capacity, and decreased the proinflammatory cytokines levels.

Sichuan Agricultural University/Link

In laying hens, a **low-bacteria intestinal model** did not affect laying performance but caused immune suppression.

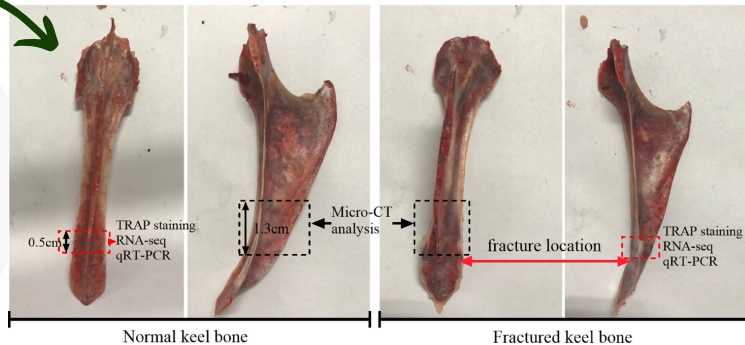
China Agricultural University | Link

The AMEn levels (2700 vs. 2800 Kcal/kg) and CP levels (16.5 vs. 14.5%) did not impact the egg production of aviary laying hens. However, the combination of **higher AMEn and CP** in the diets produced the highest egg weight. Furthermore, the main effects also showed that the high-energy diets reduced the feed intake of laying hens in aviary system.

Rural Development Administration National Institute of Animal Science, Pyeongchang/ Link

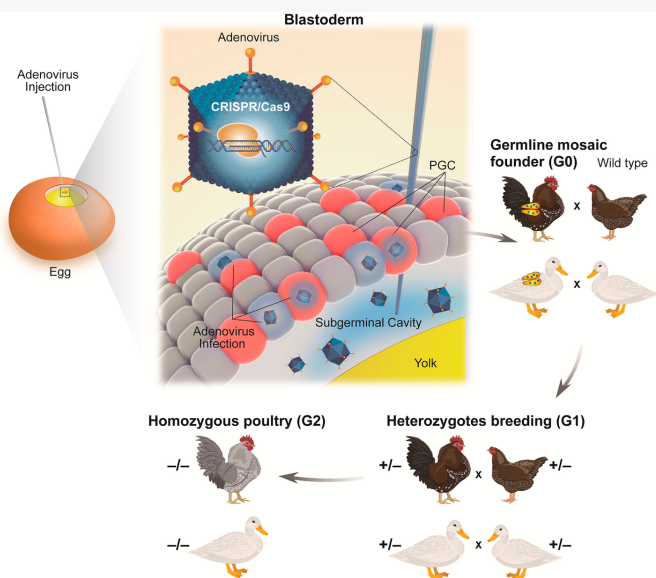
The **abnormal bone metabolism** related to keel bone fractures is possibly responded to fracture healing in laying hens, evidenced by observations of lower serum concentrations of Ca, phosphorus, calcitonin, 25-hydroxyvitamin D₃, and osteocalcin and activities of alkaline phosphatase and tartrate-resistant acid phosphatase in the birds with keel fracture compared to healthy ones.

Northeast Agricultural University/ Link



In Pekin ducks from 10-40 days of age, feeding a **high fat diet** (9% fat) improved feed efficiency and increased total fat content, inhibited hepatic de novo lipogenesis and β-oxidation was an explanation.

Qingdao Agricultural University | Link



NOT NUTRITION BUT INTERESTING...



Genome editing is the most efficacious technology for gaining an understanding of gene functions, but avian species are perhaps some of the least studied animal species...this study showed that the adenovirus-mediated method can be used successfully to produce genome-edited chicken and duck lines.

The Ohio State University | Link

Fig. Generation of genome-edited chicken and duck lines using the adenovirus-mediated method.