2021 PSA Annual Meeting
ONLINE
PROGRAM COMMITTEE

Thank you to Jason Emmert and his Program Committee for their selfless efforts on our behalf. Please take a minute to express your appreciation.

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Oluyinka A. Olukosi, Metabolism and Nutrition: Enzymes
Jeffery Escobar, Metabolism and Nutrition: Feed Additives
Ashley M. Evans, Metabolism and Nutrition: General Nutrition
Kurt R. Perryman, Metabolism and Nutrition: Vitamins and Minerals
Amit Morey, Microbiology and Food Safety
Laura E. Ellestad, Physiology and Reproduction
Casey M. Owens, Processing and Products
Sami Dridi, Bruce M. Rathgeber and Robert E. Buresh, WPSA Lecture
Douglas R. Korver, Informal Nutrition Symposium
Vanessa A. Leone & Steven C. Ricke, Dr. Mark E. Cook's Legacy Symposium
Mojtaba Yegani, Intestinal Microbiome Symposium
Steven C. Ricke and Dana K. Dittoe, Poultry Gut Microbiota Symposium
Jason T. Lee, Amino Acids Symposium
Pierre-André Geraert and Robert B. Shirley, Smart Technologies Symposium
Elizabeth L. Karcher, Online Curriculum Symposium
Katie Hilton, Necrotic Enteritis Symposium
Kelley G. S. Wamsley, Feed Manufacture Symposium
Darrin Karcher, Did You See That? Symposium
Walter G. Bottje and Sami Dridi, Water Efficiency Symposium
Elizabeth Santin, Intestinal Nutrition Symposium
Kenneth W. Koelkebeck, National Poultry Extension Workshop
Erin Ross and Gabriela Cardoso Dal Pont, Student Workshop
Douglas R. Korver, Student Competition
## PROGRAM GRID
Virtual 2021 PSA Annual Meeting

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<td>Utilizing Big Data in Poultry Smart Farming: Opportunities and Challenges</td>
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<td>Informal Nutrition Symposium</td>
<td>Leveraging the Microbiome (and the Metabolome!) for Poultry Production</td>
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<td>Amino Acids: Crude Protein Reduction: Benefits on Intestinal Health, Environment, and Performance</td>
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<tr>
<td>4:00 pm – 5:00 pm</td>
<td>Social Event</td>
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<td>How to Prepare for Your Future Career</td>
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<td>4:00 pm – 5:00 pm</td>
<td>Social Event</td>
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<td>5:00 pm – 6:00 pm</td>
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<td>Symposium</td>
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<td>PSA Business Meeting</td>
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Dr. Bogdan Slominski
World’s Poultry Science Association – Canada Branch
World’s Poultry Science Association – USA Branch
SYMPOSIA AND WORKSHOPS

Monday, July 19th

WPSA Lecture:
Utilizing Big Data in Poultry Smart Farming: Opportunities and Challenges

Poultry farms are gradually becoming high-tech environments which utilize technologies such as sensors, smart poultry management systems, and artificial intelligence to increase production, improve bird welfare, and minimize environmental footprint. These technologies generate large amounts of data by collecting a variety of parameters from farm operations. The data collected by these tools can offer credible insight into improving farm management, enhancing precision feeding, and early detection of infectious disease. However, governance, protection, and analysis of this large volume of data impose many challenges. This talk will discuss the impact of emerging digital technologies in poultry farming and opportunities they provide in terms of enhancing production and farm management. It will also review technology and operational requirements that enhance adoption and trust in farm technologies and also address challenges such as interoperability, data security, and sustainability.

Chairs: Bruce M. Rathgeber, Dalhousie University
and Sami Dridi, University of Arkansas

Ballroom

8:00 AM 446S Utilizing big data in poultry smart farming: Opportunities and challenges. Rozita Dara*, University of Guelph, Guelph, Ontario, Canada

8:50 AM Questions and answers.

Symposium:
Dr. Mark E. Cook’s Legacy: Poultry Biologics

Dr. Mark E. Cook, Past President of the Poultry Science Association and PSA Fellow, was a Professor in the Department of Animal Sciences at the University of Wisconsin-Madison who achieved excellence in his academic pursuits and embodied an entrepreneurial spirit. His main research endeavor was to identify innovative dietary strategies to modulate inflammation as a modality to improve animal growth and production endpoints, mainly in poultry. He was co-inventor of the dietary supplement Conjugated Linoleic Acid (CLA) and strategically employed the chicken egg yolk antibody (IgY) technology. Several of Cook’s later discoveries were focused on identifying co-products with biological activity from food animal agriculture that could be repurposed as dietary supplements to promote animal growth and production. The identification of novel compounds possessing unique biological properties derived from or for poultry is an untapped resource with limitless possibilities both within the industry itself and beyond. These co-products can add value to existing birds destined for slaughter, can be used to improve avian production endpoints, and can be repurposed to improve health and wellness in other species, including humans. In order to move the needle and create opportunities for the discovery of novel co-products from poultry production, creative, out-of-the-box thinking is essential. This symposium aims to present an overview of Cook’s innovative research, highlighting ongoing work from his former trainees and colleagues who embody his entrepreneurial spirit and are engaged in identifying novel biologics from and for the poultry industry with an emphasis on the future of the biologics field.

Chairs: Vanessa A. Leone, University of Wisconsin-Madison
and Steven C. Ricke, University of Wisconsin-Madison

Ballroom

9:00 AM Introductory remarks; In memory of Dr. Mark E. Cook.

*Presenter

All Times are CST
Kirk C. Klasing*, University of California, Davis, California, United States

9:10 AM 447S Identifying novel strategies to improve animal health and wellness: From concept to product.
Jordan M. Sand*, Ab E Discovery, Middleton, Wisconsin, United States

9:35 AM 448S Applying novel molecular biology approaches to identify new targets that promote avian health.
Elizabeth A. Bobeck*, Animal Science, Iowa State University, Ames, Iowa, United States

10:00 AM 449S Tapping into the immunological potential of the avian species: Novel strategies to improve performance.
Vanessa Leone*, Department of Animal & Dairy Sciences, University of Wisconsin, Madison, Wisconsin, United States

10:25 AM 450S Searching the microbiome for druggable targets: Lessons from the avian gut.
Steven C. Ricke*, Meat Science and Animal Biologics Discovery, Department of Animal and Dairy Sciences, University of Wisconsin, Madison, Wisconsin, United States

10:50 AM Wrap-up and the future directions of poultry biologics.
Steven C. Ricke*, Meat Science and Animal Biologics Discovery, Department of Animal and Dairy Sciences, University of Wisconsin, Madison, Wisconsin, United States

National Poultry Extension Workshop
Chair: Kenneth W. Koelkebeck, University of Illinois

Ballroom

11:00 AM 451S Catastrophic circumstances and commercial flock euthanasia: Meat type poultry.
Gregory P. Martin*, Cooperative Extension, Penn State University, Lancaster, Pennsylvania, United States

11:15 AM 452S Catastrophic circumstances and commercial flock euthanasia: Laying hen.
Kenneth E. Anderson*, Poultry Science, North Carolina State University, Raleigh, North Carolina, United States

11:30 AM 453S Use of vegetative buffers to mitigate poultry dust and ammonia.
Paul H. Patterson*, Penn State University, University Park, Pennsylvania, United States

11:50 AM 454S How to communicate with poultry producers concerning disease recognition and control without farm visits.
Fred Dustan Clark*, Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States

12:10 PM 455S Answering small flock poultry producer’s questions about lead toxicity and how to communicate with poultry interested clientele throughout the world.
Jacqueline P. Jacob*, Animal and Food Sciences, University of Kentucky, Lexington, Kentucky, United States

12:30 PM Discussion of poultry industry and extension happenings around the U.S.
All Extension Specialists
Informal Nutrition Symposium:
Leveraging the Microbiome (and the Metabolome!) for Poultry Production

Knowledge of gut microbiology of poultry has advanced from an ability to culture relatively few microbial species, to attempting to understand the complex interactions between the bird and its microbiome. This symposium will help the poultry nutritionist to make sense of the implications of the vast amounts of information being generated by researchers.

Chair: Douglas R. Korver, University of Alberta

Ballroom

1:00 PM  456S  Introduction.  
Rosalina Angel*1, Mamduh Sifri2, Todd Applegate3, Doug Korver4, 1Animal and Avian Sciences, University of Maryland, College Park, Maryland, United States, 2Sifri Solutions, LLC, Quincy, Illinois, United States, 3Poultry Science, University of Georgia, Athens, Georgia, United States, 4Agricultural, Food & Nutritional Science, University of Alberta, Edmonton, Alberta, Canada

1:05 PM  457S  Historical overview of the development of poultry microbiome research.  
Margie D. Lee*, Biomedical Sciences and Pathobiology, Virginia Tech, Blacksburg, Virginia, United States

1:35 PM  Questions and answers.

1:40 PM  458S  Immunometabolism and metabolic health: Implications for poultry production.  
Ignacio R. Ipharraguerre*, Institute of Human Nutrition and Food Science, University of Kiel, Kiel, Germany

2:10 PM  Questions and answers.

2:15 PM  459S  Kinomics: Regulation of the metabolome.  
Ryan Arsenault*, Animal and Food Sciences, University of Delaware, Newark, Delaware, United States

2:45 PM  Questions and answers.

2:50 PM  Life mentor awards.  
Mamduh Sifri*, Sifri Solutions, LLC, Quincy, Illinois, United States

3:00 PM  460S  Microbial Endocrinology: How evolved intersections of microbiology and neurobiology matter to poultry health and nutrition.  
Mark Lyte*, Dept. of Veterinary Microbiology and Preventive Medicine, Iowa State University, Ames, Iowa, United States

3:30 PM  Questions and answers.

3:35 PM  461S  Applying the knowledge: Where is the research leading us?.  
Brooke Humphrey*, Phibro Animal Health, Maple Grove, Minnesota, United States

4:05 PM  Questions and answers.

4:10 PM  Panel discussion.  
Douglas R. Korver*, University of Alberta, Edmonton, Alberta, Canada

*Presenter
Tuesday, July 20th

Symposium:
Strategic Modulation of Intestinal Microbiome: Different Perspectives

Constantly changing poultry production systems in different parts of the world have necessitated a much better understanding of the modulation of the intestinal microbiome and their implications in poultry flocks that are raised under these systems. This symposium is intended to discuss this important topic from a variety of perspectives so that both scientific communities and the global poultry industry can benefit from.

Chair: Mojtaba Yegani, Evonik Corporation

Ballroom

8:00 AM  Introduction.

8:00 AM 462S  Strategic modulation of intestinal microbiome: A microbiologist's perspective.
Robert J. Moore*, School of Science, RMIT University, Bundoora, Victoria, Australia

8:30 AM 463S  Strategic modulation of intestinal microbiome: An immunologist perspective.
Ryan Arsenault*, Animal and Food Sciences, University of Delaware, Newark, Delaware, United States

9:00 AM 464S  Strategic modulation of intestinal microbiome: An allied industry research scientist perspective.
Nadia Yacoubi*, Nutrition and Care, Evonik Operations GmbH, Hanau-Wolfgang, Germany

9:30 AM  Questions and answers.

9:50 AM 465S  Strategic modulation of intestinal microbiome: An extension specialist perspective.
Audrey P. McElroy*, Poultry Science Department, Texas A&M University, College Station, Texas, United States

10:15 AM 466S  Strategic modulation of intestinal microbiome: A field nutritionist perspective.
Alejandro Corzo*, Aviagen, Huntsville, Alabama, United States

10:40 AM 467S  Strategic modulation of intestinal microbiome: A Field Veterinarian Perspective.
Charles L. Hofacre*, Southern Poultry Research Group, Inc., Watkinsville, Georgia, United States

11:05 AM  Questions and answers.

Symposium:
Antagonism Versus Synergism: Poultry Gut Microbiota Interactions and Impact on the Host

The interactions of the gut microbial populations and how this impacts poultry gut health and ultimately poultry production is rapidly emerging as a critical component. There are several contributors to gut microbial ecology including not only the members of the gut microbial community but their resulting metabolic activities and interactions with host systems. Consequently, it is not just a matter of microbial composition but the metabolic functions of these individual microorganisms as members of a complex highly interactive community. In this symposium evidence of these interactions and their impact on the host will be presented. The development and expansion of the gut microbial community as the young bird matures can interface with host systems such as the immune response resulting in an interconnected relationship between these two entities. This is also true for the gut microorganisms themselves as the opportunities for metabolic “crosstalk” are common with the end products.
generated by certain members of the gut microbiota serving as substrates for other members. Finally, it is possible to edit or change the microbiota and/or metabolic activities optimizing this interactive balance for host benefit by supplementing feed additives such as prebiotics or organic acids. Therefore, the presence of pathogens, corresponding responses of host systems, the microbial community fermentation, and external dietary additives can influence the microbial metabolome, the host, pathogen biology, poultry nutrition, and gut health.

Chairs: Steven C. Ricke, University of Wisconsin-Madison and Dana K. Dittoe, University of Wisconsin-Madison

Ballroom

12:00 PM  
**Introduction.**  
Vanessa Leone*, Department of Animal & Dairy Sciences, University of Wisconsin, Madison, Wisconsin, United States

12:00 PM 468S  
**Gut microbe interaction with pathogens: Opportunistic antagonism.**  
Kristina M. Feye*, Food Science, University of Arkansas, Fayetteville, Arkansas, United States

12:25 PM 469S  
**Gut microbial interaction with the host: Education and adaptation.**  
Vanessa Leone*, Department of Animal & Dairy Sciences, University of Wisconsin, Madison, Wisconsin, United States

12:50 PM 471S  
**Gut metabolic crosstalk: Microbes feeding microbes.**  
Steven C. Ricke*, Department of Animal and Dairy Sciences, University of Wisconsin, Madison, Wisconsin, United States

1:15 PM 470S  
**Feed additives: Manipulating gut microbial interactions.**  
Dana K. Dittoe*, Animal and Dairy Sciences, University of Wisconsin, Madison, Wisconsin, United States

1:45 PM  
**Roundtable.**

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**Symposium:**  
**Amino Acids: Crude Protein Reduction: Benefits on Intestinal Health, Environment, and Performance**

Reducing dietary crude protein benefits the environment and the animal specifically intestinal health. However, as crude protein reduction expands in the US poultry industry, there are some challenges in dietary formulation especially around branched chain amino acid ratios. Swine nutritionists have adopted model predicting BCAA ratios to assist with these challenges. This symposium will provide a swine perspective on reduced crude protein diets, discuss the antagonistic relationship of branched chain amino acids, highlight using synthetic branched chain amino acids to address this antagonism and maximize performance and highlight the benefit on intestinal health of reducing dietary crude protein.

Chair: Jason T. Lee, CJ Bio America

Ballroom

2:00 PM  
**Introduction.**  
Jason T. Lee*, CJ Bio America, Goliad, Texas, United States

2:00 PM 472S  
**Managing amino acid nutrition in reduced crude protein diets: A swine nutritionist’s perspective.**  
Jason Woodworth*, Mike Tokach, Joel DeRouchey, Jordan Gebhardt, Robert Goodband, Kansas State University, Manhattan, Kansas, United States

2:30 PM 473S  
**Understanding the branched-chain amino acid conundrum and how to use it to maximize**
Wednesday, July 21st

Symposium:
Existing and Upcoming Smart Technologies: Opportunities to do Better in the Poultry Industry

Digital equipment and data management continue to improve. As a result, technologies have become less expensive and more integrated, giving poultry producers cutting-edge tools that can monitor, detect, and remedy issues that would otherwise lead to poor/inefficient production and welfare issues. This symposium will highlight how the poultry industry functions today and a few new technologies that can be implemented to improve production.

Chairs: Pierre-André Geraert, Adisseo France, SAS and Robert B. Shirley, Adisseo USA

Ballroom

8:00 AM
From individuals to large flocks: The challenges of new technologies for the poultry industry.
Pierre-André Geraert*, Adisseo France, SAS and Robert B. Shirley*, Adisseo USA

8:05 AM
Improving economic and environmental sustainability of poultry production using an innovative precision feeding system.
Bertrand Meda*, Eva Pampouille*, Yann Guyot*, INRAE UMR BOA, Nouzilly, France, ITAVI, Nouzilly, France

8:35 AM
Using in-house robots to monitor, detect and respond to real time issues.
Colin Usher*, Aerospace Transportation Advanced Systems Lab Food Processing Technology Division, Georgia Tech Research Institute, Atlanta, Georgia, United States

8:50 AM
How advances in technology are making the application of artificial intelligence and machine learning to poultry affordable, accessible and valuable.
Claire Lewis*, Agri-Food, Harper Adams University, Royston, United Kingdom

9:05 AM
Big data: What is it, what’s meaningful, and how do we use it to design and implement new strategies?.
Tammy A. Baltzley*, Kreher’s Farm Fresh Eggs, Clarence, New York, United States

9:35 AM
Roundtable.
John Halley*, Pilgrim’s Pride Corporation, Siloam Springs, Arkansas, United States
Symposium:
Sparking Curiosity and Engagement Through Online Curriculum

As a number of United States citizens directly involved with agriculture continues to decline, a similar trend is reflected in the undergraduate student body. The increase in students seeking poultry or animal science baccalaureate degrees has increased in recent year, but a growing majority of these students have no previous food animal experience. This results in a lack of awareness and understanding of career opportunities. The poultry industry is one area that is often overlooked. It is essential that deliberate strategies are integrated into the undergraduate curriculum to expose students to opportunities in the poultry industry. Successful recruiting must also include strong collaboration between academics and industry professionals. This symposium will highlight innovative recruiting methods to engage students and create interest and awareness of the poultry industry. Topics that will be included in the symposia include the pedagogy of motivation, methods for implementing active learning in the classroom and online to create interest, and innovative recruiting methods.

Chair: Elizabeth L. Karcher, Purdue University

Ballroom

8:30 AM Introduction.
Elizabeth Karcher*, Animal Sciences, Purdue University, West Lafayette, Indiana, United States

8:30 AM Student perception of teaching strategies to stimulate student interest and engagement.
Panel of PSA Student Members

8:45 AM 480S Developing and maintaining student interest in a global pandemic.
Elizabeth Karcher*, Animal Sciences, Purdue University, West Lafayette, Indiana, United States

9:00 AM 481S Creating online engagement in a world of black boxes.
Dawn Koltes*, Anna K. Johnson, Peggy Auwerda, Laura Greiner, Sherrlyn Olsen, Christen Burgett, Animal Science, Iowa State University, Ames, Iowa, United States

9:15 AM 482S Hands-on learning from a distance: Hybrid and virtual lab experiences.
Benjamin Wenner*, Animal Sciences, The Ohio State University, Columbus, Ohio, United States

9:30 AM Panel discussion.

9:50 AM Breakout Workshops: Increasing student engagement through active learning.

Symposium:
Bridging the Gap: From Science to Application – Managing the Facets of Necrotic Enteritis

Necrotic Enteritis is a multi-faceted disease. To build a viable management strategy, current knowledge on the disease and its environmental footprint must be evaluated alongside incidental contributions from coccidia and nutrition. “Bridging the gap” on Necrotic Enteritis will bring together academic, veterinary and field nutrition professions to share the latest thinking on this challenging, multi-factored disease.

Chair: Katie Hilton, IFF-Danisco Animal Nutrition

Ballroom

12:00 PM Introduction.

*Presenter

All Times are CST
Katie Hilton*, IFF-Danisco Animal Nutrition, Elkins, Arkansas, United States

12:00 PM 483S **Modeling necrotic enteritis: Applying lessons learned.**
Lisa R. Bielke*, Audrey F. Duff, Kaylin Chasser, Whitney Briggs, Kim Wilson, Animal Sciences, Ohio State University, Wooster, Ohio, United States

12:30 PM 484S **Effects of the housing environment on necrotic enteritis.**
Jeremiah D. Davis*, National Poultry Technology Center, Auburn University, Auburn, Alabama, United States

1:00 PM 485S **The cocci conundrum.**
Charles L. Hofacre*, Greg F. Mathis, 1Southern Poultry Research Group, Inc., Watkinville, Georgia, United States, 2Southern Poultry Research, Athens, Georgia, United States

1:30 PM 486S **Managing necrotic enteritis in commercial broiler production: What can nutrition do?.**
Regis F. Pastorelo Meurer*, Pilgrims, Longview, Texas, United States

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**Student Workshop:**
**How to Prepare for Your Future Career**
Chairs: Erin Ross, University of Guelph and Gabriela Cardoso Dal Pont, Texas A&M

**Ballroom**

2:00 PM **Introduction.**
Erin Ross*, University of Guelph, Guelph, Ontario, Canada

2:00 PM 487S **If you have people skills AND can handle data…the poultry industry needs you.**
Bruce Stewart-Brown*, Perdue Farms Inc., Salisbury, Maryland, United States

2:20 PM **Questions and answers.**

2:30 PM 488S **Opportunities in the field of poultry nutrition and allied industry.**
April Waguespack Levy*, Animal, Nutrition and Health, DSM Nutritional Products, Ankeny, Iowa, United States

2:50 PM **Questions and answers.**

3:00 PM 489S **Career opportunities in academia.**
David J. Caldwell*, Department of Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States

3:20 PM **Questions and answers.**

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**Symposium:**
**A Comprehensive Approach to Maximize Feed Quality and Meat Bird Potential Through Feed Manufacture**

Feed manufacture is a complex area involving a multitude of factors that can interactively impact the physical and nutritional quality of feed. Additionally, small changes within these factors can dramatically impact overall feed production costs, but also meat bird performance and economic gain. This symposium provides a comprehensive
approach considering most aspects of feed manufacture and hygiene, nutrition, meat bird performance consequences, and ultimately economics, to provide practical recommendations supported by science for feed manufacturers and nutritionists. An outlook for the future of feed manufacture and technology will also be covered.

Chair: Kelley G. S. Wamsley, Mississippi State University

**Ballroom**

2:00 PM  
**Introduction.**
Mark E. Lemons*, Sanderson Farms, Laurel, Mississippi, United States

2:00 PM 490S  
**Balancing feed quality, nutrition, and hygienics.**
Joseph S. Moritz*, West Virginia University, Morgantown, West Virginia, United States

2:25 PM 491S  
**Maintaining a balance between feed quality, nutrient digestibility, and production goals.**
Wilmer J. Pacheco*, Poultry Science, Auburn University, Auburn, Alabama, United States

2:50 PM 492S  
**The quest for optimal pellets, with an emphasis on nutritional value.**
M. Reza Abdollahi*, School of Agriculture and Environment, Massey University, Palmerston North, New Zealand

3:15 PM 493S  
**Impact of physical feed quality on meat bird performance.**
Kelley G. S. Wamsley*, Mississippi State University, Mississippi State, Mississippi, United States

3:40 PM  
**Roundtable.**

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**Thursday, July 22nd**

**Symposium:**

_Do You See That? No But the Bird Did!_

Consumers and welfare certification standards are pushing poultry industries to change the way species housing are illuminated. The time has arrived where poultry lighting needs to and can evolve based on new technologies and science. This symposium will present new technologies and ideas about vision, perception, illumination and the role of lighting in poultry production.

Chair: Darrin Karcher, Purdue University

**Ballroom**

8:00 AM  
**Introduction.**
Darrin Karcher*, Animal Sciences, Purdue University, West Lafayette, Indiana, United States

8:00 AM 494S  
**Xiant Technologies PAWSTM illuminating the rhythm of life.**
Daren Suntych*, Xiant Technologies, Greeley, Colorado, United States

8:30 AM 495S  
**Photoreception in the duck: Even the brain has eyes!**
Gregory S. Fraley*, Animal Sciences, Purdue University, West Lafayette, Indiana, United States

9:00 AM 496S  
**Wait! Light can change the eye?.**
Karen Schwean-Lardner*, Bruna Maria Remonato Franco1, 1Animal and Poultry Science, University of Saskatchewan, Saskatoon, Saskatchewan, Canada, 2Animal and Poultry Science, University of Saskatchewan, Saskatoon, Saskatchewan, Canada

9:30 AM 497S  
**How do birds see their world? Implications for poultry species.**

*Presenter

All Times are CST
Symposium:
Improving Water Efficiency in Broiler Production: Genetic, Physiological-Nutritional, and Engineering Innovations

Water is an essential component in all facets of broiler production extending from the cellular level to cooling of broiler houses. The severity and duration of heat waves place greater demand on water for cooling broiler houses. Leaky gut that develops when there are deleterious changes in the microbial population in response to undigested non starch poly saccharides can result in wet litter with skin lesions as well as translocation of bacteria out of the gut that in turn leads to lameness. Microalgae can be used to produce enzymes for nutrient recovery and incorporated into the diet to enhance water efficiency. This symposium will highlight research being conducted by a multi-institution project funded by USDA-NIFA sustainable agriculture systems grant that is focused on improving water efficiency in broiler production and includes a talk by an industry leader on sustainability in the broiler industry.

Chairs: Walter G. Bottje, University of Arkansas and Sami Dridi, University of Arkansas

Ballroom

9:30 AM  
Introduction.
Walter G. Bottje*, Xin Gen Lei*, 1Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Department of Animal Science, Cornell University, Ithaca, New York, United States

9:35 AM 498S  
Water efficiency and sustainability in broiler production: A corporate perspective.
Jamie Burr*, Sustainability, Tyson Foods Inc, Springdale, Arkansas, United States

10:05 AM 499S  
Water conservation and preservation of broiler production using sprinkler technology in hot environments.
Tom Tabler*, J. Moon1, J. DuBien1, Y. Liang2, Sami Dridi2, 1Mississippi State University, Mississippi State, Mississippi, United States, 2University of Arkansas, Fayetteville, Arkansas, United States

10:25 AM 501S  
Divergent selection for water efficiency in commercial broilers.
Joseph Hiltz, Nicholas Anthony, Sara Orlowski*, Poultry Science, University of Arkansas, Springdale, Arkansas, United States

10:45 AM 500S  
Commonalities, differences, and control measures of common causes of enteric inflammatory insults in commercial poultry and impacts on nutrient absorption and water conservation.
Billy M. Hargis, Walter G. Bottje, Guillermo Tellez-Isaias*, Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States

11:05 AM 502S  
Improving phytase accumulation in Chlamydomonas reinhardtii for animal feed applications by modeling RNA folding.
Michele G. Croen1, Jennifer A. Schmidt1, Terry W. Campbell1, Mohammad Yazdani1, Xin Gen Lei2, Beth A. Ahner*1, 1Biological and Environmental Engineering, Cornell University, Ithaca, New York, United States, 2Department of Animal Science, Cornell University, Ithaca, New York, United States

11:25 AM 503S  
Impact of diet on water use efficiency in broiler production.
Samuel J. Rochell*, Michael T. Kidd1, Xin Gen Lei2, 1University of Arkansas, Fayetteville, Arkansas, United States, 2Department of Animal Science, Cornell University, Ithaca, New York, United States

*Presenter  16  
All Times are CST
Impacts of supplemental dietary microalgae on water intakes of broiler chickens.
Xin Gen Lei*, Department of Animal Science, Cornell University, Ithaca, New York, United States

Symposium:
Precision Intestinal Nutrition: Facts, Gaps, and New Concepts
This symposium will focus on facts and knowledge gaps regarding the roles of nutrients and feed additives in regulating the immune and metabolic pathways of the intestine. An emphasis will be given to vitamins, biofactors, and amino acids and how these molecules will be able to modulate the interactions between the host intestine and microbiota to ultimately help poultry cope with growth and environmental stressors. Understanding this new scenario is key to take the worldwide poultry industry to the new era of precision nutrition.

Chair: Elizabeth Santin, Jefo Nutrition Inc.

Ballroom

Introduction.
Elizabeth Santin*, Jefo Nutrition Inc., Saint-Hyacinthe, Quebec, Canada

12:05 PM 505S Intestinal nutrition during challenge scenarios: knowledge and gaps regarding the role of amino acids.
Samuel J. Rochell*, University of Arkansas, Fayetteville, Arkansas, United States

12:35 PM 506S Intestinal nutrition: role of vitamins and biofactors and gaps of knowledge.
Douglas R. Korver*, Agricultural, Food & Nutritional Science, University of Alberta, Edmonton, Alberta, Canada

1:05 PM 507S Role of diet-microbiota interactions in precision nutrition of the chicken.
Michael H. Kogut*, USDA-ARS, College Station, Texas, United States

1:35 PM Roundtable.
SOCIAL EVENTS

Tuesday, July 20th

Poster Viewing & Chat Session
Do you have questions about this year's collection of poster presentations? Sign on for the Poster Reception to interact via chat with the 2021 poster presenters as they take your questions during this scheduled time.

Poster Room
5:00 pm – 6:30 pm

Poultry Science® 100th Anniversary Celebration
The journal title, Poultry Science®, has been in publication for 100 years! Join us in celebrating this major milestone with a hosted event that will include trivia, craft 1920s cocktail recipes, and more!

Ballroom
5:00 pm – 6:30 pm

Virtual Magic Show with Alan Hudson
Join us for an exciting virtual magic show fit for the whole family! We are pleased to welcome Alan Hudson who has appeared on several reality shows including Britain's Got Talent!

Networking Lounge
5:00 pm – 6:00 pm

Wednesday, July 21st

Fellow and Student Talks (F.A.S.T. Hour)
The “F.A.S.T. Hour” will follow the student workshop and the objective of this follow-up event is to facilitate conversation between students and Fellows so that student members can learn from the PSA Fellows’ extensive knowledge and experience, especially about career planning and management, and how to be a good professional. Fellows have so much helpful insight and guidance to offer to the next generation of poultry scientists, so our intent is to give students a chance to connect with and learn.

Networking Lounge
4:00 pm – 5:00 pm

Student Family Feud Competition: The Final Round
Leading up to the meeting, teams of students representing schools all across the globe have been competing for the ultimate prize. Join us as the final two teams compete for the title of the competition winner. The winning team will receive bragging rights for their institution! This event will be streamed live!

Networking Lounge
5:00 pm – 6:00 pm
BUSINESS MEETINGS

Thursday, July 22\textsuperscript{nd}

PSA Student Hatchery Business Meeting

\textit{All student members of the Poultry Science Association are invited to participate.}

Ballroom

2:00 PM

\textbf{Introduction}
Erin Ross, PSA Senior Student Director
Gabriela Cardoso Dal Pont, PSA Junior Student Director

\textbf{PSA Student Hatchery Business}

\textbf{Outstanding Student Award}

\textbf{Student Video Competition}

\textbf{Student Director Election Results}

\textbf{Questions and Answers}

PSA Business Meeting

\textit{All professional and graduate student members of the Poultry Science Association are invited to participate.}

Ballroom

3:00 PM

\textbf{Call to Order}
Christine Alvarado, PSA President

\textbf{Report of the Board of Directors}
Christine Alvarado, PSA President

\textbf{Report of the Secretary-Treasurer}
Douglas F. Britton, PSA Secretary-Treasurer

\textbf{Report of the \textit{Poultry Science}® Editor-in-Chief}
Robert L. Taylor, Jr., Editor-in-Chief

\textbf{Report of The Journal of Applied Poultry Research Editor-in-Chief}
John B. Carey, Editor-in-Chief

\textbf{Report of the PSA Student Hatchery}
Erin Ross, PSA Senior Student Director

\textbf{Report of the PSA Foundation}
Kayla R. Price, Vice-Chair, PSA Foundation Board of Trustees

\textbf{Report of the Resolutions Committee}
Christine Alvarado, PSA President

*Presenter

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All Times are CST
Announcement of Election Results
Christine Alvarado, PSA President

Recognition of Annual Meeting Program Chair
Jason L. Emmert, 2021 Program Chair

Recognition of Retiring Board of Directors
Christine Alvarado, PSA President

Passing of the Gavel
Christine Alvarado, PSA President

Closing Comments
Karen Schwean-Lardner, PSA President-Elect
AWARDS CEREMONY

Thursday, July 22nd

PSA Awards Ceremony

This awards ceremony will recognize this year’s PSA Fellows award recipients as well as identify other award winners. The ceremony will wrap-up with the announcement of the winners in the 2021 Student Competition.

Ballroom
4:30 pm – 5:30 pm

4:30 PM

Welcome

PSA Fellows Videos

Professional Award Winners

Student Certificate of Participation Recipients

Student Certificate of Excellence Winners

Fun Run Winners

invitation to San Antonio in 2022

Closing Comments
ABSTRACT PRESENTATIONS

Animal Well-Being and Behavior
Chair: Leonie Jacobs, Virginia Tech
Session Room I

1 Withdrawn.

2 Effects of enriched floor housing and battery caging on molecular indicators of chronic stress in Bovan brown laying hens.
Andrew M. Campbell*1, Alexa Johnson3, Mike Persia2, Leonie Jacobs3
1Animal and Poultry Science, Virginia Tech, Blacksburg, Virginia, United States, 2Virginia Tech, Blacksburg, Virginia, United States, 3Animal and Poultry Sciences, Virginia Tech, Blacksburg, Virginia, United States

3 High and low stocking density effects on floor-raised pullet welfare.
Meagan Abraham*, Kailynn Scoles, Marisa Erasmus, Gregory S. Fraley, Darrin M. Karcher
Animal Science, Purdue University, Lafayette, Indiana, United States

4 Resource-use of laying hens in a free-range setting in response to a mobile robot.
Lindsey Davis*, Bulent Koc1, Ahmed B. Ali1
1Animal and Veterinary Sciences Department, Clemson University, Clemson, South Carolina, United States, 2Department of Agriculture Science, Clemson University, Clemson, South Carolina, United States

5 Laying hens do not modulate flapping flight performance after symmetric wing feather loss.
Brianna M. Leon*, Brett Toalske1, Neila Ben Sassi1, Renee Garant1, Donald Powers3, Alexandra Harlander1
1Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 2Division of Biological Sciences, University of Montana, Missoula, Montana, United States, 3Department of Biology, George Fox University, Newberg, Oregon, United States

6 Commercial field assessment of broiler welfare when enriching barns with perching, pecking and resting enrichment combinations.
Jessica Walsh*, Martin J. Zuidhof2, Elijah Kiarie3, Kathleen E. Long1, Chantal LeBlanc1
1Ag Ops, Maple Leaf Foods, Vienna, Ontario, Canada, 2PrecisionZX, Edmonton, Alberta, Canada, 3Animal Biosciences, University of Guelph, Guelph, Ontario, Canada

7 The delivery matrix and number of chickens influence the behavior of broiler chickens during preference tests: Preliminary results.
Victoria A. Philp, Geraldine Muñoz, Paloma Cordero, Sergio A. Guzmán-Pino*
Departamento de Fomento de la Producción Animal, Universidad de Chile, Santiago, Chile

8 How does egg laying influence HPA-axis activity in turkey lines selected for growth or reproductive traits?
Emily M. Leishman*, Nienke van Staaveren1, Jeff Mohr2, Ben J. Wood3,1,2, Nikole E. Freeman*, Amy E. Newman4, Alexandra Harlander1, Christine F. Baes1,5
1Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 2Hybrid Turkeys, Kitchener, Ontario, Canada, 3University of Queensland, Gatton, Queensland, Australia, 4Integrative Biology, University of Guelph, Guelph, Ontario, Canada, 5Institute of Genetics, University of Bern, Bern, Switzerland

9 Is turkey welfare evaluated? – Validation of footpad scoring systems to improve turkey welfare.
Gabriella Furo*, Yuzhi Li2, Sally L. Noll1, Carol Cardona3
1Animal Science, University of Minnesota, Saint Paul, Minnesota, United States, 2West Central Research and Outreach Center, University of Minnesota, Morris, Minnesota, United States, 3Department of Veterinary and Biomedical Sciences, University of Minnesota, Saint Paul, Minnesota, United States

*Presenter
Effect of eugenol supplementation on broiler performance, litter moisture and foot pad dermatitis.
Ashveen Fakeer* GS 1, 2, Jos Houdijk 2
1Montida Poultry Ltd, Plaine Magnien, Mauritius, 2SRUC, Edinburgh, United Kingdom

Evaluating differences in gut morphology and sickness behavior in fast and slow growing broiler chickens when infected with Salmonella enterica serovar Typhimurium.
Ashlyn Snyder* GS 1, Tim Johnson 1, Cara Robison 2, Shawna L. Weimer 1
1University of Maryland, College Park, Maryland, United States, 2Michigan State University, East Lansing, Michigan, United States

The effect of enrichments and spotlights on broiler production and tibia morphology.
Anna Magnaterra* GS 1, Rosalina Angel 2, Shawna L. Weimer 3
1Animal and Avian Sciences, University of Maryland, Ellicott City, Maryland, United States, 2Animal and Avian Sciences, University of Maryland, College Park, Maryland, United States, 3Animal and Avian Sciences, University of Maryland, College Park, Maryland, United States

Adoption of precision livestock farming technologies by broiler farmers.
Heitor Rios* GS 1, Paulo Waquil 1, Catarina Stefanello 2
1Center for Studies and Research in Agribusiness, Federal University of Rio Grande do Sul, Porto Alegre, Brazil, 2Animal Sciences, Federal University of Santa Maria, Santa Maria, Brazil

What are the birds playing with?: Effects of environmental enrichments on well-being measures in colony caged Japanese Quail (Coturnix japonica).
Chirantana Mathkari* GS, Rachel Dennis
Department of Animal and Avian Sciences, University of Maryland, College Park, Hyattsville, Maryland, United States

Mobility of laying hens in multi-tiered housing systems is affected by flight feather loss.
Renee Garant* GS 1, Bret Tobalske 2, Neila Ben Sassi 2, Nienke van Staaveren 1, Dan Tulp 1, Donald Powers 1, Alexandra Harlander 1
1Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 2McGill, Montreal, Quebec, Canada

The effect of early life environmental complexity on skeletal characteristics in two strains of laying hen pullets.
Erin Ross* GS 1, Isabela Vitienes 2, Bettina Willie 2, Tina Widowski 1
1Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 2McGill, Montreal, Quebec, Canada

Rearing aviary design and genetic strain affect spatial cognition in laying hen pullets.
Ana K. Rentsch* GS 1, Lee Niel 2, Janice Siegford 3, Tina Widowski 1
1Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 2Department of Animal Science, Michigan State University, Michigan, Michigan, United States, 3Department of Population Medicine, University of Guelph, Guelph, Ontario, Canada

Effects of early-life microbiota modulation on aggression, concentrations of brain serotonin and blood cytokines in egg-laying strain chickens.
Yuechi Fu* GS 1, Jiaying Hu 1, Heng-wei Cheng 2
1Animal sciences, Purdue University, West Lafayette, Indiana, United States, 2Livestock Behavior Research Unit, USDA-ARS, West Lafayette, Indiana, United States

High and low stocking density effects on the immune system of floor-raised pullets.
Meagan Abraham* GS 1, Kailynn Scoles, Marisa Erasmus, Gregory S. Fraley, Darrin M. Karcher
Animal Science, Purdue University, Lafayette, Indiana, United States

Effects of perch material on performance, perching times and welfare in laying hens.
Ashlyn J. McIntyre* GS 1, Pratima Adhikari 1, Ishab Poudel 2, Tom Tabler 1, Victoria R. Williams-Hodge 2

*Presenter

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Using an Excel workbook called “The Calibration Curve Confidence Calculator” (cccc.exe) for analyzing standard curve-type experiments.
Gene M. Pesti*1,2, Lynne Billard3, Shubiao Wu2, Thi Thanh Hoai Nguyen2, Robert A. Swick2
1Poultry Science, University of Georgia, Greensboro, Georgia, United States, 2School of Environmental and Rural Science, University of New England, Armidale, New South Wales, Australia, 3Statistics, University of Georgia, Athens, Georgia, United States

Update of the Virginia Tech Research Education Programs: A scientific approach to STEM education for URMs.
Edward J. Smith*
Animal and Poultry Sciences, Virginia Tech, Blacksburg, Virginia, United States

Extended lay cycles: A new path to sustainable egg production in Canada.
Daniella Batres*, Valerie Carney
Agricultural, Life and Environmental Sciences, University of Alberta, Edmonton, Alberta, Canada

Assessment of retention trends in the College of Agriculture and Life Sciences to determine possible internal recruitment efforts for Poultry Science Departments.
Peyton A. Taylor*1, GS2, Ryan Walker3, Kelley G. Wamsley1, Jessica B. Wells1
1Poultry Science, Mississippi State University, Mississippi State, Mississippi, United States, 2Curriculum, Instruction, and Special Education, Mississippi State University, Mississippi State, Mississippi, United States

Assessment of current Hatch-out Program curriculum implemented in K-12 for Mississippi.
Marissa Powell*1, GS1, Ryan Walker2, Kelley G. Wamsley1, Jessica B. Wells1
1Poultry Science, Mississippi State University, Mississippi State, Mississippi, United States, 2Curriculum, Instruction, and Special Education, Mississippi State University, Mississippi State, Mississippi, United States

An online webinar series to teach backyard flock owners about poultry viral respiratory diseases.
Eliza Theis*1, GS3, Wayne Martin2, Sally L. Noll1, Robert Porter2, Colleen Carlson2, Michaela Olson1, Abby Schuft2
1Animal Science, University of Minnesota, Saint Paul, Minnesota, United States, 2University of Minnesota Extension, Saint Paul, Minnesota, United States, 3University of Minnesota, Saint Paul, Minnesota, United States

Genome wide association study for shell color in White Leghorns using a SNP Chip and low-pass sequencing data.
Anna Wolc*1,2, Janet Fulton2, Zigui Wang3, Jinghui Li3, Petek Settar2, Jesus Arango2, Kaylee Rowland2, Danny Lubritz2, Hao Cheng3
1Animal Science, Iowa State University, Ames, Iowa, United States, 2Research and Development, Hy-Line International, Dallas Center, Iowa, United States, 3Department of Animal Science, University of California, Davis, California, United States

Reducing susceptibility to pendulous crop in turkey (Meleagris gallopavo) via genomic selection:
estimation of genetic parameters, accuracy and bias.
Emhimad Abdalla*1, Bayode O. Makanjuola1, Nienke van Staaveren1,4, Ryley Vanderhout1, Ben J. Wood1,3,5, Christine F. Baes1,2
1Centre for Genetic Improvement of Livestock, University of Guelph, Guelph, Ontario, Canada, 2Vetsuisse Faculty, University of Bern, Institute of Genetics, Bern, Swaziland, 3School of Veterinary Science, University of Queensland, Gatton, Queensland, Austria, 4The Campbell Centre for the Study of Animal Welfare, University of Guelph, Guelph, Ontario, Canada, 5Hybrid Turkeys, Kitchener, Ontario, Canada

29
Single-step genomic evaluation of hatchability trait in turkeys (Meleagris gallopavo) using a random regression model.
Bayode O. Makanjuola*3, Emhimad Abdalla3, Ben J. Wood3,1,2, Christine F. Baes3,4
1School of Veterinary Science, University of Queensland, Gatton, Queensland, Australia, 2Centre for Genomic Improvement of Livestock, Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 3Centre for Genetic Improvement of Livestock, University of Guelph, Guelph, Ontario, Canada, 4Institute of Genetics, Vetsuisse Faculty, University of Bern, Bern, Switzerland

30
Tracking vascular inflammation associated with white striping in broilers using expression profiling.
Michael J. Mienaltowski*, Ubaldo de La Torre, Oona Vanhatalo, Annie J. King
Animal Science, University of California Davis, Davis, California, United States

31
A demonstration of amitosis in post-embryonic erythrocytes, possibly due to mycotoxin exposure - a 60-year-old challenge met.
Paul Cotter*
Biology, Framingham State University, Arlington, Massachusetts, United States

32
Synergistic induction of poultry host defense peptides by epigenetic compounds.
Melanie Whitmore*, Glenn Zhang
Animal and Food Sciences, Oklahoma State University, Stillwater, Oklahoma, United States

33
Expression characteristics of chicken IncRNA FKBP5-AS and its effect on proliferation and differentiation of myoblasts.
Pengfei Du*, Xiangli Zhang, Ziyang Wang, H.Y Zhang, Y.Q. Huang, W Chen
College of Animal Science and Technology, Henan Agricultural University, Zhengzhou, China

34
Identification and functional study of insulin-responsive microRNAs in chicken pectoralis.
Xiangli Zhang*, Pengfei Du, H.Y Zhang, B. H. Shao, Ziyang Wang, Yongshuai Wang, Y.Q. Huang, W Chen
College of Animal Science and Technology, Henan Agricultural University, Zhengzhou, Henan, China

35
Effect of probiotics on tight junction protein mRNA in the small intestine of young chicks.
Meiting Jia*, Eric Wong
Virginia Tech, Blacksburg, Virginia, United States

36
Effect of fasting and heat stress on blood parameters, carcass and meat quality of two broiler chicken strains.
Demilade I. Ibiwoye*, Bisola Sule1, Foluke E. Sola-Ojo1
1Department of Animal Production, University of Ilorin, Ilorin, Kwara, Nigeria, 2Key Laboratory of Agricultural Animal Genetics Breeding and Reproduction of Ministry of Education, Huazhong Agricultural University, Wuhan, Hubei, China

37
Effects of chronic heat stress on the expression of nutrient transporters in the jejunum of modern broilers and their ancestor Wild Jungle Fowl.
Nedra Abdelli*, Alison Ferver3, Sara Orlowski6, Travis Tabler8, Elizabeth S. Greene5, Sami Dridi2
1Animal and Food Science Department, Autonomous University of Barcelona, Sabadell, Barcelona, Spain, 2Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 3Cell and Molecular Biology, University of Arkansas, Fayetteville, Arkansas, United States, 4Poultry Science, University of Arkansas, Springdale, Arkansas, United States, 5Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 6Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States
Evaluation of Olfm4 and Muc2 expression in the jejunum of chickens divergently selected for eight week body weight.
Sydney Kinstler* GS, Sara Cloft, Paul Siegel, Christa Honaker, Eric Wong
Virginia Polytechnic Institute and State University, Christiansburg, Virginia, United States

Genome-wide SNPs regulating nervous system functions associated with stress response traits in high and low stress lines of Japanese Quail.
Steven A. Shumaker* GS1, Bhuwan Khatiri2, Dongwon Seo3, Stephanie Shouse1, Seong W. Kang1, Wayne J. Kuenzel1, Byungwhi Kong1
1Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Oklahoma Medical Research Foundation, Oklahoma City, Oklahoma, United States, 3Animal Science, Chungnam National University, Daejeon, Korea (the Republic of)

SNP-based breeding for broiler resistance to ascites and evaluation of correlated production traits.
Katie Lee* GS 1, 3, Nicholas Anthony1,2, Sara Orlowski2, Douglas Rhoads1,1
1Cell & Molecular Biology Program, University of Arkansas, Fayetteville, Arkansas, United States, 2Poultry Science, University of Arkansas, Springdale, Arkansas, United States, 3Biological Sciences, University of Arkansas, Fayetteville, Arkansas, United States

Expression of genes in the apoptosis pathway in the yolk sac of embryonic and early-post-hatch broiler chickens.
Kaitlyn Reno*UG, Sara Cloft, Eric Wong
Department of Animal and Poultry Sciences, Virginia Tech, Blacksburg, Virginia, United States

L-Tryptophan and phosphate sensing by the chicken extracellular calcium-sensing receptor via potential docking sites to initiate downstream G protein-coupled signaling cascades.
Qianru Hui* GS 1, Huanhuan Dong2, Xiaoya Zhao1, Paula Azevedo1, Martin Nyachoti1, Karmin O³ 1, Chengbo Yang1
1Animal Science, University of Manitoba, Winnipeg, Manitoba, Canada, 2Jiangxi University of Chinese Medicine, Nanchang, Jiangxi, China, ³CCARM, St. Boniface Hospital Research Centre, Winnipeg, Manitoba, Canada

Immunology, Health and Disease
Chair: Morgan B. Farnell, Texas A&M University
Session Room IV

Protective immunity elicited by live commercial coccidia vaccines (LCV) against recent field isolates and vaccine strains.
Jennifer R. Timmons*1, Celia Whyte1, Steve Fitz-Coy1, Samuel N. Mwangi2
1Agriculture, University of Maryland Eastern Shore, Princess Anne, Maryland, United States, 2Alcorn State University, Lorman, Mississippi, United States

Prevalence of Eimeria lesions quantified by ISI application in commercial farms of broiler in South America.
Bruna L. Belote*1, 2, Igor Soares1, Adrien W. Sanches1, Elizabeth Santin1,2
1Department of Veterinary Science, Federal University of Paraiba, Curitiba, Brazil, 2ISI Institute, Curitiba, Brazil

Bertrand Medina*, Ashley Wagner1, Dana Kumprechtova1, Ivan D. Girard1
1Probiotech International Inc., St-Hyacinthe, Quebec, Canada, 2Institute of Animal Science, Prague, Czechia

Bacillus subtilis based NK lysin peptide delivery system successfully mitigate avian coccidiosis by enhancing the growth and gut health of the broiler chickens.
Samiru S. Wickramasuriya1, Inkyung Park1, Jolieke v. Oosterwijk2, Chris Przybyszewski2, Cyril G. Gay1, Hyun Lillehoj1
Optimization of a *Clostridium perfringens* sporulation vaccine to reduce chicken necrotic enteritis.
Ying Fu1,2, Mohit Bansal3, Ayidh Almansour1,2, Tahrir Alenezi1,2, Hong Wang1, Danielle Graham2, Billy M. Hargis2, Xiaolun Sun1,2
1Cell and Molecular Biology & Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States

Immunomodulatory effects of mixed lactobacilli oral inoculation on experimentally induced necrotic enteritis in broiler chickens.
Bahram Shojadoost*, Mohammadali Alizadeh, Nitish Boodhoo, Jake Astill, Janan Shoja Doost, Shayan Sharif
Pathobiology, The University of Guelph, Guelph, Ontario, Canada

Essential oil and yeast cell wall efficacy in a necrotic enteritis challenge study.
Charles L. Hofacre2, Melina Bonato*, Liliana L. Borges1, Ricardo L. Barbalo1
1R&D, ICC Brazil, Sao Paulo, Sao Paulo, Brazil, 2Southern Poultry Research Group, Inc., Watkinsville, Georgia, United States

Effect of a whole yeast product supplementation on broiler performance and intestinal necrotic lesions during an experimental *Clostridium perfringens* infection.
Jose Charal1*, Michael Sims2, Brian Glover1, Milan Hruby1
1ADM Animal Nutrition, Quincy, Illinois, United States, 2Virginia Diversified Research Corp., Harrisonburg, Virginia, United States

Development of antigen-capture ELISAs for the detection of necrotic enteritis B-like (NetB) toxin and collagen adhesin protein (CNA) in broiler chickens afflicted with necrotic enteritis.
Doyun Goo*, Youngsub Lee, Hyoyoun Nam, Mingmin Lu, Charles Li, Hyun Lillehoj
Animal Bioscience and Biotechnology Laboratory, USDA-ARS, Beltsville, Maryland, United States

Early life exposure to cold stress causes distinct changes in broiler chicken gut neurochemistry and microbiome that persist into later life.
Joshua M. Lyte1*, Julia Eckenberger2, James Keane3, Kelsy Robinson1, Sandip Shrestha4, Annie M. Donoghue1, Valentina Caputi1, Karrie Daniels1, Mark Lyte5
1USDA-ARS Poultry Production and Product Safety Research Unit, Fayetteville, Arkansas, United States, 2Department of Microbiology, University College Cork, Cork, Ireland, 3Department of Computer Science, Cork Institute of Technology, Cork, Ireland, 4Department of Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 5Veterinary Microbiology and Preventive Medicine, Iowa State University, Ames, Iowa, United States

Candidate genes for A and E blood group systems in the chicken.
Robert L. Taylor1*, Wiioleta Drobiak-Czwarno2, Anna Wolc3,4, Janet Fulton4
1West Virginia University, Morgantown, West Virginia, United States, 2Department of Animal Genetics and Breeding, Warsaw University of Life Sciences, Warsaw, Poland, 3Department of Animal Science, Iowa State University, Ames, Iowa, United States, 4Hy-Line International, Dallas Center, Iowa, United States

Characterization of the effects of *Salmonella Typhimurium* on circulatory exosomal miRNA profiles in chicks.
Dan Zhao1, Wenli Li1, Morgan Farnell1, Michael Kogut2, Kenneth J. Genovese2, Chuan-Yu Hsu3, Haiqi He2, Adela Oliva Chavez2, Yuhua Z. Farnell4
1Poultry Science, Texas A&M AgriLife Research/Texas A&M University, College Station, Texas, United States, 2USDA-ARS, College Station, Texas, United States, 3IGBB/Mississippi State University, Mississippi State, Mississippi, United States, 4USDA-ARS, College Station, Texas, United States, 5DAIR Forage Research Center, Madison, Wisconsin, United States, 6Department of Entomology, Texas A&M University, College Station, Texas, United States
Efficacy of protected benzoic acid on gut histology of broilers with or without an antibiotic as growth promoter under commercial conditions.
Raquel B. Araujo\textsuperscript{2}, Flavio A. Longo\textsuperscript{2}, Ricardo A. Ivanovski\textsuperscript{2}, Fabrício B. Duarte\textsuperscript{2}, Bruna L. Belote*\textsuperscript{1, 3}, Huendy F. Moreira\textsuperscript{4}, Vitor C. Fonseca\textsuperscript{4}
\textsuperscript{1}Department of Veterinary Science, Federal University of Parana, Curitiba, Brazil, \textsuperscript{2}Novus do Brasil Comércio e Importação Ltda, Indaiatuba, São Paulo, Brazil, \textsuperscript{3}ISI Institute, Curitiba, Brazil, \textsuperscript{4}Granja Brasília Ltda, Pará de Minas, Minas Gerais, Brazil

Effects of \textit{in ovo} co-administration of vitamins (A and D) and probiotic lactobacilli on cell- and antibody-mediated immune responses in newly hatched chickens.
Mohammadali Alizadeh*\textsuperscript{1}, Jake Astill\textsuperscript{1, 3}, Nadiyah Alqazlan\textsuperscript{1}, Bahram Shojaodoost\textsuperscript{1}, Jegarubee Bavanathanasivam\textsuperscript{1, 4}, Khaled Taha-Abdelaziz\textsuperscript{1, 2}, Nitish Boodhoo\textsuperscript{1}, Janan Shoja Doost\textsuperscript{1}, Shayan Sharif\textsuperscript{1}
\textsuperscript{1}University of Guelph, Guelph, Ontario, Canada, \textsuperscript{2}Benci-Suef University, Benci-Suef, Benci-Suef, Egypt, \textsuperscript{3}Artemis Technologies Inc, Guelph, Ontario, Canada, \textsuperscript{4}McMaster University, Hamilton, Ontario, Canada

Comparison of chick quality, health, and inflammation from two hatchery environments.
Kaylin Chasser*, Audrey F. Duff, Kate McGovern, Michael Trombetta, Lisa Bielke
Animal Sciences, The Ohio State University, Wooster, Ohio, United States

Histomonas meleagridis and cholesterol depletion in turkeys.
Vijay Durairaj*, Deborrah Higuchi, Ryan V. Veen
Huvepharma Inc, Lincoln, Nebraska, United States

Impact of laying hens alternative housing systems on the incidence of intestinal and external parasites.
Rachid Chebta*\textsuperscript{G1}, Éloïse Denis\textsuperscript{1}, Lila Maduro\textsuperscript{1}, Laura Franco\textsuperscript{2}, Laura Guerrero\textsuperscript{1}, Martine Boulianne\textsuperscript{1}
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Impact of laying hens alternative housing systems on the incidence of \textit{Clostridium perfringens} and NetB toxin.
Maude Lanoie, Rachid Chebta, Lila Maduro, Martine Boulianne*
Clinical Sciences, Faculté de Médecine Vétérinaire, Université de Montréal, St. Hyacinthe, Quebec, Canada

Impact of dietary resistant starch on intestinal barrier and inflammatory response in DSS-challenged Pekin ducks.
Simeng Qin*\textsuperscript{G1}, Keying Zhang, Xuemei Ding, Jianping Wang, Shiping Bai, Qiu Feng Zeng
Animal Nutrition Institute, Sichuan Agricultural University, Chengdu, Sichuan, China

Investigating intestinal integrity, endogenous losses of amino acids, and nutrient digestibility of broiler chickens in response to graded severity of \textit{E. maxima} infection.
Po-Yun Teng*\textsuperscript{G1}, Janghan Choi, Sudhir Yadav, Yuguo H. Tompkins, Woo K. Kim
Department of Poultry Science, University of Georgia, Athens, Georgia, United States

Changes in the mRNA abundance of the stem cell marker gene Olfm4 following a mild \textit{Eimeria acervulina} and \textit{E. maxima} challenge in broiler chickens.
Sara Cloft*\textsuperscript{G1}, Kate Miska\textsuperscript{2}, Johanna H. Heller\textsuperscript{1}, Eric Wong\textsuperscript{1}
\textsuperscript{1}Animal and Poultry Science, Virginia Tech, Blacksburg, Virginia, United States, \textsuperscript{2}Animal Bioscience and Biotechnology Laboratory, USDA Agricultural Research Service, Henry A. Wallace Beltsville Agricultural Research Center, Beltsville, Maryland, United States

Milan K. Sharma*\textsuperscript{G1}, Po-Yun Teng, Yuguo H. Tompkins, Woo K. Kim
Department of Poultry Science, University of Georgia, Athens, Georgia, United States

*Presenter
66 Reduced bone formation and increased bone resorption drive bone loss in *Eimeria* infected broilers.
Yuguo H. Tompkins* GS 1, Janghan Choi1, Po-Yun Teng1, Masayoshi Yamada2, Toshie Sugiyama2, Woo K. Kim1
1Poultry Science, University of Georgia, Athens, Georgia, United States, 2Department of Agrobiology, Niigata University, Ikarash, Niigata, Japan

67 Effects of different methionine to cysteine ratios on the growth performance, gut health, and body composition of broilers challenged with *Eimeria* spp.
Guanchen Liu* GS 1, Yuguo H. Tompkins1, Po-Yun Teng1, Woo K. Kim1
1Poultry Science, University of Georgia, Athens, Georgia, United States, 2Poultry Science, University of Georgia, Athens, Georgia, United States

68 Reassessing the effects of *Eimeria* spp. infection on broiler performance.
Alexandre B. Mariani* GS 1, Catiane Orso1, William Lambert2, Pierre Gaignon2, Helene Pastorelli2, Ines Andretta1
1Animal Science, Universidade Federal do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil, 2École Supérieure d’Agriculture d’Angers, Angers, France

69 Cloning bile salt hydrolase to deconjugate bile acids for potentially intervening necrotic enteritis.
Tahrir Alenezi* GS 2, 1, Ying Fu2, Ayidh Almansour1, Hong Wang1, Xiaolun Sun1
1Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Cell and Molecular Biology, University of Arkansas, Fayetteville, Arkansas, United States

70 Comparative efficacy of modern grain sorghum for the control of necrotic enteritis caused by *Clostridium perfringens* in broiler chickens.
Alissa Moritz* GS 1, Brett Lumpkins2, Greg F. Mathis2, Mireille Arguelles-Ramos1, William Bridges3
1Animal and Veterinary Sciences, Clemson University, Clemson, South Carolina, United States, 2Southern Poultry Feed and Research, Inc., Athens, Georgia, United States, 3Mathematical and Statistical Sciences, Clemson University, Clemson, South Carolina, United States

71 Genomic analysis of avian pathogenic *Escherichia coli* (APEC) isolated from broiler chickens.
Priyanka Devkota* GS 1, Sabin Poudel1, Mark A. Arick II2, Chuan-Yu Hsu2, Pratima Adhikari1, Anuraj Sukumaran1, Aaron Kiess1, Li Zhang1
1Department of Poultry Science, Mississippi State University, Mississippi State, Mississippi, United States, 2Institute for Genomics, Biocomputing, and Biotechnology, Mississippi State, Mississippi, United States

72 Molecular characterization of virulence and antimicrobial resistance genes in avian atrophic *Escherichia coli* isolated from poultry having colibacillosis.
Deepa Chaudhary* GS 1, Priyanka Devkota1, Sabin Poudel1, Linan Jia1, Anuraj Sukumaran1, Wen-Hsing Cheng2, Aaron Kiess1, Li Zhang1
1Department of Poultry Science, Mississippi State University, Mississippi State, Mississippi, United States, 2Department of Food Science, Nutrition and Health Promotion, Mississippi State University, Mississippi State, Mississippi, United States

73 Inflammatory and antibody responses to intradermally administered autogenous *Salmonella* vaccine isolates and content-matched *Salmonella* lipopolysaccharide.
Jossie M. Santamaria* GS 1, Chrysta N. Beck, Marites A. Sales, Gisela F. Erf
Department of Poultry Science, Division of Agriculture, University of Arkansas, Fayetteville, Arkansas, United States

74 Primary and recall immune responses to autogenous *Salmonella* vaccine or *Salmonella* lipopolysaccharide administration in Light-brown Leghorn pullets.
Chrysta N. Beck* GS 1, Jossie M. Santamaria, Marites A. Sales, Gisela F. Erf
Department of Poultry Science, Division of Agriculture, University of Arkansas, Fayetteville, Arkansas, United States

75 Glucosinolate containing ingredients (rapeseed and canola meal) and glucosinolate metabolite (AITC) as potential antimicrobials: Effects on growth performance, and gut health in *Salmonella* Typhimurium challenged broiler chickens.

*Presenter
Horizontal transmission of histomoniasis may be influenced by feed composition and strains of *Histomonas meleagridis*.
Thaina L. Barros*, Thaina L. Barros1, Christine Vuong1, Elizabeth McGill2, Samuel J. Rochell1, Guillermo Tellez-Isaias1, Billy M. Hargis1
1Center of Excellence for Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Cargill Turkeys LLC, Springdale, Arkansas, United States

Role of stress factors on histomoniasis disease development and transmission in turkeys.
Catherine Fudge*, Chongxiao Chen, Robert Beckstead
Prestage Department of Poultry Science, NC State University, Raleigh, North Carolina, United States

Fructans affects mRNA expression of pro-inflammatory, antiviral, and antibacterial innate immunity genes on chicken macrophages.
Santiago Uribe-Diaz*, Blanca C. Martinez2, Julian Reyes1, Juan Carlos Rodriguez-Lecompte1
1University of Prince Edward Island, Charlottetown, Prince Edward Island, Canada, 2Promitec S.A, Bucaramanga, Colombia

Fecal and serum biomarkers for intestinal inflammation in broiler chickens.
Gabriela Cardoso Dal Pont*, Bruna L. Belote1, Christos Gougoulias2, Yuhua Z. Farnell3, Michael H. Kogut3
1Veterinary Sciences, UFPR, Curitiba, Brazil, 2Innovad NV/SA, Essen, Belgium, 3USDA-ARS, College Station, Texas, United States, 4Poultry Science, Texas A&M University, College Station, Texas, United States

Comparison between the I See Inside methodology and measurement of intestinal villi in broilers.
Bruna L. Belote*, Igor Soares1, Béatrice Hamel3, Cleverson de Souza4, Elizabeth Santin1, 3
1Department of Veterinary Science, Federal University of Parana, Curitiba, Brazil, 2ISI Institute, Curitiba, Brazil, 3Jebo Nutrition Inc., Saint-Hyacinthe, Quebec, Canada, 4CLS Consulting, Capanema, Parana, Brazil

Changes in gene expression in the intestinal mucus of broilers with woody breast myopathy.
Linan Jia*, Chuan-Yu Hsu2, Aaron Kiess1, E. David Peebles1, Wei Zhai1, Li Zhang1
1Department of Poultry Science, Mississippi State University, Mississippi State, Mississippi, United States, 2Institute for Genomics, Biocomputing, and Biotechnology, Mississippi State University, Mississippi State, Mississippi, United States

Impact of deoxynivalenol on intestinal explants of broiler chickens: an ex vivo model to assess the efficacy of an anti-mycotoxin additive.
Cristina T. Simões*, Vinícius Duarte1, Franciéli A. Molossid2, Diogo Liberalesso1, Eduarda D. Gubiani1, Thais D. Moreira1, Cintia Londero1, Carlos A. Mallmann1
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Role of autophagy machinery dysregulation in bacterial chondronecrosis with osteomyelitis.
Alison Ferver*, Elizabeth S. Greene1, Sami Dridi1
1Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Cell and Molecular Biology, University of Arkansas, Fayetteville, Arkansas, United States

Generation of chicken anti-human rotavirus recombinant monoclonal antibodies using single B-cell sorting.
Jill W. Skrobaczyk*, Cameron L. Martin1, Suresh Pillai2, 3, Luc R. Berghman1
1Poultry Science, Texas A&M University, College Station, Texas, United States, 2Food Science and Technology, Texas A&M University, College Station, Texas, United States, 3National Center for Electron Beam Research, Texas A&M University, College Station, Texas, United States

Evaluation of therapeutic efficacy of a phytogetic formulation in experimentally-induced chronic...
respiratory disease of commercial broiler chicken.
Syam G. Devabhaktuni*, Nasreen A1, Ramanamurthy RV2, Naik HS3, Sreedevi B4, Bhaskar Ganguly5, Srilatha Ch6
1Department of Veterinary Pathology, Sri Venkateswara Veterinary University, Tirupati, Andhra Pradesh, India, 2Department of Veterinary Pathology, Sri Venkateswara Veterinary University, Proddatur, India, 3Research and Development, Ayurved Limited, Baddi, Himachal Pradesh, India, 4Department of Veterinary Pathology, Sri Venkateswara Veterinary University, Garividi, Andhra Pradesh, India, 5Livestock Research Station, Sri Venkateswara Veterinary University, Siddrampuram, Andhra Pradesh, India, 6Department of Veterinary Microbiology, Sri Venkateswara Veterinary University, Tirupati, Andhra Pradesh, India

Evaluation of the trade-off between molt and innate immunity in laying hens.
Andrea DeRogatis*, Kirk Klasing
Animal Science, University of California, Davis, Davis, California, United States

Management and Production
Chair: Connie Mou, Jones-Hamilton
Session Room V

Protocol development for monitoring hydrogen sulfide emitted from poultry excreta – a case study.
Sam Shen*, Hector Leyva-Jimenez, Katherine McCormick, Michael Martin, Pai Liu
United Animal Health, Inc., Sheridan, Indiana, United States

In vitro estimation of plant extracts for their antimicrobial activity against Salmonella Enteritidis.
Weifeng Han, Chun-qi Gao*
College of Animal Science, South China Agricultural University, Guangzhou, China

Effect of long-term cyclic heat stress on turkey production and stress parameters.
Benjamin N. Alig*, Dellila Hodgson1, Jesse Grimes1, Prafulla Regmi2
1Prestage Department of Poultry Science, North Carolina State University, Wake Forest, North Carolina, United States, 2Poulty Science, University of Georgia, Athens, Georgia, United States

Heat stress and feed restriction distinctly affect carcass and body parts yield in broiler chickens.
Nima Emami*, Elizabeth S. Greene1, Barbara Mallmann2, Estelle Devillard2, Sami Dridi1
1Center of Excellence for Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Adisseo, Commeny, France

Biosecurity practices in relation to on-farm mortality and disease in turkey flocks.
Nienke van Staaveren*, Emily M. Leishman1, Ben J. Wood1,2,3, Alexandra Harlander1, Christine F. Baes1,4
1Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 2Hybrid Turkeys, Kitchener, Ontario, Canada, 3School of Veterinary Science, University of Queensland, Gatton, Queensland, Australia, 4Institute of Genetics, Vetsuisse Faculty, University of Bern, Bern, Switzerland

Effect of housing system environment on brown egg layer quality (internal and external).
Ramon D. Malheiros*, Kenneth Anderson
Prestage Department of Poultry Science, NC State University, Raleigh, North Carolina, United States

Enumeration of naturally occurring microorganisms in the intestinal tract and yolk sac of day-old chicks from commercial hatcheries.
Karely Cantu*, Craig Coufal
Poultry Science, Texas A&M University, College Station, Texas, United States

Microbiota composition of the ileum and ceca of colony-enriched and cage-free egg layer production systems.
Dana K. Dittoe*, Anita Menconi2, Steven C. Ricke1

*Presenter
Evaluating the effects of stocking density on the health and behaviour of turkey hens to 11 weeks of age.
Sameeha Jhetam*, Karen Schwean-Lardner, Kailyn Beaulac
1Meat Science and Animal Biologics Discovery, Animal and Dairy Sciences, University of Wisconsin-Madison, Madison, Wisconsin, United States, 2Evonik Corporation, Kennesaw, Georgia, United States

In pursuit of a better broiler: Tibia morphology, breaking strength, and ash content in conventional and slower-growing strains of broiler chickens.
Midian Nascimento dos Santos*, Tina Widowski, Elijah Kiarie, Michelle Guerin, Stephanie Torrey
1Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 2Department of Population Medicine, University of Guelph, Guelph, Ontario, Canada

Impact of Orego-Stem® on feed, forage, weed seed, insect and other crop contents in a range setting.
Kari L. Harding*, Benjamin N. Alig, Rebecca Wysocky, Kenneth E. Anderson, Ramon D. Malheiros, Wendy Wakeman
1Prestage Department of Poultry Science, North Carolina State University, Wake Forest, North Carolina, United States, 2Anpario plc, Worksop, Nottinghamshire, United Kingdom

Assessment of Pulsed Alternating Wavelength System (PAWS) on musculoskeletal quality of market-age Pekin ducks.
Brittney Emmert*, Jason Suntych, Daren Suntych, Marcus Reinhardt, Darrin M. Karcher, Gregory S. Fraley
1Animal Sciences, Purdue University, West Lafayette, Indiana, United States

Increasing welfare by placing circulation fans in commercial broiler houses.
Zoie N. McMillian*, Jonathan Moyle, Shawna L. Weimer
1Animal and Avian Sciences, University of Maryland, College Park, Maryland, United States, 2Extension, University of Maryland, Salisbury, Maryland, United States

Robotic poultry carcass picker.
Jennifer Koch*, Joseph Ishak, Sam Boone, EmmaLi Clark
Biological and Agriculture Engineering, North Carolina State University, Clayton, North Carolina, United States

Comparison of a standard male diet to an organic selenium or docosahexaenoic acid (DHA) supplemented male diet on rooster semen quality and reproductive performance.
Kelly M. Sweeney*, Jeanna Wilson, Luis P. Avila
1Poultry Science, University of Georgia, Athens, Georgia, Georgia, 2Poultry Science, University of Georgia, Athens, Georgia, United States

Supervised machine learning models to predict body weight and feed conversion ratio of broilers reared under commercial conditions.
Gustavo Quintana-Ospina*, Edgar O. Oviedo-Rondon, Maria C. Alfaro-Wisaquillo, Luis Carlos Bernal-Arango, Gustavo Martínez-Bernal
1Prestage Department of Poultry Science, North Carolina State University, Raleigh, North Carolina, United States, 2Poultry Science, North Carolina State University, Raleigh, North Carolina, United States, 3Grupo BIOS Inc., Envigado, Antioquia, Colombia

Verification of RFID for tracking of poultry in multi-tiered aviary systems.
Torey J. Fischer*, Cara Robison, Darrin M. Karcher, Prafulla Regmi
1Department of Animal Science, Michigan State University, East Lansing, Michigan, United States, 2Department of Animal Sciences, Purdue University, West Lafayette, Indiana, United States, 3Department of Poultry Science, University of Georgia, Athens, Georgia, United States
Effects of growth dynamics and feed intake on the reproductive performance of broiler breeders.
Maria C. Alfaro-Wisaquillo*, Gustavo Quintana-Ospina1, Edgar O. Oviedo-Rondon1, Luis Carlos Bernal-Arango2, Gustavo Martinez-Bernal2
1Poultry Science, NC State University, Raleigh, North Carolina, United States, 2Grupo BIOS Inc., Envigado, Antioquia, Colombia

Effects of light intensity variation on late-lay hen performance.
Maddison L. Wiersema*, Dawn Koltes
Department of Animal Science, Iowa State University, Ames, Iowa, United States

Metabolism and Nutrition: Amino Acids
Chair: Sergio R. Fernandez, Elanco Animal Health
Session Room VI

Insufficient dietary sulphur amino acids exacerbate oxidative stress in broilers reared in heat stress and subsequently compromise broiler meat quality.
Rose Whelan*, Johanna Zeitz2, Anne Fleischmann3, Tamara Ehbrecht3, Erika Most2, Denise Gessner3, Klaus Failing2, Dieter Luetjohann2, Klaus Eder3
1Animal Nutrition, Evonik Operations GmbH, Birmingham, United Kingdom, 2Institute of Animal Nutrition and Nutrition Physiology, Justus-Liebig-University Giessen, Giessen, Germany, 3Unit of Biomathematics and Data Processing, Faculty of Veterinary Medicine, Justus-Liebig-University Giessen, Giessen, Germany, 4Institute of Clinical Chemistry and Clinical Pharmacology, University Hospital Bonn, Bonn, Germany

Effects of feeding varying levels of DL methionine on meat quality of broiler chickens.
Anthony Pokoo-Aikins*, Jennifer R. Timmons2, Byungrok R. Min2, Samuel N. Mwangi3, Chongxiao Chen3
1Toxicology & Mycotoxin Research Unit, USDA ARS, Watkinsville GA, Georgia, United States, 2Agriculture Food & Resource Sciences, University of Maryland Eastern Shore, Princess Anne, Maryland, United States, 3Poultry Science, North Carolina State University, Raleigh, North Carolina, United States, 4Agriculture & Applied Sciences, Alcorn State University, Lorman, Mississippi, United States

Dietary sulphur amino acid level affects lipid peroxidation and subsequent meat quality in broilers fed diets high in polyunsaturated fatty acids.
Rose Whelan*, Johanna Zeitz2, Tamara Ehbrecht3, Anne Fleischmann3, Denise Gessner3, Silvia Friedrichs1, Marion Sparenberg2, Klaus Failing2, Dieter Luetjohann2, Klaus Eder3
1Animal Nutrition, Evonik Operations GmbH, Birmingham, United Kingdom, 2Institute of Animal Nutrition and Nutrition Physiology, Justus-Liebig-University Giessen, Giessen, Germany, 3Institute of Clinical Chemistry and Clinical Pharmacology, University Hospital Bonn, Bonn, Germany, 4Unit of Biomathematics and Data Processing, Faculty of Veterinary Medicine, Justus-Liebig-University Giessen, Giessen, Germany

Wnt/β-catenin signaling pathway mediates methionine promotes feather follicle stem cells proliferation in yellow-feathered broiler chickens.
Yi-jun Chen, Meng-jie Chen, Chun-qi Gao*
College of Animal Science, South China Agricultural University, Guangzhou, China

DL-methionyl-DL-methionine transported by PepT1 improves intestinal epithelial integrity via intensifying frizzled7-mediated Wnt/β-catenin signaling activity in domestic pigeon (Columba livia).
Chen Zhong, Di-qing Tong, Chun-qi Gao*
College of Animal Science, South China Agricultural University, Guangzhou, China

The optimum leucine requirement of female broilers in starter phase based on carcass traits.
Saeid Amirdahri1, Hossein Janmohammadi*, Akbar Taghizadeh1, William Lambert2, Elham Asadi Someh1, Majid Oliae3
1Department of Animal Science, University of Queensland, Queensland, Australia, Brisbane, Queensland,
Isoleucine requirements for laying hens at peak laying phase via a dose-response study.
Nadège Hervé¹, Josselin Le Cour Grandmaison², William Lambert², Simon Fontaine²*, Dinesh Kumar¹
¹Cooperative Research Farms, Saint-Jean-Baptiste de Rouville, Quebec, Canada, ²METEX NOOVISTAGo, Paris, France

Is the broiler response to dietary valine modulated by the same branched-chain amino acids as in piglets?.
Maroua Zouaoui*¹, William Lambert², Aude Simongiovanni², Marie-Pierre Létourneau-Montminy¹
¹Sciences Animales, Université Laval, Quebec, Quebec, Canada, ²METEX NOOVISTAGo, Paris, France

Impact of coccidiosis on ileal digestibility of amino acids in broiler chickens: a meta-analysis.
Emily Kim*¹, Marie-Pierre Létourneau-Montminy¹, William Lambert², Elijah Kiarie³
¹Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, ²Département des Sciences Animales, Université Laval, Québec city, Quebec, Canada, ³Ajinomoto Animal Nutrition Europe, Paris, France, ⁴Animal Biosciences, University of Guelph, Guelph, Ontario, Canada

Effect of full or partial replacement of soybean meal and crude protein reduction in the grower phase on the performance of broiler chickens.
Ahmed Amerah*¹, Henk Enting¹, Josselin Le Cour Grandmaison², Simon Fontaine², William Lambert²
¹Cargill, Velddriel, Netherland, ²METEX NOOVISTA Go, Paris, France

Effects of reducing dietary crude protein under two different rearing conditions on performance, foot pad dermatitis, meat yields & environmental impacts of Ross 308 broiler chickens.
Charlotte Raybaud², Pierre Moquet², Nicolas Brevault², William Lambert*¹, Stéphanie Lecuelle¹
¹METEX NOOVISTAGo, Paris, France, ²Mixscience, Bruz, France

Determination of the digestible lysine requirement of Cobb MV x Cobb 500 FF broilers from 28-41 days of age and the effect of feeding varying digestible lysine levels on performance and processing yield.
Dalton Dennehy*¹, Andrew Brown², Cesar Coto², Leonel Mejia³, Kelley G. Wamsley²
¹Poultry Science, Mississippi State University, Mississippi State, Mississippi, United States, ²Poultry Science, Mississippi State University, Gordo, Alabama, United States, ³Cobb-Vantress, Siloam Springs, Arkansas, United States, ⁴Mississippi State University, Mississippi State, Mississippi, United States

Determining the optimal digestible isoleucine to lysine ratio of Ross 708 x Ross YP male broilers from 28 to 42 days of age.
Andrew Brown*¹, Jason T. Lee², Roshan Adhikari², Keith Haydon², Kelley G. Wamsley¹
¹Poultry Science, Mississippi State University, Mississippi State, Mississippi, United States, ²CJ America Inc., Downers Grove, Illinois, United States

Determination of the optimal digestible arginine to lysine ratio in Ross 708 male broilers.
Jose I. Vargas*¹, Alejandro Corzo³, Jason T. Lee², Marcelo Silva², Wilmer J. Pacheco³
¹Poultry Science, Auburn University, Auburn, Alabama, United States, ²Aviagen, Huntsville, Alabama, United States, ³C.J. Bio America, Downers Grove, Illinois, United States

Efficiency of lysine and arginine utilization in broilers.
Bernardo R. Nogueira*¹, Luis Filipe V. de Freitas², Matheus D. Reis², Gabriel S. Viana¹, Nilva Sakomura²
¹Luke, Jokioinen, Finland, ²Animal Science, Paulista State University, Jaboriocal, SP, Brazil
Influence of dietary valine and leucine levels on the live performance, carcass traits, and meat quality of Cobb MV x 500 males broilers from 32 to 45 d.
1Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2CJ America-Bio, Downers Grove, Illinois, United States, 3Cobb-Vantress, Inc., Siloam Springs, Arkansas, United States, 4Poultry Science, University of Arkansas, Springfield, Arkansas, United States

Effects of dietary sulfur amino acid supplementation on broiler chickens exposed to acute and chronic heat stress.
Albaraa Sarsour, Mike Persia
Virginia Tech, Blacksburg, Virginia, United States

Practical assessment of methionine supplementation regimen for 2 commercial broiler strains on 41 d performance and processing.
Perri A. Purvis, Andrew Brown, Dalton Dennehy, Kyle Smith, Kelley G. Wamsley
1Mississippi State University, Mississippi State, Mississippi, United States, 2Evonik Corporation, Kennesaw, Georgia, United States

An investigation into the influence of age on the standardized amino acid digestibility of wheat and sorghum in broilers.
Mukti Barua, M. Reza Abdollahi, F. Zaefarian, T.J. Wester, C.K. Girish, Peter V. Chrystal, V. Ravindran
1Monogastric Research Center, School of Agriculture and Environment, Massey University, New Zealand, Palmerston North, Manawatu, New Zealand, 2Nutrition and Care, Animal Nutrition, Evonik (SEA) Pte. Ltd., Jurong Island, West Region, Singapore, 3Baiada Poultry Pty Ltd, Baiada, Pendle Hill 2145, New South Wales, Australia

Determining amino acid digestibility of soybean meal from different Midwest soybean varieties and growth performance when fed to broilers.
Kara M. Dunmire, Michaela B. Braun, Caitlin E. Evans, Charles R. Stark, Chad B. Paulk
Grain Science and Industry, Kansas State University, Manhattan, Kansas, United States

Effects of different heat stress models on ileal nutrient digestibility and molecular markers of protein metabolism.
Jean-Rémi Teyssier, Aurélie Preynat, Pierre Cozannet, Elizabeth S. Greene, Sami Dridi, Samuel J. Rochell
1Adisseo France S.A.S., Commentry, France, 2Center of Excellence for Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States

Effect of amino acid supplementation to reduced crude protein diets on growth performance, organ weights and nutrient digestibility of broiler chickens exposed to sub-clinical enteric health challenges.
Marwa A. Hussein, Farina Khattak, Lonnieke Vervelde, Spiridoula Athanasiadou, Jos Houdijk
1SRUC, Edinburgh, United Kingdom, 2The Roslin Institute and R(D)SVS, University of Edinburgh, Midlothian, United Kingdom

Broilers administered a live coccidiosis vaccine or fed a chemical anticoccidial responded similarly to increased dietary amino acids contributed by soybean meal or feed-grade sources.
Trevor Lee, Jason T. Lee, Samuel J. Rochell
1University of Arkansas, Fayetteville, Arkansas, United States, 2CJ America-Bio, INC, Downers Grove, Illinois, United States

Impact of Eimeria challenge on ileal endogenous losses and standardized ileal digestibility of amino acids in single and mixture of feed ingredients fed to broiler chickens.
Emily Kim, John Barta, William Lambert, Elijah Kiarie
1Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 2Pathobiology, University of Guelph, Guelph, Ontario, Canada, 3Ajinomoto Animal Nutrition Europe, Paris, France, 4Animal Biosciences, University of Guelph, Guelph, Ontario, Canada
Metabolism and Nutrition: Enzymes
Chair: Oluyinka A. Olukosi, University of Georgia
Session Room VII

Effect of a novel consensus bacterial 6-phytase variant on phytate degradation in broilers fed diets containing different phytate levels.
Abiodun Bello*, Yueming Dersjant-Li1, Trine Christensen2, Mehdi Toghyani1, Peter V. Chrystal4, Sonia Liu3, 5, Peter H. Selle3
1Danisco Animal Nutrition - IFF, Oegstgeest, 2342 BH, Netherlands, 2Danisco Animal Nutrition Aps - IFF, Brabrand, DK-8220, Denmark, 3School of Life and Environmental Science, Faculty of Science, The University of Sydney, Sydney, New South Wales, Australia, 4Baiada Poultry, Pendle Hill, New South Wales, Australia, 5Poultry Research Foundation, The University of Sydney, Camden, New South Wales, Australia

Abiodun Bello*, Yueming Dersjant-Li1, Arun Kumar2
1Danisco Animal Nutrition - IFF, Wilmington, Delaware, United States, 2School of Agriculture and Food Science, University of Queensland, Gatton, Queensland, Australia

Performance and tibia ash response of Ross 708 broilers to increasing concentrations of two commercial phytase products post pelleting.
Kristina M. Bowen*, Elizabeth Lynch1, Tim Boltz1, Victoria Ayres1, Mark Jackson2, Joe Moritz1
1Nutritional and Food Sciences, West Virginia University, Morgantown, West Virginia, United States, 2Huvepharma, Peachtree City, Georgia, United States

Effect of two commercially available phytases, supplemented at two different dose rates, on performance of broilers fed diets reduced in minerals, energy and amino acids.
Gilson A. Gomes*, Xavière Rousseau1, Zuzanna Wisniewska2, Sebastian Kaczmarek2
1AB Vista, Marlborough, United Kingdom, 2Department of Animal Nutrition, Poznan University of Life Sciences, Poznan, Poland

Application of Buttiauxella phytase and a combination of xylanase and β-glucanase improved long-term performance, egg quality, and production cost of laying hens.
Emma White*, Abiodun Bello1, Leon Marchal1, Rachael Hardy1, Ceinwen Evans1, Julien Kanarek3, Arun Kumar2
1Danisco Animal Nutrition - IFF, Marlborough, SN8 1NY, United Kingdom, 2Department of Animal Nutrition, Poznan University of Life Sciences, Poznan, Poland

Feeding broilers total inorganic phosphorus free diets with phytase maintained normal performance as shown in 4 independent trials.
Leon Marchal*, Abiodun Bello2, Eric B. Sobotik3, Gregory S. Archer2, Enric Esteve4, Carla R. Creus4, Cees Kwakernaak3, Ellen v. Eerden5, Yueming Derjant-Li2
1Animal Nutrition, Wageningen University & Research, Wageningen, Netherlands, 2IFF, Oegstgeest, Netherlands, 3Poultry Science, Texas A&M University, College Station, Texas, United States, 4Animal Nutrition, IRTA, Constanti, Spain, 5Poultry Nutrition, Schothorst Feed Research, Lelystad, Netherlands

Pattaveekan Preesong*, Glenmer B. Tactacan2, Akaradet Seemcharoensri2, Yuwares Ruangpanit3
1Animal Science, Kasetsart University, Kamphangsaen, Nakhon Pathom, Thailand, 2Research and Development, Jefo, Saint-Hyacinthe, Quebec, Canada

Evaluating the benefits of a novel multi-component protease supplementation in broiler chickens fed sufficient or low-protein diets.
Anhao Wang*, Rob Patterson, Anangelina Archile
CBS Bio Platforms, Calgary, Alberta, Canada

139 Effects of a multi-component protease supplementation on growth performance and carcass yield of Indian River broiler chickens.
Mohiuddin Amirul Kabir Chowdhury*, Sumiya Akter, Subhash Chandra Das, Bapan Dey, Glenmer B. Tactacan
1Research and Development, Jefo, Saint-Hyacinthe, Quebec, Canada, 2Animal Science, Bangladesh Agricultural University, Mymensingh, Bangladesh

140 Hen response to B-mannanase addition on top to a feed formulated with phytase and xylanase feed enzymes.
Sergio R. Fernandez*, Marco A. Martinez, Diego Puron, Raul Santamaria
1Nutritional, Elanco Animal Health, Guadalajara, Jalisco, Mexico, 2Centro de Investigación Animal Aplicada de Yucatan, Merida, Yucatan, Mexico

141 The efficacy of xylanase and DFM combination in disease challenged floor raised broilers.
Yun-mei A. Lin, Basheer Nusairat, Rasha Qudsieh, Jeng-Jie Wang, Nasser Odetallah
1BioResource International, Durham, North Carolina, United States, 2Department of Animal Production, Jordan University of Science and Technology, Ar-Ramtha, Jordan

142 Diets with varying inclusion rates of phytase and energy levels influence broiler performance from 1 to 42 days of age.
Joseph P. Gulizia*, Susan M. Bonilla, Jose I. Vargas, Santiago J. Sasia, Leah C. Smith, Wilmer J. Pacheco
Department of Poultry Science, Auburn University, Auburn, Alabama, United States

143 Effects of protease addition on varying levels of CP/AA on performance, egg parameters and apparent amino acid digestibility in 50-70 wk old Hy-Line W36 laying hens.
Victoria R. Williams-Hodge, Kelley G. Wamsley, Kevin Roberson, Pratima Adhikari
1Poultry Science, Mississippi State University, Starkville, Mississippi, United States, 2CSA Animal Nutrition, Dayton, Ohio, United States

144 Effects on phytase and coccidial vaccine on growth performance, bone mineralization and nutrient digestibility of broilers fed with nutrient-reduced diets.
Yanxiing (Stella) Niu*, Anna Rogiewicz, Lan Shi, Rob Patterson, Bogdan A. Slominski
1Department of Animal Science, University of Manitoba, Winnipeg, Manitoba, Canada, 2CBS Bio Platforms Inc., Calgary, Alberta, Canada

145 Nutrient utilization and expression of nutrient transporter and tight junction genes in Eimeria-challenged broilers fed diets with different dietary levels of fiber, protein and enzymes.
Yang Lin, Oluyinka Olukosi
1Poultry Science, University of Georgia, Athens, Georgia, 2Poultry Science, University of Georgia, Athens, Georgia, United States

146 The effect of enzymatically-modified canola meal on growth performance, nutrient utilization and intestinal bacterial population of broiler chickens.
Yanxing (Stella) Niu*, Anna Rogiewicz, Ian Shi, Rob Patterson, Bogdan A. Slominski
1Department of Animal Science, University of Manitoba, Winnipeg, Manitoba, Canada, 2CBS Bio Platforms Inc., Calgary, Alberta, Canada

147 Multi-experiment evaluation of increasing phytase activity from Optiphos® and Optiphos Plus® on 21-day broiler performance and tibia mineralization.
Victoria Ayres*, Mark Jackson, Staci Cantley, Samuel J. Rochell, Cole Crumpacker, Trevor Lee, Brooke Bodle, Wilmer J. Pacheco, Martha Rueda Lastres, Christopher A. Bailey, Kimberly N. Gardner, Tim Boltz, Joseph Moritz
1Animal and Nutritional Sciences, West Virginia University, Morgantown, West Virginia, United States, 2Huvepharma, Inc., Peachtree City, Georgia, United States, 3Poultry Science, University of Arkansas,
Influence of adaptation length and assay method on metabolizable energy of barley supplemented with or without glucanase.

Shravani Veluri*GS1, Oluyinka Olukosi2
1Department of Poultry Science, University of Georgia, Athens, Georgia, United States, 2Poultry Science, Auburn University, Auburn, Alabama, United States

Metabolism and Nutrition: Feed Additives
Chair: Jeffery Escobar, Elanco Animal Health
Session Room VIII

Remediation of hydrogen sulfide emissions from poultry excreta by dietary supplementation of a proprietary microbial product.

Sam Shen1, Hector Leyva-Jimenez*, Katherine McCormick1, Derek Haag1, Beth Galbraith2
1United Animal Health, Inc., Sheridan, Indiana, United States, 2Microbial Discovery Group, Franklin, Wisconsin, United States

Evaluating the effects of a synbiotic (probiotic + prebiotic) feed additive on performance of broilers compared to a chemical coccidiostat during a necrotic enteritis challenge.

Chasity M. Pender*, Shelby Ramirez1, G. R. Murugesan1, Brett Lumpkins2, Greg F. Mathis2
1Biomin America Inc., Overland Park, Kansas, United States, 2Southern Poultry Feed & Research, Inc., Athens, Georgia, United States

Evaluating the combined effects of a synbiotic (probiotic + prebiotic) feed additive and coccidiosis vaccine on performance of broilers compared to a vaccine alone during a necrotic enteritis challenge.

Chasity M. Pender*, Shelby Ramirez1, G. R. Murugesan1, Brett Lumpkins2, Greg F. Mathis2
1Biomin America Inc., Overland Park, Kansas, United States, 2Southern Poultry Feed & Research, Inc., Athens, Georgia, United States

Probiotics as a potential strategy to mitigate bacterial chondronecrosis with osteomyelitis lameness in broilers.

Adnan K. Alrubaye1, Douglas Rhoads2, Amer Hasan1, Khwlah Alharbi1, Abdulkarim Shwani1, Sonali Lenaduwelokuge1, Kyle Burks1, G. Raj Murugesan3-5, Basharat Syed6, Shelby Ramirez6
1Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Department of Biological Sciences, University of Arkansas, Fayetteville, Arkansas, United States, 3University of Baghdad, Baghdad, Iraq, 4BIOMIN Holding GmbH, Getzersdorf, Austria, 5BIOMIN America Inc., Overland Park, Kansas, United States

Performance of broilers fed diets differing on soluble arabinoxylan content, with or without stimbiotic supplementation.

Gilson A. Gomes*, Xavière Rousseau, Tiago T. dos Santos
AB Vista, Marlborough, United Kingdom

Effect of stimbiotic supplementation and litter reutilization on broiler chickens.

Gemma Gonzalez Ortiz*, Kirsi Vienola2, Teemu Rinttila2, Juha Apajalahti3, Mike Bedford1
1R&D, AB Vista, Marlborough, Wiltshire, United Kingdom, 2Alimetrics Ltd, Espoo, Finland

Withdrawn.

Protected organic acids and essential oils improves the intestinal health of broiler chickens raised under field conditions.

Cristiano Bortoluzzi*, Ludovic Lahaye1, Jared Oxford1, Derek Detzler1, Cinthia Eyng2, Nicolle Barbieri3, Elizabeth Santin1, Michael Kogut4

*Presenter
Assessing the efficacy of bacteriophage therapy to reduce *Salmonella* colonisation in broiler chickens.

Anisha M. Thanki\(^*\), Steve Hooton\(^1\), Robert Atterbury\(^2\), Natasha Whenham\(^3\), Mike Salter\(^4\), Mike Bedford\(^5\), Helen Masey O’Neill\(^6\), Martha R. Clokie\(^7\)

\(^1\)Genetics and genome biology, University of Leicester, Leicester, Leicestershire, United Kingdom, \(^2\)School of Veterinary Medicine and Science, University of Nottingham, Sutton Bonington, Leicestershire, United Kingdom, \(^3\)Ab Vista, Marlborough, United Kingdom

Effects of guanidinoacetic acid (GAA) on growth and body composition in broilers.

Chongxiao (Sean) Chen\(^*\), Dima L. White\(^1\), Yuguo H. Tompkins\(^2\), John E. Thomson\(^3\), Ulrike Braun\(^4\), Woo K. Kim\(^2\)

\(^1\)Prestage Department of Poultry Science, North Carolina State University, Raleigh, North Carolina, United States, \(^2\)Poultry Science, University of Georgia, Athens, Georgia, United States, \(^3\)AlzChem LLC, Canton, Georgia, United States, \(^4\)AlzChem Tростberg GmbH, Tростberg, Germany

Metabolomics shows that guanidinoacetic acid improves breast weights without aggravating breast muscle myopathies through changes in energy metabolism.

Martina Klünemann\(^*\), Juliano C. de Paula Dorigam

Animal Nutrition Research, Evonik Operations GmbH, Hanau, Germany

Muscle creatine content and severity of woody breast in male broilers fed varying levels of guanidinoacetic acid.

John E. Thomson\(^*\), Randy D. Mitchell\(^1\), Ulrike Braun\(^3\)

\(^1\)Animal Nutrition, AlzChem LLC, Alpharetta, Georgia, United States, \(^2\)Technical Services, Perdue Foods LLC, Salisbury, Maryland, United States, \(^3\)Animal Nutrition, AlzChem GmbH, Tростberg, Germany

Effects of glucosamine-derived caramels on performance and bone health of broilers.

Emanuele C. Goes\(^*\), Mirko Betti, Doug Korver

Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada

The effect of a dacitic tuff breccia (*Azomite*) in corn, soybean, and DDGS based diets that vary in inorganic phosphate source on pellet mill production rate and pellet quality.

Tim Boltz\(^*\), Jon Ferrel\(^4\), Kristina M. Bowen\(^2\), Kari L. Harding\(^5\), Victoria Ayres\(^3\), Joe Moritz\(^1\)

\(^1\)West Virginia University, Morgantown, West Virginia, United States, \(^2\)Nutritional and Food Sciences, West Virginia University, Morgantown, West Virginia, United States, \(^3\)Animal and Nutritional Sciences, West Virginia University, Morgantown, West Virginia, United States, \(^4\)Azomite Mineral Products, Inc., Nephi, Utah, United States, \(^5\)North Carolina State University, Raleigh, North Carolina, United States

Antimicrobial effects against *Salmonella typhimurium* and protein precipitation capacity of tannic acid in an *in vitro* chicken gut pH model and in simulated feed pelleting temperature.

Janghan Choi\(^*\), Sudhir Yadav, Sasikala Vaddu, Harshavardhan Thippedaredi, Woo K. Kim

Department of Poultry Science, University of Georgia, Athens, GA, Georgia

A blend of protected organic acids + essential oils improves intestinal health indicators and reduces intestinal permeability of laying hens raised under commercial conditions.

Mariana Lemos de Moraes\(^*\), Marcia de Souza Vieira\(^1\), Francisco Bertolini Junior\(^1\), Guilherme Moreira de Melo Silva\(^2\), João Marcos Novaes Tavares\(^2\), Carlos Yassuharu Nakamatsu\(^2\), Letícia Cury Rocha Veloso Arantes\(^2\), Elizabeth Santin\(^1\)

\(^1\)Jefo, Saint Hyacinthe, Quebec, Canada, \(^2\)Grupo Mantiqueira, Primavera do Leste, Brazil

The effects of oregano essential oil on layer hen performance and egg quality.

Kenneth E. Anderson\(^*\), Ramon D. Malheiros\(^1\), Emma Lund\(^2\), Wendy Wakeman\(^2\)

\(^1\)Poultry Science, North Carolina State University, Raleigh, North Carolina, United States, \(^2\)Anpario plc, Worksop, United Kingdom

*Presenter*
Evaluation of probiotic and organic chromium on productive performance and energy utilization of laying breeder hens.
Otoniel F. Souza¹, Catarina Stefanello¹, Bárbara Moreira¹, Carine Adams¹, Jessica C. Agilar¹, Elisa François*², Kelen Zavarize²
¹Animal Sciences, Federal University of Santa Maria, Santa Maria, Brazil, ²Kemin Industries Inc., Valinhos, SP, Brazil

Egg production and quality parameters of ISA Brown layers fed diet containing single and combined levels of turmeric and clove.
Ayoola D. Ayodele* GS, Grace O. Tayo, Martha D. Olumide
Agriculture and Industrial Technology, Babcock University, Nigeria, Ilshan Remo, Ogun State, Nigeria

Microencapsulation of ajowan essential oil within alginate: Effects on performance and intestinal microflora of broilers.
Tahereh Mersadi, Maziar Mohiti-Asli*, Hassan Darmani-Kuhi
Department of Animal Science, University of Guilan, Rasht, Iran (the Islamic Republic of)

The hepatoprotective effects of dietary herbaceous mixture supplementation on liver injury in laying hen through alleviating hepatic lipid deposition and oxidant stress.
Yao Zhu*, H.Y Zhang, Y.Q. Huang, W Chen
College of Animal Science and Technology, Henan Agricultural University, Zhengzhou, China

Effects of a direct fed microbial on pullet performance and body composition.
Jordyn Samper* GS ¹, Miloud Araba², Miguel Ruano², Troy Lohrmann³, Mike Persia¹
¹Virginia Tech, Blacksburg, Virginia, United States, ²Quality Technology International INC, Elgin, Illinois, United States

In vitro screening of drinking water acidifiers and their effects on broiler performance, serum biochemistry and intestinal development.
Yujun Guo* GS ¹, Bo Chen¹, Huaiyong Zhang¹, Y.Q. Huang¹, Peng Li², W Chen¹
¹College of Animal Science and Technology, Henan Agricultural University, Zhengzhou City, Henan Province, China, ²Novus International, Shanghai, China

Effects of direct-fed microbial inclusion on production parameters and intestinal microbial population changes in Nicholas Select tom turkeys.
Logan S. Erb* GS ¹, Alyssa Lyons³, Courtney Poholsky³, Brian Dirks⁴, John W. Boney⁴
¹Animal Science, Penn State, State College, Pennsylvania, United States, ²Animal Science, Pennsylvania State University, State College, Pennsylvania, United States, ³Penn State University, Howard, Pennsylvania, United States, ⁴Quality Technology International, Inc., East Norriton, Pennsylvania, United States, ⁵Animal Science, Penn State University, University Park, Pennsylvania, United States

Broiler intestinal health, immunity, and performance responses to an algae-based ingredient vary between basal diet compositions.
Krysten Fries-Craft* GS ¹, Ryan Arsenault², Elizabeth A. Bobeck¹
¹Department of Animal Science, Iowa State University, Ames, Iowa, United States, ²Department of Animal and Food Sciences, University of Delaware, Newark, Delaware, United States

Comparative evaluation of conventional and alternative gut health management programs on growth performance, breast meat attributes, and ceca digesta short chain fatty acid profiles in broiler chickens.
Lisa Bean Hodgins* GS ¹, Mohsen Mohammadigheisar¹, Chaoyue Wang⁴, Shai Barbut⁴, Elijah Kiarie¹
¹Department of Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, ²Food Science, University of Guelph, Guelph, Ontario, Canada

Effects of tannic acid on the growth performance, gastrointestinal permeability, antioxidant capacity, oocyst shedding, and nutrient digestibility of broiler chickens infected with Eimeria maxima.
*Presenter

All Times are CST
Dietary grape pomace – Effects on growth performance, intestinal health, blood parameters, and breast muscle myopathies of broiler chickens.
Taiwo J. Erinle* GS, Samson Oladokun, Janice Maclsaac, Bruce Rathgeber, Deborah I. Adewole
Animal Science and Aquaculture, Dalhousie University, Bible Hill, Nova Scotia, Canada

Optimizing cost and growth performance of broiler chickens fed diets with a bio-emulsifier based on lysophospholipids.
Vitor Santos Haetinger* GS 1, Catarina Stefanello1, Yuri Katagiri Dalmoroi1, Guilherme L. Godoy1, Carine Adams1, Kelen Zavarize2, Elisa François3
1Department of Animal Science, Federal University of Santa Maria, Cachoeira Do Sul, RS, Brazil, 2Kemin Industries Inc., Valinhos, São Paulo, Brazil

The effect of a dacitic tuff breccia (Azomite®) in corn, soybean, and DDGS based diets that vary in inorganic phosphate source on pellet mill energy consumption, live bird performance and amino acid digestibility.
Kristina M. Bowen* GS 1, Elizabeth Lynch1, Tim Boltz1, Victoria Ayres1, Jon Ferrel2, Joe Moritz1
1Nutritional and Food Sciences, West Virginia University, Morgantown, West Virginia, United States, 2Azomite Mineral Products, Nephi, Utah, United States

Successive delivery of essential oil via in ovo and in-water route improves broiler chicken blood biochemical and antioxidant status without altering growth performance.
Samson Oladokun* GS, Janice Maclsaac, Bruce Rathgeber, Deborah I. Adewole
Department of Animal Science and Aquaculture, Dalhousie University, Truro, Nova Scotia, Canada

Chitosan oligosaccharides as potential antibiotic replacements in broiler diets.
Emanuele C. Goes* GS, Lingyun Chen, Doug Korver
Agricultural, Food & Nutritional Science, University of Alberta, Edmonton, Alberta, Canada

Effect of dietary ginger root extract on growth performance and delayed-type hypersensitivity response of broiler chicks.
George Dosu* GS, Shengmin Sang, Temitayo Obanla, Yewande Fasina
North Carolina A&T State University, Greensboro, North Carolina, United States

Beneficial effects of A. niger-fermented tomato pomace on the growth performance and antioxidant capacity in broiler chickens.
Emrah Gungor* GS, Aydin Altop, Guray Erener
Ondokuz Mayis University, Samsun, Turkey

Efficacy of a phytophobic formulation as a replacer of antibiotic growth promoters at improving growth, performance, carcass traits and intestinal morphology in broiler chicken.
Naveen S. Murikipudi* GS 2, 1, Anil k. chittithothi3, Susmitha Thuirmalli4, Aswani Kumar5, Bhaskar Ganguly5, Ravikanth kotagiri6
1Veterinary Biochemistry, Sri Venkateswara Veterinary University, Vijayawada, India, 2Animal Biochemistry, NDRI, Karnal, Haryana, India, 3Animal Nutrition, Sri Venkateswara veterinary university, Vuyayavada, Andhra Pradesh, India, 4Poultry Science, Sri Venkateswara Veterinary University, Vijayawada, Andhra Pradesh, India, 5Research & Development, Ayurvet Limited, Baddi, Himachal Pradesh, India

Protective efficacy of quercetin supplementation on the dietary-induced fatty liver syndrome in broiler chicken model.
Abhishek B. Parmar* GS 2, 1, Vipul R. Patel2, Jignesh M. Patel3, Umed V. Ramani4, Dhruv N. Desai5
1Animal Nutrition Research Station, College of Veterinary Science & Animal Husbandry, Anand Agricultural University, Anand, Gujarat, India, Anand, Gujarat, India, 2Department of Animal Nutrition, College of Veterinary Science & Animal husbandry, Navsari Agricultural University, Navsari, 396450, Gujarat, India, 4Research & Development, Ayurvet Limited, Baddi, Himachal Pradesh, India
Correlation between data on proximal composition, protein quality indicators, and amino acid profile of commercial samples of soybean meals analyzed by wet chemistry or estimated by NIRS technology.
L. Dardabou, H. Kadardar, L. Cámara*, Gonzalo Mateos
UPM, Madrid, Madrid, Spain

Effect of genetically modified DP-3Ø5423-1 (305423) soybean on immune response and fatty acid metabolism markers of broilers.
Ali Calik*,1, Nima Emami2,4, Mallory B. White2, Rami A. Dalloul2,3
1Animal Nutrition and Nutritional Diseases, Ankara University Faculty of Veterinary Medicine, Ankara, Turkey, 2Avian Immunobiology Laboratory, Department of Animal and Poultry Sciences, Virginia Tech, Blacksburg, Virginia, United States, 3Poultry Science, University of Georgia, Athens, Georgia, United States, 4Center of Excellence for Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States

Evaluation of increasing levels of enzyme-treated soy protein on turkey poult live performance.
Kyle D. Brown*,1, Alfred Blanch2, Meghan Schwartz4, Hannah Robinson2, Simone H. Rasmussen2
1Hamlet Protein, Inc., Findlay, Ohio, United States, 2Hamlet Protein A/S, Horsens, Denmark, 3Applied Poultry Research LLC, Louisburg, North Carolina, United States

Effects of dietary corn germ meal levels on growth performance, meat quality, serum biochemical indices, and intestinal morphology in Pekin ducks.
Ying Y. Qi*, Keying Zhang, Shiping Bai, Xuemei Ding, Jianping Wang, Yue Xuan, Zhuowei Su, Huanwei Peng, Qufeng Zeng
Sichuan Agricultural University, Cheng du, China

Influence of heat stress and the inclusion of sodium-butyrate in the diet, on growth performance, body weight uniformity, and intestinal morphology in broilers from 0 to 39 d of age.
V. Bernad1, G. Fondevila4, B. Saldaña2, J.L. Archs1, L. Aguirre1, A.F. de Juan1, Gonzalo Mateos1
1UPM, Madrid, Madrid, Spain, 2Nutega S. L., Madrid, Spain

Multiple dietary supplementations of omega 3 fatty acids and calcidiol on growth performance, health status, and tissue enrichments of broiler chickens.
Sahil Kalia*, Tao Sun, Andrew Magnuson, Ziqiao Sun, Xin Gen Lei
Animal Science, Cornell University, Ithaca, New York, United States

Protein efficiency and intake of chickens applied with salted poisonous yam added to commercial diet from week 5 to 13 of age.
Albino N. Taer*
Animal Science, Surigao State College of Technology, Surigao City, Surigao del Norte, Philippines

Effects of dietary DDGS levels on growth performance, serum biochemical indices, and intestinal morphology in Pekin ducks.
Ying Y. Qi*, Keying Zhang, Shiping Bai, Jianping Wang, Xuemei Ding, Zhuowei Su, Yue Xuan, Qufeng Zeng, Huanwei Peng
Sichuan Agricultural University, Cheng du, China
A comparison of statistical methods to estimate zinc bioavailability in chickens.

Thi Thanh Hoai Nguyen¹, Robert A. Swick¹, Shubiao Wu¹, Gene M. Pesti², Lynne Billard³

¹School of Environmental and Rural Science, University of New England, Armidale, New South Wales, Australia, ²Poultry Science, University of Georgia, Greensboro, Georgia, United States, ³Statistics, University of Georgia, Athens, Georgia, United States

An assessment of the variation in limestone grit originating from North and South America and implications for laying hen nutrition.

Anneleen Swanepoel⁴, Gareth Wilks⁵, Janet Remus⁶, Mauricio S. Cunha⁷, Peter W. Plumstead⁸, Rosalina Angel⁹

⁴Poultry, Chemuniqué (Pty) Ltd, Lanseria, Gauteng, South Africa, ⁵Poultry, Chemuniqué, Johannesburg, Gauteng, South Africa, ⁶Chemunique PTY LTD, Lanseria, South Africa, ⁷Animal and Avian Sciences, University of Maryland, College Park, Maryland, United States, ⁸Department of Animal and Wildlife Sciences, University of Pretoria, Pretoria, South Africa, ⁹Danisco Animal Nutrition (IFF), Cedar Rapids, Iowa, United States

The effects of using different levels of millet on egg production performance and egg qualitative traits of Japanese quails.

Hosna Hajati⁴, ⁵

⁴Animal Science, Animal Science Research Department, East Azarbaijan Agricultural and Natural Resources Research and Education Center, AREEO, Tabriz, Iran., Tabriz, Iran (the Islamic Republic of), ⁵Animal Science, University of Tehran, Karaj, Iran (the Islamic Republic of)

Effects of dietary metabolizable energy and standardized ileal digestible lysine content of the diet on performance and egg quality of brown-egg laying hens from 18 to 41 weeks of age.

R. Scappaticcio², H. Herrera², G. Fondevila¹, A.F. de Juan¹, L. Cámar¹, Gonzalo Mateos*¹

¹UPM, Madrid, Madrid, Spain, ²Camar Agroalimentaria S.L., Toledo, Spain

Egg quality and serum biochemical profile of laying breeder hens fed diets supplemented with probiotic and organic chromium.

Otoniel F. Souza¹, Catarina Stefanello¹, William Gräf¹, Beatriz N. Rodrigues¹, Geovana Müller¹, Elisa François², Kelen Zavarize*²

¹Animal Sciences, Federal University of Santa Maria, Santa Maria, Brazil, ²Kemin Industries Inc., Valinhos, SP, Brazil

Apparent metabolizable energy and performance of broilers and Japanese quail fed selected modern grain sorghum varieties.

Alissa Moritz*, Michael Blair², Bob Buresh³, William Bridges⁴, Mireille Arguelles-Ramos¹, Tiffany Wilmoth¹

¹Animal and Veterinary Sciences, Clemson University, Clemson, South Carolina, United States, ²United Animal Health, Sheridan, Indiana, United States, ³Novus International, St. Charles, Missouri, United States, ⁴Department of Forestry and Environmental Conservation, Clemson University, Clemson, South Carolina, United States, ⁵Department of Mathematical and Statistical Sciences, Clemson University, Clemson, South Carolina, United States

Effect of select modern grain sorghum varieties on the growth performance and carcass traits of broiler chickens.

Alissa Moritz*, Michael Blair², Bob Buresh³, William Bridges⁴, Mireille Arguelles-Ramos¹

¹Animal and Veterinary Sciences, Clemson University, Clemson, South Carolina, United States, ²Department of Mathematical and Statistical Sciences, Clemson University, Clemson, South Carolina, United States, ³United Animal Health, Sheridan, Indiana, United States, ⁴Novus International, St. Charles, Missouri, United States

Effect of beak trimming at hatch and oat hulls inclusion in the diet on growth performance, pecking behavior, and digestive tract traits of brown-egg pullets from hatch to 15 weeks of age.

J. Ben Mabrouk*, Gonzalo Mateos, A.F. de Juan, B. Carreño, V. Bernad, L. Cámar⁴

⁴UPM, Madrid, Madrid, Spain

*Presenter
An assessment of the variation in limestone quality originating from North and South America and implications for broiler nutrition.
Gareth Wilks* GS 1,4, Anneleen Swanepoel1, Janet Remus3, Mauricio S. Cunha3, Peter W. Plumstead3, Rosalina Angel2
1Chemunique PTY LTD, Lanseria, South Africa, 2Animal and Avian Sciences, University of Maryland, College Park, Maryland, United States, 3Danisco Animal Nutrition (IFF), Cedar Rapids, Iowa, United States, 4Department of Animal and Wildlife Sciences, University of Pretoria, Pretoria, South Africa

Effects of encapsulated cinnamaldehyde on intestinal digestive and absorptive functions, meat quality and gut microbiota in broiler chickens.
Chongwu Yang* GS 1, Moussa Diarra2, Janghan Choi1, Argenis Rodas-Gonzalez1, Dion Lepp2, Shangxi Liu1, Peng Lu1, Marion Mogire1, Qi Wang2, Joshua Gong2, Chengbo Yang1
1Animal Science, University of Manitoba, Winnipeg, Manitoba, Canada, 2Agriculture and Agri-Food Canada, Guelph, Ontario, Canada

Supplemental dietary omega 3 fatty acids and calcidiol improved intestinal integrity and function of broiler chickens.
Tao Sun GS *, Sahil Kalia, Andrew Magnuson, Xin Gen Lei
Animal Science, Cornell University, Ithaca, New York, United States

Complete replacement of soybean meal with black soldier fly larvae meal in feeding program for broiler chickens depressed growth performance from placement through to 49 days of age.
Hannah M. Facey* GS 1, Munene Kithama2, Mohsen Mohammadigheisar1, Lee-Anne Huber1, Anna Kate Shoveller1, Elijah Kiarie1
1Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 2Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 3Animal Biosciences, University of Guelph, Guelph, Ontario, Canada

Energy values of Tenebrio molitor larvae meal for broiler chickens determined using the regression method.
Yuri Katagiri Dalmoro* GS, Carine Adams, Lidiele Bairros, Guilherme L. Godoy, Beatriz N. Rodrigues, Marina Botega Lang, Catarina Stefanello
Department of Animal Science, Federal University of Santa Maria, Santa Maria, RS, Brazil

Spirulina (Arthrospira) platensis ingredient characterization and amino acid digestibility in male Cobb 500 broilers.
Garrett Mullenix* GS 1, Craig W. Maynard3, Samuel J. Rochell1, Walter G. Bottje1, Roy Brister2, Michael T. Kidd1
1Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Tyson Foods Inc., Springdale, Arkansas, United States, 3Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States

Energy expenditure in broiler chicks under health challenges.
Rosiane D. Camargos* GS, Rony Riveros Lizana, Guilherme F. Teofilo, Luis Filipe V. de Freitas, Bruno Balbino Leme, Nilva Sakomura
Animal Science, Sao Paulo State University, Jaboticabal, Sao Paulo, Brazil

Evaluation of semi-purified diets for glucose recovery in order to estimate endogenous losses of energy in broiler chickens.
Stephanie Philpot* GS 1, Aaron Cowieson2, William A. Dozier, III1
1Poultry Science, Auburn University, Auburn, Alabama, United States, 2DSM Nutritional Products, Kaiseraugst, Switzerland

Effect of beak trimming at hatch and the inclusion of oat hulls in the diet on water intake, preference behavior for coarse particles, and gastrointestinal tract traits of brown-egg pullets from 0 to 5 weeks of age.
N. L. Corrales* GS, J. Ben Mabrouk, N. García, A.F. de Juan, Gonzalo Mateos, L. Cámara
UPM, Madrid, Madrid, Spain
Feed processing technologies on Camelina sativa and its effect on performance in laying hens.
Kiana A. Rieger* GS, Rex Newkirk
Animal and Poultry Science, University of Saskatchewan, Saskatoon, Saskatchewan, Canada

Influence of the inclusion of Aspergillus oryzae on productive performance and egg quality of brown hens from 15 to 43 weeks of age.
A.F. de Juan* GS 1, Ignacio R. Ipharraguerre2, J. Ben Mabrouk1, C. Ocasio-Vega3, L. Aguirre1, Gonzalo Mateos1
1UPM, Madrid, Madrid, Spain, 2Institute of Human Nutrition and Food Science, University of Kiel, Kiel, Germany, 3BioZyme Incorporated, St. Joseph, Missouri, United States

Allometric coefficient and energy for maintenance in pullets and laying hens.
Freddy Horna* GS, Matheus D. Reis, Rony Riveros Lizana, Raully L. Silva, Carolina Cardoso Nagib Nascimento, Bruno Balbino Leme, Nilva Sakomura
Animal Science, Sao Paulo State University, Jaboriabal, Sao Paulo, Brazil

Metabolomics biomarkers of sexual development in broiler breeders.
Mohammad Afrouziyeh* GS 1, Nicole Zukwisky2, Douglas R. Korver3, Martin J. Zuidhof2
1University of Alberta, Edmonton, Alberta, Canada, 2University of Alberta, Edmonton, Alberta, Canada

Understanding factors that affect soybean meal quality.
Muhammad Ali* GS 1, Gustavo Quintana-Ospina1, Maria C. Alfaro-Wisaquillo1, Danny B. Patino1, Michael Joseph1, Rachel Vann2, Edgar O. Oviedo-Rondon3
1Prestage Department of Poultry Science, North Carolina State University, Raleigh, North Carolina, United States, 2Crop and Soil Sciences, North Carolina State University, Raleigh, North Carolina, United States

Effects of soybean meal particle size on feed milling efficiency, pellet quality, broiler performance (D1-42) and processing characteristics.
Alyssa Lyons* GS, Logan S. Erb, Courtney Poholsky, Paul Patterson, John W. Boney
Animal Science, Penn State University, University Park, Pennsylvania, United States

Variability in particle size of different types of soybean meal subject to different roller mill settings.
Danny B. Patino* GS, Thien Vu, Muhammad Ali, Andrea Rubio, Ondulla Toomer, Adam Fahrenholz, Edgar Oviedo, Michael Joseph
Poultry Science, North Carolina State University, Raleigh, North Carolina, United States

Effect of different soybean meal inclusions in broiler diets on the Arkansas Net Energy, performance and body composition from d0 to d56 of age.
Nawin Suesuttajit* GS, Jordan Weil, Cole Umberson, Pramir Maharjan, Diego Martinez, Craig N. Coon
Center of Excellence for Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States

Chemical composition, protein quality, and in vitro protein digestibility of commercial soybean meals from different origins.
L. Aguirre* GS 1, A. Smith2, J. J. Arroyo3, A.F. de Juan1, G. Fondevila1, H. Kadardar2, Gonzalo Mateos1, L. Cámara3
1UPM, Madrid, Madrid, Spain, 2DSM Nutritional Products (UK) Ltd, Heanor, Derbyshire, United Kingdom, 3DSM Nutritional Products Ltd, Madrid, Alcalá de Henares, Spain

Effects of varying corn particle size on broiler performance and organ development from 1 to 21 days of age.
Emily K. Stafford* UG, Gabrielle Harder1, Kevin M. Downs1, Joseph P. Gulizia2, Santiago J. Sasia2, Wilmer J. Pacheco2
1School of Agriculture, Middle Tennessee State University, Murfreesboro, Tennessee, United States, 2Department of Poultry Science, Auburn University, Auburn, Alabama, United States

Effects of fiber type, particle size, and inclusion level on the growth performance, digestive organ

*Presenter

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growth, intestinal viscosity, intestinal morphology, and gene expression of broilers.
Oscar J. Tejeda* GS, Woo K. Kim
Poultry Science, The University of Georgia, Athens, Georgia, United States

Effects of improvements to pellet quality on commercial hen turkey performance and processing parameters.
Courtney Poholsky* GS 1, Morgan L. Watt1, Logan S. Erb2, Alyssa Lyons3, John W. Boney4
1Penn State University, Howard, Pennsylvania, United States, 2Animal Science, Penn State, State College, Pennsylvania, United States, 3Animal Science, Pennsylvania State University, State College, Pennsylvania, United States, 4Animal Science, Penn State University, University Park, Pennsylvania, United States

Metabolism and Nutrition: Vitamins and Minerals
Chair: Kurt R. Perryman, Social Chicken
Session Room X

Combined effects of dietary cadmium, lead, mercury, and chromium on performance, egg quality, serum biochemical markers, and oxidative stress in laying hens, and the subsequent attenuation of toxicity with selenized yeast.
Cai M. Wu*1, lang Li1, Todd Applegate2, Shiping Bai1, Guangmang Liu1, Keying Zhang1
1Institute of Animal Nutrition, Sichuan Agricultural University, Chengdu, China, 2Poultry Science, University of Georgia, Athens, Georgia, United States

The effects of using dietary zeolite on the growth performance, intestinal morphology, and ileal microbiota of Turkey pouls.
Hosna Hajati*, Seyed Mehdi Morsali
Animal Science, Animal Science Research Department, East Azarbaijan Agricultural and Natural Resources Research and Education Center, AREEO, Tabriz, Iran., Tabriz, Iran (the Islamic Republic of)

Copper(I) oxide as an alternative for antibiotic replacement to promote growth and improve health in broilers under challenge.
Alessandra Monteiro*1, Denise Cardoso1, Cristina Massoco Salles Gomes3, Cristiane S. Araujo2, Fabricia d. Roque2, Lucio F. Araujo2
1Animine, Annecy, Rhone-Alpes, France, 2Nutrition and Animal Science, University of Sao Paulo, Pirassununga, Brazil, 3Department of Pathology, University of São Paulo, Pirassununga, São Paulo, Brazil

Withdrew.

Determination of the standardized digestible calcium requirement of broilers from day 11 to 24 post-hatch.
Carrie L. Walk*1, Zhenzhen Wang2, Shikui Wang2, Jose O. Sorbara1, Jingcheng Zhang2
1DSM Nutritional Products, Heanor, United Kingdom, 2DSM Nutritional Products, Bazhou, China, 3DSM Nutritional Products, Kaiseraugst, Switzerland

Available phosphorus and calcium: are we close to the best dietary levels for performance and mineralization in broilers regarding calcium to available phosphorus ratio?.
Marion Bournazel*, Stéphanie KLEIN, Pierre Moquet, Adeline Mathiaud
R&D, Mixscience, Bruz, France

Evaluating the impact of supplementing organic chromium with flax seed in broiler diets: Effects on production performance, breast muscle pathology, and meat quality aspects.
Ahmad Fraz* GS 1, Sydney T. Bolanos1, Nathan B. Parker1, Christiane V. Loehr3, Gita Cherian2
1Animal and Rangeland Sciences, Oregon State University, Corvallis, Oregon, United States, 2Animal and Rangeland Sciences, Oregon State University, Corvallis, Oregon, United States, 3Department of Biomedical Sciences, Carlson College of Veterinary Medicine, Oregon State University, Corvallis, Oregon, United States

*Presenter
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Effects of in ovo injection of 25-hydroxyvitamin D3 in conjunction with Marek's Disease vaccine on the hatchability and hatch variables of Ross 708 broilers.

Noelle M. Forcier*UG1, Saman Fatemi1, Christopher J. Williams2, Katie E. Elliott3, Ayoub Mousstaaid1, David Peebles1

1Poultry Science, Mississippi State University, Starkville, Mississippi, United States, 2Zoetis, Swabia Court, North Carolina, United States, 3Poultry Science, Mississippi State University, Starkville, Mississippi, United States

25-hydroxycholecalciferol reverses heat induced alterations in bone quality in finisher broilers associated with effects on intestinal integrity and inflammation.

Huaiyong Zhang* GS 1, 2, Maryam Majedddin1, Djore Gaublomme3, Bernard Taminiau3, Matthieu Boone5, 6, Dirk Elewaut1, George Daube3, Iván Josipovic3, Keying Zhang2, Joris Michiels1

1Department of Animal Sciences and Aquatic Ecology, Ghent University, Ghent, Belgium, 2Institute of Animal Nutrition, Sichuan Agricultural University, Chengdu, Sichuan, China, 3Department of Food Sciences - Microbiology, University of Liège, Liège, Belgium, 4Unit Molecular Immunology and Inflammation, VIB Center for Inflammation Research, Ghent University, Ghent, Belgium, 5Ghent University Centre for X-ray Tomography (UGCT), Ghent University, Ghent, Belgium, 6Radiation Physics Research Group, Department of Physics and Astronomy, Ghent University, Ghent, Belgium

Effects of oil quality, phytase and vitamin E supplementation on the growth performance, nutrient utilization and relative fat and liver weight in 21-day-old broiler chickens.

Richard Adefioye* GS, Merlin Lindemann, Anthony Pescatore, Michael Ford, Sunday Adedokun

Animal Science, University of Kentucky, Lexington, Kentucky, United States

Effects of dietary Ca concentration on the performance of broiler chicks fed various sources of dietary P with and without phytase supplementation, responses under slight P deficiency.

Cooper Fritzlen* GS 1, Mike Bedford2, Mike Persia1

1Virginia Tech, Blacksburg, Virginia, United States, 2AB Vista, Marlborough, United Kingdom

Available phosphorus requirement for broilers: integrated assessment of bone characteristics using meta-analysis.

Thais Bastos Stefanello* GS 1, Carolina Haubert Franceschi1, Alexandre B. Mariani1, Marcos Kipper1, Ana P. Ázara De Oliveira3, Vinicius Gonsales Schiramm1, Cícero Peres da Cruz1, Ronan O. Fernandes dos Santos1, Ines Andretta1

1Universidade Federal do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil, 2Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil, 3Poultry Study Group, UFRGS, Porto Alegre, Brazil

Available phosphorus requirement for broilers: integrated assessment of performance results using meta-analysis.

Carolina Haubert Franceschi* GS 1, Thais Bastos Stefanello1, Alexandre B. Mariani1, Marcos Kipper1, Ana P. Ázara De Oliveira3, Vinicius Gonsales Schiramm1, Cícero Peres da Cruz1, Ronan O. Fernandes dos Santos1, Ines Andretta1, Andréa M. L. Ribeiro1

1Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil, 2Animal Science, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil, 3Poultry Study Group, São Paulo, Brazil

Contamination of eggs by Salmonella Enteritidis and Salmonella Typhimurium in experimentally infected laying hens in indoor cage-free housing.

Richard K. Gast*, Deana R. Jones1, Rupa Guraya1, Kenneth E. Anderson2, Darrin M. Karcher3

1US National Poultry Research Center, USDA-ARS, Athens, Georgia, United States, 2Poultry Science, North Carolina State University, Raleigh, North Carolina, United States, 3Animal Science, Purdue University, West Lafayette,
Impact of different caging systems on eggshell cuticle quality and *Salmonella* adherence in table eggs.
Garima Kulshreshtha*, Cristina Benavides Reyes, Alejandro R. Navarro, Ty Diep, Maxwell T. Hincke
1Cellular and Molecular Medicine, University of Ottawa, Ottawa, Ontario, Canada, 2Departamento de Mineralogía y Petrología, University de Granada, Campus de Fuentenueva, Granada, Spain, 3Lyn Egg production and Grading, Bumbrae Farms Limited, Lyn, Ontario, Canada, 4Department of Innovation in Medical Education, Faculty of Medicine, University of Ottawa, Ottawa, Ontario, Canada

Tissue colonization and egg and environmental contamination associated with experimental infection of laying hens with *Salmonella* Braenderup.
Javier S. Garcia*, Richard K. Gast, Deana R. Jones
US National Poultry Research Center, Egg Safety and Quality Research Unit, USDA Agricultural Research Service, Athens, Georgia, United States

Efficacy of a combination of a yeast cell wall and live *Salmonella* Infantis colonization in broilers to hot rehang carcass rinse.
Charles L. Hofacre*, Sangita Jalukar, Matthew K. Jones, Jennie Baxter, Roy Berghaus
1Southern Poultry Research Group, Inc., Watkinsville, Georgia, United States, 2Arm and Hammer Animal and Food Production, Mason City, Iowa, United States, 3College of Vet. Med., Animal Science, The University of Georgia, Athens, Georgia, United States

Reducing *Salmonella* Kentucky in broilers with inactivated autogenous vaccines administered by coarse spray.
Charles L. Hofacre*, Roy Berghaus, Bereket Zekarias, Sam Christenberry, Hector Cervantes, Luis Gomez, Peter Winter, Matthew K. Jones, Jennie Baxter
1Southern Poultry Research Group, Inc., Watkinsville, Georgia, United States, 2Poultry Science, The University of Georgia, Athens, Georgia, United States, 3Phibro Animal Health, Teaneck, New Jersey, United States

Effect of a live attenuated *Salmonella* Typhimurium-vaccine against emerging *Salmonella* Reading in poults.
Claire Peichel*, Shijinaraj Manjankattil, Grace Dewi, Timothy Johnson, Sally L. Noll, Anup Kollanoor Johny
1Animal Science, University of Minnesota, St. Paul, Minnesota, United States, 2Animal Science, University of Minnesota, Saint Paul, Minnesota, United States, 3University of Minnesota, St. Paul, Minnesota, United States, 4Animal Science, University of Minnesota, Saint Paul, Minnesota, United States, 5Animal Science, University of Minnesota, St. Paul, Minnesota, United States

Effects of *Eimeria tenella* on cecal luminal and mucosal microbiota in broiler chickens.
Philip M. Campos*, Kate Miska, Stanislaw Kahl, Jonathan Shao, Monika Proszkowiec-Weglarz
1Beltsville Agricultural Research Center, Animal Biosciences and Biotechnology Laboratory, USDA-ARS, Beltsville, Maryland, United States, 2USDA-ARS Research Participation Program, Oak Ridge Institute for Science and Education (ORISE), Oak Ridge, Tennessee, United States, 3NEA Bioinformatics, USDA-ARS, Beltsville, Maryland, United States

Limited gut microbiota overlap between heavy breeders and their specific progeny.
Naama Shterzer, Nir Rothschild, Erez Mills
Animal Sciences, Hebrew University of Jerusalem, Rehovot, Israel

Development of monoclonal antibodies against *Clostridium perfringens*.
Ying Fu*, Tahrir Alenezi, Ayidh Almansour, Hong Wang, Xiaolun Sun
1Cell and Molecular Biology & Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States

Assessment of mycotoxins contamination and chemical composition of South American corn via Near Infrared Reflectance Spectroscopy (NIRS), year 2020.

*Presenter

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Correlation between naturally occurring feed mycotoxins and necrotic enteritis severity in broiler birds.
Revathi Shanmugasundaram*
Toxicology and Mycotoxins Research unit, USDA, Athens, Georgia, United States

Poultry compost as an alternate safe feed ingredient in broilers production.
Haseeb Anwar*, Imtiaz Mustafa
Physiology, Government College University, Faisalabad, Punjab, Pakistan

Response of hilA of firmly attached Salmonella Infantis on chicken skin to the use of Cetylpytidinium Chloride (CPC) as a short duration dip.
Dana K. Dittoe*, Elena G. Olson¹, Lindsey A. Wythe¹, Lindsey Perry², Steven C. Ricke¹
¹Meat Science and Animal Biologies Discovery, Animal and Dairy Sciences, University of Wisconsin-Madison, Verona, Wisconsin, United States; ²Safe Foods, North Little Rock, Arkansas, United States

Effects of hot water spray and sub-zero saline chilling on bacterial reduction of broiler carcasses.
Anisse Pereira*
Food Science, Cal Poly San Luis Obispo, Los Osos, California, United States

Effects of common litter treatments on Campylobacter jejuni prevalence in broilers.
Luis R. Munoz*, Matthew A. Bailey¹, Kaicie S. Chasteen¹, Aidan A. Talorico², John B. Adkins¹, Cesar Escobar¹, Kenneth Macklin¹
¹Poultry Science, Auburn University, Auburn, Alabama, United States; ²Poultry Science, Auburn University, Auburn, Alabama, United States

Identification of Enterococcus cecorum in broiler breeder waterline biofilms and fecal sample.
Nicolas Deslauriers*, GS ², Lila Maduro¹, Martine Boulianne¹
¹Clinical Sciences, Faculté de Médecine Vétérinaire,, Université de Montréal, St. Hyacinthe, Quebec, Canada; ²Clinical Sciences, University of Montreal, Saint-Hyacinthe, Quebec, Canada

Evaluation of a protocol to study Salmonella and Campylobacter spp. inovo transmission via inoculation and incubation of hatching eggs.
Caitlin Harris*, GS ¹, ², L. N. Bartenfeld Josselson², R. J. Buhr²
¹Poultry Science, University of Georgia, Athens, Georgia, United States; ²Poultry Microbiological Safety and Processing Research Unit, USDA-ARS, Athens, Georgia, United States

Investigation of the potential of aerosolized Salmonella Enteritidis on colonization and persistence in broilers from d 3 to 21.
Amrit Pale*, GS ¹, Rachel Osborne¹, Andrea Urrutia¹, Alexandra Jackson¹, Matthew A. Bailey¹, Kenneth Macklin¹, Stuart Price¹, R. J. Buhr², Dianna Bourassa³
¹Poultry Science, Auburn University, Auburn, Alabama, United States; ²USDA-ARS US National Poultry Research Center, Athens, Georgia, United States; ³College of Veterinary Medicine, Pathobiology, Auburn, Alabama, United States

Effect of inoculation dose on prevalence and concentration of Salmonella Reading in commercial turkey poults.
Estefania Novoa Rama*, GS ¹, Davis A. Fenster³, Jasmine Kataria¹, Gaganpreet Sidhu¹, Sasikala Vaddu², Amanda Elisa Moller¹, Cortney Leone³, Thiago Belem³, Anju Singh⁴, Rami A. Dalloiu³, Harshavardhan Thippareddi⁵, Manpreet Singh³, ²
¹Department of Food Science and Technology, University of Georgia, Athens, Georgia, United States; ²Department of Poultry Science, University of Georgia, Athens, Georgia, United States
Development of a protocol for early colonization of the chick intestinal tract.
Laura Franco* GS, Marcio Costa1, Martine Boulianne2, Eric Parent3
1Biomedicine Veterinary, University of Montreal, St.-Hyacinthe, Quebec, Canada, 2Clinical Sciences, Faculté de Médecine Vétérinaire, Université de Montréal, St.-Hyacinthe, Quebec, Canada, 3Faculté de Médecine Vétérinaire, Université de Montréal, St.-Hyacinthe, Ontario, Canada

Effect of dietary resistant starch on cecal microbiota and metabolome in Pekin ducks.
Simeng Qin* GS, Keying Zhang, Xuemei Ding, Jianping Wang, Shiping Bai, Qiufeng Zeng
Animal Nutrition Institute, Sichuan Agricultural University, Chengdu, Sichuan, China

Role of microbiota on Campylobacter jejuni chicken colonization.
Ayidh Almansour* GS 2, 1, Ying Fu3, Tahrir Alenezi4, Mohit Bansal1, Hong Wang1, Xiaolun Sun1, 2
1Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Cell and Molecular Biology, University of Arkansas, Fayetteville, Arkansas, United States, 3Cell and Molecular Biology & Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 4poultry science, University of Arkansas, Fayetteville, Arkansas, United States

Assessment of cecal cycling in broilers and turkeys.
Olivia A. Wedegaertner* GS, Chongxiao Chen, Frank Edens, Robert Beckstead
Prestage Department of Poultry Science, North Carolina State University, Raleigh, North Carolina, United States

Reduction of cecal colonization and internal organ dissemination of emerging Salmonella enterica serovar Reading using a turkey-derived probiotic and a Salmonella Typhimurium vaccine in growing turkeys.
Claire Peichel* GS 1, Shijinaraj Manjankattil2, Grace Dewi3, Ashton Amann3, Peter Bina3, Medora Creek3, Mastura Akhtar3, Timothy Johnson3, Sally L. Noll3, Kent M. Reed3, Carol Cardona3, Anup Kollanoor Johny6
1Animal Science, University of Minnesota, St. Paul, Minnesota, United States, 2Animal Science, University of Minnesota, Saint Paul, Minnesota, United States, 3University of Minnesota, St. Paul, Minnesota, United States, 4animal science, university of Minnesota, Saint Paul, Minnesota, United States, 5Animal Science, University of Minnesota, Saint Paul, Minnesota, United States, 6Animal Science, University of Minnesota, Saint Paul, Minnesota, United States

In silico prediction of novel vaccine candidates to reduce Campylobacter jejuni in chickens.
Sabin Poudel* GS 1, Mark A. Arick II2, Chuan-Yu Hsu2, Wei Zhai1, Anuraj Sukumaran1, Aaron Kiess1, Li Zhang1
1Department of Poultry Science, Mississippi State University, Mississippi State, Mississippi, United States, 2Institute for Genomics, Biocomputing, and Biotechnology, Mississippi State University, Mississippi State, Mississippi, United States

Prediction of fumonisins B1 and B2 through Near Infrared Reflectance Spectroscopy (NIRS) in distiller’s dried grains with solubles (DDGS).
Denize Tyska* GS 1, 2, Daniel F. Soares1, Gisèle P. da Rosa1, Magdiél A. Reghelin1, Rodrigo d. Carvalho1, Raul F. Marcon1, Adriano O. Mallmann2, Carlos A. Mallmann1
1Department of Preventive Veterinary Medicine, Federal University of Santa Maria, Santa Maria, Brazil, 2Pegasus Science, Santa Maria, Rio Grande do Sul, Brazil

Modeling the thermal inactivation of Salmonella reduction in poultry feed in a lab-based water bath.
Tim Boltz* GS 1, Victoria Ayres2, Cangliang Shen1, Joe Moritz1
1West Virginia University, Morgantown, West Virginia, United States, 2Animal and Nutritional Sciences, West Virginia University, Morgantown, West Virginia, United States

Identification and characterization of Escherichia coli isolates from poultry litter.
Maryann Khong*1, Nicolle Barbieri2, Ashlyn Snyder1, Anna Magnaterra1, Shawna L. Weimer1
1Animal and Avian Science, University of Maryland, College Park, Maryland, United States, 2Population Health, University of Georgia, Athens, Georgia, United States

Efficacy of Trans-cinnamaldehyde nanoemulsions in inactivating Salmonella Enteritidis on shelled

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Effect of Trans-cinnamaldehyde, Eugenol and Carvacrol on Salmonella Enteritidis proteome critical for colonization in chickens.
Trushen Kumar M. Shah* GS, Brindhalakshmi Balasubramanian1, Indu Upadhyaya2, Kumar Venkitanarayanan1, Abhinav Upadhyay1
1Department of Animal Science, University of Connecticut, Willimantic, Connecticut, United States, 2Department of Extension, University of Connecticut, Willimantic, Connecticut, United States

Establishing on-site diagnostic procedures for the detection of Campylobacter jejuni in poultry.
Mackenzie A. Ripper* UG, Sabin Poudel, Aaron Kiess, Li Zhang
Department of Poultry Science, Mississippi State University, Mississippi State, Mississippi, United States

Withdrawn.

Effect of Cetylpyridinium Chloride (CPC) on the microbiome of Salmonella Typhimurium and S. Infantis inoculated chicken skin.
Elena G. Olson* GS, Dana K. Dittoe1, Lindsey A. Wythe1, Zachary G. Lawless3, Lindsey Perry2, Steven C. Ricke1
1Meat Science and Animal Biologics Discovery, Animal and Dairy Sciences, University of Wisconsin-Madison, Madison, Wisconsin, United States, 2Safe Foods, North Little Rock, Arkansas, United States, 3Computer Science and Computer Engineering, University of Arkansas, Fayetteville, Arkansas, United States

Reduction of Salmonella Infantis on skin-on, bone-in chicken thighs by Cetylpyridinium Chloride application and the impact on the skin microbiota.
Lindsey A. Wythe* GS, Dana K. Dittoe1, Kristina M. Feye2, Elena G. Olson1, Lindsey Perry3, Steven C. Ricke1
1Meat Science and Animal Biologics Discovery, Animal and Dairy Sciences, University of Wisconsin-Madison, Madison, Wisconsin, United States, 2Food Science, University of Arkansas, Fayetteville, Arkansas, United States, 3Safe Foods, North Little Rock, Arkansas, United States

Salmonella Enteritidis decontamination on egg shell surface by High Voltage Atmospheric Cold Plasma.
Aparajitha Sudarsan, Alba E. Illera*, Vanessa R. Souza, Kevin Keener
School of Engineering and Physical Sciences, University of Guelph, Guelph, Ontario, Canada

Supply-chain temperature abuse of tray-packed raw chicken on pallets can influence spoilage at retail level.
Charles B. Herron* GS, Amit Morey2, Aftab Siddique3, Laura J. Garner1, Indira Medina1, Peyton Williams1
1Poultry Science, Auburn University, Auburn, Alabama, United States, 2Poultry Science, Auburn University, Auburn, Alabama, United States, 3Poultry Sciences, Auburn University, Auburn, Alabama, United States

**Physiology and Reproduction**
Chair: Laura E. Ellestad, University of Georgia
Session Room XII

In ovo black cumin extract affects intestinal morphology and physiological responses of broiler chickens from thermally challenged broilers embryos.
Oyegunle E. Oke*
Animal Physiology, Federal University of Agriculture, Abeokuta, Nigeria, Abeokuta, Nigeria

*Presenter
Delayed feeding of newly hatched broiler chicks alters hepatocytic and adipocytic exosomal miRNA secretion and cross-tissue regulation.
Julie Hicks*, Hsiao-Ching Liu
NC State University, Raleigh, North Carolina, United States

Sex differences in dose dependent release of both corticosterone and cortisol, and in heterophil to lymphocyte ratios in response to ACTH in the adult Pekin duck.
Victoria K. Tetel*, Brooke E. Van Wyk, Gregory S. Fraley
1Animal Sciences, Purdue University, West Lafayette, Indiana, United States, 2Biology, Hope College, Holland, Indiana, United States

Acute injections of either corticosterone or cortisol elicit differential effects on heterophil to lymphocyte ratios in a sex-dependent manner in Pekin ducks.
Victoria K. Tetel*, Sara Tonissen, Mallory Swanson, Gregory S. Fraley
Animal Sciences, Purdue University, West Lafayette, Indiana, United States

Relationship between broiler breeder eggshell cuticle deposition and incubation parameters.
Luis P. Avila*, Kelly M. Sweeney, Jeanna Wilson
Department of Poultry Science, University of Georgia, Athens, Georgia, United States

Cryopreservation of rooster semen using different levels of acetamide.
Shaimaa K. Hamad*, Ahmed M. Elomda, Gamal M. Mehaisen, Farid K. Stino
1Department of Animal Production, College of Agriculture, Cairo University, Giza, Egypt, 2Department of Biotechnology, Animal Production Research Institute, Giza, Egypt

Impact of growth trajectory on sexual maturation in layer chickens.
Mohammad A. Bahry*, Charlene Hanlon, Sierra Schaus, Gregory Y. Bedecarrats
Animal Biosciences, University of Guelph, Guelph, Ontario, Canada

Cyclosporin A halts ovarian transplant rejection during the first two weeks post-surgery in the domestic turkey (Meleagris gallopavo).
George B. Hall*, Janet Beeler-Marfisi, Julie Long, Ben J. Wood, Gregory Y. Bedecarrats
1Animal Biosciences, University of Guelph, Guelph, British Columbia, Canada, 2ARS-USDA, Beltsville, Maryland, United States, 3The University of Queensland, Gatton, Queensland, Australia

Impacts of intensive genetic selection on expression of genes regulating calcium and phosphorus uptake and retention in broilers during embryonic and early post-hatch development.
Manuel A. Arango*, Brett Marshall, Min Lee, Laura Elledstad
Poultry Science, University of Georgia, Athens, Georgia, United States

Tissue distribution of genes involved in calcium and phosphorus utilization in the laying hen intestinal tract.
Micaela Pinto*, Camille Evans, Lyssa R. Blair, Laura Elledstad
1Poultry Science, University of Georgia, Athens, Georgia, United States, 2Poultry Science, University of Georgia, Athens, Georgia, United States

Determining the phenotypic shape variation of the premaxillary and dentary bones that may underlie beak shape in two pure layer lines.
Sarah Struthers*, Björn Andersson, Matthias Schmutz, Heather McCormack, Peter Wilson, Ian Dunn, Vicky Sandilands, Jeffrey Schoenebeck
1Roslin Institute, University of Edinburgh, Edinburgh, United Kingdom, 2Scotland’s Rural College, Edinburgh, United Kingdom, 3Lohmann Breeders, Cuxhaven, 27472, Germany

Delayed post-hatch feeding alters intestinal stem cell activities and intestinal permeability in broiler chickens.
Heat stress affects proliferation and differentiation through the mTOR/S6K pathway in breast muscle satellite cells from turkeys with different growth rates.
Jiahui Xu*, Gale M. Strasburg, Kent M. Reed, Sandra Velleman
1Animal Sciences, Ohio State University, Wooster, Ohio, United States, 2Department of Food Science and Human Nutrition, Michigan State University, East Lansing, Michigan, United States

Effect of cell culture plate gelatin coating method on density of primary broiler chicken skeletal muscle satellite cells.
Brittany L. Wall*, Caroline R. Gregg, Joshua J. Flees, Jessica D. Starkey
Poultry Science, Auburn University, Auburn, Alabama, United States

Effect of in vitro culture temperature on heterogeneity of myogenic regulatory factor expression in primary broiler chicken satellite cells.
Caroline R. Gregg*, Joshua J. Flees, Brittany L. Wall, Jessica D. Starkey
Poultry Science, Auburn University, Auburn, Alabama, United States

Effect of basal plating culture media on primary broiler chicken muscle satellite cell myogenic regulatory factor expression heterogeneity.
Joshua J. Flees*, Caroline R. Gregg, Brittany L. Wall, Jessica D. Starkey
Poultry Science, Auburn University, Auburn, Alabama, United States

Temporal and tissue-specific mRNA expression of glucose and amino acid transporters in broilers.
Shailes Bhattrai*, Ana Villegas, Todd Applegate, Laura Ellestad
Poultry Science, University of Georgia, Athens, Georgia, United States

Diminished insulin-like growth factor binding protein expression in the liver and muscle of peri-hatch broilers is associated with the transition from embryogenesis to juvenile development.
Lauren A. Vaccaro*, Kyle Herring, Abigail M. Wilson, Emma England, Laura Ellestad
Poultry Science, University of Georgia, Athens, Georgia, United States

Effect of maternal and post-hatch supplementation of 25-hydroxycholecalciferol on in vivo broiler chicken duodenal crypt cell proliferation.
Samuel F. Leiva*, Luis P. Avila, Gerardo A. Abascal-Ponciano, Joshua J. Flees, Kelly M. Sweeney, Jeanna Wilson, Jessica D. Starkey, Charles W. Starkey
1Poultry Science, Auburn University, Auburn, Alabama, United States, 2Poultry Science, University of Georgia, Athens, Georgia, United States

Effects of antibiotic growth promoters on growth performance and intestinal development in commercial broilers.
Charles K. Meeks*, Laura Ellestad
Poultry Science, University of Georgia, Athens, Georgia, United States

Processing and Products
Chair: Casey M. Owens, University of Arkansas
Session Room XIII

Immersion chiller media characterization and effects on peracetic acid half-life rates.
Daniel Sabo*, Stephanie Richter
Georgia Tech Research Institute, Atlanta, Georgia, United States
Combination of water immersion chilling and subzero saline chilling improved chilling efficiency and meat tenderness of broiler carcasses.
Kota Kawamura*, Danyi Ma, Anisse Pereira, Ike kang
1Agriculture, California Polytechnic University - San Luis Obispo, Fullerton, California, United States, 2Food Science, Cal Poly San Luis Obispo, Los Osos, California, United States

Sub-zero saline chilling improved chilling efficiency and bacterial reduction of turkey carcasses.
Priscilla Hsieh*, H.C. Lee, Colton Naylor, Si Hong Park, Ike kang
1Department of Animal Science, California Polytechnic State University, San Luis Obispo, San Diego, California, United States, 2Department of Food Science and Technology, Oregon State University, Corvallis, Oregon, United States

Temperature stress and poultry meat quality: a meta-analysis.
Emily M. Leishman*, Jennifer Ellis, Nienke van Staaveren, Shai Barbut, Ryley Vanderhout, Vern Osborne, Ben J. Wood, Alexandra Harlander, Christine F. Baes
1Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 2Food Science, University of Guelph, Guelph, Ontario, Canada, 3School of Veterinary Science, University of Queensland, Gatton, Queensland, Australia, 4Hybrid Turkeys, Kitchener, Ontario, Canada, 5Institute of Genetics, University of Bern, Bern, Switzerland

Evaluation of toughness and firmness of pet treats developed from broiler chicken carcass frames and wooden breast combinations.
1Balchem Animal Nutrition and Health, Balchem Corp., New Hampton, New York, United States, 2Poultry Science, Auburn University, Auburn, Alabama, United States, 3Animal Science, Auburn University, Auburn, Alabama, United States

Differences in carcass yield and breast meat quality parameters in fast- and slow-growing chickens.
Jaroslav Valenta*, Eva Tumova, Darina Chodova
Department of Animal Science, Czech University of Life Sciences Prague, Prague, Czechia

Quality attributes of standard and high breast yielding broilers raised for small and big bird debone markets.
Clay J. Maynard*, Ashunti Jackson, Juan Caldas-Cueva, Andy Mauromoustakos, Michael T. Kidd, Samuel J. Rochell, Casey M. Owens
1Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Cobb Vantress, Inc., Siloam Springs, Arkansas, United States, 3University of Arkansas, Fayetteville, Arkansas, United States

Assessment of meat quality attributes of four commercial broiler strains processed at various market weights.
1Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Biological Science and Food Engineering, Chuzhou University, Chuzhou, Anhui, China, 3Cobb Vantress, Inc., Siloam Springs, Arkansas, United States, 4Animal Science and Food Engineering, University of São Paulo - USP, São Paulo, Brazil

Identification of dead on arrival chickens by analysis of body temperature variation.
Montana Riggs*, Amrit Pal, Rachel Osborne, Alexandra Jackson, Dianna Bourassa
Poultry Science, Auburn University, Auburn, Alabama, United States

The effect of High Voltage Atmospheric Cold Plasma (HVACP) on chicken egg quality.
Nooshin Nikmaram, Abrar Alzaydi, Aarushi Bhardwaj, Alba E. Illera*, Vanessa R. Souza, Kevin Keener Engineering, University of Guelph, Guelph, Ontario, Canada
Textural analysis of pet treats developed from broiler chicken Wooden Breast meat and carcass frame combinations.
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Textural characteristics analysis of pet treats generated from mixtures of ground chicken carcass frames and wooden breast meat.
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Textural profile analysis of raw pet treats generated from mixtures of carcass frames and wooden breast meat.
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Evaluation of the texture profile analysis of pet treats generated from mixtures of broiler liver and heart.
Cristopher I. Almendares* UG 1, Marc R. Presume1, Rigo F. Soler1, Moses Chilenje1, Jorge L. Sandoval1, Luis P. Avila1, Laura J. Garner1, Amit Morey1, Robert P. Mason2, Eric K. Altom2, Charles W. Starkey1
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Evaluation of three-point bend textural characteristics of pet treats created from the combination of different chicken processing co-products.
Allan J. Calderon* GS 1, Marc R. Presume1, Rigo F. Soler1, Moses Chilenje1, Jorge L. Sandoval1, Luis P. Avila1, Laura J. Garner1, Amit Morey1, Robert P. Mason2, Eric K. Altom2, Charles W. Starkey1
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Effect of inclusions of a forming agent on texture analysis of pet treats developed from cooked chicken paws.
Jorge L. Sandoval* GS 1, Marc R. Presume1, Said J. Herrera1, Joshua S. Renew1, Haisten R. Smith1, Theodore B. Turall1, J. Enrique Banegas1, J. Wesley Rogers1, Orlando B. Fiallos1, Gerardo A. Abascal-Ponciano1, Cristopher I. Almendares1, Diego E. Ventura1, Laura J. Garner1, Amit Morey1, Robert P. Mason2, Eric K. Altom2, Charles W. Starkey1
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Evaluation of color change over time in pet treats produced from chicken paws using sodium alginate and encapsulated calcium lactate as a stabilizer.
Jorge R. Romero* UG 1, Marc R. Presume1, Said J. Herrera1, Joshua S. Renew1, Haisten R. Smith1, Jorge L.
Analysis of color variation over time of cooked pet treats made from co-products of broiler chicken processing.
Said J. Herrera* UG 1, Marc R. Presume 1, Moses Chilenje 1, Gerardo A. Abascal-Ponciano 1, Joshua J. Flees 1, Jorge L. Sandoval 1, Jason T. Sawyer 2, Barney S. Wilborn 2, Robert P. Mason 3, Eric K. Altom 3, Charles W. Starkey 1
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Evaluation of color variation of raw pet food treats made from broiler chicken processing co-products.
Joshua S. Renew* UG 1, Marc R. Presume 1, Moses Chilenje 1, Gerardo A. Abascal-Ponciano 1, Joshua J. Flees 1, Jorge L. Sandoval 1, Jason T. Sawyer 2, Barney S. Wilborn 2, Robert P. Mason 3, Eric K. Altom 3, Charles W. Starkey 1
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Novel structure forming technology for the manufacturing of pet treats utilizing broiler chicken paws.
Haisten R. Smith* UG 1, Marc R. Presume 1, Said J. Herrera 1, Joshua S. Renew 1, Jorge L. Sandoval 1, Theodore B. Turall 1, J. Enrique Banegas 1, J. Wesley Rogers 1, Orlando B. Fiallos 1, Gerardo A. Abascal-Ponciano 1, Cristopher I. Almendares 1, Diego E. Ventura 1, Laura J. Garner 1, Amit Morey 1, Robert P. Mason 2, Eric K. Altom 2, Charles W. Starkey 1
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Chemical analysis of pet treats generated using varying combinations of broiler processing co-products.
J. Wesley Rogers* UG 1, Marc R. Presume 1, Moses Chilenje 1, Gerardo A. Abascal-Ponciano 1, Joshua J. Flees 1, Jorge L. Sandoval 1, Barney S. Wilborn 2, Jason T. Sawyer 2, Robert P. Mason 3, Eric K. Altom 3, Charles W. Starkey 1
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All Times are CST
How do broiler farmers picture broiler welfare and perceive technologies potentialities on welfare improvements?
Heitor Rios*, Paulo D. Waquil
CEPAN, UFRGS, Porto Alegre, Brazil

Identification of reliable reference genes for expression studies in digestive system tissues of laying hens housed in cage and cage-free systems.
Karen D. Diaz Solano*, Roy Rodriguez Hernández, Iang S. Rondon Barragan
1Biology, University of Tolima, Ibagué, Tolima, Colombia, 2Animal Health, University of Tolima, Ibagué, Tolima,

First genetic characterization of Infectious Bursal Disease Virus isolated from Chile.
Miguel Guzmán*, Leandro Cádiz, Leonardo Sáenz, Héctor Hidalgo
1Universidad de Las Américas, Santiago, Chile, 2Laboratory of Avian Pathology, Universidad de Chile, Santiago, Chile, 3Laboratory of Veterinary Vaccines, Universidad de Chile, Santiago, Chile

Gut health markers of the efficacy of Bacillus subtilis DSM 29784 in broiler chickens.
Damien Preveraud*, Tim Goossens, Estelle Devillard
1Health by Nutrition, Adisseo France SAS, Antony, France, 2Health by Nutrition, Adisseo, Dendermonde, Belgium, 3Center of Excellence and Research in Nutrition, Adisseo, Commentry, France

Positive Impact of Gumboro control on broiler performance, uniformity and results in the slaughterhouse.
Higor Cotta, Mathilde Lecoupeer, Thomas Lewiner, Jorge Chacon, José Maurício França, Marco Aurélio Elmer Lopes
1Ceva, Libourne, France, 2Universidade Tuiuti do Paraná, Curitiba, Brazil

Quality of chicken meat receiving diets with passion fruit seed oil.
Fernanda K. Krenchinski*, Tatiane Souza dos Santos, Priscila Michelin Groff-Urayama, Jéssica Moraes Cruvinel, Cássio Yutto Oura, Evelyn Prestes Brito, Felipe Ferreira dos Santos, Jose Roberto Sartori
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Effect of passion fruit seed oil supplementation on the intestinal permeability of broilers reared under heat stress.
Fernanda K. Krenchinski*, Tatiane Souza dos Santos, Priscila Michelin Groff-Urayama, Jéssica Moraes Cruvinel, Bruna Lindolfo da Silva, Joyce Andrade da Silva, Celso Antonio Pezzato, Jose Roberto Sartori
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Effect of different source of yeasts on broiler performance.
Ricardo V. Nunes*, Jomara Broch, Cristine Kaufmann, Nilton R. Junior, Thiago P. Ribeiro, Barbara Colletta, Idiana Silva, Daniel Pigatto Monteiro, Guilherme Tesser, Nathanela Santos
1Animal Science, Universidade Estadual do Oeste do Paraná, Marechal Cândido Rondon, Paraná, Brazil, 2Animal Nutrition, Tectron, Toledo, Brazil

Effect of dietary balanced protein on body composition and the age at first egg of laying hens.
Ingrid Nobrega*, Rony Lizana, Thalla Moura, Guilherme Teófilo, Rauly Silva, Leticia Bittencourt, Nilva Sakomura
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Effect of amylase on broiler performance and digestibility of nutrients.

*Presenter

All Times are CST
Improving feed efficiency by boosting digestive and exogenous enzymes activity thanks to clay and algae.
Marie Gallissot*, Aleixo Pedro2, Luiz Fernando T. Albino2, Horacio S. Rostagno2, Raquel Pereira1, Maria Angeles Rodríguez1
1Olmix, Bréhan, France, 2Agricultural Science Center, University of Viçosa, Viçosa, Brazil

Composition of the use of glucose oxidase and BMD for the control of Enteropathogenic bacteria in broiler chicken.
Beatriz Ibarra Macari, Josue Sanchez, Noel Cesáreo*
Animal Nutrition, Excelling, S.A. DE C.V., Querétaro, Queretaro, Mexico

Effects of live *Saccharomyces cerevisiae* dietary supplementation on performance and immunity of broiler chickens.
Alexandre B. Brito*, Gustavo Cordero, Gilson Gomes
Technical, AB VISTA, São Paulo, São Paulo, Brazil

Uncoated-buffered sodium butyrate addition improved performance and intestinal health of broilers fed low energy-protein diets.
Julián E. Melo*, Florencia Prosdóccimo1, Federico Quinteiro1, Ernesto Vignoni1, Nélida Sosa1, Matías Biondi1, Mariano Batallé1, Silvina Pinto2, Xavier Roulleau3, Hebe Barrios4
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Effects of calcium pidolate supplementation on performance, Ca-P retention, and bone development of broilers fed low Ca-P diets.
Guillermo Fondevila Lobera2, 3, Nereida Luna Corrales2, 3, Julián E. Melo*, Xavier Roulleau4, Gonzalo González Mateos2
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Use of a blend of organic acid on broiler performance.
Thiago P. Ribeiro*, Andrea Massuquetto1, Leandro da Silva1, Daniel Pigatto Monteiro1, Clauber Polese2, Cleison de Souza1, Andre Sanches de Avila2, Felipe Potenza Campos2, Ricardo V. Nunes2
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Ricardo V. Nunes*, Fabricio Philippsen2, Clauber Polese1, Guilherme Tesser1, Nilton R. Junior1, Edinan Hagdon Cirilo1, Thiago P. Ribeiro3, Natalia Milani1, Daniel Pigatto Monteiro3
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The evaluation of feed additives garlic-cinnamon combined with betaine on post-peak layer production.
Kim Wilson*, Jorge Plata2, Diana Hernández1, Arno van der Aa1
1Orffa Additives, B.V., Werkendam, Netherlands, 2San Rafael Farm, Arbeláez, Colombia
Influence of vitamin A supplementation on the incidence of myopathies in poultry at 42 days of age.
Vaneila Daniele L. Savaris*,1, Jomara Broch2, Cleison Souza2, Lucas Walchholz3, Nililton Rohloff Jr2, Guilherme Luis Tesser1, Edinan Hagdon Cirilo1, Cintia Eynq1, Cristine Kaufmann2, Ricardo V. Nunes1
1UNIVEL - University Center, Cascavel, Paraná, Brazil, 2Western Paraná State University - UNIOESTE, Marechal Cândido Rondon, Brazil

Mineral profile of chicken meat affected by Wooden Breast myopathy stored for 12 months.
Erick A. Villegas-Cayllahua*1, Juliana Lolli Malagoli de Mello1, Rodrigo Fortunato de Oliveira1, Daniel Rodrigues Dutra1, Érika Nayara Freire Cavalcanti1, Mateus Roberto Pereira1, Rodrigo Alves de Souza2, Aline Giampietro-Ganeco2, Fábio Borba Ferrari2, Heloísa de Almeida Fidelis1, Pedro Alves de Souza1, Hirasilva Borba1
1Faculdade de Ciências Agrárias e Veterinárias da UNESP, Jaboticabal, SP, Brazil, 2Universidade de Sao Paulo, Pirassununga, SP, Brazil

Staphylococci profile of Free-Range eggs collected in nest boxes and on the aviary bedding according to the collection time post-laying.
Daniel R. Dutra*1, Nivea Maria G. Misson Carneiro2, Erick A. Villegas-Cayllahua1, Amanda Cristina M. Silva2, Romário A. Rodrigues2, Nadir S. Bornatte2, Marco Antonio d. Belo2, Hirasilva Borba2
1Animal Science, UNESP, Sertãozinho, São Paulo, Brazil, 2Technology, FCAV/UNESP, Jaboticabal, SP, Brazil

Visual acceptance of chicken meat with different degrees of myopathies.
Carlos E. Benito*,1, Laura A. Pinto1,2, Laura Gubert1, Luiza R. Stefanello1, Eduarda P. Simões1, André N. Pinto1, Ana C. Ferreira1, Jovani I. Fernandes1,2
1Poultry Experimentation Laboratory, Federal University of Paraná, Palotina, PR, Brazil, 2Animal Science Post-Graduate Program, Federal University of Paraná, Palotina, PR, Brazil

The effect of clove essential oil as a natural preservative in the oxidation of chicken hamburgers.
Laura Gubert*,1, Carlos E. Benito1, André Pinto1, Luiza R. Stefanello1, Eduarda P. Simões1, Ana C. Ferreira1, Laura A. Pinto1,2, Jovani I. Fernandes1,2
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The effect of different degrees of wooden breast and white stripe myopathies on the quality of refrigerated chicken meat.
Luiza R. Stefanello1, Regina Buzim2*, Juliana S. Schuroff3, Julianne R. Severiano1, James Barbosa1, Carlos E. Benito1, Laura A. Pinto1,2, Jovani I. Fernandes1,2,3
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Nilotic tilapia oil (Oreochromis niloticus) as a potential substitute to soybean oil on a chicken diet: The effect on meat quality.
Eduarda P. Simões*,1, Regina Buzim3, Juliana S. Schuroff1, Julianne R. Severiano1, James Barbosa1, Laura Gubert1, Laura A. Pinto1,3, Jovani I. Fernandes1,2,3
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POSTERS

Animal Well-Being and Behavior

314P Laser environmental enrichment increased broiler activity and upregulated myogenic gene expression in the pectoralis major muscle.
Meaghan M. Meyer*, Anna K. Johnson, Elizabeth A. Bobeck
Animal Science, Iowa State University, Ames, Iowa, United States

315P LED light environmental effects on male mating behaviour and fertility of layer breeders in natural mating colony cages.
Haipeng Shi1,2, Baoming Li1, Tong Qin1, Weichao Zheng1, Shijie Fan2
1China Agricultural University, Beijing, China, 2Beijing Huadu Yukou Poultry Industry Co., Ltd., Beijing, China

316P Laser environmental enrichment increased body weight and pectoralis major muscle width while improving woody breast score in broilers.
Meaghan M. Meyer*, Anna K. Johnson, Elizabeth A. Bobeck
Animal Science, Iowa State University, Ames, Iowa, United States

317P Study on the distribution feature of angel wing and its relationship with wing bone development, hematological and serum biochemical parameters in geese.
Xinghao Zhu*, B. H. Shao, Lin Ge Gao, H.Y Zhang, W Chen, Y.Q. Huang
Henan Agriculture University, Henan Province, China

318P Aviary rearing enhances bone microstructure in Lohmann LSL-Lite and bone mass in Lohmann Brown Lite egg-laying hen pullets compared to conventional cage-rearing.
Isabela Vitienes*, Alice Bouchard1,4, Gabriele Graceffa3,4, Beatrice Steyn1,3,4, Bettina Willie1,3,4, Tina Widowski2
1Biological and Biomedical Engineering, McGill University, Montreal, Quebec, Canada, 2Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 3Research Centre, Shriners Hospitals for Children Canada, Montreal, Quebec, Canada, 4Pediatric Surgery, McGill University, Montreal, Quebec, Canada

319P The efficacy of increasing dietary L-tryptophan inclusion on broiler breeder pullet growth and fear response.
Gabrielle M. House*, Gregory S. Archer1, Jason T. Lee2
1Texas A&M University, College Station, Texas, United States, 2CJ America - Bio, Downers Grove, Illinois, United States

320P Differences in expression of frolicking and running behavior in conventional and slow-growing strains of broiler chickens.
Lucas J. Zilli*, Lauren Dawson1, Zhenzhen Liu4, Ruth Newberry2, Stephanie Torrey1, Tina Widowski1
1Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 2Norwegian University of Life Sciences, Ås, Norway, 3University of Guelph, Guelph, Ontario, Canada

321P Impact of pen density on environmental enrichments usage in broiler chickens.
Annie Lozano*, Katy Tarrant
Animal Science and Agricultural Education, Fresno State, Fresno, California, United States

Genetics and Molecular Biology

322P Exosomes derived from lipopolysaccharide-stimulated chicken macrophages regulate immune response through the MyD88/ NF-κB signaling pathway.
Yeojin Hong*, Jia Lee1, Thi Hao Vu1, Sooyeon Lee1, Hyun S. Lillehoi2, Yeong Ho Hong1
1Dept of Animal Science and Technology, Chung-Ang University, Anseong, Gyeonggi-do, Korea (the Republic of), 2USDA-ARS, Beltsville, Maryland, United States
323P  In vitro validation of newly constructed chicken oviduct gene promoters using luciferase assay.
Hyeon Yang*, Bo Ram Lee, Sun Keun Jung, Ji-Youn Kim, Jingu No, Yong Jin Jo, Keon Bong Oh, Sung June Byun
National Institute of Animal Science, Jeonjusi, Korea (the Republic of)

324P  Neuropeptide Y and its receptors are expressed in chicken skeletal muscle and regulate mitochondrial function.
Elizabeth S. Greene*, Ahmed Dhamad, Marco Zampiga, Federico Sirri, Sami Dridi
1Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Agricultural and Food Sciences, Alma Mater Studiorum - University of Bologna, Bologna, Italy

325P  Seasonal and sexual variation in mRNA expression of selected adipokine genes affecting fat deposition and metabolism of Emu (Dromaius novaehollandiae).
Ji Eun Kim*, Darin C. Bennett, Kristina Wright, Kimberly M. Cheng
1Avian Research Centre, University of British Columbia, Vancouver, British Columbia, Canada, 2Canada’s Michael Smith Genome Sciences Centre, University of British Columbia, Vancouver, British Columbia, Canada, 3Animal Science Department, California Polytechnic State University, San Luis Obispo, California, United States

326P  Microbiota diversity in duodenum, jejunum and ileum of emu (Dromaius novaehollandiae).
Ji Eun Kim*, Hein M. Tun, Darin C. Bennett, Dengwei Zhang, Kimberly M. Cheng
1Avian Research Centre, University of British Columbia, Vancouver, British Columbia, Canada, 2Animal Science Department, California Polytechnic State University, San Luis Obispo, California, United States, 3HKU-Pasteur Research Pole, School of Public Health, Li Ka Shing Faculty of Medicine, University of Hong Kong, Hong Kong, SAR, China

327P  Production and reproductive characteristics of native Marandi chicken in Iran.
Ghorban Elyasi Zarringhabaei*, Shole Ghobani
1Animal Science Research Department, East Azerbaijan Agricultural and Natural Resources Research and Education Center, Agricultural Research, Education and Extension Organization (AREEO), Tabriz, Iran, 2Animal Science Research Institute of Iran, Agricultural Research, Education and Extension Organization (AREEO), Karaj, Iran

328P  A 127 Kilobase Deletion affecting the Carboxy Peptidase Q gene in broilers.
Duaa A. Almansaf
Biological Department, University of Arkansas, Fayetteville, Arkansas, United States

329P  Haplotype distribution of the MC1R gene in commercial and heritage turkeys.
Edward J. Smith*, Jun Xu, J. M. B. Adikari
1Animal and Poultry Sciences, Virginia Tech, Blacksburg, Virginia, United States, 2Faculty of Agriculture, Rajarata University of Sri Lanka, Anuradhapura, Sri Lanka

330P  Profiling and functional analysis of Insulin-induced circular RNAs in pectoralis muscle of different chicken breeds.
Binghao Shao*, Lin Ge Gao, Xinghao Zhu, H.Y Zhang, W Chen, Y.Q. Huang
1Henan Agricultural University, ZhengZhou, China, 2Henan Agricultural University, ZhengZhou, China, 3Henan Agriculture University, Henan Province, China

331P  Identification and functional analysis of insulin-responsive lncRNA in chicken skeletal muscle.
Ziyang Wang*, Pengfei Du, Xiongli Zhang, Yongshuai Wang, H.Y Zhang, Y.Q. Huang, W Chen
College of Animal Science and Technology, Henan Agricultural University, ZhengZhou, Henan, China

332P  Effects of exogenous insulin and energy restriction on PPP1R3C expression in arbor acres broilers.
Lin Ge Gao*, Binghao Shao, Xinghao Zhu, H.Y Zhang, Y.Q. Huang, W Chen
1Henan Agricultural University, ZhengZhou, China, 2Henan Agricultural University, ZhengZhou, China, 3Henan Agriculture University, Henan Province, China
Seasonal and sex dependent gene expression in emu (*Dromaius novaehollandiae*) fat.
Kristina Wright*, GS 1, Ka Ming Nip1, Ji Eun Kim2, Kimberly M. Cheng2, Inanc Birol1
1Canada’s Michael Smith Genome Sciences Centre, University of British Columbia, Vancouver, British Columbia, Canada, 2Avian Research Centre, University of British Columbia, Vancouver, British Columbia, Canada

Detection of differentially expressed genes in broiler *Pectoralis major* muscle affected by spaghetti meat and woody breast.
Sunoh Che*, GS 1, Chaoyue Wang2, Shai Barbut2, Csaba Varga3, Christian Fuchs4, Phuc H. Pham1, Dorothee Bienzle1, Leonardo Susta1
1Pathobiology, University of Guelph, Guelph, Ontario, Canada, 2Food Science, University of Guelph, Guelph, Ontario, Canada, 3Pathobiology, University of Illinois, Urbana, Illinois, United States, 4Maple Leaf Foods, Mississauga, Ontario, Canada

Antimicrobial resistance and phylogenetic groups in *Escherichia coli* isolated from broiler chickens in the State of Paraná, Brazil.
Mikaela D. Adur*, GS 1, 2, Jean-Yves Madec2, Marisa Haenni2, Renata Macedo1
1Pontifical Catholic University of Paraná, Curitiba, Brazil, 2National Agency for Food Safety, Environment and Occupational Health, Lyon, France

**Immunology, Health and Disease**

Development and characterization of poultry-specific immune reagents and immunoassays: NIFA grant progress report.
Hyun Lillehoj*
ARS, USDA, Beltsville, Maryland, United States

Tissue colonization in broiler chickens after oral challenge with *Salmonella* Heidelberg field strains.
Clarissa S. Vaz*, Daiane Voss-Rech, Francisco N. da Fonseca, Marcos A. Zanella Morés, Arlei Coldebbela Embrapa Suínos e Aves, Concordia, Santa Catarina, Brazil

Anisomorphism - a case of poikilocytosis or a marker of subtle toxicity in heterophils?.
Paul Cotter*
Biology, Framingham State University, Arlington, Massachusetts, United States

Comparison of immune cell composition and metabolic responses in peripheral blood mononuclear cells of three inbred chicken genetic lines during *Eimeria* challenge.
Krysten Fries-Craft*, Susan Lamont, Elizabeth A. Bobeck
Department of Animal Science, Iowa State University, Ames, Iowa, United States

*Clostridium perfringens* enumeration and toxin expression in a model with *Eimeria maxima* and influences in mineral digestibility after each component of the challenge.
Matthew K. Jones*, Jennie Baxter1, Anita Menconi1, Charles L. Hofacre1, Roy Berghaus2
1Southern Poultry Research Group, Inc., Watkinsville, Georgia, United States, 2Department of Population Health, University of Georgia, Athens, Georgia, United States

Saponins-citroflavonoids based solution reduced by 70% the growth of *Histomonas meleagridis*: an *in vitro* study.
Mohammed El Amine Benarbia*, Pierre Chicoteau1, 2
1R&D, Nor Feed, Angers, France, 2Labcom FeedInTech, Beaucouzé, France

*Salmonella* chitosan nanoparticle vaccine administration is protective against *Salmonella* Enteritidis in broiler birds.
Keila Y. Acevedo-Villanueva*, Sankar Renu2, Renukaradhya Gourapura2, Ramesh Selvaraj1
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valuation of anti-mycotoxin additives in poultry intestinal explants challenged with aflatoxin.
Department of Preventive Veterinary, Federal University of Santa Maria, Santa Maria, Rio Grande do Sul, Brazil

Adaptation of cell culture assay measuring fluorescent quantification of β-D-Glucuronidase activity for assessment of ileal granulocyte degranulation in tissue scrapings.
Audrey F. Duff* GS, Kaylin Chasser, Kate McGovern, Michael Trombetta, Lisa Bielke
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Effect of probiotics on early microbial colonization in day of hatch ducklings.
Michael Trombetta* GS 1, Kaylin Chasser2, Audrey F. Duff3, Kate McGovern1, Denise Russi Rodrigues3, Debbie Jeffery5, Daniel J. Shafer2, Lisa Bielke4
1Animal Science, The Ohio State University, Wooster, Ohio, United States, 2Animal Sciences, Ohio State University, Columbus, Ohio, United States, 3Animal Sciences, The Ohio State University, Wooster, Ohio, United States, 4OSU, Wooster, Ohio, United States, 5Maple Leaf Farms, Leesburg, Indiana, United States

Entero-V Poultry, a botanical liquid blend, limits coccidiosis impact in Eimeria-vaccinated broilers.
Jonathan Pierron* GS 1, 2, Bertrand Medina3, Marie-Christine Frenette4, Simon Cloutier4, Ivan D. Girard3, Carl Julien1, 5
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Evaluation of quinine as a prophylactic candidate against Histomonas meleagridis.
Lesleigh C. Beer* GS, Billy M. Hargis, Christine Vuong
Poultry Science, University of Arkansas: Division of Agriculture, Fayetteville, Arkansas, United States

Effect of Clostridium septicum hemolytic activity units on Clostridial dermatitis (cellulitis) bacterin/toxoid humoral immunogenicity in turkeys
Aaron Forga* GS 1, Danielle Graham1, Makenly Coles1, Lesleigh C. Beer1, Callie Selby1, Lucas Graham1, Roberto S. Cuesta1, Jared Ruff1, Guillermo Tellez-Isaias1, Billy M. Hargis1, Christine Vuong1
1Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 3Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States

Effect of oral or intracloacal challenge with Escherichia coli or Salmonella Enteritidis on enteric colonization and early performance in broiler chickens.
Callie Selby* GS 1, Danielle Graham2, Lucas Graham1, Aaron Forga3, Mikayla Baxter1, Guillermo Tellez-Isaias1, Billy M. Hargis3, Christine Vuong1
1Poultry Science, University of Arkansas, Bella Vista, Arkansas, United States, 2Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 3Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States

Evaluation of a functional sensory feed additive on broiler performance, blood chemistry and carcass yield under heat stress conditions.
Jean-François Gabarrou*4, Carlos T. Gonzales1, Aurélie Auvray, Eduardo Bernal1, William Narváez-Solarte2
1Spin Colombia SAS, Bogota, Colombia, 2Universidad Caldas, Manizales, Colombia, 3Phodé, Terssac, France
**352P** Peanut skins as a natural antimicrobial feed additive to reduce the transmission of *Salmonella* in poultry meat produced for human consumption.
Adam Redhead*, Thien Vu†, Fernanda Santos‡, Ramon D. Malheiro§, Ondulla Toomer¶
1Animal Biosciences & Biotechnology Laboratory, USDA - ARS, Beltsville, Maryland, United States, 2Food Science & Market Quality Handling Research Unit, USDA - ARS, Raleigh, North Carolina, United States, 3Food, Bioprocessing and Nutrition Sciences Department, North Carolina State University, Raleigh, North Carolina, United States, 4Prestage Department of Poultry Science, North Carolina State University, Raleigh, North Carolina, United States

**353P** Gompertz-Laird and Von Bertalanffy models to describe the growth curve of Creole hens of Mexico.
Diego Zárate-Contreras*, Juan M. Cuca-García†, Arturo Pro-Martínez‡, Gustavo Ramírez-Valverde§, Omar Hernández-Mendoza¶, Jaime Gallegos-Sánchez#, Rosalía Ordaz-Contreras$, Belén López-Pérez%, Fernando González-Cerón*
1Livestock Program, College of Postgraduates Campus Montecillo, Texcoco, State of Mexico, Mexico, 2Department of Animal Science, Chapingo Autonomous University, Texcoco, State of Mexico, Mexico

**354P** Estimation of parameters of the Gompertz model to describe the growth of Creole chickens of Mexico of two generations in random mating.
Juan C. Perrusquia Delgado*, Diego Zárate-Contreras†, Arturo Pro-Martínez‡, Juan M. Cuca-García§, Eutimio Olivera-Santiago#, Giselle G. Maldonado-Martínez¶, Ana M. Rodríguez-Velázquez$, Gerardo Aguilar-Villarreal$, Fernando González-Cerón%
1Livestock Program, College of Postgraduates Campus Montecillo, Texcoco, State of Mexico, Mexico, 2Department of Animal Science, Chapingo Autonomous University, Texcoco, State of Mexico, Mexico

**355P** The effects of rearing system design on bone mineral density and skeletal development in laying hens.
Qinyi Lu*, Christina Rufener†, John M. Toscano‡, Richard A. Blatchford‡, Maja M. Makagon², Michael J. Toscano³, John Tarlton⁴
1Center for Animal Welfare, Dept. Animal Science, University of California, Davis, Davis, California, United States, 2Center for Proper Housing: Poultry and Rabbits (ZTHZ), Division of Animal Welfare, University of Bern, Zollikofen, Switzerland, 3Federal Food Safety and Veterinary Office, Tänikon, Switzerland, 4Bristol Veterinary School, University of Bristol, Bristol, United Kingdom

**356P** Performance of Japanese Quail subjected of environmental high temperature and different nutrition plans.
Romilton Barros Júnior*, João P. Souza Silva†, Tamires M. Silva Felix‡, Jose A. de Lira Barbosa§, Fernando Guilherme Perazzo Costa¹, José H. Vilar Da Silva¹
1Animal Science, Universidade Federal da Paraíba, Solânea, Paraíba, Brazil, 2UFPB, MACEIó, AL, Brazil

**357P** Characterization of growth patterns and carcass characteristics of male and female broilers from four commercial strains fed low or high density diets.
Clay J. Maynard*, Craig W. Maynard†, Ashunti Jackson‡, Michael T. Kidd¶, Samuel J. Rochell%, Casey M. Owens¹
1Poultry Science, University of Arkansas, Fayetteville, Arkansas, United States, 2Cobb Vantress, Inc., Siloam Springs, Arkansas, United States

**358P** Comparison of different ammonia amendments for poultry operations under winter climate.
Hong Li*, Aliyah Parsons
Animal and Food Sciences, University of Delaware, Newark, Delaware, United States

**359P** Epiphyseal and diaphyseal bone mineral density comparison of turkey Femurs.
Dalton Plotter*, Gabriella Furo†, Darrin M. Karcher‡, Jeanine A. Brannon§, Sally L. Noll¶
1Animal Science, University of Minnesota, Saint Paul, Minnesota, United States, 2University of Minnesota, Saint Paul, Minnesota, United States, 3Animal Science, University of Minnesota, Debrecen, Hungary, 4Purdue University, West Lafayette, Indiana, United States

**360P** Initial evaluation of Pulsed Alternating Wavelength System (PAWS) on growth and physiological

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All Times are CST
markers of stress in grow-out Pekin ducks.
Sara Tonissen* UG1, Jason Suntych2, Daren Suntych2, Marcus Reinhardt2, Darrin M. Karcher1, Gregory S. Fraley1
1Animal Sciences, Purdue University, West Lafayette, Indiana, United States, 2Xiant Technologies, Inc., Greeley, Colorado, United States

Dietary ginger root extract modulates fecal concentrations of *Bifidobacteria* and *Lactobacillus* in laying hens.
George Dosu* GS, Shengmin Sang, Temitayo Obanla, Tiffany Crenshaw, Yewande Fasina
North Carolina A&T State University, Greensboro, North Carolina, United States

Metabolism and Nutrition: Amino Acids

Effects of dietary L-Citrulline supplementation on the nitric oxide synthesis and mitochondrial bioenergetics in the breast muscle of heat stressed broilers.
Victoria A. Uyanga*, Jingpeng Zhao, Xiaojuan Wang, Hongchao Jiao, Hai Lin
Animal Nutrition and Feed Science, Shandong Agricultural University, Tai’an, China

Determining amino acid digestibility of soybean meal from different South Carolina soybean varieties when fed to broilers.
Kara M. Dunmire* GS1, Michaela B. Braun1, Caitlin E. Evans1, Benjamin D. Fallen2, Charles R. Stark1, Chad B. Pauk1
1Grain Science and Industry, Kansas State University, Manhattan, Kansas, United States, 2Plant and Environmental Sciences, Clemson University, Clemson, South Carolina, United States

Determination of standardised ileal digestibility of tryptophan in granular sources for 21-day-old broiler chickens.
June Hyeok Yoon*, Hyeon-Jin Kim2, Hyelim Lee2, Changsu Kong3
1Animal Science and Technology, Konkuk University, Seoul, Korea (the Republic of), 2Animal Nutrition Solution Team, CJ BION, Seoul, Korea (the Republic of), 3Animal Science, Kyungpook National University, Sangju, Gyeongsangbuk-do, Korea (the Republic of)

Standardized ileal methionine requirements of male broilers from 22 to 29 days.
Su Hyun An*, Hwang-Ku Kang3, Changsu Kong3
1Animal Science and Biotechnology, Kyungpook National University, Sangju, Gyeongsangbuk-do, Korea (the Republic of), 2Animal Science, Kyungpook National University, Sangju, Gyeongsangbuk-do, Korea (the Republic of), 3Institute of Poultry Science, National Institute of Animal Science, Pyeongchang, Gangwon-do, Korea (the Republic of)

Protective effect of L-Citrulline on the growth performance of cyclic heat stressed broilers via modulation of hypothalamic GH/IGF-1 pathway proteins.
Victoria A. Uyanga* GS, Jingpeng Zhao, Xiaojuan Wang, Hongchao Jiao, Hai Lin
Animal Nutrition and Feed Science, Shandong Agricultural University, Tai’an, China

Sulphur amino acids sources affect the gene expression of glucose transporters in the jejunum of broilers chicken.
Tamires M. Silva Felix*, Claudia S. Souza1, Jose A. Barbosa1, Fernando Guilherme Perazzo Costa1, Patricia E. Givisiez1, Danila B. Campos1, Samuel Aggrey2, José H. Vilar Da Silva1
1Animal Science, Universidade Federal da Paraíba, Solânea, Paraíba, Brazil, 2Department of Poultry Science, University of Georgia, Athens, Georgia, United States

Metabolism and Nutrition: Enzymes

Supplementation of exogenous enzymes in diets deficient in nutrients and energy for broilers.
Rodrigo F. Jacob*, Luiz Fernando T. Albino, Arele A. Calderano, Romário D. Bernardes, Bruno A. Figueiredo, Samuel O. Borges, Tobias A. Silva
Animal Science, Federal University of Viçosa, Viçosa, Brazil
Dietary Allzyme® Spectrum improved the performance of broiler chickens fed low nutrient diet.
Tuoying Ao*, Marquisha Paul, Anthony Pescatore, Daniel Graugnard, Lizza Macalintal, Rebecca Delles, Mike Ford, Ronan Power
Alltech-University of Kentucky Nutritional Research Alliance, Lexington, Kentucky, United States

Comparative effects of two phytases on bone mineralization, nutrient digestibility and phytate-P degradation of boilers.
Qian Zhang*1, Carrie L. Walk2, Jose O. Sorbara2, Guenter Pappenberger2, Costas Stamatopoulos2
1DSM China Animal Nutrition Research Center, DSM Nutritional Products, Bazhou, Hebei, China, 2Animal Nutrition and Health, DSM Nutritional Products, Kaiseraugst, Switzerland

Sources of corn and soybean meal and carbohydrase enzymes supplementation differently affect growth performance and nutrient digestibility in broiler chickens.
Rajesh Jha*, Razib Das1, Birendra Mishra1, Aaron Cowieson2
1Human Nutrition, Food and Animal Sciences, University of Hawaii at Manoa, Honolulu, Hawaii, United States, 2DSM Nutritional Products, Kaiseraugst, Switzerland

Sources of corn and soybean meal and carbohydrase enzyme supplementation differently affect cecal volatile fatty acid production and microbiota profile in broiler chickens.
Rajesh Jha*, Razib Das1, Birendra Mishra1, Aaron Cowieson2
1Human Nutrition, Food and Animal Sciences, University of Hawaii at Manoa, Honolulu, Hawaii, United States, 2DSM Nutritional Products, Kaiseraugst, Switzerland

Field evaluation of an exogenous protease in commercial turkey diets.
Elizabeth J. Kim*, Franco Mussini, Jordon Gruber, Michael Perry, Janet Remus
Danisco Animal Nutrition/IFF, Buford, Georgia, United States

Performance of commercial laying hens supplemented with functional fiber associated with xylanase.
Deibity A. Cordeiro1, Natiele F. de Oliveira1, Imar C. Fernandes Filho1, Lucas B. de Castro1, Laura A. Duarte1, Fernanda B. Toledo1, Thaciane L. Amaral1, Alexandre B. de Brito2, Jose H. Stringhini*1
1Zootecnia, Universidade Federal de Goiás, Goiania, Goias, Brazil, 2ABVista, Malborough / Sao Paulo, United Kingdom

Metabolism and Nutrition: Feed Additives

Evaluation of apparent metabolizable energy of pequi oil in broiler chickens.
Murillo N. Carvalho*1, Pedro Pereira Leite Trevisani1, Jéssica M. Cruvinel1, Beatriz A. de Souza1, Felipe F. dos Santos1, Cássio Y. Oura2, Fernanda Kaiser de Lima-Krenchinski2, Priscila M. Groff-Urayama1, Tatiane Souza dos Santos1, Julianna Batistioli2, Erica S. Mello1, José R. Sartori1, Antonio Celso Pezzato1,2, Amanda B. Cirino2
1Animal Nutrition, UNESP, Botucatu, São Paulo, Brazil, 2FMVZ, UNESP, Botucatu, Brazil, 3Animal Nutrition Department, School of Veterinary Medicine and Animal Science, Botucatu, Brazil, 4animal breeding and nutrition, São Paulo State University (UNESP), Botucatu, Brazil

Effect of Lactobacillus plantarum supplement on the growth performance, nutrient digestibility, gas emission, excreta microbiota, and meat quality of broilers.
Hyun Ju Park*, Vetrisevi Sampath, Je Min Ahn, Chai Bin Lim, In Ho Kim
Department of Animal Resource and Science, Dankook University, Cheonan, Korea (the Republic of)

The impact of dietary supplementation of NuPro® in the starter diets on the 21 day growth performance of broiler chickens.
Rebecca Delles*, Tuoying Ao1, Marquisha Paul1, Anthony Pescatore2, Mike Ford1, Daniel Graugnard1, Ronan Power1
1Research, Alltech, Inc., Lexington, Kentucky, United States, 2Animal and Food Sciences, University of Kentucky, Lexington, Kentucky, United States
Evaluation of a postbiotic as an intervention for mitigating necrotic enteritis in experimentally infected broilers.
Tri Duong*1, Sara Llamas Moya1, Cynthia Rasmussen1, Brett Lumpkins2, Greg F. Mathis3
1Kerry Group, Plc., Beloit, Wisconsin, United States, 2Southern Poultry Research, Athens, Georgia, United States

The effect of various levels of a dacitic (rhyolitic) tuff breccia on growth performance of broilers mildly challenged with *Eimeria* spp.
Po-Yun Teng*1, Janghan Choi1, Sudhir Yadav1, Fernanda L. Castro2, Jon Ferrel2, Woo K. Kim1
1Department of Poultry Science, University of Georgia, Athens, Georgia, United States, 2AZOMITE Mineral Products Inc., Nephi, Utah, United States

Effects of dietary vitamin C, vitamin E, and betaine on productive performance, egg quality, and stress marker of laying hens raised under heat stress conditions.
Sung Hoon Kwon*, Jeong Hun Nam, Deok Yun Kim, Cha Yeong Lee, Chan Ho Kwon, Seung Yeon Won, Dong Yong Kil
Chung-Ang University, Anseong-si, Korea (the Republic of)

Effects of organic acids and essential oils on growth performance, serum biochemistry, antioxidant enzyme activities, intestinal morphology, and digestive enzyme activities in broiler chickens.
Janghan Choi*1, Amit Singh1, Xixi Chen2, Yan Lei2, Woo K. Kim1
1Department of Poultry Science, University of Georgia, Athens, Georgia, United States, 2DDC Nutrition LLC, Walnut, California, United States, 3DadHank (Chengdu) Biotech Corp, Chengdu, China

Comparison of alternative feed additives to antibiotics to prevent subclinical necrotic enteritis in broilers.
Masoumeh Ghiyamatiun, Maziar Mohiti-Asli*
Department of Animal Science, University of Guilan, Rasht, Iran (the Islamic Republic of)

Effects of supplementation of a blend of encapsulated organic acids in drinking water on performance, intestinal microflora and morphology of broilers.
Motahar Rahnama Ghaleroudkhani, Maziar Mohiti-Asli*
Department of Animal Science, University of Guilan, Rasht, Iran (the Islamic Republic of)

BoreOX®, a proprietary blend of botanical extracts designed to optimize the vitamin E feed supplementation in broilers nutrition.
Bertrand Medina1, Ashley Wagner1, Ivan D. Girard1, Carl Julien*2,3
1Probiotech International Inc., St-Hyacinthe, Quebec, Canada, 2Centre de Recherche en Sciences Animales de Deschambault (CRSAD), Deschambault, Quebec, Canada, 3Animal Sciences, Université Laval, Quebec, Quebec, Canada

Effect of probiotic additives on growth performance of broilers.
Pouyan Malekinezhad*1, Laura Ellestad1, Nazar Afzali2, Seyed Homayoun Farhangfar3, Monese Hamidi3
1Poultry Science, University of Georgia, Athens, Georgia, United States, 2Animal Science, University of Birjand, Birjand, Iran (the Islamic Republic of), 3Poultry Science, Modares University, Tehran, Iran (the Islamic Republic of)

Effects of a specific blend of oleoresins of spices as a complementary intestinal aid for conventional raised broilers.
Angel R. Alfonso-Avila*3,1, Bertrand MEDINA2, Ivan D. Girard1, Marie-Pierre Létourneau-Montminy1
1Sciences Animales, Université Laval, Quebec, Quebec, Canada, 2Probiotech International Inc., St-Hyacinthe, Quebec, Canada, 3Centre de Recherche en Sciences Animales de Deschambault (CRSAD), Quebec, Quebec, Canada

Bone development of broilers fed chondroitin sulfate and manganese.
Julian A. Muñoz*1,2, Taiane S. Martins1, Tainara A. Sant’Ana1, Pollyana L. Garbossa1, Lenise F. Mueller2, Laura B. Ferreira3, Caio B. Barbalho2, Monica M. da Silva2, Cristiane S. Araujo1, Angélica S. Pereira1
1Animal Nutrition and Production, School of Veterinary Medicine and Animal Science, University of São Paulo,
Effect of dietary supplementation with *Bacillus amyloliquefaciens* and tributyrin on performance and egg quality in second-cycle Bovans White hens.
Gerardo Aguilar-Villarreal¹, Dalia L. Carlos-Mateos², Diego Zárate-Contreras¹, Óscar Vázquez-Mendoza³, Arturo Pro-Martínez³, Fernando González-Cerón²
¹Livestock Program, College of Postgraduates Campus Montecillo, Texcoco, State of Mexico, Mexico, ²Department of Animal Science, Chapingo Autonomous University, Texcoco, State of Mexico, Mexico, ³Evonik Mexico S.A. de C.V., Tlalpan, Mexico City, Mexico

Meat quality in broiler chickens fed Pequi Oil (*Caryocar brasiliense* camb.).
Pedro Pereira Leite Trevisani¹*UG1, 3, 2, Jéssica M. Cruvinel⁴, Murilo N. Carvalho², Beatriz A. de Souza⁵, Evelyn Prestes Brito⁶, Carolina Santos⁵, Iasmin M. Farias⁶, Amanda B. Cirino⁶, Andrey Savio⁶, Felipe F. dos Santos⁶, Cássio Y. Oura⁵, Fernanda Kaiser de Lima-Krenchinski⁶, Priscila M. Groff-Urayama⁶, Tatiane Souza dos Santos⁶, Juliana Batistioli⁶, Erica S. Mello⁶, José R. Sartori¹, Antônio Celso Pezzato¹
¹FMVZ, UNESP, Botucatu, Brazil, ²Animal Nutrition, UNESP, Botucatu, São Paulo, Brazil, ³Animal Breeding and Nutrition, São Paulo State University (UNESP), Botucatu, Brazil, ⁴Animal Nutrition Department, School of Veterinary Medicine and Animal Science, Botucatu, Brazil

Effects of diets formulated with a bio-emulsifier based on lysophospholipids on performance, energy utilization and nutrient digestibility of broiler chickens.
Vítor Santos Haetinger*³GS 1, Catarina Stefanello³, Yuri Katagiri Dalmoro¹, Guilherme L. Godoy¹, Marina Botega Lang¹, Kelen Zavarize², Elisa François²
¹Department of Animal Science, Federal University of Santa Maria, Cachoeira Do Sul, RS, Brazil, ²Kemin Industries Inc., Valinhos, São Paulo, Brazil

Standardized Natural Citrus Extract (SNCE) dietary supplementation recover zootechnical performances losses due to the reduction of protein and energy levels in broiler chicken’s feed.
Sekhou Cisse*¹GS 1, 2, 3, Hoa Bui², Mathilde Buffière², Mohammed El Amine Benbarbia³, David Guillet¹, ⁴EA 921 SONAS, Beaucouzé, Maine et Loire, France, ⁵R&D, Nor-Feed SAS, Beaucouzé, Maine et Loire, France, ⁶Labcom FeedInTech, Beaucouzé, Maine et Loire, France, ⁷R&D, Nor Feed, Angers, France

Effects of methyl sulfonyl methane and sodium sulfate on laying performance, egg quality, and antioxidant capacity for laying hens.
Yoo Bhin Kim*¹GS 1, Sang Hyeok Lee³, Hwan Gwan Lee¹, Kyung-Woo Lee¹
¹Konkuk University, Seoul, Korea (the Republic of), ²Konkuk University, Seoul, Korea (the Republic of)

Production of omega-3 enriched meat through feeding with dietary soluble flaxseed oil for broiler chickens.
Sang Hyeok Lee*¹GS 1, Yoo Bhin Kim¹, Hyun Gwan Lee¹, Dong won Lee³, Kyung-Woo Lee¹
¹Konkuk University, Seoul, Korea (the Republic of), ²Konkuk University, Seoul, Korea (the Republic of), ³Haitnim Bio, Icheon-si, Korea (the Republic of)

Effect of dietary bacteriophage on *Clostridium perfringens* in broilers.
Hyun Gwan Lee*¹GS 1, Yoo Bhin Kim¹, Sang Hyeok Lee³, Jong Pyo Chae³, Yu Jin Kim³, Kyung-Woo Lee¹
¹Konkuk University, Seoul, Korea (the Republic of), ²Konkuk University, Seoul, Korea (the Republic of), ³CJ Cheiljedang Co., Ltd, Suwon-si, Korea (the Republic of)

Effect of different dietary levels of fenugreek seeds powder on the growth performance of broiler chickens.
Deependra Paneru*¹GS 1, Guillermo Tellez-Isaias², Walter G. Bottje², Jayant Lohakare¹
¹University of Arkansas at Pine Bluff, Pine Bluff, Arkansas, United States, ²University of Arkansas, Fayetteville, Arkansas, United States

Mycotoxins binder alleviates aflatoxin B1 toxic effects on the growth performance, immunological

*Presenter
function and intestinal health of broilers.
Yujiao Lai* GS, Meng Sun, Yang He, Jiaqi Lei, Yuming Guo, Bingkun Zhang
College of Animal Science and Technology, China Agricultural University, Beijing, China

397P Effect of dietary folic acid and energy density on immune response, gut morphology, and oxidative status in blood and breast muscle of broiler chickens.
Fisayo Akinyemi* GS, Deborah I. Adewole
Animal Science and Aquaculture, Dalhousie University, Valley, Nova Scotia, Canada

398P Influence of dietary inclusion of probiotic on egg quality and well-being during the late laying period in brown hens.
Marcos Antonio Nascimento Filho* GS 1, Caio Cesar Ouross, Marconi Italo Lourenço-Silvass, Ana Beatriz de Oliveira1, Andressa Jacinto1, Alberto Inouesc, Ibiara Almeida Paz1
1Departamento de Produção Animal e Medicina Veterinária Preventiva, UNESP, Botucatu, São Paulo, Brazil, 2 Chr. Hansen Animal Health, Valinhos, São Paulo, Brazil

Metabolism and Nutrition: General Nutrition

399P Estimation of the optimal metabolizable energy and feed intake that maximizes egg mass and economic margin of commercial laying hens.
Elias Salvador Tasayco*, Julio Manuel Narvaez Reyes, Lorenzo Rios Junchaya
Producción Animal, Universidad Nacional "San Luis Gonzaga", Chincha, Peru

400P Effects of including a porcine intestinal mucosa hydrolysate on first-week performance and profitability in broiler chickens.
Elias Salvador*, Luis Lujuans, Sergi Segarraj1
1R&D Bioiberica SAU, Esplugues de Llobregat, Barcelona, Spain, 2 Universidad Nacional "San Luis Gonzaga", Chincha, Peru

401P Energy values of tilapia byproduct meal for broiler chickens determined using the regression method.
Yuri Katagiri Dalmoro*, Vitor Santos Haetinger, Carine Adams, Guilherme L. Godoy, Willian Gráf, Otoniel F. Souza, Catarina Stefanello
Department of Animal Science, Federal University of Santa Maria, Santa Maria, RS, Brazil

402P Effect of beak trimming at hatch and the inclusion of oat hulls in the diet on growth performance of brown-egg pullets from 0 to 5 weeks of age.
J. Ben Mabrouk*, N. L. Corrales, N. García, L. Aguirre, Gonzalo Mateos, L. Cámara
UPM, Madrid, Madrid, Spain

403P Influence of the origin of the beans on the chemical composition, particle size distribution, and color of soybean meal.
H. Kadardar, L. Aguirre, G. Fondevila, M. Elkissi, Gonzalo Mateos*, L. Cámara
UPM, Madrid, Madrid, Spain

404P Influence of soybean origin on growth performance of broilers fed a semisynthetic diet with soybean meal as the unique source of amino acids from 18 to 21 days of age.
G. Fondevila*, L. Aguirre1, Emrah Gungor1,1, D. Baruch1, V. Bernad1, Gonzalo Mateos1, L. Cámara1
1UPM, Madrid, Madrid, Spain, 2 Ondokuz Mayis University, Samsun, Turkey

405P Metabolizable energy values and metabolizability coefficients of soybean meal from different origins for broilers.
Lorrayne M. de Paulo, Alison B. Gouveia, Mihayr M. Jardim, Júlia Marixara S. da Silva, João Marcos M. Batista, Helder F. de Oliveira, Marcos B. Cafe, Jose H. Stringhini*
Zootecnia, Universidade Federal de Goias, Goiania, Goias, Brazil
productive performance and egg quality of laying hens from 64 to 67 weeks of age.
D. Baruch, A.F. de Juan*, J. Ben Mabrouk, L. Dardabou, N. L. Corrales, Gonzalo Mateos
UPM, Madrid, Madrid, Spain

407P
Short-term effect of the energy restriction on the phosphorus metabolism in broiler chickens.
Rony Riveros Lizana*1, Matheus D. Reis2, Rosiane d. Camargos1, Nilva Sakomura1
1Animal Science, Sao Paulo State University, Jaboticabal, Sao Paulo, Brazil, 2Animal Science, Unesp, Jaboticabal, Sao Paulo, Brazil

408P
Effect of sesame meal as an alternative to soybean meal and its impact on performance, carcass traits, meat quality, and intestinal morphology of broiler chickens.
Pouyan Malekinezhad*1,2, Laura Ellestad1, Moslem Bashtani2, Soheyla Shabkhan2
1Poultry Science, University of Georgia, Athens, Georgia, United States, 2Animal Science, University of Birjand, Birjand, Iran (the Islamic Republic of)

409P
Evaluation of different particle size analysis methodologies for finely to coarsely ground corn.
Department of Poultry Science, Auburn University, Auburn, Alabama, United States

410P
Productive performance of Mexican Creole chickens, 13-20 weeks of age, fed diets with different concentrations of metabolizable energy and crude protein.
Miguel A. Matias-Aragón*1,2, Arturo Pro-Martinez3, Josafhat Salinas-Ruiz3, Fernando González-Cerón3, Juan M. Cuca-Garcia1, Eliseo Sosa-Montes3, Sergio I. Mendoza-Pedroza1, Berenice Hernández-Blancas3, Diego Zarate-Contreras1, Rosalia Ordez-Contreras1
1Genetic Resources and Productivity, Livestock Orientation, College of Postgraduates, Texcoco, Mexico, 2College of Postgraduates Campus Cordoba, Cordoba, Veracruz, Mexico, 3Department of Animal Science, Chapingo Autonomous University, Chapingo, State of Mexico, Texcoco, State of Mexico, Mexico

411P
Determination of nitrogen corrected true metabolizable energy content of feed ingredients for poultry diets by Near Infrared Reflectance Spectroscopy.
Mary Cope*, Adam J. Davis
Poultry Science, University of Georgia, Athens, Georgia, United States

412P
Evaluation of combinations of a butyric acid-based product and cranberry pomace extract on the growth performance of mixed-sex broiler chickens.
Bruce Rathgeber*, Joshua Gong, Moussa Diarra, Janice MacIsaac
1Animal Science and Aquaculture, Dalhousie University, Brookside, Nova Scotia, Canada, 2Guelph Research and Development Centre, Agriculture and Agri-Food Canada, Guelph, Ontario, Canada

413P
Growth performance and the tibia bone ash of broilers fed various inclusion levels of a black soldier fly larvae meal.
Munene Kithama*, Michael Fruci, Ed Topp, Elijah Kiarie, Moussa Diarra
1Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 2AAFC, Guelph Research and Development Centre, Guelph, Ontario, Canada, 3AAFC, London Research and Development Centre, London, Ontario, Canada, 4Animal Biosciences, University of Guelph, Guelph, Ontario, Canada

414P
Effect of corn particle size on bulk density, angle of repose, and pellet quality.
Susan M. Bonilla*, Joseph P. Gulizia, Santiago J. Sasia, Jose I. Vargas, Wilmer J. Pacheco, Charles W. Starkey
Poultry Science, Auburn University, Auburn, Alabama, United States

415P
Assessing dietary corn particle size influences on broilers grown from 1 to 21 days of age.
Gabrielle Harder*, Emily K. Stafford, Kevin M. Downs, Joseph P. Gulizia, Santiago J. Sasia, Wilmer J. Pacheco
1School of Agriculture, Middle Tennessee State University, Murfreesboro, Tennessee, United States, 2Department of Poultry Science, Auburn University, Auburn, Alabama, United States

*Presenter 70 All Times are CST
Conditioning temperature directly affects pellet quality.
Santiago J. Sasia* UG, Joseph P. Gulizia, Susan M. Bonilla, Jose I. Vargas, Wilmer J. Pacheco
Department of Poultry Science, Auburn University, Auburn, Alabama, United States

Effect of production rate on pellet durability index.
Leah C. Smith* UG1, Susan M. Bonilla1, Joseph P. Gulizia1, Martha Rueda Lastres1, Fozol K. Ovi1, Jeffery Escobar2, Jared Froetschner3, Wilmer J. Pacheco1
1Poultry Science, Auburn University, Auburn, Alabama, United States, 2Elanco Animal Health, Greenfield, Indiana, United States

Effects of maternal fish oil on adipose development in the broiler chick embryo.
Minjeong Kim* GS1, Usuk Jung1, Suchita Das1, Lindsay Brown2, Shawn Campagna2, Jeanna Wilson3, Brynn H. Voy1
1Animal Science, University of Tennessee, Knoxville, Tennessee, United States, 2Chemistry, University of Tennessee, Knoxville, Tennessee, United States, 3University of Georgia, Athens, Georgia, United States

Body weight and uniformity, organ development and jejunal histomorphology in broiler breeder pullets fed n-3 fatty acids enriched diets from hatch through to 22 weeks of age.
Aizwarya Thanabalan* GS1, Elijah Kiari2
1Animal Biosciences, University of Guelph, Guelph, Ontario, Canada, 2Animal Biosciences, University of Guelph, Guelph, Ontario, Canada

Metabolism and Nutrition: Vitamins and Minerals

The mechanism on cadmium-induced autophagy in follicular granulosa cells of laying hens and ameliorative property with selenized yeast.
Yuxuan Jiang* UG, lang Li, Jingping Song, Cai M. Wu
Institute of Animal Nutrition, Sichuan Agricultural University, Chengdu, Sichuan Province, China

Microbiology and Food Safety

Assessing the in vitro effect of wild-type lytic bacteriophages on Salmonella Minnesota field strains.
Daiane Voss-Rech, Arlei Coldebella, Clarissa S. Vaz*
Embrapa Suínos e Aves, Concordia, Santa Catarina, Brazil

Use of a bacteriophage in feed to control Salmonella enteritidis in broilers in a contaminated feed model.
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Effect of Bacillus subtilis and Bacillus licheniformis probiotic supplementation on performance and Campylobacter jejuni load in broilers challenged with C.jejuni.
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Evaluation of the antimicrobial effect of essential oils associated with organic acids against serovars of Salmonella and Escherichia coli APEC.
Beatriz Pasqualli Fernandes*1, Lilian Kolling Girardini2, Amanda de Souza da Motta1, Julcimar Machado Maciel2, Márcio Rennan Santos Tavares3
1Federal University of Rio Grande do Sul (UFRGS), Porto Alegre, Rio Grande do Sul, Brazil, 2University of the West of Santa Catarina (UNOESC), Xanxerê, Santa Catarina, Brazil, 3Federal Institute of Sertão Pernambucano,
Prediction of deoxynivalenol in wheat bran samples using Near Infrared Reflectance Spectroscopy (NIRS).
Denize Tyska*1,2, Gisèle P. da Rosa1, Daniel F. Soares1, Eduarda d. Gubiani1, Rodrigo d. Carvalho1, Raul F. Marcon1, Adriano O. Mallmann2, Carlos A. Mallmann1
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Phytochemicals as an alternative to conventional chemicals for controlling Campylobacter jejuni in poultry.
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Accelerated shelf-life testing in frozen chicken wings.
Bárbara Oliveira*, Angela Junges, Lucas Wolf, Lisirs Kindlein
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Leveraging a large scale GI microbiome dataset for necrotic enteritis outbreak prediction.
Joshua P. Lefler*, Brian Dirks, Grant Gogul, James Gaffney, Andrew Izzo, Mallory Embree
Native Microbials, Inc., San Diego, California, United States

Antimicrobial efficacy of a plant-derived compound, carvacrol, against Salmonella Enteritidis on organic chicken carcasses.
Divek V. T. Nair1, Shijinaraj Manjankattil*, Claire Peichel1, Annie M. Donoghue2, Kumar Venkitanarayanan3, Anup Kollanoor Johny1
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Comparison of microbial populations from day-of-hatch chick digestive tracts and chick papers.
John B. Adkins* GS 1, James Krehling1, Kaicie S. Chasteen1, Cesar Escobar1, Luis R. Munoz2, Aidan A. Talorico3, Kenneth Macklin1
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Identification of the intestinal microbes linked to the growth rate in broilers.
Jing Liu* GS 1, Qing Yang1, Kelsy Robinson2, Glenn Zhang1
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Prevalence of virulence and antimicrobial resistance genes in suspected APEC isolates collected from different extra-intestinal tissue of layer hen.
Fozol K. Ovi* GS, Pratima Adhikari, Li Zhang, Aaron Kiess
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Effect of prebiotics and essential oil combination on Salmonella Enteritidis in-vitro.
Ishab Poudel* GS 1, Claudia Castañeda1, Aaron Kiess1, Alamanda Calvert2, Pratima Adhikari1
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Effect of pimenta essential oil against multidrug-resistant Salmonella Agona and Salmonella Saintpaul in non-processed turkey breast meat and ground turkey.
Shijinajar Manjankattil* GS 1, Grace Dewi1, Claire Peichel1, Timothy Johnson2, Sally L. Noll1, Carol Cardona2, Anup Kollanoor Johny1
Seminal characteristics of Mexican Creole roosters in winter and spring.
Rosalía Ordaz-Contreras1*, Arturo Pro-Martínez1, Juan M. Cuca-García1, Said Cadena-Villegas2, Josafhat Salinas-Ruíz3, Diego Zarate-Contreras1, Belén López-Pérez1, Irma Ordaz-Contreras1, Fernando González-Cerón1*
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Effect of heat stress on ileal microbiota in modern broilers and their ancestor Jungle Fowl.
Nima Emami*1, Monika Proszkowiec-Weglarz2, Lori Schreier3, Elizabeth S. Greene2, Travis Tabler1, Sara Orlowski1, Joseph Hiltz1, Nicholas Anthony1, Sami Dridi1
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Comparison of seminal characteristics of breeding Creole roosters of Mexico.
Giselle G. Maldonado-Martínez*1, Juan M. Cuca-García1, Arturo Pro-Martínez1, Tlacaélel Tapia-Estrada2, Diego Zárate-Contreras1, Rosalía Ordaz-Contreras1, Gerardo Aguilar-Villarreal1, Miguel Á. Matus-Aragón1, Kevin B. Flores-de la Torre1, Fernando González-Cerón1*
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The effects of Coenzyme Q10 on reproductive performance of Japanese quail under cadmium challenge.
Hamid R. Rafieian* UG 1, Mahdi Zhandi1, Mostafa Sadeghi1, Ali Reza Yousefi2, Havva Marzban2
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Variation in Pekin drake testosterone levels and pen level fertility in relation to access to females during rearing.
Lindsey J. Broadus* GS 1, 2, Brian Lee3, Maja M. Makagon1, 2
1Department of Animal Science, University of California, Davis, California, United States, 2Animal Behavior Graduate Group, University of California, Davis, California, United States, 3Maple Leaf Farms, Inc., Leesburg, Indiana, United States

Adapting methods for Golgi-Cox staining from rodents to chickens to evaluate dendritic morphology in the hippocampus.
Allison N. Pullin* GS 1, Jason W. Loxterkamp2, Maja M. Makagon1
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The effect of feeding Omega-3 fatty acids on secondary sexual characteristics of different strains of layer breeder roosters.
Anna Laszczuk* GS 1, Rosemary Whittle3, Elijah Kiarie2, Tina Widowski1
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Use of pressure with ambient or heated water to clean broiler carcasses on the slaughter side of the processing plant.

*Presenter
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443P The effects of potassium ferrate (VI) on the meat quality of chicken thigh meat.
Wendy Attuquayefio*, Skyler Lewis, Michael R. Barnas, James L. McNaughton
AHPPharma, Inc., Hebron, Maryland, United States

444P Study of the effect of using an acidity-regulating additive in water for scalding broiler carcasses.
Lediane Tomazi Miotto*, Beatriz Pasqualli Fernandes1, Caroline Schmidt Facchi1, Diego Todescato1, Liris Kindlein2
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445P Microwave analysis of broiler breast meat in conjunction with singularity value decomposition to categorize myopathic fillets.
Aftab Siddique*, GS 1, Ryan Freeman2, Amit Morey3
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FUTURE MEETINGS

Poultry Science Association

2022 PSA Annual Meeting
San Antonio Marriott Rivercenter
San Antonio, Texas
July 11-14, 2022

2022 Latin American Scientific Conference
Hotel Bourbon de Foz do Iguaçu
Iguacu Falls, Paraná, Brazil
October 4-6, 2022

2023 PSA Annual Meeting
Philadelphia Marriott Downtown
Philadelphia, Pennsylvania
July 10-13, 2023

2024 PSA Annual Meeting
The Galt House Hotel
Louisville, Kentucky
July 15-18, 2024