

Getting more from canola

Canola is an important Canadian and world crop. In 2003, Canadian farmers planted 13.2 million acres of canola, and pulled off an above average crop yield of 6.7 million metric tonnes.

Canola seed contains about 40% oil and is either sold as seed to other countries where it is processed into oil; or it is crushed in Canada and sold as oil here or to other countries. Canola is second only to soybean as the most important source of vegetable oil in the world. After oil extraction, the remaining part of the seed is known as canola meal and is routinely used as a protein supplement in feed rations for livestock.



Canola field in bloom

BREEDING BETTER CANOLA

Improving the oil yield from canola will have significant economic value for Canada. A group of researchers in Agriculture and Agri-Food Canada, Saskatoon (Drs. Lester Young and Martin Reaney) are developing a screening technique that will help breed better canola. They are using a new synchrotron-based X-ray imaging technique, Diffraction Enhanced X-ray Imaging (DEI) to look at structures related to oil content within canola seeds. The technique co-developed by Dr. Dean Chapman now of the University of

Saskatchewan, makes use of x-ray refraction, scattering and absorption to develop image contrast. This is the first documented incidence of using DEI to look at seeds.

CANOLA MEAL

The good balance of essential amino acid in canola meal provides excellent nutritional value while the low molecular weight of the major protein results in very low antigenicity resulting in minimal food allergy. Despite its benefits, canola meal is currently sold as a low value animal feed ingredient. Canola meal's fiber (12%) and phytate (3%) levels are too high for effective use in aquaculture and for optimal use in swine and poultry. The fibre components of canola

meal include lignin, cellulose and other polysaccharides. The fiber dilutes the protein resulting in less than optimum protein utilization. Phytate binds nutrients such as proteins and essential minerals, preventing their absorption. Undigested phytate (a form of phosphorus) in animal waste is a significant environmental concern. Excess phosphorus can promote the proliferation of algae and phytoplankton that consume oxygen, leading to oxygen-starving of fish and other aquatic organisms. Even though the digestive systems of ruminant animals (cattle) are well suited for fiber and phytate consumption of canola meal, they do not make good

use of the protein component because these proteins are rapidly utilized by rumen bacteria. Work is underway to develop high protein concentrates from canola meal where fibre and phytate levels are reduced and the protein level increased in order to produce an ingredient that is substitutable for fishmeal and can be used in animal feed. Canola protein has been shown to be superior to other plant based sources like soy and competitive with milk. It is one of the highest quality plant-based protein sources, more abundant and predictable in supply than fish meal. Bovine spongiform encephalopathy (BSE) or Mad Cow Disease has resulted in bans on meat and bone meal in Europe and import bans in Japan. This is creating a huge void in protein markets that must be filled with high quality plant-based alternatives. Canola protein is well positioned to fill this void.

IMPROVING THE VALUE OF CANOLA MEAL

MCN BioProducts Inc. is a technology company focused on maximizing the value of canola meal used in large feed, food and cosmetics market. The company was incorporated in 2000 by three University of Saskatchewan scientists: Drs. David Maenz, Hank Classen and Rex Newkirk. Using aqueous extraction techniques, enzyme treatment and standard filtration equipment, canola meal is separated into protein concentrates, customized fiber protein products and other co-products tailored to maximize value in their respective markets and generate significant value in excess of that derived from canola meal. One of these products, CanPro IP Insoluble Protein is a high quality and economically attractive substitute for fishmeal and animal-based proteins and contains no detectable phytate.

There is a demand for high quality protein sources in milk replacers. The purpose of milk replacers for calves is to replace whole milk when whole milk is not available or not economically fed. Milk replacers should contain 20-22% protein which is

the most expensive component. The protein sources for milk replacers include whey, eggs or soybeans. Canola meal can now venture into this market. Can Pro SP, a concentrate of soluble canola meal protein can be used in milk replacers for calves. CanPro FP Fiber Protein is a high quality insoluble canola meal protein product that can be used in ruminant feed.

For more information:

Sarwar, G., D.A. Christensen, A.J. Finlayson, M. Friedman., L.R. Hackler, S.L. Mackenzie, P.L. Pellett, and R. Tkachuk. 1983. Inter- and Intra-laboratory variation in amino acid analysis of food proteins. *Journal Food Science* 48(2): 526-531.

<http://www.mcnbioproducts.com/>

<http://www.regional.org.au/au/gcirc/1/273.htm>

<http://www.canola-council.org/pubs/meal8.html>

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