

# Plant Protein Science and Technology Forum Abstracts

October 2020

Hosted online by the American Oil Chemists' Society (AOCS)

For more information, please visit <https://plantprotein.aocs.org>.

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## Session: Processing and Utilization Technologies, Tuesday, October 6, 2020

Session Time: 8:00 AM - 11:30 AM

Session Chair: Chris Marinangeli - Pulse Canada

Session Chair: Mehmet C. Tulbek, PhD - AGT Foods Research & Development Centre

Session Chair: Janitha Wanasundara - Agriculture and Agri-Food Canada

In this session processing and utilization technologies of plant-based proteins and their relationships in plant-based food systems will be discussed. Presentations include protein-starch interactions in the development of structure and functionality of plant-based products, development strategies for plant-based meat alternatives, almond, canola and oats as alternative protein sources and enzyme solutions for plant-based food and beverage production.

Tuesday, October 6, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 8:00 AM - 8:15 AM

### **Introduction: Processing and Utilization Technologies**

Session Chair: Chris Marinangeli - Pulse Canada

Session Chair: Mehmet C. Tulbek, PhD - AGT Foods Research & Development Centre

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Tuesday, October 6, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 8:15 AM - 8:35 AM

### **Protein-starch Interactions to Create Structure in Plant-based Foods**

Speaker: Alejandro G. Marangoni, FRSC, FAOCS, FIFT, FRSC (U.K.) - University of Guelph

Co-Author: Stacie Dobson

Animal protein makes up a large sector of the food industry, however, it is considered to be one of the most environmentally harmful and unsustainable food sources. With the increasing population, the demand for food will also rise. The growth of the population cannot be stopped, but the creation of foods that are more environmentally sustainable that can ultimately reduce the demand for animal protein and alter consumption habits, could help save our planet from self-destruction. Plant-based meat analogues are considered an environmentally friendly and sustainable alternative to animal meat, providing similar nutritional protein value with decreased

environmental impact. However, most of the products on the market do a poor job of mimicking the fibrous texture of meat, while the ingredients and methods used are usually not consumer-friendly. In this talk we will outline our view on the design of plant-based meat products. The hydrophobic prolamines from wheat, sorghum, corn and barely have been found to be able to stretch under specific conditions and form fibers, however, a supporting polymer network is also necessary. This supporting network needs to possess certain mechanical characteristics which can be modulated using filler particles and modulating its water-binding behavior. By creating a unique rapid swelling starch- protein isolate network, the fibrils can be suspended and repeatedly extended to separate them into a fine fibril network. The starch and protein isolate house the fibers and allow for the sample to set and form a solid meat like structure without the need for extrusion.

Tuesday, October 6, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 8:45 AM - 9:05 AM

### **Scientific challenges for next generation meat analogues**

Speaker: Atze Jan Van der Goot - Lab of Food Process Engineering, Wageningen University  
to be done

Tuesday, October 6, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 9:15 AM - 9:20 AM

### **Almonds in the world of plant based proteins**

Speaker: Swati Kalgaonkar - Almond Board of California

Almonds are one of the tree nuts with highest protein content. Their protein quality has also been ascertained and published (House et al 2019). Their taste and variety of forms lends them a great advantage in the plant protein world.

The amino acid profile of almonds is similar to other nuts; lysine is the limiting amino acid, but they are high in methionine and cyteine. When paired with other plant sources of proteins with complimentary amino acid profile, almonds offer complete protein as part of a healthy and balanced diet.

Tuesday, October 6, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 9:20 AM - 9:35 AM

### **Challenges and Perspectives on the Development of Bioguided Extraction of Almond Proteins**

Speaker: Juliana Leite Nobrega de M. Bell - UC Davis

Tuesday, October 6, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 9:40 AM - 10:00 AM

### **Oats as an alternative protein source**

Speaker: Nesli Sozer, PhD - VTT Technical Research Centre of Finland

Tuesday, October 6, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 10:10 AM - 10:30 AM

### **Canola Proteins: Moving Plant-Based Foods Forward**

Speaker: Martin Schweizer, PhD - Burcon NutraScience Corporation

As the current trend towards plant based foods continues to grow, the food industry is looking for new alternative plant proteins. In particular, the search has focused on low allergenic and non-GMO alternatives to soy protein which has long been the dominant plant protein. The two fundamental drivers for using proteins in food products are nutrition and function. On one hand, proteins should have a complete nutritional profile supplying all of the essential amino acids that are required in our diet. On the other hand, a protein is used in food products for its functional characteristics such as solubility, emulsifying, binding, gelling or foaming. Canola proteins can meet all of these criteria and have long been of interest for use as food ingredients. However, traditional methods of extracting protein from canola for use in human food have proven to be challenging mainly due to limitations in flavour and colour of the final products. Burcon NutraScience Corporation has developed disruptive technology to extract and produce highly purified canola protein products starting from canola meal. A proprietary purification process separates the two naturally occurring proteins resulting in a cruciferin-rich canola protein and a napin-rich canola protein. These products have unique nutritional value as well as great functional and sensorial characteristics and present an excellent alternative to animal proteins. This presentation will give an overview of the many opportunities with canola proteins in human food applications.

Tuesday, October 6, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 10:35 AM - 10:55 AM

**Enzyme solutions for plant-based food and beverage production**

Speaker: Katie Maloney, PhD - Novozymes

The plant-based food and beverage market is growing much faster than the overall food and beverage market. Companies are looking for ways to differentiate their plant-based product offerings through unique sensory experiences and enhanced nutrition. Formulating plant-based foods and beverages to meet the desired organoleptic and nutrition targets can be challenging. This presentation will focus on how enzymes can help overcome these challenges in plant-based dairy alternatives. Optimizing mouthfeel and sweetness of oat beverages, increasing protein content of plant-based beverages, and improving texture of plant-based yogurts will be covered.

Tuesday, October 6, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 11:05 AM - 11:30 AM

**Q&A Panel Discussion: Processing and Utilization Technologies**

Session Chair: Chris Marinangeli - Pulse Canada

Session Chair: Mehmet C. Tulbek, PhD - AGT Foods Research & Development Centre

Session Chair: Janitha Wanasundara - Agriculture and Agri-Food Canada

Speaker: Alejandro G. Marangoni, FRSC, FAOCS, FIFT, FRSC (U.K.) - University of Guelph

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Speaker: Swati Kalgaonkar - Almond Board of California

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Speaker: Martin Schweizer, PhD - Burcon NutraScience Corporation

Speaker: Katie Maloney, PhD - Novozymes

**Session: Human Experiences with Plant Proteins: Nutrition & Health Benefits,  
Sensory Attributes and Personal Care, Thursday, October 8, 2020**

Session Time: 8:00 AM - 11:00 AM

Session Chair: Phil S. Kerr, PhD - Prairie AquaTech, LLC

This Session will explore how emerging technologies and analytical methods for plant proteins and the products in which they are used affect how people "experience" plant proteins. Topics will explore new methods for determining the nutritional quality of proteins and their implications for nutrition labelling and influencing consumer perception of products in which protein content and quality are characterizing attributes. In addition, the utilization of comprehensive, quantitative sensory science methods to develop protein ingredients and the foods and other products that contain them will be presented. Finally, the opportunities and issues for using plant proteins, hydrolyzates and peptides in cosmetic and personal care applications will be discussed and bring a holistic view to how protein ingredients can enhance the human experience.

Thursday, October 8, 2020

Session Time: 8:00 AM - 11:00 AM

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**Human Experiences with Plant Proteins: Nutrition & Health Benefits, Sensory Attributes and Personal Care**

Thursday, October 8, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 8:15 AM - 8:40 AM

**Plant-based Proteins: Challenges with Current Labeling Regulations in the U.S.**

Speaker: Kathy Musa-Veloso, PhD - Intertek Health Sciences Inc.

The labeling of a food represents an important means of highlighting that a food is plant-based, the food's protein content, as well as the health attributes of the protein. In the U.S., the naming of a plant-based food has turned out to be quite complicated, particularly when the plant-based food is intended to be an analogue for an animal-based food. This is because most animal-based foods (*e.g.*, butter, cheese, yoghurt, meat) are associated with standards of identity, which are regulations that dictate the composition of these foods. In addition to the challenges inherent in ascribing a descriptive name to a product, there are challenges with respect to the types of claims that can be made for the plant-based protein. Prior to making any claims about protein content or health benefits, it is important to understand the types of claims that are permissible in the U.S., as well as the associated substantiation requirements and qualifying criteria. In this presentation, Dr. Kathy Musa-Veloso will provide an overview of the regulations in the U.S. pertinent to the

naming of plant-based foods, the claim categories that are permissible in the labeling of foods and dietary supplements containing plant-based protein, the challenges associated with making some of these claims, and untapped opportunities.

Thursday, October 8, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 8:45 AM - 9:10 AM

**Assessing Protein Quality in Foods: What Does the Future Hold?**

Speaker: James D. House, PhD - University of Manitoba

Thursday, October 8, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 9:15 AM - 9:40 AM

**How to Determine Which Sensory Attributes are Important in Plant-Based Products?**

Speaker: Ivy Koelliker, MS - Sensory Spectrum

A quick internet search on foods and cosmetics trends will undoubtedly return that plant-based proteins continue to be a hot topic. From meat analogs to dairy alternatives, new product introductions are flooding the global market. Yet, the use of plant-based protein in consumer products that traditionally showcased animal proteins comes with a multitude of sensory challenges. So how does one go about optimizing the flavor and texture of plant-based alternatives to meat, fish, yogurt or ice-cream? How does one deliver a sensory experience that consumers will enjoy and return to time and time again? The answer is: with the help of sensory and consumer science. In this presentation, you will learn how sensory evaluation, specifically descriptive analysis and product testing with consumers, alone or in combination with one another, yield valuable insights for product developers and those intent on entering or further establishing their presence in the plant-based market.

Thursday, October 8, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 9:45 AM - 10:10 AM

**Peptides and Proteins: the most versatile ingredients for cosmetic products**

Speaker: Karl Lintner, PhD - Kal'idées

Peptides and proteins have been used as cosmetic ingredients for at least 40 years, using both terms for the same type of substance: hydrolyzed proteins of various origin (collagen, milk, soy, wheat...). They afforded moisturization and superficial smoothing benefits to skin and not much else. Over time, sophistication of both chemical derivatization of such protein fragments and of methods of claim substantiation led to specific protein complexes such as quaternized anti-frizz benefits and/or volumizing hair claims, to skin tightening ingredients based on High Molecular Weight proteins from wheat and similar material, to name but a few. About 20 years ago, the idea of using oligopeptides, of synthetic or "natural" derived sequence, was introduced together with very specific bioactivity claims on skin repair, skin toning, tanning, hair growth and the like.

The presentation will give examples of the various applications to which high- and low molecular weight proteins and specific peptides can be employed in the Personal Care domain. Do's and don'ts, and an appraisal of the market will also be addressed.

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**Q&A Panel Discussion: Human Experiences with Plant Proteins: Nutrition & Health Benefits, Sensory Attributes and Personal Care**

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Speaker: Kathy Musa-Veloso, PhD - Intertek Health Sciences Inc.

Speaker: James D. House, PhD - University of Manitoba

Speaker: Ivy Koelliker, MS - Sensory Spectrum

Speaker: Karl Lintner, PhD - Kal'idées



**Session: Emerging Technologies for Plant Protein Quality-Based Supply Chains – US Soy, Tuesday, October 13, 2020**

Session Time: 8:00 AM - 11:00 AM

Session Chair: Phil S. Kerr, PhD - Prairie AquaTech, LLC

Moderator: Keenan McRoberts, PhD - United Soybean Board

Accurate, affordable and rapid Near Infrared Reflectance (NIR) analysis of protein-rich crops like soybeans has been used commercially for 25 years but they often fail to accurately predict the value in use of protein ingredients like soybean meal for the major production livestock markets that soybean serve. Efforts to enhance NIR systems for predicting protein quality are now underway in the United States soybean industry and are increasingly being used to distinguish and differentiate quality and value in use. This session at the 2nd Annual Plant Protein Science and Technology Forum will highlight the emerging analytical technologies that are enabling new U.S. soybean supply chains that are based on more robust predictive technologies for protein quality. In addition, economic considerations using protein quality for identifying and mitigating value at risk in these emerging supply chains will also be presented as a viable model for future commercialization of soy protein ingredients in domestic and global markets.

Tuesday, October 13, 2020

Session Time: 8:00 AM - 11:00 AM

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**Introduction: Emerging Technologies for Plant Protein Quality-Based Supply Chains – US Soy**

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Session Time: 8:00 AM - 11:00 AM

Presentation Time: 8:15 AM - 8:40 AM

### **Breeding Soybean with High Protein and Improved Amino Acid Profiles**

Speaker: Rouf M. Mian, PhD - USDA-ARS

The meal protein content derived from most current commercial soybean varieties in the U.S. are below the 47.5% minimum meal protein content needed at the national and international soybean meal markets. This reflects a long-term pattern of slow decline in seed protein content of U.S. soybean. According to the U.S. Soybean Export Council, protein content of U.S. soybean declined to a record low of **34.1 percent** in 2017. In November 2016, CME lowered soybean futures meal contracts by 0.5% to 47.5% and allowed for no rejection or penalty to 47.0% to reflect the lower average protein content. This is a major concern for U.S. soybean farmers who want to reverse this trend. The negative correlations of seed protein with seed yield and oil have been major constraints to the development of soybean lines with high meal protein without reduction in yield or oil.

Despite the historical negative correlations of seed protein with seed oil and seed yield, recent USB funded research by our group indicates that small but meaningful increases in soybean meal protein are possible with little or no drag on seed yield. We have recently released and are nearing release of new soybean varieties/germplasm which produce high ( $\geq 48\%$ ) meal protein and have little or no yield drag compared to the elite check varieties. However, significant challenges remain in achieving full success in this area of research, particularly in the area of balanced amino acid profiles. Several amino acids in soybean protein, including the sulfur containing amino acids Methionine and Cysteine are less than optimum in soybean seed. The challenges in improving soybean meal protein, progress being made and way forward will be addressed.

Tuesday, October 13, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 8:45 AM - 9:10 AM

**Soybean Quality: Beauty is in the eye of the beholder**

Speaker: Seth Naeve - University of Minnesota

The US Soy Family, which includes the American Soybean Association, United Soybean Board, and US Soybean Export Council, has supported a survey of the quality of the US soybean crop since 1986. This survey is intended to provide new crop quality data to aid international customers with their purchasing decisions. The survey also serves as a benchmark for US soybean quality and as an important jumping off point for investigating genetic, cultural, and environmental inputs on soybean quality. For this presentation, the survey will provide the platform for discussions about factors affecting soybean quality and trade-offs between seed constituents. A discussion of alternative measures of soybean quality will be an important component of this presentation.

Tuesday, October 13, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 9:15 AM - 9:40 AM

**A Nutritionist's View on Value Points and Methods of Quantifying Value Across Varying Soy Quality**

Speaker: Bart Borg - Standard Nutrition Services

Tuesday, October 13, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 9:45 AM - 10:10 AM

**Opportunities and Challenges in Differentiating Soybeans Based on Essential Amino Acids**

Speaker: William Wilson - North Dakota State University

Opportunities and Challenges in Differentiating Soybeans Based

on Essential Amino Acids

By Dr. William W Wilson

To the

AOCS 2020 Plant Protein Science and Technology Forum

October 13, 2020

University Distinguished Professor

CHS Chair in Risk Management and Trading

Department of Agribusiness and Applied Economics

**Abstract:** An important emerging challenge and opportunity in soybean marketing is the variability in quality. This study analyzes the effects of testing soybeans for specific quality traits including essential amino acids. A model was developed to analyze costs and risks that may arise for grain handlers to segregate soybeans into high- and low-quality grain flows based on alternative importer purchasing specifications. A stochastic optimization model is used to determine optimal testing locations and intensities in addition to the costs and risks to grain handlers. The model allows for blending to determine optimal shipments from separate locations with differing quality distributions. This paper provides a framework for agribusinesses, grain handlers, and marketers to make decisions in response to importers' purchasing requirements and strategies.

**KEYWORDS** soybean quality, testing, trading

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**Session: Emerging Technologies for Plant Protein Quality-Based Supply Chains –  
Global Crops, Thursday, October 15, 2020**

Session Time: 8:00 AM - 11:00 AM

Session Chair: James D. House, PhD - University of Manitoba

Session Chair: Janitha Wanasundara - Agriculture and Agri-Food Canada

Thursday, October 15, 2020

Session Time: 8:00 AM - 11:00 AM

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Thursday, October 15, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 8:15 AM - 8:40 AM

### **Breeding pea for improved protein concentration and quality**

Speaker: Tom Warkentin - Crop Development Centre, University of Saskatchewan

This presentation will address research activities aimed at improving the pea crop to fuel the plant-based protein industry. In order to expand the role of pea in this industry, new varieties must be brought to the marketplace that show improvements in grain yield, agronomic performance, as well as increased seed protein concentration. Breeding and research initiatives directed towards these goals will be addressed.

Thursday, October 15, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 8:45 AM - 9:10 AM

### **Lupin, an ancient crop with a promising future**

Speaker: Rob J.F van Haren, PhD - Hanze University of Applied Sciences, Groningen, The Netherlands

Andean Lupin (*Lupinus mutabilis*, tarwi, chocho, pearl lupin) is one of the “Lost Crops of the Inca’s”. Remains of Andean lupin seeds are found in the tombs of the pre-Inca Nazca culture (about 500 AD) in the Peruvian coastal desert, and the plant is represented in stylized paintings on large pots from the Tiahuanaco culture (500 to 1,000 AD) of the Andean highlands. Andean lupin is like other lupins from this genus rich in quinolizidine alkaloids which makes it toxic for direct human consumption. Low alkaloid contents is a prerequisite for making lupins of interest as major staple crop

Von Sengbusch, a German plant breeder in the 1930’s, was the first who succeeded to develop “sweet”, low alkaloid varieties of the four major lupin species, white lupin (*L. albus*), narrow-leaved lupin (*L. angustifolius*), yellow lupin (*L. luteus*) and Andean lupin. Unfortunately, the sweet Andean lupin variety went lost, probably during World War II, but was later in the 1980’s developed again and registered as variety “Inti”. The availability of sweet low alkaloid Andean lupin varieties in combination with its high protein (45%) and oil (20%) content, gives Andean lupin the potential to have a business case like soybean. However, three major hurdles need to be overcome. First hurdle is domestication of the crop. Second hurdle is development of fossil solvent free green practices for lupin bean processing like an integrated supercritical CO<sub>2</sub>-biorefinery which can make cost-effective products using biocascading principles. Third hurdle is consumer acceptance of lupin based products. This hurdle can be taken by communicating lupin beneficial “superfood” effects on human beauty, well-being and health. The EU-funded BBI-JU H2020 project LIBBIO has the objective to develop new “sweet” Andean lupin varieties, an integrated scCO<sub>2</sub> biorefinery and high-end lupin products for skin and hair care cosmetics and food applications

Thursday, October 15, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 9:20 AM - 9:45 AM

**Faba bean: the future king of plant protein production for cool climates**

Speaker: Frederick L. Stoddard, PhD (Camb), DrHC (LLU) - University of Helsinki

Faba bean (*Vicia faba*) was one of the first plants to be cultivated at the dawn of agriculture in the Fertile Crescent. It is now grown on all inhabited continents. Like other grain legumes, it fixes atmospheric nitrogen in symbiosis with Rhizobium bacteria in its root nodules, so it requires little nitrogen fertilizer. It is adapted to cool-temperate conditions, in contrast to the warm-temperate adaptation of soybean. Thus, it is autumn-sown in oceanic and Mediterranean climates and spring-sown in sub-boreal and other cool climates. Its protein concentration and biomass production are generally higher than those of other cool-season starchy legumes such as pea and lentil, so it has the potential to produce more protein per hectare than they do. A natural mutation is available to reduce the concentrations of the main antinutritional compounds, vicine and convicine. Faba bean is thus a top candidate as a source of plant protein for use in food manufacture and is already used in meat and ice-cream analogues in Finland.

Thursday, October 15, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 9:50 AM - 10:15 AM

**Canola Protein, The Future – Food, Feed & Film**

Author: Curtis. B Rempel - Canola Council of Canada

Speaker: Lisa Campbell, MSc - Protein Industries Canada

Thursday, October 15, 2020

Session Time: 8:00 AM - 11:00 AM

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**Q&A Panel Discussion: Emerging Technologies for Plant Protein Quality-Based Supply Chains – Global Crops**

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Session Chair: Janitha Wanasundara - Agriculture and Agri-Food Canada

Speaker: Tom Warkentin - Crop Development Centre, University of Saskatchewan

Speaker: Rob J.F van Haren, PhD - Hanze University of Applied Sciences, Groningen, The Netherlands

Speaker: Frederick L. Stoddard, PhD (Camb), DrHC (LLU) - University of Helsinki

Speaker: Curtis. B Rempel - Canola Council of Canada



**Session: Relationship between Canine Diets & Dilated Cardiomyopathy (DCM) –  
Pet Food Health & Nutrition, Tuesday, October 20, 2020**

Session Time: 8:00 AM - 11:00 AM

Session Chair: Elaine Krul - EKSci, LLC

Session Chair: Janitha Wanasundara - Agriculture and Agri-Food Canada

DCM has become a polarizing issue in the pet food industry since the FDA first announced a possible link between certain pet food diets and DCM in July 2018. Additional research since the first FDA report has included research which showed that dietary-associated DCM may occur with some grain-free diets, but that the cause is likely multifactorial, resulting from a combination of dietary, metabolic, and genetic factors. A cause-and-effect relationship between DCM and grain-free diets has not been proven to date, however, there is much concern and debate among pet food formulators, veterinarians, and pet owners. This session is intended to inform AOCS and meeting attendees on the latest developments in this research area and stimulate ideas for any needed further research.

Tuesday, October 20, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 8:00 AM - 8:15 AM

**Introduction: Relationship between Canine Diets & Dilated Cardiomyopathy (DCM) – Pet  
Food Health & Nutrition**

Session Chair: Elaine Krul - EKSci, LLC

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& Nutrition**

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Presentation Time: 8:15 AM - 8:45 AM

**Incidence of canine dilated cardiomyopathy, breed and age distributions, and grain-free diet sales in the United States from 2000-2019: a retrospective survey**

Speaker: Eva M. Oxford, DCM, PhD, DACVIM-C - The Heart Vet, BSM Partners

Tuesday, October 20, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 8:50 AM - 9:20 AM

**Overview of pulse crops and historical use of pulses and pulse ingredients in pet food industry**

Speaker: Mehmet C. Tulbek, PhD - AGT Foods Research & Development Centre

Tuesday, October 20, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 9:25 AM - 9:55 AM

**The evaluation of protein and carbohydrate sources with an emphasis on their impact to taurine status in dogs**

Speaker: Greg Aldrich - Kansas State University

For a grain free diet to be a contributing factor on dilated cardiomyopathy in dogs several ingredient related factors must be demonstrated relative to lower circulating taurine. Previous research has implicated limited bioavailability of precursor amino acids CYS and MET and the impact of fermentable substrates on TAU destruction or elimination. Various animal proteins, legumes and tubers have been implicated recently. Bioavailability of amino acids differs from direct measurement and can be influenced by structural protein composition, thermal processing, and interference from protease inhibitors or structural carbohydrates. Direct evaluation of a single ingredient in the target species is difficult, so surrogate species such as poultry or rodents are often used. More recently *in vitro* methods have been explored such as the protein digestibility corrected amino acid score and others. These methods can aid in the comparison among protein sources for the availability of amino acids such as CYS and MET whether of animal or plant origin. The legume seeds are well established to possess protease inhibitors such as the trypsin inhibitor which can reduce protein utilization. These are generally considered to be inactivated by thermal processing. Fiber sources, such as beet pulp have been shown to reduce TAU in the circulation. Other non-structural carbohydrates such as the oligosaccharides may act in a similar fashion. Legume seeds contain appreciable levels of these non-structural carbohydrates. They are not quantified by fiber analysis so may not be accounted for during formulation. They are fermentable substrates which may affect colonic fermentation and bile acid metabolism; thus, possibly disrupting TAU availability. Examples from our laboratory

evaluating implicated ingredients in the dog and model systems will be shared to provide context to the discussion about where they may, or may not, be involved in this canine health issue.

Tuesday, October 20, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 10:00 AM - 10:30 AM

**The pulse of innovative ingredients for foods intended for dogs: Then, now and the future**

Speaker: Anna K. Shoveller, BScH, PhD - University of Guelph

Since July 2018 many researchers have been attempting to deconstruct the variables that contribute to the progression of dilated cardiomyopathy. Indeed, the most important factor to avoiding secondary DCM is ensuring sulfur amino acid sufficiency to support taurine synthesis. New information suggests differences in the minimum methionine requirement among breeds and unique SAA metabolism among small, medium and large breeds dogs. When these AA are provided in sufficient amounts in diets containing pulses, taurine excretion increases, but if SAA are adequate, taurine status does not decrease. In addition to the contribution of dietary SAA, micronutrients that provide methyl groups may also improve SAA and taurine status and micronutrient content should be considered in food formulation. While appropriate diet formulation is important, the habits of consumers as it contributes to healthy choices should also be considered among consumers who chose grain-free vs. grain-based foods.

Tuesday, October 20, 2020

Session Time: 8:00 AM - 11:00 AM

Presentation Time: 10:35 AM - 11:00 AM

**Q&A Panel Discussion: Relationship between Canine Diets & Dilated Cardiomyopathy (DCM) – Pet Food Health & Nutrition**

Session Chair: Elaine Krul - EKSci, LLC

Session Chair: Janitha Wanasundara - Agriculture and Agri-Food Canada

Speaker: Greg Aldrich - Kansas State University

Speaker: Anna K. Shoveller, BScH, PhD - University of Guelph

Speaker: Eva M. Oxford, DCM, PhD, DACVIM-C - The Heart Vet, BSM Partners

Session: Plant Proteins and Sustainability - sponsored in part by: [ADM](#), Friday, October 23, 2020

Session Time: 8:00 AM - 11:30 AM

Session Chair: Baljit Ghotra - Archer Daniels Midland Company, USA

Moderator: Seyhun Gemili - Archer Daniels Midland Company, USA

Our growing global population requires affordable proteins that promote the wellbeing of both people and the planet. This requires building a sustainable value chain from farms to consumers. Join us to participate and learn how science and technological advances can help solve the challenges as we look at the future of plant proteins. The session on plant proteins and sustainability will highlight the importance of collaborative efforts between research, industry and government agencies to apply effective technological solutions, that include sustainable agricultural practices, crop biotechnology, processing solutions, food quality, and traceability.

Friday, October 23, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 8:00 AM - 11:30 AM

### **Plant Proteins and Sustainability**

Our growing global population requires affordable proteins that promote the wellbeing of both people and the planet. This requires building a sustainable value chain from farms to consumers. Join us to participate and learn how science and technological advances can help solve the challenges as we look at the future of plant proteins. The session on plant proteins and sustainability will highlight the importance of collaborative efforts between research, industry and government agencies to apply effective technological solutions, that include sustainable agricultural practices, crop biotechnology, processing solutions, food quality, and traceability.

Friday, October 23, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 8:15 AM - 8:40 AM

### **Unlocking Nature. Enriching Life: ADM's 360° Focus on Sustainability**

Speaker: Alison Taylor - Archer Daniels Midland

Friday, October 23, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 8:45 AM - 9:10 AM

### **Digitalization to Create Business Value**

Speaker: Stuart Bashford, MBA - Bühler Group

Friday, October 23, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 9:15 AM - 9:40 AM

**Developing Camelina and Pennycress as Sustainable Sources of Functional Proteins**

Speaker: B. Pam Ismail - University of Minnesota

Friday, October 23, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 9:45 AM - 10:10 AM

**Bayer Crop Science, Sustainability, & Open Innovation – Partnering to solve agriculture’s challenges**

Speaker: Dan Ruzicka, PhD - Bayer Crop Science

At Bayer, we are driven to help solve some of the world's toughest challenges. In agriculture, this means feeding the world of the future without starving our planet. Farmers need innovation not only to grow enough, but to grow better for our planet and its people. Our scientists in R&D are united around this purpose, and our pipeline is designed to realize this goal. Everything we do—from biology, biotechnology, crop protection and data science to collaborating with external partners large and small—is about finding new and better ways to create true value for farmers, consumers and our planet. We approach innovation in three ways: We drive both incremental and disruptive innovation by leaning into our strengths to continuously improve our offerings, while at the same time advancing transformational breakthroughs at the intersection of emerging technologies and with new partners. We seek inspiration from in-field challenges and opportunities to develop tailored solutions that combine the right seeds and traits, crop protection and digital tools to meet the needs of farmers in their specific fields. We believe every investment in innovation should also be an investment in sustainability and are committed to developing products that help reduce the environmental impact of agriculture. We are passionate about improving the lives of smallholder farmers through better solutions for their fields. We remain purpose-driven in our daily endeavor to deliver products through our R&D Pipeline, to contribute to a more sustainable agriculture in the years to come.

Friday, October 23, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 10:15 AM - 10:40 AM

**Sustainability of Plant, Hybrid and Meat Products**

Speaker: Sergiy M. Smetana - DIL German Institute of Food Technologies (DIL e.V.)

Friday, October 23, 2020

Session Time: 8:00 AM - 11:30 AM

Presentation Time: 10:45 AM - 11:30 AM

**Q&A Panel Discussion: Plant Proteins and Sustainability**

Session Chair: Baljit Ghotra - Archer Daniels Midland Company, USA

Speaker: Alison Taylor - Archer Daniels Midland

Speaker: Stuart Bashford, MBA - Bühler Group

Speaker: B. Pam Ismail - University of Minnesota

Speaker: Dan Ruzicka, PhD - Bayer Crop Science

Speaker: Sergiy M. Smetana - DIL German Institute of Food Technologies (DIL e.V.)