

Will NIRS put bushel-weight out to pasture?

by KIERAN BRETT

With support from ACIDF Ltd., 12 feedlots will study the role of Near Infrared Spectroscopy (NIRS) in assessing the feed value of grain they buy.

When you talk about Alberta's beef industry, the numbers tend to be as big as Wild Rose Country itself. The province's beef producers earn more than \$4 billion in annual cash receipts, contribute two-thirds of Canada's beef production and bring tens of thousands of head to market each week. The province's feedlot sector, for its part, finishes up to 2.3 million head per year and is a major market for Alberta-grown feedgrains.

In the autumn of 2011, an initiative began that could fundamentally change the feeding of beef cattle in Western Canada. In an industry that takes big for granted, this could be very big news indeed.

On August 1, 12 Alberta feedlots began using a technology known as Near Infrared Spectroscopy (NIRS) to evaluate the feeding potential of grain. These NIRS units, valued at up to \$70,000 each, are being cost-shared with the Alberta Crop Industry Development Fund (ACIDF) as part of its ongoing Feeding Initiative. ACIDF's contribution is part of \$8 million in funding the group administers on behalf of the Alberta Livestock and Meat Agency (ALMA) for feedgrains-related work.

“The idea behind this network of feedlots using NIRS is to get more value from feedgrains,” explains Rob Hand, ACIDF's Manager of Feeding Initiatives. “Energy is key because energy drives animal performance. Traditionally, indicators like plumpness and bushel-weight have been used to evaluate grain. NIRS potentially provides an approach that is fast, accurate and acceptable in this market.”

How NIRS could change cattle feeding

NIRS is a proven technology that measures the amount of light energy absorbed by chemical bonds containing hydrogen within a sample. Constituents within a feed -- such as protein, starch, fiber and lipids -- contain molecules with hydrogen bonds. This measurement produces a one-of-a-kind spectral 'fingerprint' for each sample. This fingerprint is statistically associated to the chemical composition of a sample and a calibration model is produced once this data is known for at least 50 samples. These models are routinely used in many laboratories around the world to predict dry matter, protein and fiber concentrations in grains and forages.

Over the last few years, great strides have been made in using NIRS technology to assess feed value in the hog industry. Now, the same work is being done for beef.

“In the first year of this project, the feedlots will be scanning grain with NIRS, then comparing the feeding values of samples to wet chemistry analysis,” says Hand. “This will be the foundation for a database of NIRS-based feeding values for the grain that feedlots buy.”

Though barley is the main crop used in Alberta feedlots, the NIRS project is looking well beyond. Hand expects progress on understanding the feeding value of Dried Distillers Grain Solubles, a byproduct of ethanol production, and the screenings left over from grain cleaning.

On its way, eventually, to everyone

For Mary-Lou Swift, Feed Quality Research Scientist with Alberta Agriculture and Rural Development (ARD), the first month of the project represents the calm before the storm. During that time, the manufacturer of the NIRS units will be setting up their machines at the 12 feedlots and training people on how to use them.

At that point Swift, in her role as network manager, expects to get busy. Over the next three years, she'll be supporting the feedlots in their use of NIRS and remotely monitoring their readings from her lab in Lacombe.



As a scientist, Swift is quick to note that any firm conclusions must wait until the data are available. Having worked with NIRS for 20 years, however, she expects that the feedlots won't be anxious to part with their units.

“Once they get the data and see what they can do with it, that will really open up the possibilities,” she says. “Overall, I have huge belief in NIRS. As equipment prices fall, and computing power increases, NIRS will become commonplace in any farming operation, just like a tractor.”

As costs rise, technology helps

Tim McAllister explains that today's higher costs for feedgrains make it timely for feedlots to give NIRS a fair shake.

“With rising feed costs, producers have been looking for new rapid methods to assess feed value,” says McAllister, Principal Research Scientist with Agriculture and Agri-Food Canada in Lethbridge. “This applies to the use of cereal grains, but also to byproduct feeds such as distiller's grains. NIRS has the ability to provide information on feed value in a matter of minutes.”

Over the coming years, McAllister and his Lethbridge team will develop equations that improve the accuracy of NIRS in a feedlot setting. The equations will incorporate newly generated information on how feed is digested and absorbed in the cattle's GI tract. Building on this work, he sees a day when NIRS data can accurately predict a feedlot animal's performance on a given feed.

With a network of 12 feedlots up and running, three years' worth of data to collect and a team of scientists and technicians to study it, the NIRS feedlot evaluation project is complex. While many important things are yet to be discovered, McAllister echoes Swift's view that the long-term value of this technology is clear. In fact, it could be a game-changer both for feedlots and the crop producers who supply them.

“It represents a significant advancement in the rapid assessment of feed quality on farm,” says McAllister. “All of this is aimed at capturing more value from the feed and improving the efficiency of beef production. The difference here is that it can be done in a short period of time on the farm. This will send a strong economic message to feed producers that will force them to not only focus on feed production, but feed quality as well.”

Funding available for NIRS adoption

Alberta Crop Industry
Development Fund Ltd.

The business potential of NIRS technology is plain to see. While prices for NIRS units have come down, it's still quite a touch for individual operations. That's where the NIRS Equipment Grant can play a role.

Administered by ACIDF with funding from ALMA, the grant will provide up to 50% of eligible costs to purchase NIRS technology, up to a maximum of \$20,000 per NIRS equipment package.

“The cost of an NIRS package right now is between \$40,000 and \$70,000 per unit or more,” says Rob Hand, ACIDF's Manager of Feeding Initiatives. “Even so, if NIRS can demonstrate its value to a producer, all of a sudden the return on investment looks very compelling.”

Hand notes that ALMA has earmarked \$750,000 in funding for NIRS assessment and adoption until March 2015. To date, ACIDF has approved funding for 12 units at up to \$20,000 in funding each. That means there's a considerable amount of funding still available to farms, feeders, processors and other businesses that want to adopt NIRS technology. Hand encourages producers and processors to consider whether NIRS technology could have a fit in their business, and find out how ACIDF's NIRS Equipment Grant can help make the purchase economically feasible.

To learn more about the NIRS Equipment Grant, please visit www.acidf.ca/feeding or contact Rob Hand at rob@acidf.ca or (403) 872-8262.



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