



Advancing our industry through evidence-based research

Research summary overview

Our Research Grant Program actively supports research projects in a variety of fields at universities across Canada. Each research project is linked to at least one of Egg Farmers of Canada's research priorities. Below is an introduction to these research projects as well as their status.

2021 EFC GRANT PROGRAM RESEARCH SUMMARY										
PROJECT NAME	PAGE	RESEARCH PRIORITY AREA ADDRESSED								
		Animal care science	Food safety	Human nutrition and health	End of flock management	Innovative uses of eggs	Environment and sustainability	Bird nutrition and health	Public policy and economics	Research gaps identified by the Code of Practice
The role of shell protein in controlling bacterial movement through laying hen eggs	4		X							
Investigating the influence of a range of exposure conditions during simulated transport on pullet and end-of-lay physiology, welfare and meat quality	5				X					
Egg production for a complete cycle feeding of dietary seaweed	5		X							
Precision feeding layers for improved uniformity, production and sustainability	6							X		
Development of strategies for control of avian influenza virus transmission	6							X		

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The role of omega-3 fatty acids in bone development in pullets: Investigating epigenomic response to breeder and perinatal nutrition	6							X		
Eggshell membrane nano-particles for biomedical applications	6					X				
Cuticle proteins in diverse lines of hens	6		X							
How much omega-3 fatty acids do hens require for optimal health and productivity?	7							X		
A novel non-antibiotic strategy for controlling avian pathogenic <i>Escherichia coli</i> in laying hens	7							X		X
Importance of eggshell cuticle quality for reducing bacterial adherence in table eggs	7		X							
Assessment of the impact of Canadian infectious bronchitis virus variants on egg production and fertility in laying hens	7							X		X
Determination of the metabolic triggers responsible for sexual maturation in laying hens and their relation to rearing environment and nutrition	8							X		X
Precision pullet rearing strategies for optimal reproductive body condition	8							X		X
Egg yolk lecithin supplementation to improve pulmonary health: Implications for healthy individuals and individuals with chronic obstructive pulmonary disease	8			X						
Develop new application of egg protein ovotransferrin as a functional food ingredient for bone health	8			X		X				
Modified eggshell membrane formulations as a novel supplement to maintain gut health	8			X		X				
Optimization of vaccination strategies for table egg layers controlling egg production problems induced by currently circulating infectious bronchitis virus variants	9							X		X
The fermentation of end-of-lay hen hydrolysate to produce pathogen-free microbiological-rich plant nutrient solutions	9				X					
The beneficial effect of egg-derived phosphatidylcholine on the obesity-related immune dysfunction	9			X						
Get cracking for diabetes: An egg-based breakfast for improving blood glucose control in type 2 diabetes	9			X						
Animal implant studies with nano-textured eggshell-based constructs for bone regeneration	9			X		X				
Use of 3D kinematics and genomics to evaluate perching biomechanics in commercial and heritage strains of enriched colony housed pullets and laying hens	9	X								X

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Mining the hen gastrointestinal microbiome for novel anti-infective probiotics to reduce the incidence of bacterial infections	10							X		
Impact of alternative housing systems on layer health and egg production	10	X						X		
Eggs as a strategy to maintain retina health in people with diabetes	10			X						
Functional feedstuffs to bolster performance and immunocompetence of pullets reared at different rearing densities in enriched colony housing systems	10							X		X
Optimization of environmental and hen welfare outcomes in Canadian egg production using predictive analytics (machine learning) techniques	10						X			
Determination of ideal perch space allowance for pullets	11	X								X
Egg white-alginate based biomaterial for 3D tissue engineering	11					X				
The role of eggs in improving choline and DHA nutrition during development	11			X						
Sustainable composites from waste eggshells for practical applications	11					X	X			
Assessing hatchery related well-being	12	X								X
Development of novel and alternative approaches using small-RNA based immune-stimulant molecules for control of avian infectious bronchitis virus	12							X		
Effect of LED flicker on the welfare, health, and production of pullets reared to 16 weeks and further impacts on hen performance and egg production and quality	12	X								
Impact on metabolic health of new ingredients enriched with active components derived from egg yolk	12			X		X				
Understanding the social representations of meat, eggs and protein replacement products and their impact on food habits	13								X	
Whole eggs for reducing inflammation and promoting muscle repair in adults with obesity	13			X						
Surveillance of egg yolk peritonitis (EYP) and causative <i>Escherichia coli</i> in Alberta egg farms	13							X		
A detailed characterization of particulate matter in Canadian egg farms	13						X	X		
Long-life layers: An environmental, economic, and animal welfare cost/benefit analysis	13						X		X	
The use of pecking blocks as foraging enrichment for improvement of feather condition in enriched colonies	14	X								X

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Pre-hatch sexing for hens based on chorioallantoic membrane (CAM) immune-interrogation	14	X					X			
Egg versus whey protein as the optimal supplement for fitness-conscious people	14			X		X				
Cold plasma pasteurization of liquid whole eggs	15		X							
Use of full-body imaging scans on live hens to develop a model describing the impact of body composition on sexual maturation	15							X		X
Supplementation strategies in vitamin D to protect layers from vitamin D deficiency and immunological stress	15			X				X		
Accelerating speed to market of an egg-derived natural health product: Clinical efficacy and safety assessment of egg peptides in the management of high blood pressure	15			X		X				
From eggshell wastes to key components in green energy storage and conversion	16					X				
Evaluation of hemp seed products to ameliorate fatty liver disease and reduce cannibalism in laying hens	16	X		X				X		
Manipulation of maturity with light during incubation	16							X		

Completed research 2020-2021

The role of shell protein in controlling bacterial movement through laying hen eggs

Dr. Bruce Rathgeber, Dalhousie University

Objective

This project assessed the presence of antimicrobial proteins in eggshells from a wide range of genetic backgrounds to determine if the increased protection from *Salmonella* penetration in some hens is related to increased presence of antibacterial proteins in the eggshell.

Results

The study used eggs from Lohmann LSL Lite, Lohmann Brown Lite, Barred Plymouth Rock and Ross 308 breeds, with all hens between 36 and 38 weeks of age. While Barred Plymouth Rock eggs were the smallest, no differences in breaking force or shell thickness were found between eggs. The ability to resist bacterial penetration differed among breeds. Lohmann Brown eggs had the highest bacterial penetration count, while eggs from Lohmann LSL Lite hens had the lowest. The profile of proteins from the shell matrix indicated that one protein, referred to as “36kDa”, was notably absent in eggs from Lohmann Brown Lite, while it was highest in Lohmann LSL Lite and somewhat present in the eggs from the other two breeds. The presence of this protein on the eggshell may be a clue as to why Lohmann LSL Lite eggs were able to resist bacterial penetration better than Lohmann Brown Lite eggs.



Investigating the influence of a range of exposure conditions during simulated transport on pullet and end-of-lay physiology, welfare and meat quality

Dr. Karen Schween-Lardner, University of Saskatchewan

Objective

This study investigated the response of pullets and end-of-lay hens to a range of travel exposure conditions, durations and feather covers during simulated transport. Data from this project will support the development of evidence-based transportation limits for pullets and end-of-lay hens in regulations and Codes of Practice.

Results

For this study, researchers created simulated transport experiences by placing the birds in crates and inside environmental chambers set to varying temperatures and levels of relative humidity, and recorded their behavioural responses during 4, 8 and 12 hours of exposure. The hens were then removed from the crates and the researchers collected a range of data including body weight and blood samples.

The results clearly showed that age, feather cover and perhaps body weight can have a significant impact on how laying hens are able to cope with temperature, humidity and duration of transportation. Pullets were able to regulate body temperature, or thermoregulate, and could handle colder temperatures and longer transportation without major impacts. However, end-of-lay hens with poor feather cover were not able to cope at cold temperatures, particularly at -15°C. All hens showed the ability to thermoregulate at higher temperatures and humidity levels. In addition, the research showed that longer transport times may cause dehydration.

Egg production for a complete cycle feeding of dietary seaweed

Dr. Bruce Rathgeber, Dalhousie University

Objective

The project evaluated the use of dietary red seaweed in laying hen diets over an entire production cycle to confirm the safe, long-term use of red seaweed as a dietary ingredient. It also looked to determine if the established benefits of red seaweed supplementation on hen intestinal health and protection from pathogen colonization was sustained over the production cycle.

Results

The results of this project indicate that red seaweed (*Chondrus crispus*) can be included for an extended period in the diet of laying hens up to a level of 3% with no negative effects on performance. Although some negative impacts on gut microbiota (higher clostridia and lower lactobacilli) and shell quality (less density and thickness) were associated with low levels of inclusion (0.5%), higher levels of inclusion (1.75-3%) of red seaweed did not impact eggshell quality as compared to the control. Additionally, high levels of red seaweed produced a favorable shift in the fatty acid profile of the yolk by increasing omega-3 fatty acids concentration, without increasing omega-6 fatty acids, which has benefits for human health. These results build on Dr. Rathgeber's previous work establishing red seaweed as an effective feed ingredient with antimicrobial properties.

Research in progress

Precision feeding layers for improved uniformity, production and sustainability

Dr. Martin Zuidhof, University of Alberta

Objective

Researchers are using precision feeding to improve the uniformity of free run pullets and laying hens by feeding an optimal diet based on real-time body weight readings and reducing body size and frame size variation at the point of sexual maturity.

Development of strategies for control of avian influenza virus transmission

Dr. Shayan Sharif, University of Guelph

Objective

This project aims to develop vaccine formulations that can effectively control avian influenza (AI) virus shedding and be administered in-ovo or in feed, water or spray. The mucosal delivery vaccine platform that will be established in this research could be used for other types of poultry vaccines. This research will combine expertise in vaccine development and computer modelling to model the transmission of AI from vaccinated poultry to susceptible poultry, and create a decision support system for the management of AI.



The role of omega-3 fatty acids in bone development in pullets: Investigating epigenomic response to breeder and perinatal nutrition

Dr. Elijah Kiarie, University of Guelph

Objective

This project will investigate the epigenetic, long-term effects of feeding breeder hens diets enriched with omega-3 fatty acids on embryonic bone development. In addition, it will assess the subsequent effect on skeletal development and performance in breeder offspring, namely pullets and laying hens, and on pullet behaviour when they are subjected to stressors.

Eggshell membrane nano-particles for biomedical applications

Dr. Maxwell Hincke, University of Ottawa

Objective

Through this study, researchers will produce and characterize eggshell membrane nano-particles and evaluate their applications as therapeutic agents against cancer, microbial infection and inflammatory disease conditions, with an enhanced emphasis on skin applications such as cosmetics and skin cancer.

Cuticle proteins in diverse lines of hens

Dr. Bruce Rathgeber, Dalhousie University

Objective

This project will determine the presence of antimicrobial proteins in the eggshell cuticle of eggs laid by hens from a wide range of genetic backgrounds, including both commercial and heritage breeds. The study will also identify if increased protection against *Salmonella* in some hens is related to the increased presence of antibacterial proteins. The study will further assess if there is a relationship between cuticle proteins and shell matrix proteins that will allow for optimal selection of overall complement of shell proteins based on the cuticle protein profile.



How much omega-3 fatty acids do hens require for optimal health and productivity?

Dr. James House, University of Manitoba

Objective

This project seeks to define omega-3 requirements for optimal health and performance in pullets and laying hens. To do this, the study will identify whether the type and level of the omega-3 fatty acids in the diet affect bird health and productivity. Additionally, it will determine the optimal quantity and type of omega-3 fatty acids to enhance immunity in pullets and laying hens to overcome an immune challenge induced by lipopolysaccharide, an inflammation-causing component of the cell wall of gram-negative bacteria.

A novel non-antibiotic strategy for controlling avian pathogenic *Escherichia coli* in laying hens

Dr. Dongyan Niu, University of Calgary

Objective

This study will evaluate the impact of plant tannins and bacteriophages to optimize the control of *Escherichia coli* in free run housing systems in lieu of using antibiotics.

Importance of eggshell cuticle quality for reducing bacterial adherence in table eggs

Dr. Maxwell Hincke, University of Ottawa

Objective

This project aims to identify the effect of hen age, strain and egg washing on eggshell quality and components of the eggshell cuticle. The study also looks to block bacterial adhesion and reduce pathogen contamination of table eggs.

Assessment of the impact of Canadian infectious bronchitis virus variants on egg production and fertility in laying hens

Dr. Faizal Careem, University of Calgary

Objective

The study will determine the economic impact of variant infectious bronchitis virus (IBV) strains that lead to egg production and quality problems in laying hens. This project also aims to propose mitigation strategies against IBV and to evaluate vaccines capable of protecting laying hens.

Determination of the metabolic triggers responsible for sexual maturation in laying hens and their relation to rearing environment and nutrition

Dr. Gregoy Bedecarrats, University of Guelph

Objective

This study aims to determine the body weight and body composition thresholds responsible for initiating sexual maturation in two strains of laying hens reared in different environments. Researchers will characterize the metabolic signals responsible for activating and inhibiting the reproductive axis and determine if this is impacted by different rearing environments, and if this impacts skeletal integrity.

Precision pullet rearing strategies for optimal reproductive body condition

Dr. Martin Zuidhof, University of Alberta

Objective

This project aims to optimize nutritional management for free run pullets and hens. Researchers will strive to understand the metabolic and physiological interactions that govern sexual maturation and lifetime egg production using precision feeding.

Egg yolk lecithin supplementation to improve pulmonary health: Implications for healthy individuals and individuals with chronic obstructive pulmonary disease

Dr. Mathieu Morissette, Institut universitaire de cardiologie et de pneumologie de Québec – Université Laval

Objective

This study will investigate the impact of egg yolk lecithin supplementation on pulmonary health, circulating phosphatidylcholine levels and lung function in healthy individuals and individuals with chronic obstructive pulmonary disease (COPD).

Develop new application of egg protein ovotransferrin as a functional food ingredient for bone health

Dr. Jianping Wu, University of Alberta

Objective

By developing a new application for ovotransferrin, a natural bioactive egg white-derived protein, as a functional food ingredient for use in bone health products, this study aims to provide a long-term approach for preventing and mitigating osteoporosis by offering an alternative to standard treatments.

Modified eggshell membrane formulations as a novel supplement to maintain gut health

Dr. Maxwell Hincke, University of Ottawa

Objective

This study will determine the appropriate eggshell membrane format, particle size and method of preparation to formulate a capsule-based oral supplement that can be marketed for positive impact on human gut health.



Optimization of vaccination strategies for table egg layers controlling egg production problems induced by currently circulating infectious bronchitis virus variants

Dr. Faizal Careem, University of Calgary

Objective

This project seeks to optimize vaccination strategies against false layer syndrome, shell-less egg syndrome and other egg production abnormalities induced by select IBV variants isolated from laying hens. To do this, the researcher will test hens raised in Eastern and Western Canada using currently available IBV vaccines in Canada.

The fermentation of end-of-lay hen hydrolysate to produce pathogen-free microbiological-rich plant nutrient solutions

Mr. Marc Legault, Alberta Agriculture and Forestry

Objective

This study will demonstrate the value-added potential for end-of-lay hens by fermenting end-of-lay hen hydrolysate to produce an organic plant nutrient solution. Researchers will grow crops using this solution through commercial greenhouse techniques where crop productivity and soil health will be investigated.

The beneficial effect of egg-derived phosphatidylcholine on the obesity-related immune dysfunction

Dr. Caroline Richard, University of Alberta

Objective

Eggs are a source of phosphatidylcholine, a type of fat that is the major component of cell membranes that has been found to have a positive effect on immune function in humans. This project aims to understand the direct and indirect mechanisms by which egg

phosphatidylcholine can counteract the negative effects of a high-fat diet and obesity on the function of T-cells (cells that play a role in immune response).

Get cracking for diabetes: An egg-based breakfast for improving blood glucose control in type 2 diabetes

Dr. Jonathan Little, University of British Columbia Okanagan

Objective

This study looks to determine if consuming an egg-based breakfast can improve glucose control and cardiometabolic health in people with type 2 diabetes when compared to a standard low-fat breakfast.

Animal implant studies with nano-textured eggshell-based constructs for bone regeneration

Dr. Maxwell Hincke, University of Ottawa

Objective

In this project, the researcher will evaluate the biocompatibility, mineralization, and integration of nano-textured eggshell-based constructs for bone replacement when implanted into rats. This study is a continuation of Dr. Hincke's project entitled *Nano-textured eggshell scaffolds for bone regeneration*.

Use of 3D kinematics and genomics to evaluate perching biomechanics in commercial and heritage strains of enriched colony housed pullets and laying hens

Dr. Clover Bench, University of Alberta

Objective

This study will assess the biomechanics of perching behaviour in pullets and laying hens using 3D kinematics to determine optimal phenotypes associated with specific genomic markers, stronger bones and better keel and foot health for hens housed in enriched colonies.

Mining the hen gastrointestinal microbiome for novel anti-infective probiotics to reduce the incidence of bacterial infections

Dr. Jennifer Ronholm, McGill University

Objective

The researchers will seek to discover anti-infective novel probiotics in the intestine of laying hens that could reduce the incidence of bacterial infections, with the aim to eliminate or reduce the need and use of antibiotics.

Impact of alternative housing systems on layer health and egg production

Dr. Martine Boulianne, Université de Montréal

Objective

Data will be collected from commercial farms to understand the effect of enriched colony and aviary housing environments on laying hen health and welfare, air and litter quality and production parameters such as egg production, feed consumption and mortality.



Eggs as a strategy to maintain retina health in people with diabetes

Dr. Miyoung Suh, University of Manitoba

Objective

This project will investigate the effects of consuming lutein and omega-3 DHA-enriched eggs on retina health in people with diabetes. The results of this study will contribute to the development of prevention strategies for eye health in diabetic individuals.

Functional feedstuffs to bolster performance and immunocompetence of pullets reared at different rearing densities in enriched colony housing systems

Dr. Elijah Kiarie, University of Guelph

Objective

This study aims to understand the impact of functional feedstuffs (e.g. omega 3 fatty acids, yeast metabolites) on pullet growth, mortality, health and *E. coli* load in enriched colony housing systems at low and high stocking densities. Additionally, this project will examine the long-term effects of functional feedstuffs on laying hen performance and livability.

Optimization of environmental and hen welfare outcomes in Canadian egg production using predictive analytics (machine learning) techniques

Dr. Nathan Pelletier, University of British Columbia Okanagan

Objective

Researchers are aiming to optimize the sustainability of the egg industry by identifying animal welfare and environmental best practices through machine-learning techniques. The results from this project will provide improvement opportunities and trade-offs to inform the on-going housing system transition in Canada.



Determination of ideal perch space allowance for pullets

Dr. Karen Schwean-Lardner, University of Saskatchewan

Objective

This study will determine the minimum perch space requirements for pullets throughout rearing. Additionally, this project aims to determine the impact of perch space and genotype on growth and performance parameters, behaviour, bone strength, and keel bone damage.

Egg white-alginate based biomaterial for 3D tissue engineering

Dr. Simon Tran, McGill University

Objective

With this project, the researchers aim to fully characterize egg white alginate for use as a novel 3D scaffold to grow organoids such as salivary glands. This study is a continuation of Dr. Tran's *A novel egg white-based biomaterial for 3D tissue engineering* project.

The role of eggs in improving choline and DHA nutrition during development

Dr. Angela Devlin, University of British Columbia

Objective

This project seeks to understand the role of eggs on child development. Specifically, it will explore if a mother's egg consumption during lactation affects the nutrient composition of human milk, and the impact egg consumption has on dietary nutrient intake in children. This study will also investigate the cardiometabolic risk of egg consumption in women and children.

Sustainable composites from waste eggshells for practical applications

Dr. Duncan Cree, University of Saskatchewan

Objective

This study will determine if eggshells can improve physical, chemical and mechanical properties of polylactic acid polymers, a bioplastic that is a more sustainable alternative to petroleum-based plastics. It also aims to find alternative uses of eggshells and to widen the scope of field applications for polylactic acid polymers.



Assessing hatchery related well-being

Dr. Karen Schwean-Lardner, University of Saskatchewan

Objective

The researchers look to provide evidence-based information to assist hatcheries with decision making around equipment and transportation practices that promote chick welfare.

Development of novel and alternative approaches using small-RNA based immune-stimulant molecules for control of avian infectious bronchitis virus

Dr. Neda Barjesteh, Université de Montréal

Objective

This project will identify and evaluate the ability of small-RNA molecules to target and control IBV in laying hens. The researchers will examine if these small-RNAs can increase the efficacy of IBV vaccinations.

Effect of LED flicker on the welfare, health, and production of pullets reared to 16 weeks and further impacts on hen performance and egg production and quality

Dr. Karen Schwean-Lardner, University of Saskatchewan

Objective

This longitudinal study aims to determine the impact of flickering LED lights on pullet and laying hen health, welfare, and performance including egg production and egg quality.

Impact on metabolic health of new ingredients enriched with active components derived from egg yolk

Dr. Alain Doyen, Université Laval

Objective

Applying high hydrostatic pressure to egg yolk generates granule and plasma fractions enriched with active components (e.g. proteins, folic acid). This project aims to determine the digestibility and bioavailability of these fractions along with their impact on metabolic health, the microbiota, and intestinal health in humans.

Understanding the social representations of meat, eggs and protein replacement products and their impact on food habits

Dr. Laurence Godin, Université Laval

Objective

The researchers intend to understand the role and social representations of alternatives to meat, eggs and other animal proteins. This project will provide the egg industry with knowledge on emerging dietary trends and their impact on egg consumption practices.

Whole eggs for reducing inflammation and promoting muscle repair in adults with obesity

Dr. Michael De Lisio, University of Ottawa

Objective

This project seeks to understand if a short term increase in whole egg consumption aids in muscle regeneration and reduces inflammation following exercise in obese adults.



Surveillance of egg yolk peritonitis (EYP) and causative *Escherichia coli* in Alberta egg farms

Dr. Dongyan Niu, University of Calgary

Objective

This study will determine the prevalence and impact of EYP in Alberta pullets and laying hens. Additionally, the researchers aim to genetically characterize EYP and determine risk factors associated with its existence.

A detailed characterization of particular matter in Canadian egg farms

Dr. Ran Zhao, University of Alberta

Objective

This study seeks to evaluate, optimize and validate the use of low-cost air quality sensors in egg farms. Additionally, the researchers aim to understand the trend of dust and particulate matter in Canadian egg farms, particularly those with enriched colony and aviary housing systems. This includes identifying factors impinging on the concentration of dust and particulate matter, and understanding the chemical composition and toxicological effect of particulate matter on egg farms.

Long-life layers: an environmental, economic, and animal welfare cost/benefit analysis

Dr. Nathan Pelletier, University of British Columbia Okanagan

Objective

This study will investigate and quantify the potential effects of extending lay cycle lengths on the environmental, animal welfare, and economic performance of egg production in Canada. The evaluation of these impacts can provide valuable information to Canada's egg farmers about the economic feasibility and sustainability implications of longer lay cycles.



The use of pecking blocks as foraging enrichment for improvement of feather condition in enriched colonies

Dr. Tina Widowski, University of Guelph

Objective

This project looks to determine the effect of pecking blocks on foraging behaviour, feather pecking, feather damage and beak shape, while also identifying the most effective placement of pecking blocks within an enriched colony. Researchers will also note individual differences in frequency and duration of pecking block use among hens and will match this behaviour to health outcomes, including keel fractures, feather damage and eggshell quality. Finally, this study will establish whether the attraction to pecking blocks is related to its nutritional composition.

Pre-hatch sexing for chicks based on chorioallantoic membrane (CAM) immune-interrogation

Dr. Maxwell Hincke, University of Ottawa

Objective

This project will develop and validate an immunochemical approach to sex determination in ovo, by detecting the presence of chorioallantoic or blood specific proteins encoded on the W chromosome, at the earliest possible embryonic age.

Egg versus whey protein as the optimal supplement for fitness-conscious people

Dr. Philip Chilibeck, University of Saskatchewan

Objective

This study will evaluate the effectiveness of whole-egg protein powder supplements compared to whey protein supplements in the diets of males and females aged 18-35 years old who are currently engaged in exercise training.

Cold plasma pasteurization of liquid whole eggs

Dr. Kevin Keener, University of Guelph

Objective

This project will develop a protocol for the inoculation and recovery of *Salmonella Enteritidis* in the liquid whole egg and assess the microbial contamination present in raw, liquid whole egg. The researchers will then study the effect of high voltage atmospheric cold plasma treatment parameters on the decontamination of *Salmonella Enteritidis* and background microflora in the liquid whole egg. This research project will contribute to the development of a sustainable technology that could replace traditional pasteurization.

Use of full-body imaging scans on live hens to develop a model describing the impact of body composition on sexual maturation

Dr. Gregoy Bedecarrats, University of Guelph

Objective

This project seeks to develop a standard operating procedure for using full-body imaging scans on live hens and monitor body composition changes during growth of layer pullets with a specific focus on adipose tissue accumulation and bone characteristics. The researchers will also determine the precise relationship between changes in body composition and the onset of sexual maturation throughout the development of pullets,



and will generate a model describing the physiological processes governing the impact of body composition on reproductive capacity and fitness. This model will provide the tools to predict growth and maturation of pullets and proactively implement on-farm adjustments to ensure nutrition and housing requirements are met during pullet growth.

Supplementation strategies in vitamin D to protect layers from vitamin D deficiency and immunological stress

Dr. Marie-Pierre Létourneau-Montminy, Université Laval

Objective

This study will test the addition of vitamin D to hen diets in a more active form, to the maximum allowed, for up to 90 weeks of laying. Researchers will specifically explore the impact of this diet on production performance, mineral levels, immune system and bone health. With this project, the researchers look to improve the robustness of laying hens so that they can better cope with nutritional, immune, and environmental stresses in a context of longer laying cycles.

Upcoming research projects

Accelerating speed to market of an egg derived natural health product: Clinical efficacy and safety assessment of egg peptides in the management of high blood pressure

Dr. Jianping Wu, University of Alberta

Objective

Researchers will conduct a clinical trial to assess the safety and efficacy of an egg-derived peptide in managing blood pressure through a randomized, placebo controlled trial. They will also assess the impact of the egg peptide product in subjects' 24 hour systolic, diastolic and mean ambulatory blood pressure for six weeks.



From eggshell wastes to key components in green energy storage and conversion

Dr. Zhi Li, University of Alberta

Objective

Carbonized eggshell membrane can work as an excellent electrode material in energy storage systems commonly used in electric vehicles and batteries. This project will focus on boosting the competitive advantage of carbonized eggshell membrane for electrode material. In addition, the researchers aim to improve the technology readiness level and expand the potential market of this product.

Evaluation of hemp seed products to ameliorate fatty liver disease and reduce cannibalism in laying hens

Dr. Stephanie Collins, Dalhousie University

Objective

This study will look at the effect of feeding hemp by-products to laying hens, specifically assessing the impact on production performance, mortality rate, incidence of fatty liver disease, egg yolk cannabidiol (CBD) and fatty acid profile, feather pecking behaviour and incidence of cannibalism, and gut microbial populations. The researcher aims to provide recommendations for including hemp products in laying hen diets.

Manipulation of maturity with light during incubation

Dr. Bruce Rathgeber, Dalhousie University

Objective

Researchers will determine the impact of photoperiod length during incubation of hatching eggs on several factors, including: hatch success and timing of hatch, early post-placement feed and water intake, recovery from long distance transportation, age at first egg, overall performance over a production period, egg number and egg size, and bone health in the long term. This project will provide data to further the knowledge of potential benefits of using lights in incubators.



Visit eggfarmers.ca or contact us at research@eggs.ca for more information about Egg Farmers of Canada or our research program.

