New data accelerates NIRS for complete feeds

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This three-year study built a solid foundation of data to calibrate NIRS units to assess multi-component feeds for hog and poultry production.

When hog producers gather to talk about production issues and business opportunities, conversation often turns to Near InfraRed Spectroscopy (NIRS) technology.

NIRS provides a rapid, accurate estimate of the nutritional composition of feed materials. Based on this, producers and feed manufacturers know how feed will create gain and thus, what its economic value is.

As Mark Wobick explains, producers are looking to maximize what NIRS can do for them.

"We operate a hog leadership advisory board with nine of our Hutterite Colony clients," says Wobick, Farm Management Consultant with MNP based in Lethbridge. "Some of them have looked at NIRS and have bought their own NIRS units. Others partnered with a local feed mill to buy one. We determined they could really use help in calibrating these units so they can get a rapid analysis on complete feeds."

For NIRS purposes, complete feeds are more complicated than single ingredients because they contain multiple components. A hog producer could have up to 10 components in a ration: grains, oilseed or pulse meals, co-products and several different nutritional supplements purchased as a pre-mix. NIRS developed to read wheat, for example, won't accurately assess the quality of a complete feed that *contains* wheat.

Complete feed calibrations for swine (and poultry, another monogastric) are available from European sources. If these translated well to Alberta, they could be purchased and provide the tool producers have been looking for.

Road-testing European calibrations

Beginning in 2012, a research study addressed this question with two objectives. One, validate off-the-shelf calibrations from Europe. Two, if these were insufficient, develop calibrations specific to Alberta. This work was supported by the Alberta Crop Industry Development Fund (ACIDF) under the $8 million Feeding Initiative managed for the Alberta Livestock and Meat Agency (ALMA).

This project was a team effort. Wobick worked with MNP's Colony clients to gather and track complete feed samples. Mary Lou Swift, then a Research Scientist with Alberta Agriculture and Rural Development (ARD), managed wet chemistry analysis, NIRS scanning and calibration development. Ron Gietz, Brooks-based Business Development Manager (Pork) with ARD, managed the data produced by the study.

In all, the team gathered 342 samples, of which 180 were considered spectrally unique enough to be of value in the study. In the project's initial phase, NIRS predictions with the European calibrations were compared to the samples sent for wet chemistry analysis.

"We found that starch and fiber from the European calibrations didn't work that well," says Swift, who's now Director of Nutrition with Hi-Pro Feeds in Okotoks. "It could be a matter of how they do the chemistry in Europe. We decided to develop a made-in-Alberta calibration model."

Developing calibrations for Alberta

From there, the team continued the process of taking NIRS predictions of complete feed samples and comparing these to the results of wet chemistry analysis of those samples.

As this data set grew larger and richer, the team found that NIRS was able to accurately predict nutritional composition of these complete feeds. Amino acids, which are important to swine and poultry nutrition but were unavailable from European calibrations, tracked well. Swift reports that protein prediction was the weak element in these new calibrations. Protein registered about 2% different between the NIRS estimate and the wet chemistry reality.

This reservation aside, Swift was satisfied with the overall results. The new calibrations have been made available to members active in Alberta's NIRS network, including feed mills and consultants.

As Ron Gietz sees it, hog and poultry producers now have valid NIRS calibrations to predict nutritional composition of complete feeds. This will allow producers to know what's in their feed, without the cost and time associated with wet chemistry. It should also open up new avenues to manage both the nutrition and the economics of complete feeds.

"These types of projects are quite important," says Gietz. "NIRS is a powerful tool, but to get the value out of it, you've got to be using it every day. Whatever is measured can be improved."

ACIDF Alberta Crop Industry Development Fund Ltd

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