

Feedlots target lower-cost gain, and wheat fits the bill

by Kieran Brett

In a major project funded by the ALMA/ACIDF Feeding Initiative, NIR technology has challenged some long-held beliefs about what and how to feed cattle in a feedlot setting.



Back in 2011, feedlot owners were looking for answers. Many of their questions were directed Tim McAllister's way.

“At that time, the feedlots had a number of factors working against them,” says McAllister, pictured right, Principal Research Scientist with Agriculture and Agri-Food Canada in Lethbridge. “Feed costs were high, the Canadian dollar was high and beef prices weren't so good. They were looking for anything that could lower their feed costs.”

As it happens, McAllister was already working on that very issue. Beginning in 2011, McAllister was lead investigator on a large-scale project supported by the Alberta Crop Industry Development Fund (ACIDF) under the \$8 million Feeding Initiative funded by the Alberta Livestock and Meat Agency (ALMA).

McAllister's mission was to utilize Near InfraRed spectroscopy (NIR) technology (see sidebar) to predict the feed value of grain and grain by-products.

NIR puts feed to the test

Suppose four trucks pull up to a feedlot. One contains barley, the second contains feed wheat, the third contains corn DDGS left over from ethanol production and the fourth has screenings from a seed cleaning plant.

For many feedlot operators, there's no choice to be made. They're buying the barley, and will likely pass on the wheat. As for the by-products, they may not be worth the risk.

“Traditionally, there's been a reluctance on the part of feedlot operators to use feed wheat in the ration,” says McAllister. “The belief was that wheat was associated with subclinical acidosis. That's one of the fallacies that have taken hold out there.”

Over a three-year period, McAllister's team worked closely with 10 Alberta feedlots to estimate the feed value of barley, feed wheat and by-products. NIR predicted feed value, while another study assessed feed value lost during digestion, as indicated by the starch level in feces.

In this work, what mattered to McAllister wasn't *rate* of gain, but *cost* of gain. After all, barley often costs more than feed wheat. In recent years, barley availability has declined due to increased canola acreage. Volatile weather, meanwhile, has resulted in large volumes of wheat missing the food market and ending up as feed.

Vindication for feed wheat, properly processed

“When we look at digestibility and energy, wheat is actually higher than barley,” says McAllister. “Wheat, chemically and structurally, is different than barley. There’s also a big range between durum, soft wheat and hard wheat, but if they’re properly processed, they are equal in terms of feed value.”

Corn DDGS and grain screenings were also found to have worthwhile value given their modest cost. Here, given the wide variability of by-products like these, NIR technology makes all the difference. A truckload of grain by-products could be a cost-effective addition to a ration, or it could be a nutritional strikeout. You can’t judge this by the naked eye, but NIR can tell you.

Whether the feedstuff is barley, wheat or some type of by-product, McAllister’s research found that proper processing was key to maximizing its feed value. Overall, the project found that sound processing could improve feed efficiency by 7% for barley and 4% for wheat.

Three years ago, McAllister’s hypothesis was that wheat could help reduce feedlots’ feed bills and diversify their supply at times when barley is expensive. That’s been proven to his satisfaction.

Today, of course, the factors bedeviling feedlot owners in 2011 have largely been reversed: barley prices are lower, along with the Canadian dollar, while fed cattle prices are at record highs. Even so, in the cyclical world of cattle production, insights generated by Tim McAllister and his team will serve feedlots well in the future.

“In all cases, you must pay attention to processing,” says McAllister. “Using NIR to predict feed value, you should be able to pay for feed based on its feed value, not its weight, because weight can’t tell you much. It doesn’t take long, or very many cattle, for this to add up to a significant amount of money.”

NIR 101

Near InfraRed spectroscopy (NIR) is a proven technology that measures the amount of light energy absorbed by chemical bonds 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.