Eighth Annual

Dairy Info Day

January 24, 2019

SaskMilk, Ministry of Agriculture and the University of Saskatchewan

University of Saskatchewan

Ministry of Agriculture

Saskmilk

Eighth Annual Dairy Info Day

Thursday January 24, 2019
Brian King Centre, Warman, SK

9:15 Registration and Coffee
9:45 Welcome and opening comments by Denise Coghill, SaskMilk Director and Andrew Van Kessel, Head, Animal and Poultry Science

Dairy Advisory Board and Rayner Dairy Research and Teaching Facility

9:50 Report from Dairy Advisory Board – Jack Ford
9:55 Report on Rayner operations – Jay Olyniuk, Manager, Rayner Dairy Facility

Presentations

10:05 Considerations in barn design to optimize cow behaviour and comfort. Trevor DeVries, University of Guelph

10:45 Genetic improvement of alfalfa. Bill Biligetu, Plant Sciences

11:15 Better treatment option for bovine respiratory disease (BRD). Jian Yang and Meena Sakharkar, College of Pharmacy and Nutrition

11:35 Undergraduate thesis project: An update on flax seed and meal for use in dairy cow diets. Maddy Lazurko

11:50 Undergraduate thesis project: Bovine leukemia virus, the tip of the iceberg. Miriam Ter Borgh

12:05 – 1:00 Lunch provided by SaskMilk

1:00 *Salmonella dublin* update. Chris Luby, WCVM

1:15 Optimizing feeding management of dairy cows. Trevor DeVries, University of Guelph

2:00 Whole crop faba bean plant as silage for ruminants. PhD candidate Víctor Hugo Guevara Oquendo

2:15 Opportunity starch sources for dairy diets. Rex Newkirk

2:25 Optimum inclusion levels for camelina meal in dairy cow diets. Tim Mutsvangwa

2:35 Closing remarks - Jack Ford

Considerations in barn design to optimize cow behaviour and comfort

Dr. Trevor DeVries, Professor, University of Guelph, tdevries@uoguelph.ca

Producers invest significant amounts of money in constructing housing for dairy cattle, with the aim of providing a comfortable environment that will not only meet the physiological needs of the cows, but also their behavioural needs. This environment should allow cows to perform behaviours that are important to them, in order to ensure adequate rest, minimize idle standing time, and free access to an appropriate, well-balanced diet. Despite these aims, housing systems do not always function well from the perspective of the cow; poorly designed, managed, and maintained facilities can cause injuries, increase the risk of lameness, limit cows from optimizing their dry matter intake, and increase competition among herd mates for access to feed and lying space. Feeding, standing and lying areas need to be designed and managed to prevent some of these problems and improve cow comfort, health, and milk quality. This includes providing free stalls that are adequately sized and provide a soft, dry resting surface, minimizing excessive idle standing by reducing stocking densities, and ensuring adequate feed and water space.

Genetic Improvement of alfalfa

Bill Biligetu
Crop Development of Center/Department of Plant Sciences, University of Saskatchewan
Email: Bill.Biligetu@usask.ca

Alfalfa is one of the most important forage crops for the dairy producers in Saskatchewan. A large number of the alfalfa cultivars available in the market are developed outside Saskatchewan such as Northern United States. These alfalfa cultivars may not be well adapted to our climatic and soil conditions as they were selected under different growth conditions and management regimes. To maintain long-term competiveness of the dairy industry, it is important to have a regional alfalfa breeding program in Saskatchewan to support industry need. In 2014, a new forage breeding program was established at the Crop Development Center of the University of Saskatchewan. This presentation will provide breeding research update and discuss future goals of the program.

Better treatment option for bovine respiratory disease (BRD)

Jian Yang and Meena Sakharkar
Drug Discovery and Development Research Group, College of Pharmacy and Nutrition, University of Saskatchewan, Saskatoon, SK S7N 5E5, Canada

Bovine respiratory disease (BRD) is the most prevalent infectious disease in diary and beef cattle. The key pathogenic bacteria identified in Canada are Mannheimia haemolytica, Pasteurella multocida and Haemophilus somni. Metaphylactic injection of tulathromycin (Draxxin) is commonly used (upon arrival) to reduce the risk and/or severity of BRD. This practice may lead to the development of drug resistance. In this study, we show that gallic acid, a natural plant product, can help lower the amount of tulathromycin required to prevent/treat BRD infections. Gallic acid also reduces/delays resistance development to tulathromycin against two key BRD causing-pathogens.

An update on flax seed and meal for use in dairy cow diets

Maddy Lazurko, 4th year Animal Science major, BSA program, University of Saskatchewan. Thesis supervisor Dr. D. A. Christensen.

Canada produces about 40% of world flax seed. It is one of the oldest oilseed crops in the world. Use of its fibre for linen and upholstery, oil for paint and industrial products, and seed for human and animal consumption is well documented. The nutrient profile of flaxseed is high in biologically active compounds that positively influence human and animal health. These compounds include omega-3 fatty acids, lignans, and essential amino acids. Feeding flaxseed meal to dairy cattle may lead to improved reproductive capabilities and enhanced immune function. Replacing concentrate with flaxseed meal or extruded flaxseed products may increase overall herd health and productivity. Flaxseed is of great interest in transition cow management as immune support, and increased energy balance it provides, can give cows an advantage when facing the biological challenges associated with pre and post-parturition. Sample rations will be provided. When flaxseed is consumed by cattle, important compounds from the seed and rumen appear in the milk resulting in a product that has increased human health benefits. The compounds in flaxseed contain anti-inflammatory and antioxidant effects. In people, they may also reduce the risk of cardiovascular disease, reduce total blood cholesterol, and provide chemopreventive and chemotherapeutic effects. This evidence suggests an opportunity in the food market for value added products such as milk high in Omega-3 fatty acids. Supporting information will be included in the PowerPoint presentation.

Bovine Leukemia Virus Summary

Miriam ter Borgh, 4th year Animal Science major, BSA program, University of Saskatchewan. Thesis supervisor Dr. D. A. Christensen.

I was born and raised on a dairy farm outside Calmar, Alberta, where we currently milk 360 cows. Dairy farming has been a great passion in my family for the past three generations, where both of my brothers are currently taking over my parents' dairy farm. I plan on using the knowledge gained over the past four years in the dairy industry upon graduation.

My fourth-year thesis topic is Bovine Leukemia Virus (BLV). BLV is a fascinating topic to me, as it is a disease that is prevalent amongst many dairy herds across the nation. However, many producers have limited knowledge or concern about the subject. Polet et al. (2017) examined BLV prevalence in countries and reported that 89.0 percent of herds in Canada and 37.2 percent of cows in Saskatchewan are BLV-positive. The purpose of my presentation is to allow the dairy industry and producers to recognize the importance of BLV, the effects it may have on their dairy farms, and the clinical and sub-clinical signs.

BLV is a retrovirus that affects B-lymphocytes in cattle. The virus is transmitted through bovine DNA and is spread through BLV-infected cells. The transmission of BLV can occur through semen, the birth canal, colostrum administration, and the re-use of blood contaminated needles. There are no vaccines and no treatment is available to kill the virus after infection, thus once an animal contracts BLV, it is infected for life.

BLV has a direct economic impact on dairy farms. According to Holly Drankhan (2018; the Canadian Progressive Dairyman) the total economic impact of BLV on a 150-cow dairy farm is $79,329.56 CAN, annually. This amount is a result of the following factors: milk production, longevity, disease management, and condemnation. The annual cost of decreased milk production, due to failure to reach peak milk production, is $65,745.08 CAN. A decreased longevity is equivalent to $12,252.48 CAN,

annually. Depending on individual herd circumstances, additional costs for controlling BLV are $428.57 CAN per year, as well as; condemnation can decrease slaughter value, costing $903.43, annually. A 2013 Michigan dairy study followed BLV-positive cows over a 20-month period, upon diagnosis. BLV-positive cows were 23 percent more likely to be prematurely culled, as opposed to BLV-negative cows. These factors hinder productivity and increase farms' cost of production.

It is essential to take preventive measures to prevent the spread of BLV. Preventive measures include artificial insemination or embryo transfer and using refined colostrum products. Increased cleanliness and biosecurity management protocols also prevent the spread of BLV such as changing palpation gloves and changing treatment needles between animals.

There is on-going research on the possible implications of BLV on human health.

Optimizing feeding management of dairy cows

Dr. Trevor DeVries, Professor, University of Guelph, tdevries@uoguelph.ca

Despite many advances in the field of dairy cattle nutrition, we are still faced with the challenge of ensuring consistent and adequate dry matter intake to maximize production and maintain health. Despite best intentions, dairy cows are not always consistently provided the ration that is formulated for them. Further, cows do not always consume that feed as it is delivered or in a manner which is good for them. It is known that dairy cow health, production, and efficiency are optimized when cows consume consistent rations, both within the day and across days. This presentation will review empirical studies on this topic, focusing on strategies that may be implemented that allow cattle to have good access to the proper ration, and consume it in manner which is conducive to good health, productivity, and efficiency. To achieve this, consistency is required in ration preparation; rations must be prepared accurately and precisely, by regularly monitoring feed components and ensuring mixing protocols are in place and followed. Feeding management should also focus on ensuring cows have good access to their feed throughout the day, through frequent feed delivery and push up and minimizing the time feed bunks are empty, so that good eating behaviour is promoted.

Whole Crop Faba Bean Plant as Silage for Ruminants

Víctor H. Guevara-Oquendo, David Christensen, John McKinnon, Bunyamin Tar'an, Peiqiang Yu. College of Agricultural and Bioresources, University of Saskatchewan, 51 Campus Drive, Saskatoon, SK, S7N 5A8. Canada;*Corresponding authors: vhg019@mail.usask.ca; Tel: 306 8802403; peiqiang.yu@usask.ca; Tel: 306 9664132*

In Canada the production of faba bean has increased, therefore whole crop faba bean can become an additional option to produce high quality silage. However, its use as a forage source is very limited and there is little information about it. The present study was conducted to determine the effect of the variety (tannin level) and stage of cutting on whole crop faba bean silage in terms of yield, nutrient profile, rumen degradation kinetics, intestinal digestibility, metabolic characteristics and feed milk value. Statistical analyses were performed using PROC MIXED procedure of SAS 9.4 with significance declared at $P < 0.05$. The results showed that the yield, starch content and net energy of lactation (NE_L) were higher at late pod stage than at flower stage (12.2 vs 7.34 t of DM/ha; 17.2 vs 1.3 % DM and 1.46 vs 1.13 Mcal/kg respectively). The *in situ* study showed that high tannin whole crop faba bean silage had higher ($P < 0.05$) rumen undegraded crude protein (RUP, 33 vs. 25 g/kg DM) than the low tannin

whole crop faba bean silage. The RUP and the bypass starch (BSt) were higher (P< 0.05) at late pod stage than that at mid pod stage (34 vs. 23 and 32 vs. 18 g/kg DM respectively). The *in vitro* study showed that intestinal digested dry matter (IDBDM), the intestinal digested crude protein (IADP), the intestinal digested rumen bypass starch (IDBST), and the total digested starch (TDST) were higher (P< 0.05) at late pod stage than that at mid pod stage (216 vs.182; 19 vs. 14; 32 vs. 17; and 175 vs. 95 g/kg DM respectively). There was a tendency for the whole crop faba bean silage at late pod stage to have greater (P= 0.06) metabolizable protein (MP^{NRC}, 73 vs. 67 g/kg DM), however the degraded protein balance (DPB^{NRC}) was lower (P< 0.05) and the feed milk value (FMV^{NRC}) was higher than at mid pod stage (97 vs. 109 g/kg DM and 1.37 vs. 1.20 kg of milk/kg DM silage respectively). Whole crop faba bean silage at late pod stage showed a superior feed quality and predicted milk performance than whole crop faba bean silage at flower and mid pod stages and barley silage. It can be used as a potentially high value feed ingredient for dairy cows. Animal trials are needed to confirm the findings from this study.

Effects of feeding graded levels of camelina meal on feed intake, milk yield and composition, and milk fatty acid profiles in dairy cows.

T. Mutsvangwa. Department of Animal and Poultry Science, University of Saskatchewan, Saskatoon, Canada

Camelina meal (CAM) is a by-product of bio-diesel extraction from the oilseed crop *Camelina sativa.* Two experiments were conducted to determine the effects of feeding graded levels of CAM as a partial or complete replacement for canola meal on feed intake and milk production in dairy cows. In Experiment 1 (Exp. 1), the 4 dietary treatments consisted of a standard barley silage-based diet containing canola meal as the principal protein supplement (control) or diets formulated to contain 5, 7.5, and 10% CAM (as % of diet DM). In Exp. 2, the 4 dietary treatments consisted of the same control diet or diets formulated to contain 10, 15, and 20% CAM. Eight lactating Holstein cows that were housed in individual tie-stalls were used in a replicated 4 x 4 Latin square design in both experiments. In Exp. 1, both feed intake and milk yield were not affected by the dietary inclusion of CAM; however, feed intake and milk yield decreased as the dietary inclusion of CAM increased in Exp. 2. Milk fat content decreased numerically (by -0.46% units) when dietary CAM content was increased in Exp. 1, whereas milk fat content significantly decreased as CAM inclusion increased in Exp. 2. In both experiments, milk fat yields of *cis*-9, *trans*-11 CLA, *trans*-10, *cis*-12 CLA, and total CLA increased as dietary inclusion of CAM increased. Dietary inclusion of CAM had no effects on organoleptic properties of milk or blood thyroid hormone levels. These results indicate that CAM can be incorporated in dairy diets up to 10% without negatively affecting production performance; however, dietary inclusion levels >10% could decrease both feed intake and milk yield which would be undesirable for dairy producers.