

Feed Summit

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Feed Quality Evaluation Matrix for Alberta

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These groups met with the following objective:

To design a matrix to guide investment in research that will measure and improve the value of Alberta feed ingredients in Alberta's livestock industries.

And, to discuss this vision:

By 2009, there will be a system in place to allow rapid evaluation of major feed ingredients grown and fed in Alberta for the benefit of feed producers and feed consumers.

Background

The grains and livestock industries and the research community have worked to develop a research and extension plan that will improve the agriculture industry in Alberta.

In 2003, the Institute for Food and Agricultural Sciences, Alberta (IFASA) stated a broad goal:

“The development of synergistic and sustainable livestock and crop production systems that are safe, economically viable and socially acceptable.”

In 2005, IFASA developed a Feed Grain Quality and Supply Program that refined the goal:

“A profitable and sustainable crop and livestock industry that is characterized by defined feed quality and assured feed grain supply led by leading edge nutrition, production and processing systems.”

In 2005, the Alberta Crop Industry Development Fund developed the Feed Grain Quality and Supply Initiative that outlined these focus areas:

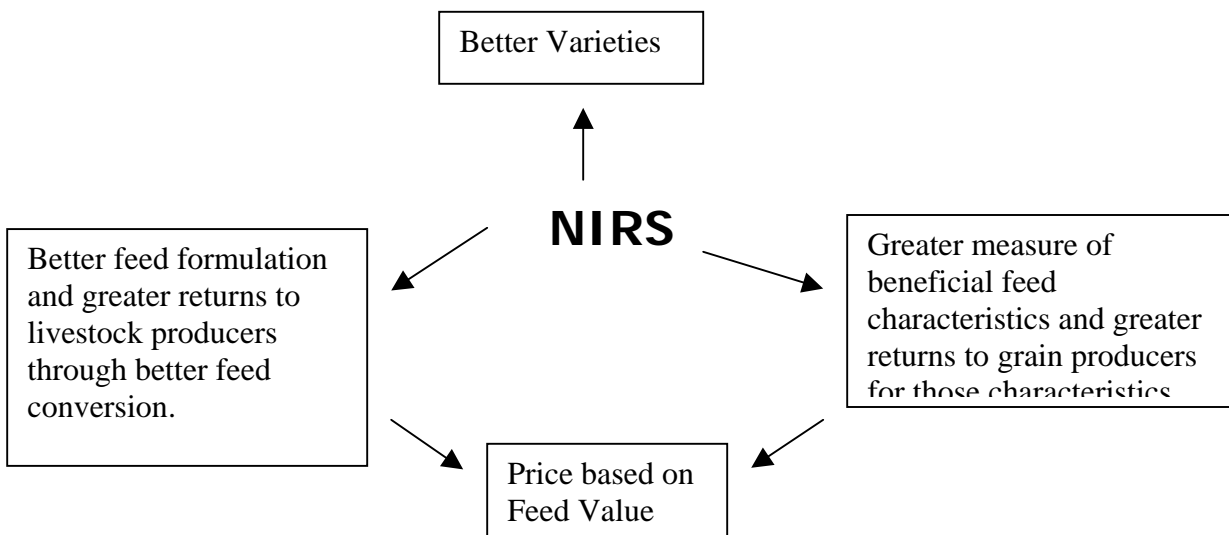
*“ Enhance feed grain profitability in Alberta through cultivar development, biotechnology and agronomy directly associated with feed grains;
Add value to feed grains produced in Alberta through improved feed processing technology;
Develop superior feed ingredient determination technology for the benefit of Alberta’s crop and livestock sectors.”*

In an industry meeting on June 13, 2005, ACIDF stakeholders selected Feed Quality Evaluation as the primary step in accomplishing the goals stated above. In April, 2006, Alberta Barley, Alberta Pork, Alberta Chicken, Alberta Milk, ACIDF, AAFRD, University of Alberta, Agricore United and Alberta Pulse developed a framework designed to achieve the goals outlined by the Government of Alberta and the industry.

Vision

By 2009, there will be a system in place to allow rapid evaluation of major feed ingredients grown and fed in Alberta for the benefit of the production and feeding sectors.

In order to achieve this vision, the Alberta Government, Universities, ARC , AAFC and the crop and livestock industries must cooperate to move forward on utilizing NIR technology to evaluate quality in Alberta feed ingredients. Advances in this technology will bring these benefits to the Alberta agriculture industry:



- Leaders in the feed industry have NIRS in some of their processing plants now (Maple Leaf, Unifeed, Ridley). Near-infrared Spectroscopy (NIRS) is a rapid, non-destructive and economical analytical technology. If we act on NIRS now, we will be able to provide the industry the ability to achieve consistent feed quality using superior formulation decisions. It will be used to monitor quality of incoming feed ingredients and compounded feed and to determine the benefits of utilization of specific feeds based on that analysis.
- For example, Unifeed is using NIRS in their mills in Sherwood Park, Alberta and Chilliwack, BC. They scan incoming loads of wheat, barley, corn, soy meal, meat meal, canola meal and peas and use the data to predict moisture and protein. Amino acid levels are then predicted using published regression equations. Currently-used NIRS calibrations lack the ability to predict digestible nutrient content of ingredient.

- Accurate NIRS of Alberta-grown ingredients will give plant breeders the ability to accurately measure the characteristics that are valuable to the feed industry; then improve or increase those characteristics in new varieties.
- Accurate analysis of characteristics will allow grain producers and feed buyers to establish a mechanism to discover and implement a price that is related to value.
- It is imperative to act now. We have the technology and the need. If we want to increase the value of feed grains to producers and users, it is time to move forward on this initiative.
- The success of the initiative relies on communication with all members of the value chain throughout the process. Adoption of the results will happen more quickly if grain producers, feed buyers, livestock producers, plant breeders, animal nutritionists and nutrition scientists are involved from the start and in the entire process..
- Adequate sampling of the product is the fundamental first step to any project. No project should proceed without detailed description of sampling procedure.
- Barley and wheat have at least a 20 % variability in feed quality. Accurate measurement of this variability will provide the industry with valuable information. A corresponding 4% variation in corn was sufficient to generate \$10 million for NIRS development in the U.S.
- Low Starch Degradability is a valued characteristic for beef and dairy cattle rations. Western Canadian dairy industry buys corn because they believe corn has lower degradability. NIRS would allow us to measure starch degradability and develop feed grains for the dairy industry (and possibly the beef industry)

Nutritional Characteristics to be Measured

Two characteristics for all livestock species

- Energy including starch degradability (NE, DE and ME)
- Amino Acid digestibility

Feedstuffs to be Analysed

- Highest Priority: Established feed ingredients for crop and livestock industries
Barley, Peas, Wheat (including Triticale)
- Second Priority: Established feed ingredients for crop, value-added, and livestock industries
Wheat/Barley Co-Products, Canola Co-Products

- Third Priority: Emerging feed ingredients for crop, value-added, and livestock industries

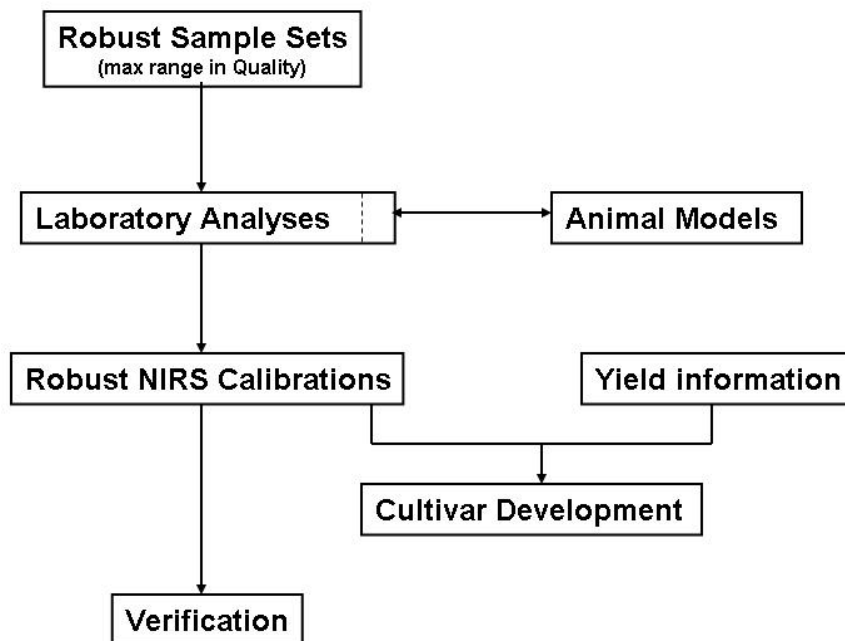
Fababeans, Hulless Oats, novel ingredient fractions

For the highest and second priority feed ingredients, NIRS calibrations should be established by 2009. For the third priority ingredients, in vitro testing to determine mean and range in quality should be completed, NIRS calibrations are a lower priority for 2006-2009.

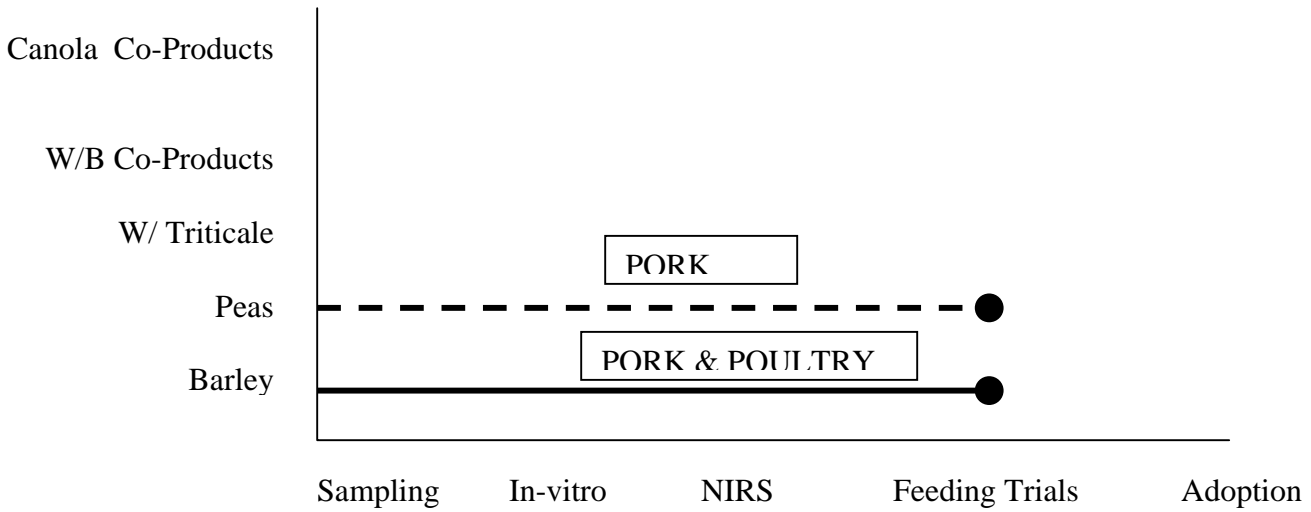
Steps for Priority 1 and 2 Feedstuffs

In order to establish NIRS calibration cost-effectively, the first steps will be based on laboratory methods such as in vitro nutrient digestibility, for nutritional (energy and amino acids) characteristics of importance. Animal models will then be used to verify the collected laboratory data and to build confidence in the resulting NIRS. The following steps are required for each feedstuff :

1. Determine sample collection procedure to obtain maximum variation.
2. Conduct in-vitro nutrient digestibility in the laboratory for detailed analyses of nutritional characteristics, describing digestible and available nutrient profile and rate of nutrient digestion (entire sample set).
3. Conduct animal digestibility experiments to validate in vitro digestibility data, using both standard and advanced processing technologies (sample sub-set)
4. Use the in vitro data to develop NIRS calibrations.
5. Verify NIRS calibrations using industry settings.
6. Use calibrations to improve cultivar development.
7. Use calibrations to determine the range in ingredient quality within the crop.



Progress to Date



Barley: NIRS is in progress for pork and poultry feeding trials to be completed by 2008.
Ruminant work has not started.

Peas: limited NIRS work for pork at the University of Saskatchewan
nothing for poultry or ruminants

All other crops: need to start at Step 1.

Next Steps for Feed Quality Evaluations

ACIDF:

ABC: Verify whether this framework meets the criteria to invest and if there is initiative from the livestock feeding/supply sector to proceed.

APG: Use information from this Summit document to direct investment in feed research.

Alberta Pork:

Alberta Milk:

Alberta Chicken: This framework meets the criteria for the Alberta Chicken Producers to consider investment.

U of A, AAFRD and AAFC: Ready to submit project proposals when the decision is made to proceed.