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Utilizing Whole Canola Seed As An Effective Feed Ingredient

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Ontario canola growers normally market most, if not all of their crop to Ontario's only canola crusher, ADM in Windsor. There the oil is extracted and the resulting co-product canola meal is marketed into the feed industry as a valued feed ingredient. The bad news is that this year the hot dry weather experienced during the summer has caused "chocolate coloured" canola seeds to develop, referred to as heat damaged seeds. Presence of heat damaged seeds can reduce the quality of the extracted oil. Much of this year's crop contains more than five dark seeds in a sample of 1000 seeds and consequently is being rejected by the crusher. This has left many country elevators with several thousand tonnes of canola that has not made the grade, as well as many acres of canola still unharvested.

Figure 1. Ripening Canola in Field

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The good news is that this off-grade whole canola seed can potentially be used as feed or for industrial use (fuel), albeit possibly at a lower value or price than what might have been received from the crusher. There has been considerable research conducted on whole canola seed as a feed ingredient. The results show that both off-grade and good quality whole canola seed is an effective feed ingredient for most livestock. In fact, there are a number of feed mills in Western Canada that process good and off-grade whole canola seed and successfully market it, either alone or in combination with other feed ingredients as a feed supplement. Examples of such mills are Oleet in Regina, Saskatchewan; Falher Alfalfa in Falher Alberta and EXL Milling at Lloydminster, Saskatchewan.

Whole canola seed is a good source of protein (approximately 21%) and with its high oil content (approximately 41%) it is a concentrated source of energy (one unit of fat contains 2.25 times the energy of one unit of starch). While the high oil content contributes to the nutrient value of whole canola it is also what limits its inclusion rate in many diets and rations.

Processing Important

The canola seed is small, round and has a hard seed coat so it should be processed in some way to rupture the seed coat to obtain maximum digestibility. Various techniques used to achieve this include grinding, rolling, popping, extruding and even softening the seed coat with an acid treatment. However, the relatively high oil content in the seed can present some challenges for processing. Vern Racz, Executive Director at the Prairie Feed Research Resource Centre in Saskatchewan and fellow staff have considerable experience in working with whole canola seed as a feed ingredient. His advice for on farm processing is to mix the canola seed 50:50 with another dry grain and grind it through a 1/8 inch hammer mill. It not only processes easier, it flows better. If using a roller, Vern recommends a scraper set up on the rollers to avoid having canola residue sticking to the rollers. Once processed, canola becomes susceptible to oxidation so it should be fed shortly after processing, although the folks in Saskatchewan report that they have safely stored processed canola up to two and three months.

Unlike raw soybeans, there is little or no nutritional advantage to heat treating whole canola seed. Some commercial processors may apply heat to slightly improve the bypass fat and bypass protein levels for dairy cattle.

Inclusion Rate Recommendations for Whole Canola Seed

The inclusion of whole canola seed into livestock and poultry diets should be based upon its fat, energy and amino acid content.

Poultry

The nutritional value in poultry diets is considered to be higher than for other animals. Poultry diets typically contain added fat or oil, so canola seed a is convenient way of adding that oil. Some researchers are recommending the inclusion of full fat canola seed in poultry diets so that the unsaturated fatty acids may be deposited in the meat and eggs. This alters the fatty acid profile to a balance that is more favourable for human health. In general, for poultry, whole canola should not exceed 10 to 12% of the total diet.

Figure 2. Combining Canola

Swine Diets

Similar to poultry diets, swine diets commonly contain added fat or oil. Whole canola seed is a convenient way of supplying oil and can also help reduce the dust in diets. Total dietary fat levels should not exceed 5.5% for grower finishing pigs to avoid soft fat in the carcass. For sows, whole canola seed can provide added fat and is commonly included up to 12% of the

sows' feed. Practical feeding experience with pork producers has indicated that whole canola seed is best fed to pigs greater than 25 kg of weight and is readily accepted at levels up to 12 to 14 % of the diet.

Dairy Cattle

Whole canola seed can supply the added fat often used to provide additional non-starch energy for high producing cows. Added dietary oil levels up to 400 grams per head per day can be used. Because of the unsaturated fat and interference with fibre digestibility, much higher levels are generally not tolerated without lowering butterfat levels or reducing feed intake. The suggested feeding rate for dairy cattle is .8 to 1 kg per head per day, however, the University of Manitoba reports feeding 2 kg per head per day with no detrimental effects. It is important to account for all sources of fat in the ration.

Beef Feedlot Cattle

As with dairy cattle, the amount of whole canola seeds that can be added to beef feedlot rations depends upon the total amount of fat or oil in the diet. Fat concentrations in excess of 5.5 to 6% of total dry matter interfere with fibre digestion and may reduce intake. In work done by Vern Racz with feedlots in Saskatchewan, whole canola seed, when added at 10% of the total dry matter content, improved feed efficiency, positively altered the fatty acid composition of the meat and reduced rumen methane production.

Beef Cows

Whole canola seed can be fed mixed with grain at a level that will provide a maximum of 300 to 350 grams of oil per cow per day.

Whole canola seed is an effective feed ingredient in terms of improving animal performance and product quality, and has been recently shown to reduce methane production. Its value will depend upon the type of poultry or livestock it is being fed to, as well as the price of competing ingredients. The market price for off-grade canola? Well, that will be up to the buyer and the seller to negotiate!

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Measuring Pasture Yields

Jack Kyle, Grazier Specialist, OMAFRA

Measuring pasture yields can be a challenge. With harvested forage or grain crops we get an indication of yield from the number of bales, feet in the silo or bushels of grain produced. With pasture we can measure the number of pounds of beef or lamb produced, but in many cases it is breeding females that are being pastured, so although we get an idea of the pounds of calf produced it is not a very accurate estimation of the actual pasture yields.

In many areas the productivity of a pasture is measured in terms of AUMs (Animal Unit Months), which is based on carrying capacity. An Animal Unit (AU) is considered to be 1000 pounds of beef cow with or without a nursing calf. Other animal types also fit under this definition based on 1000 pounds of body weight. The number of months (M) that this animal unit can be fed on the pasture gives the AUMs. This measure gives a good indication of the carrying capacity or productivity of the pasture.

Let's look at an example: 10 cows weighing 1500 lbs would represent 15 animal units …

If they were on a pasture for 60 days that would represent 2 months, 15AU X 2M is 30 AUM's on that pasture. Let's consider this value on an acreage basis. If this example was a 15 acre pasture then we would have (30 AUM / 15 ac) 2 AUM's per acre. If it was a 20 acre pasture we would have 1.5 AUMs per acre. Another example: 10 stockers weighing an average of 500 pounds would represent 5 Animal Units. If they pastured for 120 days that would be (5AU X 4M) 20 AUMs. If this pasture was 5 acres then we would have 4 AUMs per acre.

By converting the animals into 1000 pound units you then have a consistent measure that will allow you to compare pastures, seasons and years.

Two websites that can provide additional information are:
http://www.agr.gc.ca/pfra/land/fft1.htm and
http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/faq6722?opendocument

Figure 1. Cows Grazing Forage in the Fall

Another measure that can be used is cow days per acre. If 30 cows were on 20 acres for 90 days then we would have 30 X 90 =2700 cow days. 2700 cow days on 20 acres represents 2700/20 or 135 cow days per acre. This may be easier to calculate but it does not take into account the size of the cows.

The important part of this exercise is to record the number and size of animals that are in the pasture and the number of days that they are there. This is a very important measurement when looking at the productivity of annual crops such as turnips or cereals planted for grazing.

Annuals For Forage: on farm results

A number of people have planted turnips, cereals or sorghum-sudan for pasture this year, I would be very interested in hearing your results, give me a call at 705-324-5855 or email jack.kyle@omafra.gov.on.ca.

This type of information will give Ontario graziers some bench marks for selecting pasture crops and what to expect in productivity from these crops. I will share the results with you in future articles. Please send your results to me.

Thanks, Jack

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More or Less $?

Nancy Noecker, Cow Calf Specialist, OMAFRA

Ever wonder why one group of calves sells for more than another similar group of calves? This summer I had a chance to hear a large order buyer talk about his five criteria for paying more or less.

His five were: Quality, Processing, Vaccination, Condition of Sale and Age Verification

Quality of the calves you have for sale is the only thing on the list that is already decided. That decision was made when you made your breeding decisions 18 months ago. However, the other four criteria are all things you can change or influence between now and sale time.

Processing. The message that calves not dehorned and castrated are discounted has been around a long time but many calves still come to the market place "Au natural". Weaned calves are big enough that the process of castration and dehorning is very stressful and the calves go through a large setback, losing weight and increasing the risk of sickness. This weight loss and increased morbidity/mortality force the buyer to factor in a 5-10 cent/lb discount on calves that are not dehorned or castrated. You can still correct this as long as the calves have sufficient time to heal prior to shipping. Many feedlots express a preference for calves castrated by the knife and tend to discount calves castrated by rings. Ask what your market wants, and deliver it to maximize the value of your calves.

Vaccination. Studies since the 1980's have consistently shown a preference and premium for calves properly vaccinated with at least a 4-way vaccine. Many feedlots believe that a Modified Live(ML) vaccine will give a better immune response than a killed vaccine, and may pay accordingly. However, if your current vaccination strategy does not use a ML vaccine you will need to consult your Veterinarian to find out how to make the market preference for ML work in your herd. Whether the vaccine is killed or ML, it is important that calves receive all their required shots 10 – 14 days prior to the sale. Buyers have stated that calves with one shot of a killed vaccine are no different than unvaccinated calves and bid on them accordingly.

Figure 1. Weaned Calf Ready for Sale

Buyers are also interested in the vaccination status of your cow herd. Vaccination of the cow herd prior to breeding reduces the chance of creating persistently infected BVD carrier calves. If you have done the work of vaccinating your calves as well as your cow herd advertise the particulars.

Condition of Sale. This refers to how the calves are presented. Are they clean, sorted into uniform groups for weight and sex? What about gut fill? No buyer wants to pay for a lot of feed and water and calves that are "filled up" will be discounted. The other side, especially with calves, is not to have them so empty that they risk becoming sick. Calves that are used to eating some dry feed will handle the sale

Figure 2. Group of Sorted Calves in Sale Ring

process much better and start easier once they are landed in the feedlot. This doesn't mean overfeeding calves on grain or creep till they become fat, as this will also cause the calves to be discounted.

Age Verification. This is a new area that can add value in the beef industry. Over the last year many feedlots have had finished animals, classed as being over thirty months (OTM) of age by dentition, and discounted $300-$400 on the carcass. Currently in federally inspected packing plants inspectors will accept birth date information in the national Canadian Cattle Identification Agency (CCIA) database as an alternative to dentition. Stockers destined for the feedlot will in all likelihood will be worth more money if their birth date information has been entered in the CCIA database. The cow calf producer submits the birth date information to the CCIA by associating it with the identification number of the approved CCIA tag applied to the calf. The birth dates are entered electronically at www.clia.livestockid.ca . For producers not comfortable with computers the information can be entered by a third party. Some tag suppliers are offering to enter the birth information for clients.

So …. do you want more for your calves this fall? Then talk to your market place and consider the four things you can still influence: processing, vaccination, condition of sale and age verification.

Deliver what your market wants and you will get "More not Less $"!

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Hay In Cow Wintering Rations Can Be Replaced With Grain

Christoph Wand, OMAFRA Beef Cattle and Sheep Nutritionist

With hay scarce (and expensive) and grains relatively cheap, it makes sense to look at replacing some of the hay in winter diets with grains. Corn (and other grains or grain by products) can be used very effectively to partially replace hay. For example, one lb. of corn can displace two lbs. of hay up to about one-third of the ration. This rule of thumb is based on typical energy and moisture contents of corn and cow hay. It all boils down to economics and managing the livestock and ration under your circumstances. The economics are certainly right at this point in time; grain is inexpensive and hay is rising in price or already high, depending on where you are located in Ontario.

Figure 1. Cows Eating Hay

Figure 2 shows price breakpoints where corn is economically equivalent to hay, assuming 1 unit of corn replaces 1.8 units of hay. For example, if corn costs $110/tonne and hay costs $80 /tonne, it is cost effective to replace some of the hay in the ration with corn. Since grain typically needs to be processed for beef cows to ensure digestibility, a milling or rolling premium of $10-15 per tonne should be considered in the decision process.

The greatest challenge with using corn to replace hay is bunk management. Most people winter feed their cows in free-choice systems. By introducing grain, the ration becomes a limit-fed (restricted) diet. This means there needs to be enough bunk space for each and every animal in the group to eat the grain portion at the same time to avoid serious behavioural problems. If bunk space is limited, the least dominant animals will not get their required share.

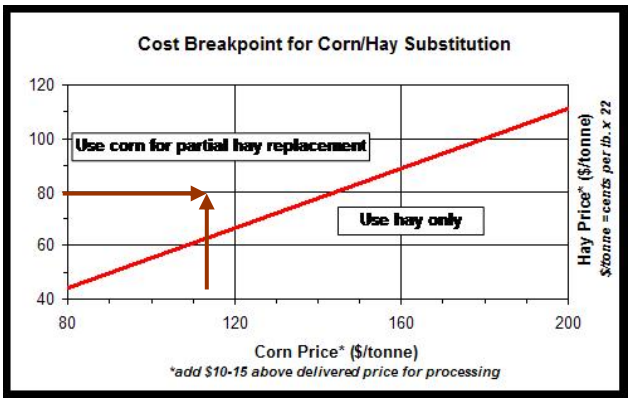

Figure 2. Price Decision Graph for Substitution of Hay by Corn

Just like the 'rich get richer', fat cows get fatter while their skinny sisters suffer in a limit-fed system with inadequate bunk space. With limit feeding, beef cows and heifers each require 65 to 75 cm (26-30 inches) of bunk space, compared to less than one-third of that amount with self-fed (free-choice) systems. Although their nutrient needs will be met with a smaller volume of feed, the animals will still feel hungry. You can supply some very low quality hay or straw for the cows to munch on to satisfy their craving for feed volume.

Another challenge can be acidosis from the overeating of grain (grain overload), especially if the grain is processed. To prevent acidosis grain should not exceed one-third of the total ration. For example; a diet for a 1400 lb. beef cow that was 28 to 30 lbs of hay/day can be changed to 20 lbs of hay plus 5 lbs of grain (5/25*100 = 20% grain). The upper limit for grain would be 15 lbs of hay plus 7.5 lbs of grain (7.5/22.5*100=33% grain). This latter scenario requires that the grain be divided into at least 2 feedings per day, or the use of a TMR

(total mixed ration) delivery and good management. Keeping the hay replaced at one-third rather than half will also help keep the hunger response from being too extreme. Some ration ideas and associated limitations are given in the tables below.

Table 1 gives example rations to replace 28-30 lbs hay intake per 1400 lb. cow per day. We are assuming mid-bloom grass hay at 57% TDN and 10% CP, where TDN is total digestible nutrients and CP is crude protein. In addition to the ingredients listed, all rations should have mineral included. This can be either mixed in with the grain, fed free choice or mixed in a TMR at rates recommended by a qualified nutritionist or the manufacturers' label specifications.

Figure 3. Well Fed Cow

Table 1. Example Dry Cow Rations With Hay Substitution

Cow Management Stage	Ration #	Ingredients	Specs*
Mid–Gestation (2nd Trimester)	Ration using 10 pounds of hay, straw and grain		
	1	10 lb. hay 10 lb. wheat straw 3.0 lb. ground corn 2.0 lb. ground canola	54% TDN 7.5% CP
	Rations using 15 pounds of hay		
	2	15 lb. hay 7 lb. ground corn	52% TDN 9.8% CP
	3	15 lb. hay 2.5 lb. ground corn 2.5 lb. ground canola 2.0 lb. DDGS	55% TDN 10.1% CP
Late Gestation (3rd Trimester)	Rations using 20 pounds of hay		
	4	20 lb. hay 5 lb. ground corn	56% TDN 8.8% CP
	5	20 lb. hay 5 lb. DDGS***	56% TDN 12.0% CP**
	6	20 lb. hay 3 lb. ground corn 2 lb. ground canola	58% TDN 9.7% TDN
	Ration using 15 lb. of better hay (60% TDN, 14% CP)		
	7	15 lb. 'better' hay 4.5 lb. ground corn 3.0 lb. ground canola	58% TDN 11.3% CP**

* Nutrient content based on 28 lb intake equivalency
** Ration protein content somewhat higher than required
*** Dried distiller's grains

Other opportunity feeds also present themselves in the hay-reducing equation. Cull canola can be used in small amounts (not exceeding 3 lbs per cow per day). However, even this amount provides a cost effective source of cheap protein and energy (21% CP, 40% oil) at current salvage value for canola. The canola seeds need to be processed to make them digestible, and to minimize the risk of viable seed in the manure, which could create a weed problem in fields. Another option at this time is dried corn distillers' grains (DDG or DDGS). This product has the added benefit of being preground, higher in protein and with less acidosis causing potential for beef cows than ground corn. Much like canola, it is an ideal choice in cases where a small amount of a high energy, moderate protein source is needed. In practice it can be valued at almost exactly the average of the costs of corn and soybean meal. Similarly, barley should be valued at about 90% of corn as an energy source, while wheat is equal to or slightly higher than corn.

Caution! These rules of thumb and example rations are intended to assist producers in evaluating hay replacement options, and are not substitutes for ration evaluation and balancing.

Good luck with your winter rations and happy commodity shopping!

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Beef Symposium 2005

Feeding to Fit!

Fit the Market…

Fit the Grid/Branding Program…

Fit the Feed Inventory you have to work with!

Thur., Dec 1/05 … Feedlot Evening at Brussels Community Hall

Featuring Dr. Glen Dolezal / Cargill Feeding for Grids/Brands/Quality
Dr. Steve Rust Michigan State U/Feedlot Nutrition
6:00 p.m. - Beef on a Bun/Trade show
7:00 p.m. - Program

Sat., Dec.3/05…. Cow Calf Day Oddfellows Hall, Port Perry

Featuring Dr. Glen Dolezal /Cargill Feeding for Grids/Branding/Quality
Also talks on…By-products to stretch/cheapen the feed bill. Finding Forage. Age Verification, Vaccination and Producer presentations.
9:00 a.m. - Registration /Coffee/Trade show
10:00 a.m. - 3:30 p.m. Program

For information Contact 1-877-424-1300…Brochures available soon.