

## Canola

**canola** is one of two cultivars of rapeseed or *Brassica campestris* (*Brassica napus* L. and *B. campestris* L.). Their seeds are used to produce edible oil that is fit for human consumption because it has lower levels of erucic acid than traditional rapeseed oils and to produce livestock feed because it has reduced levels of the toxin glucosin. Canola was originally naturally bred from rapeseed in Canada by Keith Downey and Baldur R. Stefansson in the early 1970s, but it has a very different nutritional profile in addition to much less erucic acid. The name "canola" was derived from "**Can**adian oil, **low acid**" in 1978. A product known as LEAR (for *low erucic acid rapeseed*) derived from cross-breeding of multiple lines of *Brassica juncea* is also referred to as canola oil and is considered safe for consumption.



## History

Once considered a specialty crop in Canada, canola has become a major North American cash crop. Canada and the United States produce between 7 and 10 million tonnes of canola seed per year. Annual Canadian exports total 3 to 4 million tonnes of the seed, 700,000 tonnes of canola oil and 1 million tonnes of canola meal. The United States is a net consumer of canola oil. The major customers of canola seed are Japan, Mexico, China and Pakistan, while the bulk of canola oil and meal goes to the United States, with smaller amounts shipped to Taiwan, Mexico, China, and Europe. World production of rapeseed oil in the 2002–2003 season was about 14 million metric tons.

Canola was developed through conventional plant breeding from rapeseed, an oilseed plant already used in ancient civilization. The word "rape" in rapeseed comes from the Latin word "*rapum*," meaning turnip. Turnip, rutabaga, cabbage, Brussels sprouts, mustard and many other vegetables are related to the two canola varieties commonly grown, which are cultivars of *Brassica napus* and *Brassica rapa*. The negative associations due to the homonym "rape" resulted in creation of the more marketing-friendly name "Canola". The change in name also serves to distinguish it from regular rapeseed oil, which has much higher erucic acid content.

Hundreds of years ago, Asians and Europeans used rapeseed oil in lamps. As time progressed, people employed it as a cooking oil and added it to foods. Its use was limited until the development of steam power, when machinists found rapeseed oil clung to water or steam-washed metal surfaces better than other lubricants. World War II saw high demand for the oil as a lubricant for the rapidly increasing number of steam engines in naval and merchant ships. When the war blocked European and Asian sources of rapeseed oil, a critical shortage developed and Canada began to expand its limited rapeseed production. After the war, demand declined sharply and farmers began to look for other uses for the plant and its products. Edible rapeseed oil extracts were first put on the market in 1956–1957, but these suffered from several unacceptable characteristics. Rapeseed oil had a distinctive taste and a disagreeable greenish colour due to the presence of chlorophyll. It also contained a high concentration of erucic acid. Experiments on animals have pointed to the possibility that erucic acid, consumed in large quantities, may cause heart damage, though Indian researchers

have published findings that call into question these conclusions and the implication that the consumption of mustard or rapeseed oil is dangerous. Feed meal from the rapeseed plant was not particularly appealing to livestock, due to high levels of sharp-tasting compounds called glucosinolates.

Plant breeders in Canada, where rapeseed had been grown (mainly in Saskatchewan) since 1936, worked to improve the quality of the plant. In 1968 Dr Baldur Stefansson of the University of Manitoba used selective breeding to develop a variety of rapeseed low in erucic acid. In 1974 another variety was produced low in both erucic acid and glucosinolates; it was named Canola, from **Canadian oil, low acid**.

A variety developed in 1998 is considered to be the most disease- and drought-resistant variety of Canola to date. This and other recent varieties have been produced by gene splicing techniques.

An Oregon State University researcher has determined that growing winter canola for hybrid seed appears possible in central Oregon, USA. Canola is the highest-producing oil-seed crop, but the state prohibits it from being grown in Deschutes, Jefferson and Crook counties because it may attract bees away from specialty seed crops such as carrots which require bees for pollination.

Canola was originally a trademark but is now a generic term for this variety of oil. In Canada, an official definition of canola is codified in Canadian law.

### Health benefits

Canola oil has been claimed to promote good health due to its very low saturated fat and high monounsaturated fat content, and beneficial omega-3 fatty acid profile. The Canola Council of Canada states that it is completely safe and is the "healthiest" of all commonly used cooking oils. It has well established heart health benefits and is recognized by many health professional organizations including the American Dietetics Association, and American Heart Association, among others. Canola oil has been authorized a qualified health claim from the US Food and Drug Administration based on its ability to reduce the risk of coronary heart disease due to its unsaturated fat content.

Compound	Family	% of total	
<a href="#">Oleic acid</a>	$\omega$ -9	61%	
<a href="#">Linoleic acid</a>	$\omega$ -6	21%	
<a href="#">Alpha-linolenic acid</a>	$\omega$ -3	11%	9%
<a href="#">Saturated fatty acids</a>		7%	
<a href="#">Palmitic acid</a>		4%	
<a href="#">Stearic acid</a>		2%	
<a href="#">Trans fat</a>		0.4%	

### Genetic modification

Genetically modified canola which is resistant to herbicide was first introduced to Canada in 1995. Today 80% of the area of canola is sown with genetically modified canola.

Contamination of conventional canola crops from neighbouring genetically engineered fields has been a serious problem for Canadian canola farmers. It is very difficult for farmers to grow non-GM crops because of the frequent contamination.

The most high-profile case of contamination is Monsanto Canada Inc. v. Schmeiser, where Monsanto sued Percy Schmeiser for patent infringement because his field was contaminated with Monsanto's patented Roundup Ready glyphosate tolerant canola. The supreme court ruled that Percy was in violation of Monsanto's patent because the crops were growing on his land, but he was not required to pay Monsanto damages since he did not benefit financially from its presence. On March 19, 2008, Schmeiser and Monsanto Canada Inc came to an out of court settlement whereby Monsanto will pay for the clean-up costs of the contamination which came to a total of \$660 Canadian. Also part of the agreement was that there was no

gag-order on the settlement and that Monsanto could be sued again if any further contamination occurred.



### **Canola field in Saskatchewan**

Introduction of the genetically modified crop to Australia is generating considerable controversy. Canola is Australia's third biggest crop, and is often used by wheat farmers as a break crop to improve soil quality. As of 2008 the only genetically modified crops in Australia were non-food crops: carnations and cotton. In 2003, Australia's gene technology regulator approved the release of canola altered to make it resistant to the herbicide Glufosinate ammonium.