

Feeding canola to dairy cattle

A survey of some of the recent literature confirms that canola meal is an excellent protein source in feeds for dairy cattle. This has long been known by dairy farmers in the Western Cape, but for those who are unaware of its value here follow a number of articles that provide evidence in this regard.

1. Canola Meal for Dairy Cattle

GrainCorp Oilseed (graincorp.com.au)

<http://www.riverland.com.au/riverlandhome/products/documentmanager/brochures/brochures/20396105>

'Canola meal is the major protein meal consumed within the Australian livestock industry. A premium product, canola meal is produced by Australian oilseed crushing plants, which operate international equipment under strict quality assurance parameters. The Australian market has two oilseed crushing processes - expeller or solvent extraction plants. GrainCorp Oilseeds operate both processing systems and the specification of the resulting canola meal depends upon the method from which product is produced.

The minimum protein content of canola meal varies with the protein level of the seed being crushed. Canola seed protein levels have been increasing with improvements from seed breeding, however are affected by seasonal growing conditions, with drier seasons tending to result in higher protein seed and resulting meal. Canola seed contains over 40% oil and the crushing process aims to maximise oil extraction. After initial seed heating, oil is removed through mechanical pressing in the expeller plant. The finished meal has residual oil in the range of 9-11%. For canola processed through the GrainCorp Oilseeds Numurkah solvent extraction plant, an additional oil extraction process is applied which results in the finished meal containing 2-3% oil. The higher residual oil within expeller meal results in lower levels of protein, fibre and minerals, whilst energy content is significantly increased. Whole canola seed is processed, thus the seed coat contributes to the fibre contained within canola meal. Canola meal is an ingredient that supplies energy from sugars, starch and oil for ruminant feeding whilst at the same time providing additional ADF and NDF. During the oil extraction process canola seed is heated to increase the efficiency of oil removal, this temperature is in the order 90-100°C as the meal cake leaves the expeller. The heat and pressure applied through processing results in an increase in the level of rumen undegradable protein contained within canola meal. As part of the solvent extraction process, the meal undergoes further heating which exceeds 100°C, this results in a higher level of protein protection. Data derived from cattle feeding research has identified the level of protein protection to be in the order of 35% for solvent extracted canola meal. Less work has been completed looking at expeller canola meal, a bypass protein level of 30% is recommended for use within dairy cattle feeding.'

'Canola meal is accepted globally as a valuable raw material for use within dairy cattle feeding. It is primarily used as a source of rumen degradable and undegradable protein. The rumen degradable protein fraction within canola meal is released gradually in line with microbial fermentation. Unlike urea, a source of non-protein nitrogen, which is very soluble and rapidly released within the rumen, canola meal provides a source of nitrogen within the rumen which better matches microbial growth. The undegraded or bypass protein component of canola meal supplies essential amino acids for absorption within the small intestine. Canola meal is an ideal raw material for use in high production

dairy herds where higher protein requirements need to be met or where low protein grains and roughage sources are in use. Canola meal relative to cereal grains provides a source of energy in the form of sugars and residual oil which is not fermented as quickly within the rumen. This assists in stabilising rumen fermentation and lessens the acid load within the rumen and potential rumen pH depression. ‘

‘Where expeller canola meal is used, the residual oil content provides a significant advantage in terms of supplying energy.’

2. Feeding canola meal to dairy cows

SourceNZ

<http://www.sourcenz.com/85/products/canola-meal>

‘Canola contains 30 - 35 % rumen undegradable (by-pass) protein and the other 65-70 is degraded in the rumen. This is quite similar to the protein fraction in soybean meal. Therefore canola works well in diets low in rumen degradable protein, e.g. when over 40 % of the diet is low protein feed such as maize silage, whole crop silage, starchy grass silage or grain.’

‘The benefits of canola meal are best captured in a balanced feed ration and normally feeding rates for dairy cows are 0.5-2.0 kg DM per day. In grain mixes inclusion rates range from 10-30 %.’

‘Canola meal can be fed mixed in the paddock or fed on the feed pad. It can also be fed via the grain feeding system in the dairy shed, by itself or mixed with other ingredients. Canola is not suitable for self-feeding.’

3. Use of whole canola seed in dairy cattle diets

Randall, K., Dofing, S.M. and Brainard, D.J. (1996)

<http://www.uaf.edu/files/snre/RPR%2035.pdf>

In the experiment reported here, whole canola seed was substituted for barley and soybean meal at 0, 4, 8, and 12 % of canola in the total diet dry matter, respectively. Diets were not balanced to be iso-energetic but were balanced to contain about 17.5 % crude protein on a total diet dry matter basis with a forage to concentrate ratio of 42:58. The results of three trials conducted over consecutive years suggest that whole canola seed may be fed at the rate of 1.4 to 1.8 kg/cow per day, or 6 to 8 % of the total diet dry matter. Milk fat was reduced with increasing canola inclusion, but this may have been the result of reducing the fat content in the feeds used from 3 to 2.7 %.

4. The optimal ratio of canola meal and dried distillers grain proteins in high-producing Holstein cow diets.

Swanepoel, N., P.H. Robinson and L.J. Erasmus (no date given)

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<http://canolamazing.com/wp-content/uploads/2013/09/The-optimal-ratio-of-canola-meal-and-dried-distillers-grain-proteins-in-high-producing-Holstein-cow-diets..pdf>

Feeding canola meal at a rate of 60 % of crude protein (12 % of the total dry matter) and 40 % distillers dried grains with solubles (DDGS) was the optimal ratio of canola meal and DDGS. At these levels milk production averaged 47.3 kg/day per cow. Also recorded during the study at the 60 % inclusion rate was an increase in the optimal body condition score of 0.034 of a unit over 28 days for this group of high-producing cows.

5. Canola Meal as a Protein Supplement in Dairy Rations

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[http://www.journalofdairyscience.org/article/S0022-0302\(83\)81756-1/abstract](http://www.journalofdairyscience.org/article/S0022-0302(83)81756-1/abstract)

‘Thirty high-producing Holstein cows in the 2nd week of lactation were in a 4-month feeding trial to compare canola meal with soybean and cottonseed meals as single protein supplements in complete dairy rations. Diets were isonitrogenous and isocaloric and contained 11.7 % canola, 10.4 % cottonseed, or 8.6 % soybean meals. Actual and 4 % fat-corrected milk production did not differ among diets. However, cows fed canola meal tended to yield more milk than cows fed soybean or cottonseed meal. Milk component (protein, fat, total solids, and solids-not-fat) percentages were not different. Solids-not-fat was the only component that was different, reflecting accumulated differences of milk production and percentage solids-not-fat. Diets did not affect milk flavor quality. Feed intake was similar for different diets.’

When considering a switch from one protein source to another it is essential to consider the biological and economic consequences of such action. Biologically, the use of canola meal has been demonstrated to be an excellent source of protein in feeds for dairy cows, so the only consideration should be whether a switch from an existing protein source to canola meal is economically viable. Once this has been established there should be no reason why canola meal should not be fed to dairy cattle.

Rob Gous

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