



RESEARCH FACTS

RESEARCH & TECHNOLOGY DEVELOPMENT FOR THE CANADIAN BEEF INDUSTRY

Beef Science Cluster



Evaluating corn silage

Project Title:

Increased use of high energy forages in conventional feedlot beef production

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Background:

Corn silage can be a good alternative to small grain silage for beef cattle because of its high yield and high digestible energy content. In addition, the rising feed grain prices may encourage beef producers to consider corn silage as an alternative to purchased grains. However, corn grown for silage in colder regions of Canada does not always achieve its full potential due to the limited growing season. Many recommendations for producing high quality corn silage originate from the USA, with limited applicability in areas with a shorter growing season. It might be possible for corn silage to play a greater role in beef cattle production in Canada if high energy forage can be produced, without compromising biomass yield. The energy content of corn silage depends on maximum kernel development and low plant lignification at harvest, both of which are affected by maturity, hybrid and growing environment. Better knowledge of the relationships among maturity, starch content, fiber content, and digestibility of corn silage hybrids grown in Canada is required to optimize their use. A lot of information about producing high energy corn silage in shorter growing seasons as well as the optimum inclusion rate of corn silage in backgrounding cattle diets is still relatively unknown.

Objectives:

To determine the variability in yield and nutritive value of short-season corn hybrids grown for silage and develop predictive equations, as well as determine the optimum use of corn silage in backgrounding diets and determine the characteristics of manure from these diets.

What they did:

Corn silage hybrids: Corn silage hybrids varying in degree days to maturity were grown in: Lethbridge (AB), Vauxhall (AB), Lacombe (AB), Elk River (MB), and Ottawa (ON) in 3 years. Six hybrids were grown at each location in 4 replicates, and the material was harvested before and after frost. Whole plant material and grain kernels were analyzed to determine nutritive quality. Chemical analysis and *in vitro* digestibility were assessed. Samples were scanned using Near Infrared Reflectance Spectroscopy and prediction equations were developed.

Animal study: The study evaluated the effects of increasing the amounts of corn silage in backgrounding diets on performance of cattle by: 1) replacing barley silage with corn silage, 2) increasing the proportion of corn silage in the diet, and 3) extending the backgrounding duration. 160 steers were assigned to 16 pens and fed backgrounding diets that contained (dry matter basis) 60% barley silage, or 60%, 75% or 90% corn silage. Half the cattle on each diet were transitioned to a finishing diet at 840 lbs, while the other half transitioned at 950 lbs. All steers were finished on the same diet. Samples of manure were collected from the pens for analysis.

What they learned:

Nutritive quality of corn hybrids grown for silage in colder areas of Canada is highly variable. Corn heat units accumulated from seeding to harvest and water supply are the main determinants of biomass yield. Nutritive quality is mainly dictated by starch content, and secondly by indigestible neutral detergent fiber content. In cooler areas, as biomass increases a decrease in nutritional value is sometimes observed.

Researchers also found that the ideal time to harvest corn for silage is when dry matter content is 32 to 38%. Processing the kernels at the time of harvest maximized the amount of starch that was available to the rumen, and this is important because increasing the availability of starch resulted in an increase in the total digestible nutrient content of corn silage.

For the cattle on the backgrounding diets researchers found that performance was similar for cattle on either a corn or barley silage diet if the diets had similar total digestible nutrient content. Increasing the proportion of corn silage (up to 90%, dry matter basis) in the diet in place of barley silage and barley grain resulted in a decrease in intake, gain, and gain to feed ratio due to a decrease in dietary starch content and an increase in indigestible fiber content. Researchers also found that extending the backgrounding period resulted in a decrease in the duration for finishing, without negatively affecting overall gain or carcass characteristics. Type of silage in backgrounding diets was found to have relatively small effects on the properties of manure.

What it means:

The study showed that early-maturing corn silage is an appropriate forage source for backgrounding cattle, but nutritive value of corn silage is highly variable. Producers are encouraged to use feed analysis to determine the feeding potential of their silage.

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