

Maximizing feed value of canola meal

Rising availability and favorable economics have more animal nutritionists considering canola meal.

As canola production has shot upward over the past decade, so, too, has the potential for more U.S. livestock operations to take advantage of canola meal as an alternative feed protein source.

Canola production is primarily associated with the prairie provinces of western Canada, where it was first introduced and has ascended to become the dominant cash crop thanks to rising demand for the crop's healthy oil for culinary uses and a wide variety of food products, along with some ethanol use.

However, rising production and exports of Canadian canola meal, as well as gradually expanding canola production in the northern-tier states and other key pockets of the U.S., have quietly made canola meal a rapidly increasing factor in U.S. feed markets.

According to the Canola Council of Canada, in the 2013-14 crop year, the country produced approximately 4.2 million metric tons of canola meal and, of that, exported about 3.2 mmt — the vast majority (more than 95%) to the U.S. This represents a peak in a canola meal export trend that has rocketed skyward in recent years and the highest canola meal exports to the U.S. to date.

At the same time, U.S. canola production has expanded to about 1.5 million acres, with virtually all canola meal used domestically, according to the U.S. Canola Assn.

Spike in interest

"The numbers are a clear reflection that interest and use of canola meal in the U.S. has expanded substantially over the years," Brittany Dyck, canola meal manager with the Canola Council of Canada, said. "Increasing levels of production in Canada should make even more canola meal available to the U.S. and other markets around the world."

The rise in exports of canola meal to the U.S. is due to a number of factors, starting with major production increases over the last five years, Dyck said. More major U.S. operations are now familiar with using canola meal and, based on favorable results, have become repeat customers. Also, the quality of canola meal has been very consistent for the past 10 years, and industry knowledge has greatly improved on how to get the best value from it.

"A growing body of new research results is having an influence," Dyck said. "There have also obviously been some favorable economics in recent years that have made canola meal more attractive more often relative to other options."

The main concentration of canola meal use in the U.S. has been in the dairy industry, Dyck said. The feed source provides an alternative to soybean meal with a strong overall nutritional composition, including an excellent amino acid profile that is favorable for milk production.

A meta-analysis (Martineau, 2013) comparing results from 49 separate

dietary treatments with the same level of protein confirms that canola meal can increase milk production by approximately 1.4 lb. of milk per cow per day compared to similar use of soybean meal and other vegetable protein ingredients.

There is also significant interest in and increasing use of canola meal in the U.S. poultry and swine sectors, she said. Along with improving economics, this is driven, in large part, by new research results supporting higher inclusion levels.

"The research shows that when diets are properly formulated, canola meal can be safely fed at much higher levels than what was traditionally recommended, including to young animals," Dyck said. "Canola meal represents an expanding area of opportunity for more animal nutritionists and livestock operations to consider."

Key factors

Good information on key considerations for canola meal is available through sources such as the Canola Council of Canada and the U.S. Canola Assn.

These organizations caution that nutritional composition may vary depending on the processing method (i.e., solvent-extracted or expeller) and changes in the growing conditions from year to year. Some of the important factors to consider include:

Nutritional composition. The main advantages of canola meal typically include a good protein content and amino acid profile, high oil content and a complex carbohydrate matrix, along with good selenium and phosphorous content. Like many vegetable protein sources, canola meal is limiting in lysine but has high levels of methionine and cysteine.

The bypass protein content of canola meal is also substantial, making key amino acids such as methionine more available for milk production. A high bypass protein value and ideal amino acid composition contribute to the dramatic research results showing a substantial milk production advantage with canola meal compared to soybean meal. (The Table provides a snapshot of the typical chemical composition of canola meal.)

Glucosinolates. An early concern with canola meal was its glucosinolate content, which, at high levels, can cause a host of problems, including health concerns for young animals and a bitter taste that can reduce feed intake. However, this is no longer an issue with today's canola varieties because plant breeding advances have steadily reduced the total glucosinolate content of canola to about one-twelfth of that of the earlier high-glucosinolate varieties.

Inclusion levels. Advances in the current generation of canola varieties, along with improvements in diet formulation practices, have also supported much higher inclusion levels than was advised in the past.

For example, while recommended



MORE CANOLA: Canola meal use in livestock rations is gaining traction, led by the dairy sector.

Typical chemical composition of canola meal (12% moisture basis)

Component	Average
Crude protein (nitrogen x 6.25%)	36
Rumen bypass protein, %	35
Oil, %	3.5
Linoleic acid, %	0.6
Crude fiber, %	12.0
Tannins, %	1.5
Sinapine, %	1.0
Phytic acid, %	3.3
Glucosinolates (µmol/g)	7.2

Note: Information shown is for canola meal processed using the solvent extraction method. Canola meal will have 8-15% higher fat and much higher energy values if processed using the double-press expeller method.

Source: Canola Council of Canada.

levels for poultry were traditionally as low as 3%, today even very cautious recommendations based on appropriate feed formulation techniques and animal health considerations are at around 10% for young birds and rise to 20% or 30% depending on other life stages and bird types.

Another area where major inroads have been made is in understanding the potential for pigs. For example, the research team of Dr. Martin Nyachoti at the University of Manitoba demonstrated recently that canola meal can be included in the diets of weaned pigs at levels of up to 25% while supporting high growth performance (*Journal of Animal Science*, July 2014).

Energy factor. Canola meal is a slightly more fibrous byproduct, which lends itself to better utilization in ruminant animals.

For monogastrics such as poultry and swine, the energy profile of canola meal compared to soybean meal is often lower. However, nutritionists note that this gap can be easily addressed by adding slightly higher fat levels to the diet along with the canola meal.

Enzymes boost potential. Another

option to consider is supplementing with enzymes to unlock more nutrients from canola meal. Recent studies and literature reviews, such as those by Dr. Bogdan Slominski and his team at the University of Manitoba, show that substantial gains in nutrient utilization are possible for all species with properly formulated and applied enzyme supplementation; also, this approach can make feasible the use of full-fat canola or off-grades of canola seed that can represent an economic, well-balanced source of protein.

Because canola meal is a complex feed ingredient with multiple hard-to-digest components, research trials by Slominski and others indicate that multi-carbohydrase enzyme approaches are more effective than single-enzyme formulations.

Top researchers on feed nutrient digestibility such as Dr. Hans Stein of the University of Illinois have highlighted that the digestibility of amino acids in canola meal is lower than in soybean meal, primarily due to a higher fiber content. This is a key area where Slominski and others suggest that enzyme supplementation can play an important role. ■

In 60 seconds

Pen front: Hampel Animal Care has introduced a next-generation pen front, part of Calf-Tel's modular pen system. The new pen front works seamlessly with existing Calf-Tel pens, the announcement said, and now provides a number of enhanced features, including: flexibility to open the pen front door inwards or outwards with the hinge on the right or left side; a new locking mechanism that secures the door at the top and bottom to provide strength and ease of use; a one-of-a-kind feed opening size with a new teardrop shape that minimizes the chance for calves to escape and helps pre-train calves for future headlock-style feeding; an optional larger feed opening

for bigger calves or feed restrictor for smaller breeds and animals, and a new pail holder design with a single pail height and single ring pail holder.

Big bottle: Calf-Tel and Land O'Lakes Animal Milk Products have partnered to introduce a new four-quart bottle that offers dairy producers a convenient way to deliver more nutrition to calves as part of a full-potential feeding program. Using a four-quart bottle allows calf raisers to feed a higher level of nutrition even if feeding calves more than two times per day is impractical within their management or labor situation. The companies said the biggest potential advantage is the ability to provide more nutrition to calves at an earlier stage in life as intake is critical for a calf to achieve its full genetic potential.