



## Department of Poultry Science

*College of Agricultural & Environmental Sciences*

**UNIVERSITY OF GEORGIA**

# UGA Poultry Nutrition Newsletter

October, 2023



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## Upcoming Poultry Events

### 2023

- 9/25-9/27 [58th National Meeting on Poultry Health, Processing, and Live Production, Ocean City, MD](#)
- 9/25 [Layer Conference, Athens, GA](#)
- 9/27 [Broiler Conference, Athens, GA](#)
- 10/4 [Broiler Breeder Management Seminar, Athens GA](#)
- 10/4 [GPLN Annual Meeting, Gainesville, GA](#)
- 10/6 Homecoming tailgate & new poultry science building grand opening, Athens, GA
- 10/17-10/19 [Sunbelt Ag Expo, Moultrie, GA](#)
- 10/29-11/1 [GPF Poultry Strong, Lanier Islands, GA](#)
- 10/29-11/1 [Symposium on Gut Health in Production of Food Animals, St. Louis, MO](#)
- 11/6-11/8 [Poultry Tech Summit, Atlanta, GA](#)

- 11/14-11/16 [Cold weather workshop, Athens, GA](#)

## 2023

- 1/23-1/26 [International short course, Athens, GA](#)

- 1/29-2/1 [ISPF/IPPE, Atlanta, GA](#)

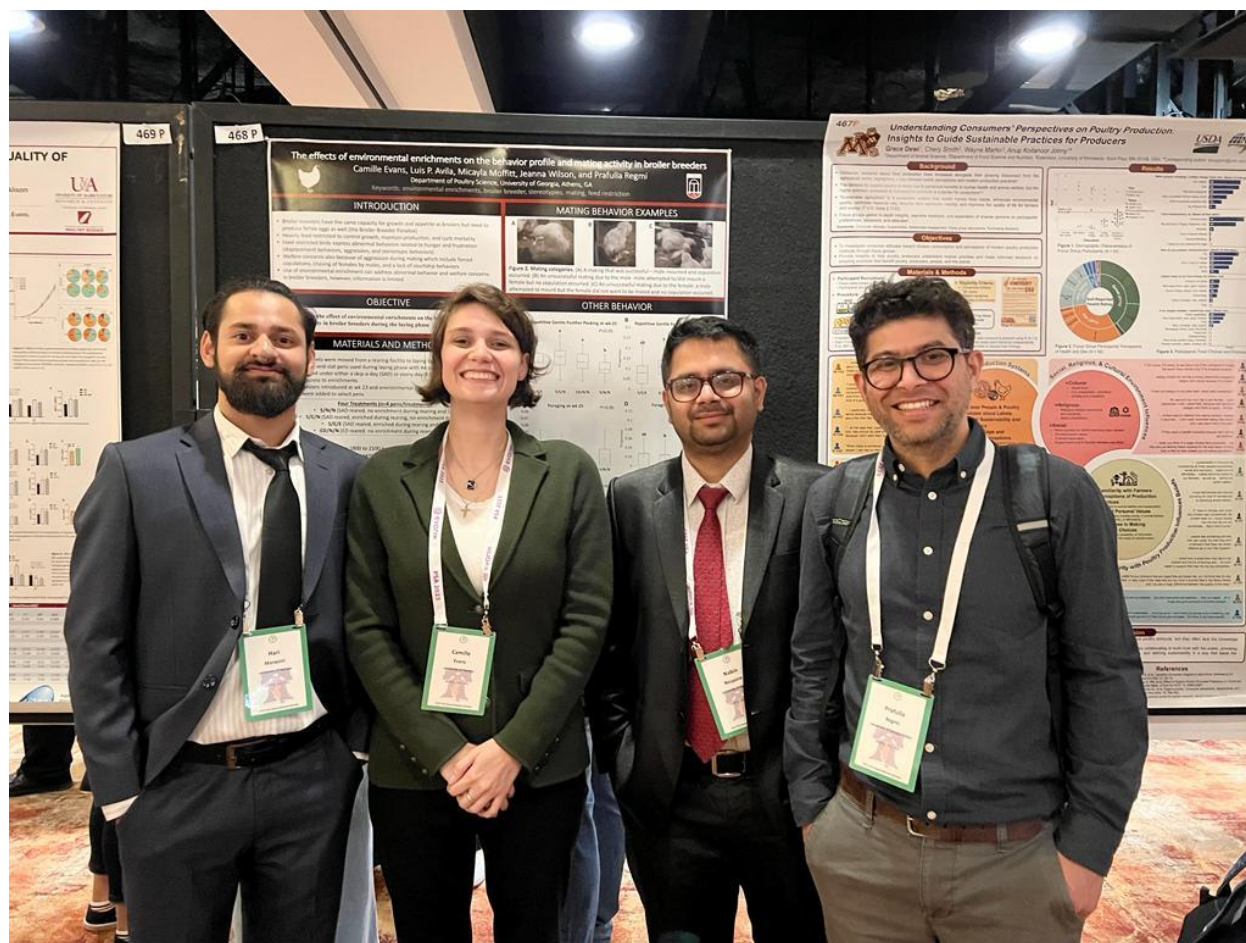
- 3/3-3/7 [Purchasing and Ingredient Suppliers Conference, Orlando, FL](#)

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## Poultry News at a glance

- **[September Business Update: What's new in the world of poultry? \(Poultry World\)](#)**
    - The latest business developments and updates from around the world.
  - **[World's Top Feed Companies: 147 feed manufacturers rank in 2023 \(Feed Strategy\)](#)**
    - In 2022, 147 animal feed manufacturers worldwide reached or exceeded 1 million metric tons of compound feed production, which represents 43% of total production. Learn more about the detailed ranking. Check the link above.
  - **[Iowa on high alert for avian influenza \(WATT Poultry\)](#)**
    - With the presence of HPAI confirmed in bordering South Dakota and Minnesota, Iowa agriculture secretary says poultry producers must pay attention.
  - **[Ukrainian poultry giants are profitable again \(Poultry World\)](#)**
    - At least 2 leading Ukrainian poultry groups (MHP and Ovostar Union) posted positive financial results for the first half of 2023, following a turbulent previous year. The positive trend, however, seems fragile.
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## UGA Poultry Research Highlight



Dr. Prafulla Regmi, an assistant professor, specializes in **poultry welfare and management**. His recent research focuses on basic and applied understanding of welfare issues in broilers and layers. Nabin Neupane and Camille Evans, his M.S. students worked on applied research related interaction between growth rate and lameness in broilers and effects of environmental enrichment in broiler breeders respectively. Nabin's project highlighted that a **20% reduction in growth of commercial broilers can reduce incidences of lameness and footpad dermatitis**. On the other hand, Camille's study found that inclusion of **environmental enrichments can reduce frequency of stereotypic behaviors in broiler breeder pullets**. Regmi's group has also conducted research to track movements of laying hens in cage-free aviaries using RFID based tracking system and has found **significant individual variation in the movement patterns of hens with implications for keel bone damage**. Fundamental research in Regmi's lab includes characterizing heart rate variability as a

potential indicator of stress in chickens and understanding the role of inflammation and microbiota on behaviors.

[Learn more about the research](#)

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Intrigued by Dr. Regmi's research and lab? Reach out to the team:

[Email](#)

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To subscribe to the newsletter and keep updated with the latest news and research in poultry nutrition. Please click the button below, or contact Sean Chen at [sean.chen@uga.edu](mailto:sean.chen@uga.edu)

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2023 OCTOBER

In this issue, you will read research summaries from  
12 Broilers studies  
1 Layer studies  
3 Literature review  
from 14 research institutes in 9 countries



# POULTRY NUTRITION RESEARCH SUMMARY



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# Nutribins LLC

# LATEST NUTRITION RESEARCH AT A GLANCE

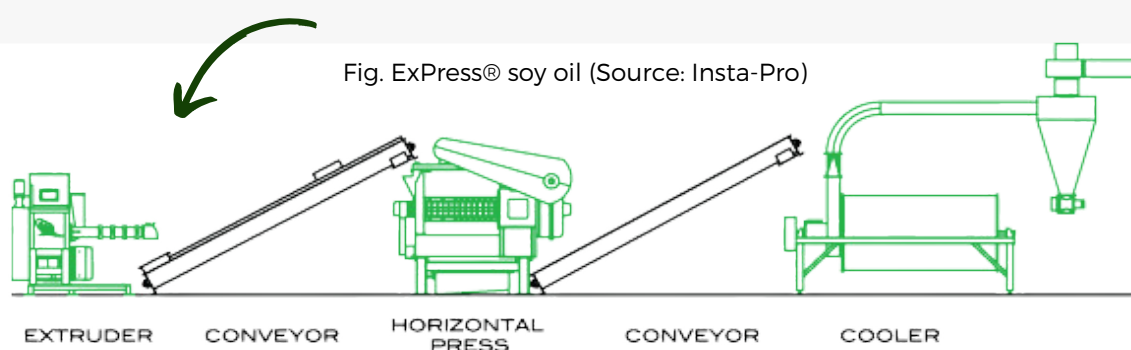
## POULTRY

In broilers, supplementing **compounded bioengineering proteins (Parasin I + plectasin protein)** at 750 mg/kg improved overall growth performance. It also enhanced the antioxidant capacity, intestinal health, immune function, and gut microflora population.

*Sichuan Agricultural University / [Link](#)*

In broilers, compared to animal fat, **soy oil from different processing methods** (refined, bleached, and deodorized (RBD-SO) vs. mechanically-processed (Mech-SO) vs. ExPress® soy oil (ExP-SO)) all improved feed intake, BW gain, FCR, and nutrient digestibility; ExP-SO had the best overall FCR among all soy oils.

*Iowa State University / [Link](#)*



In broilers under LPS challenge, supplementing **oleanolic acid** (100 to 200 mg/kg) prevented LPS-induced liver damage and oxidative stress; it also reduced expression of inflammatory-related interleukins (IL) and TNF while increasing IL-10, an anti-inflammatory cytokine.

*Northeast Agricultural University / [Link](#)*

In broilers, supplementing **Bacillus subtilis probiotic** improved body weight; Both the probiotic and antibiotic had similar effects on the microbiome of increasing beneficial bacteria in the ceca.

*Russian Academy of Sciences / [Link](#)*

In broilers, 50 g/ton **bacitracin** reduced the intestinal innate immune responses at d14 and adaptive immune responses at d28 and d36, demonstrating that antibiotics have an impact on gut immunity; effects of bacitracin were more dominant in the jejunum prior to 14 days and the ileum at later stages of growth.

*Texas A&M / [Link](#)*

In broilers, completely replacing soybean meal with **16% Black Soldier Fly larvae (BSFL)** in isonitrogenous and isocaloric diets worsened FCR, reduced body weight, dietary available energy, and nutrient digestibility; whereas feeding BSFL reduced excreta moisture content.

*Harper Adams University / [Link](#)*

In broilers, dietary supplementation of **medium-chain fatty acids blended with essential oils** improved body weight gain and jejunum morphology, elevated cecal propionate, acetate, and butyrate concentrations, and decreased cecal concentration of branch chain fatty acids.

*Ankara University / [Link](#)*



# POULTRY

# LATEST NUTRITION RESEARCH AT A GLANCE

In broilers, supplementing **Bacillus subtilis** ( $5.0 \times 10^8$  cfu/kg) improved feed efficiency, antioxidant capacity, and the mRNA expression of pro-inflammatory cytokines in the jejunal mucosa, while decreasing the activity of diamine oxidase in serum, which might be attributed to the modulation of gut microbiota composition and the functions of cecal microbiota in broilers.

Foshan University / [Link](#)

In broiler under heat stress, supplementing **copper proteinate** (112.5 or 150 mg Cu/kg) improved performances and *Lactobacillus* proliferation, inhibited *E. Coli* and *Salmonella*, and ameliorated oxidative stress, this suggests that Cu-Proteinate may be a novel strategy to alleviate the negative effects of heat stress without involving any apparent risk of Cu toxicity.

AgriVet Research and Advisory in India / [Link](#)

In broilers under continuous heat stress, supplementing **vitamin C** (250 mg/kg) and **green tea extract** (600 mg/kg) in the diet started at 1d or 22d both improved meat quality and immunity. Vitamin C supplementation from day 1 also enhanced villus development and decreased rectal temperatures.

Poultry Research Institute (Korea) / [Link](#)

In broilers, supplementing **microalgae** (30 g/kg diet) with or without xylanase promoted growth performance and showed a tendency to improve gut health parameters (*ZO1*, *CD56*, *SLC7A7* gene expressions).

University of Hawaii at Manoa / [Link](#)

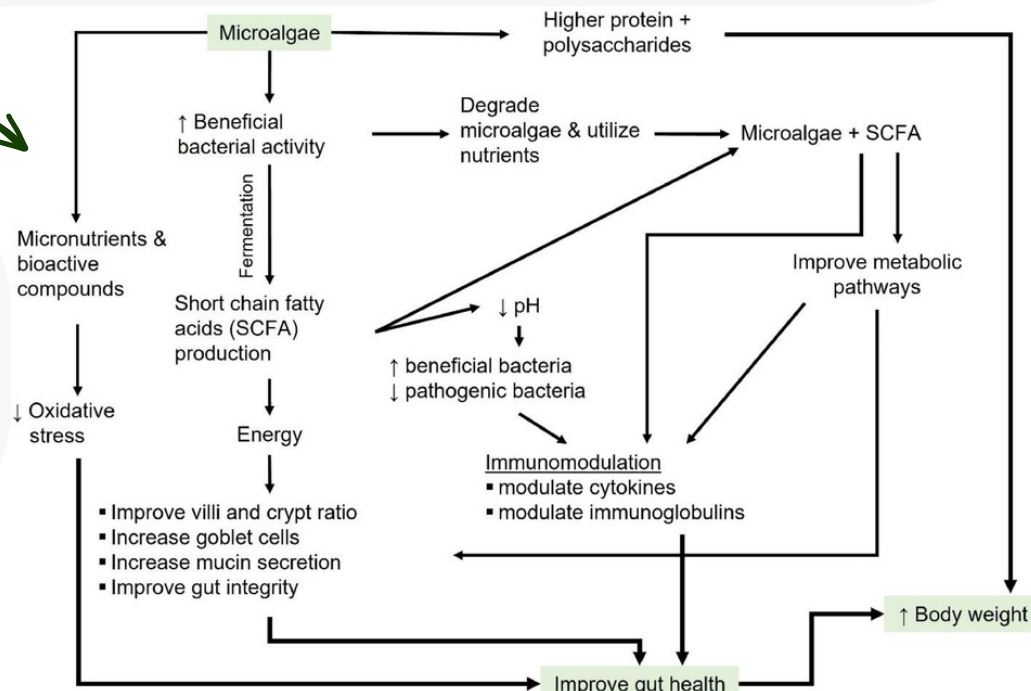


Fig. Probable working pathways of microalgae to improve gut health and body weight of broiler chickens.

In broilers subjected to coccidiosis vaccine challenge, dietary supplementation of **25-OH-D3** improved performance, FCR and tibia breaking strength.

Texas A&M University / [Link](#)

In layers, replacing two-thirds of soybean meal with **sunflower meal and rapeseed meal** did not adversely affect laying performance, FCR, egg weight, eggshell quality, or AMEn intake.

Harper Adams University / [Link](#)

## Review #1

### The future of feed formulation for poultry: toward more sustainable production of meat and eggs

Currently, feed formulation is based off the least cost method of feed production. This review article focuses on the future goals of feed formulation. These goals should include bird genetics, housing, and feed quality. In this way, utilizing these goals as part of the feed formulation creates a **profit-maximizing model** where feeding birds involves the nutritionist, production managers, marketing, and processing managers. This type of formulation is ever-evolving and changing, with various inputs like the price of eggs, meat, exogenous enzyme use, the use of net energy, and more.

*Poultry Hub Australia* | [Link](#)

**Table 1.** Functions and signs of vitamin A insufficiency in poultry.

| Chemical structure | Functions                                 | Signs of insufficiency                                | Sources                        |
|--------------------|---|---|--------------------------------|
| Retinol            | Vision                                    | Compromised immune function                           | Shastak and Pelletier (2023),  |
| Retinal            | Cellular proliferation and specialization | Abnormalities in reproduction                         | Fu <i>et al.</i> (2000),       |
| Retinoic acid      | Immunomodulation                          | Hindered bone development                             | Bermudez <i>et al.</i> (1993), |
|                    | Reproductive and embryonic development    | Stunted growth  | Chiba <i>et al.</i> (1996),    |
|                    | Skeletal integrity                        | Corneal and ocular xerosis                            | Hong <i>et al.</i> (2013),     |
|                    | Dermatological well-being                 | Excessive keratinisation or follicular hyperkeratosis | Aydelotte (1963),              |
|                    | Genetic regulation                        | Nephrosis and nephritis                               | Elvehjem and Neu (1932),       |
|                    | Antioxidant capacity                      | Deficiency-related anemia                             | Chandra <i>et al.</i> (1984),  |
|                    | Oxidative stress defence                  |   | Bhuiyan <i>et al.</i> (2004)   |



## Review #2

### Delving into vitamin A supplementation in poultry nutrition

Chickens are unable to synthesize Vitamin A, and a diet must provide it. However, inadequate **vitamin A** doses can lead to different problems in the immune system, antioxidant capacity, and reproductive performance. This review discusses a deep analysis of vitamin A supplementation, comparing different dosages and their implications on poultry production. It concludes that optimal vitamin A balance improves growth, reproductive performance, antioxidant capacity, and immune function.

## Review #3

### Methionine and Arginine in Intestinal and Bone Health of Poultry

Amino acids are an important part of chicken diets and play various physiological roles in the body. Intestinal and bone health are two significant parameters for welfare and normal physiological function that can be affected by amino acids, especially **methionine and arginine**. Besides their vital role in protein synthesis, both amino acids can influence intestinal and bone health. This review covers the effect of methionine and arginine on immune response, modulation of intestinal microbiota, gut health and bone formation, growth, remodeling, and their potential toxicity in diets.

*University of Georgia* | [Link](#)

*BASF SE Germany* | [Link](#)

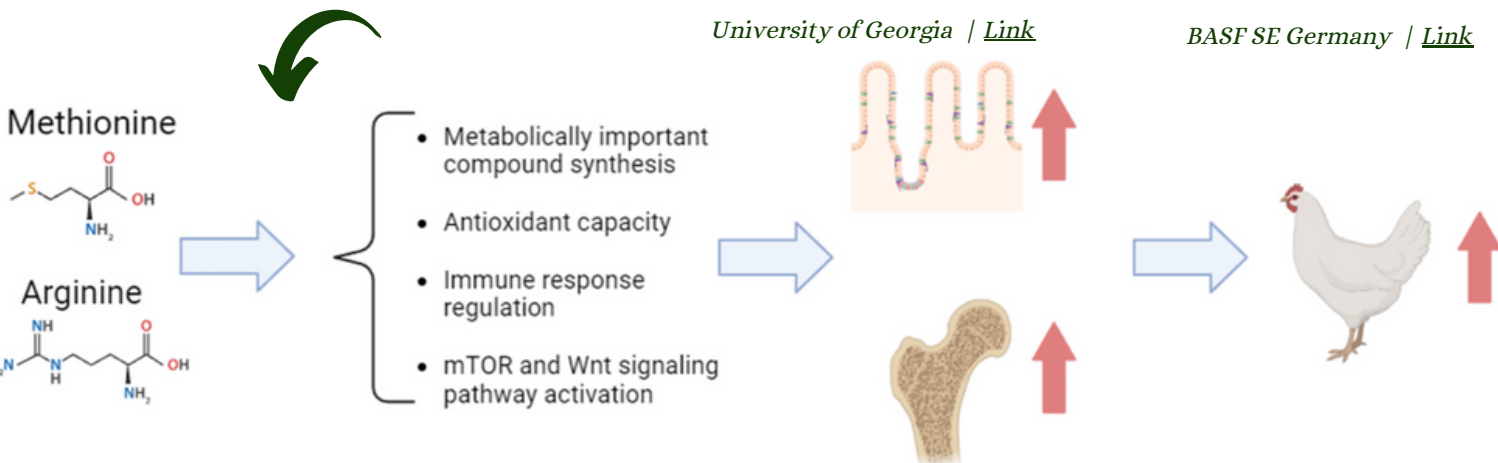


Fig. Schematic model illustrating potential mechanisms of Met and Arg in enhancing intestinal and bone health in poultry.