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from Farm to Fuel

Canola is a high quality feedstock for biodiesel production.

Proven technology

Biodiesel is a proven renewable fuel that is supplying an increasing amount of fuel in the countries of the European Union (EU) and the United States (US). Biodiesel can be produced from a variety of feedstocks, including vegetable oils, animal fats and recycled restaurant grease. In the EU in 2000, just over 389 million liters of biodiesel was produced from vegetable oil feedstock; almost all of it using rapeseed. By 2012, the EU is expected to produce over 7.3 billion liters of biodiesel from vegetable oils, with rapeseed continuing to be the foundation feedstock. In the US in 2000, biodiesel production from vegetable oils was just over 11 million liters. The fastest growing alternative fuel in the US, production from vegetable oils is projected to exceed 2.7 billion liters by 2012[1].

Quality Feedstock

Biodiesel can be made from a variety of feedstocks, including vegetable oil, animal fats or recycled restaurant grease. A Canadian-based biodiesel industry will be able to source feedstock from all three, but biodiesel producers are seeking to include high levels of canola because of its mandated quality standards and unique characteristics including:

- High oil content
- Low levels of saturated fat
- Iodine values averaging 114

Since 1994, the average oil content of canola has exceeded 42% and the average oil content of the 2005 crop exceeded 44%[2]. The high oil content means more oil is available per unit of seed, which ultimately makes more of the feedstock available for biodiesel production and less by-product relative to other oilseeds. As a result, the biodiesel producer realizes greater efficiencies from canola than from other oilseeds with lower oil contents, notably soybeans.

In biodiesel, low saturated fat content is linked to improved cold weather performance. At low temperatures, petroleum diesel can gel or crystallize and cause the engine to stop. One measure of fuel performance is the Cloud Point—the temperature at which small solid crystals form in the fuel[3]. Canola has the lowest level of saturated fats at 7% and the resulting biodiesel has a cloud point of –3°C. Soybean oil biodiesel will begin to form crystals at 3°C, while the cloud point for diesel made from edible tallow is 19°C.

Iodine value (IV) is a measure of oxidative stability. Oxidation can lead to the formation of corrosive acids and deposits that cause increased wear in engine fuel pumps and fuel injectors. In general, the lower the IV, the more stable the oil, the less oxidation and the lower the engine deposits. The IV value for canola is 114 and over 130 for soybean oil.

Quality Standards

In 1987, the canola industry developed a standard for canola oil to ensure end users received the predictable quality product they expected[4]. This commitment to quality is maintained by ensuring all canola varieties grown in Canada meet the quality standard set by the Western Canada Canola/Rapeseed Recommending Committee (WCC RCC) for a range of factors including percent oil[5]. It is upon this record of commitment to high quality that canola biodiesel advocates are actively supporting the development of quality standards for biodiesel that will provide assurances of consistent quality to Original Equipment Manufacturers (OEM's), fuel suppliers and users.

The importance of standards in place prior to production is demonstrated by the recent experience in Minnesota[6], where fuel quality problems attributed to biodiesel not meeting the specifications for cold weather use led to the temporary suspension of their B2 mandate and calls for enhanced quality control measures. The trust of suppliers, users and taxpayers will only be maintained in this developing industry if quality is mandated.

Biodiesel quality is being addressed by the development of standards for in Australia, member states of the EU and in the United States. A standard is currently being developed for Canada under the auspices of the Canadian General Standards Board. Until the process for developing a Canadian standard for biodiesel quality is completed, the most current version of the ASTM D 6751 standard for

[1] *Promar International "Evaluation and Analysis of Vegetable Oil Markets", 2005*
[2] *Canadian Grain Commission, "Western Canadian Canola Harvest Quality" 2005*
[3] *United States Department of Energy "Biodiesel Handling and Use Guidelines" 2006*
[4] *CAN/CGSB 32.300-M87*
[5] *Canola Council of Canada "WCC RCC Procedures" 2006*
[6] *National Biodiesel Board "Biodiesel Leaders Request Enhanced Quality Control Measures in Minnesota" 2006*
[7] *UFOP "Biodiesel Facts, Arguments, Tips" 2003*

biodiesel provides a framework that has supported biodiesel innovation in other countries. Experience with biodiesel in climates similar to Canada has also demonstrated the need for additional quality parameters relating to cold flow and oxidative stability[7].

The Engine Manufacturers Association (EMA), an international membership organization representing the interests of manufacturers of internal combustion engines, has stated that blends up to B5 (5% biodiesel to 95% petroleum diesel) should not cause engine or fuel system problems, provided the biodiesel source used meets accepted quality standards. The canola industry must already meet quality standards in the production of its product, providing another reason why canola will play a key role in a domestic biodiesel industry.

Foundation supply

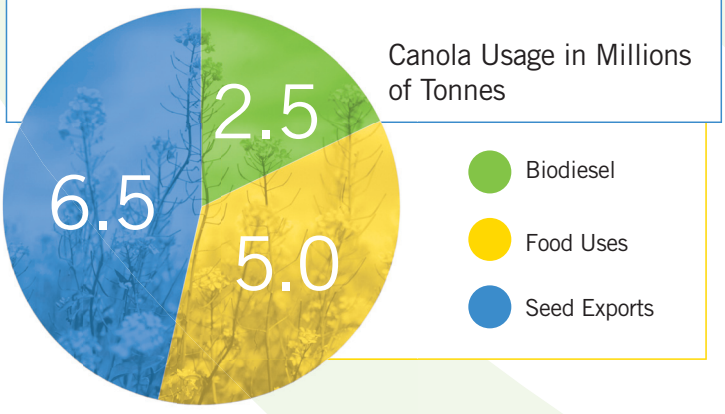
Current production and market demand for canola have traditionally resulted in significant carryovers (stocks left over after all market commitments have been made). The canola industry believes a carryover level of 1 million tonnes is necessary for stability and confidence in the processing sector. Since the 2004–2005 crop year, however, carryover levels have been in excess of the desired 1 million tonnes, which has the effect of depressing prices. One demand opportunity with proven potential in other jurisdictions for this carryover is biodiesel. Using 1 million tonnes of canola seed for biodiesel production instead of having it remain unsold could have supplied over 500 million litres of biodiesel for immediate use had domestic production facilities been in place.

In 2002, the canola industry set a target of 7 million tonnes of production; this level was exceeded in 2004. The canola industry is confident that by 2015, production will exceed 14 million tonnes—5.0 million tonnes for food use, 6.5 million tonnes to meet export requirements and 2.5 million tonnes for biodiesel—enough to supply over 1 billion litres of canola oil feedstock[8].

This increase will be met by improvements in technological advances in the yield and oil content of canola varieties and the expansion of acreage into non-traditional production areas as a result of the development of better-adapted varieties. The introduction of hybrid varieties with double digit yield increases over open pollinated varieties is increasing rapidly[9]. In 2003, the Prairie Canola Variety Trials (PCVT) had 4 hybrid canola entries, 13 in 2005 and 23 in 2005. In 2004, the highest yielding hybrid yielded 128% of the check variety, indicating the level of production increase from the existing canola acreage that will result as the adoption of hybrid varieties increases. By 2015, an estimated 3.4 million additional tonnes of canola will be produced from increased acres devoted to canola[10].

This expectation of production increases is supported by experiences in other jurisdictions, including Germany[11], where increases in feedstocks advanced with the market development of biodiesel, and through experience with yield increases due to adoption of higher yielding, better adapted hybrid varieties in crops like corn and rice[12].

The canola industry will produce 14 million tonnes by 2015[7]



Canola is grown across western Canada

[8] *Canola Council of Canada, personal communication 2006*
[9] *Canola Council of Canada "Prairie Canola Variety Trials" 2005*
[10] *M Goodwin Consulting "Canola Production in Western Canada – Potential Opportunities for Expansion" 2006*
[11] *UFOP "Biofuel in Europe: Situation and Outlook" 2005*
[12] *Harlan, JR "Crops and Man" 1975*