

Cancer Association of South Africa (CANSA)



Fact Sheet on Canola Oil

Introduction

In the early 1970s, canola was developed using traditional plant breeding techniques to significantly reduce the levels of erucic acid and glucosinolates that were found in the parent rapeseed plant. The name 'Canola' is apparently a contraction of 'Canadian' and 'ola', which means oil.

[Picture Credit: Canola]



There is a strict internationally regulated definition of canola that differentiates it from rapeseed, based upon it having less than two percent erucic acid and less than 30 micromoles of glucosinolates.

Oilseed products that do not meet this standard cannot use the term canola. High erucic acid rapeseed acreage, although still grown, is now confined to production under contract for specific industrial uses, including environmentally friendly lubricants.

Canola oil has generated a lot of research interest into its potential health benefits because of its low level of saturated fat, high monounsaturated fat and good balance of omega 3 and 6 fats .



[Picture Credit: Brassica vegetables]

The canola plant belongs to the same genus of the crucifer family called *Brassica*, the large family of plants, which also includes turnip, mustard, Brussels sprouts, cabbage, kale, cauliflower and broccoli.

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February 2021

Petrie, J.R., Zhou, X.R., Leonforte, A., McAllister, J., Shrestha, P., Kennedy, Y., Belide, S., Buzza, G., Gororo, N., Gao, W., Lester, G., Mansour, M.P., Mulder, R.J., Liu, Q., Tian, L., Silva, C., Cogan, N.O.I., Nichols, P.D., Green, A.G., de Feyter, R., Devine, M.D. & Singh, S.P. 2020.

“Plant seeds have long been promoted as a production platform for novel fatty acids such as the ω 3 long-chain ($\geq C_{20}$) polyunsaturated fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) commonly found in fish oil. In this article we describe the creation of a canola (*Brassica napus*) variety producing fish oil-like levels of DHA in the seed. This was achieved by the introduction of a microalgal/yeast transgenic pathway of seven consecutive enzymatic steps which converted the native substrate oleic acid to α -linolenic acid and, subsequently, to EPA, docosapentaenoic acid (DPA) and DHA. This paper describes construct design and evaluation, plant transformation, event selection, field testing in a wide range of environments, and oil profile stability of the transgenic seed. The stable, high-performing event NS-B50027-4 produced fish oil-like levels of DHA (9-11%) in open field trials of T₃ to T₇ generation plants in several locations in Australia and Canada. This study also describes the highest seed DHA levels reported thus far and is one of the first examples of a deregulated genetically modified crop with clear health benefits to the consumer.”

Canola Oil Health Claim

On October 6, 2006 the United States Food and Drug Administration (FDA) ruled that canola oil is eligible to bear a qualified health claim on its ability to reduce the risk of coronary heart disease due to its unsaturated fat content, namely: “19 grams (about 1½ tablespoons) per day may reduce the risk of coronary heart disease due to its unsaturated fat content, according to supportive but not conclusive research. Canola Oil should replace a similar amount of saturated fat in the diet without increasing calories”.

(US Food and Drug Administration).

Health concerns about canola oil are, therefore, unfounded.

A Brief History of Canola Oil

1950: The agricultural area seeded to rapeseed dropped to 162 hectares (400 acres) from a high in 1948 of 32 300 hectares (80 000 acres). The postwar availability of other edible oils eliminated the need for rapeseed, but some processors continued to pursue industrial oil export markets. In the early 1950s, both the National Research Council and private oil processors in Canada were experimenting with edible uses for rapeseed, in part because rapeseed looked so promising from an agronomic standpoint, and Prairie farmers needed an alternative cash crop.

1956: The food and drug directorate of the Department of National Health and Welfare (now Health Canada) ruled that rapeseed was not an approved edible oil in Canada. The department was persuaded to withdraw its objection pending a submission to show that the oil was safe.

1958: After some 18 months of feeding trials on experimental animals, in which no harmful effects from feeding rapeseed oil were observed, the directorate removed its objection. During the same year, Dr. Baldur R. Stefansson and Dr. Keith Downey began breeding work to reduce erucic acid content in rapeseed.

1974: Tower, the first canola, was released. This new B. napus variety meant that Canada could now produce oil and meal which was nutritionally superior to that produced from rapeseed in other parts of the world.

1978: The term canola was trademarked by the Western Canadian Oilseed Crushers' Association (now the Canadian Oilseed Processors Association) to differentiate the superior low-erucic acid and low-glucosinolate varieties and their products from the older rapeseed varieties.

[Picture Credit: Canola Plant and Seed]



Canola Oil Facts

Canola oil is one of the healthiest culinary oils in the world with zero trans fat and the lowest amount of saturated fat of all common cooking oils. It has been rigorously tested and approved by authoritative scientific bodies for human consumption. In fact, canola oil is recognised as a heart-smart cooking oil by many health organisations. The facts about canola are set straight here, showcasing the oil's heart-smart properties and versatility as well as the crop's usefulness in animal and industrial applications.

Scientists agree, canola oil is healthy - clinical studies have been going on for decades involving thousands of human volunteers to examine canola oil and its effects on the body. Canola oil is not only safe for humans per United States, Canadian and other government approvals, but studies have shown it may also have health benefits. Canola oil is free of trans fat and cholesterol, with the lowest amount of saturated fat among common cooking oils, so trials have shown that it may favourably impact the body when used in place of other fat sources. In October 2006, canola oil received a qualified health claim from the United States Food and Drug Administration (FDA) on its ability to potentially reduce the risk of heart disease when used in place of saturated fat in the diet.

[Picture Credit: Canola Oil]

Canola is its own plant species is different from rapeseed - although they look similar, canola and rapeseed plants are very different. Scientists used traditional plant breeding to eliminate the undesirable components of rapeseed, namely erucic acid and glucosinolates. Before canola oil received 'generally recognised as safe' (GRAS) status from the FDA and favourable recognition as a vegetable oil by Health Canada, it had to go through rigorous testing to ensure it was safe for human consumption.



Canola was developed by traditional plant breeding - unwanted traits in rapeseed were bred out through traditional cross-breeding to produce canola in the late 1950s and 1960s. In fact, modern crop biotechnology was not even invented at that time. Today, different varieties of canola help to

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produce crops that are resistant to drought, pests, disease and other challenges that farmers face. Plant breeders are constantly making breakthroughs to aid growers in getting the most out of their crop.

Canola belongs to the same family as cabbage and cauliflower - Canola, along with cabbage, broccoli and cauliflower, is part of the genus *Brassica*, which belongs to the mustard family of plants. Although members of this family are occasionally mistaken for ingredients in mustard gas, they have nothing to do with it. Mustard gas got its name from its mustard-like odour.

Canola meal is a highly valuable feed for livestock - Canola meal's high protein content makes it a useful and nutritious feed for cattle, fish, chickens and other animals. In dairy cattle, canola meal has been shown in several studies to boost milk production compared to other animal feeds. In 18 studies done over the course of 24 years, results found that using canola meal instead of soybean or cottonseed meal increased milk production by an average of 1 litre per day in each cow.

Canola oil is non-allergenic - food allergens are proteins that can cause the body's immune system to react in susceptible individuals. Allergic responses are abnormal ones by the immune system to a specific food. Since traditional refined canola oil does not contain proteins, it will rarely, if ever, cause an allergic reaction.

Canola oil has a long shelf life - Canola oil can be stored at room temperature for about one year. This is about the same shelf life as most other vegetable oils. Store canola oil in a cool cupboard for optimal shelf life.

Canola oil is free of cholesterol and trans fat and low in saturated fat - Canola oil will not raise cholesterol in the body; it is a heart-smart choice for cooking. In fact, canola oil is high in monounsaturated fat, which studies show may help lower 'bad' LDL cholesterol in the blood and control blood glucose. Canola oil also contains an omega-3 fatty acid that may help protect the heart and is a good source of vitamin E.

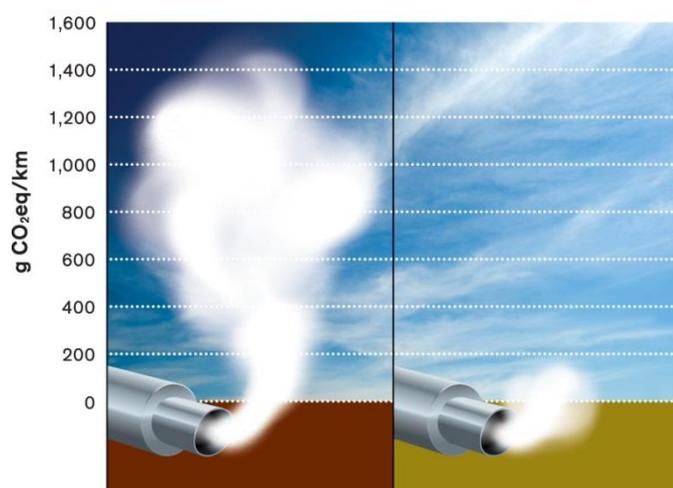
Canola oil is used in biodiesel, lubricants, soap and other products - any oil derived from plants can be used in making these products. Oils from canola, olives, corn, soybeans and flax can all be used to make a wide range of non-food items, including cosmetics, paints, plastics and more. Vegetable oils can even help fuel one's car with biodiesel. Canola oil is a particularly good feedstock for biodiesel due to its low saturated fat content.

[Picture Credit: Biodiesel]

Health Benefits of Canola Oil

Canola oil has more unique health benefits than many other vegetable-oils and is fast emerging as one of the healthiest oils in tandem with olive oil.

Canadian canola reduces Lifecycle Greenhouse Gas Emissions by 90% over fossil fuel.



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Like olive oil, it is very low in saturated fats. It contains linoleic (omega-6) and α -linolenic acid (omega-3) essential fatty acids at 2:1 making it as one of the healthiest cooking oils at a ratio even better than olive oil.

[Picture Credit: Canola Margarine]



It has the highest levels of plant sterols, especially β -sitosterol and campesterols. The FDA has approved the following claim for phytosterols: "Foods containing at least 0.4 gram per serving of plant sterols, eaten twice a day with meals for a daily total intake of at least 0.8 gram, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease." Phytosterols competitively inhibit cholesterol absorption in the gut and thereby can reduce cholesterol levels by 10% to 15%.

Canola oil is high in kilojoules. However, its high-kilojoule content comes from better fats. It is especially rich in mono-unsaturated fatty acids (MUFA) like oleic acid (18:1) which constitutes about 61% of total fats that help to lower LDL or 'bad cholesterol' and increase HDL or 'good cholesterol' in the blood. Research studies suggest that the Mediterranean diet that is very rich in monounsaturated fatty acids helps to prevent coronary artery disease and strokes by favouring healthy blood lipid profile.

The oil contains valuable amounts of anti-oxidant vitamin E, particularly gamma-tocopherol. 100g fresh oil has 27.34 μ g of γ -tocopherol and 17.46 μ g of α -tocopherol. Vitamin E is a powerful lipid soluble antioxidant, required for maintaining the integrity of cell membrane of mucus membranes and skin by protecting it from harmful oxygen-free radicals.

Being a vegetable source, it has very high levels of plant sterols, especially β -sitosterol. The FDA has approved the following claim for phytosterols: "Foods containing at least 0.4 gram per serving of plant sterols, eaten twice a day with meals for a daily total intake of at least 0.8 gram, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease." Phytosterols competitively inhibit cholesterol absorption in the gut and thereby can reduce cholesterol levels by 10% to 15%.

Canola oil has the highest smoke point of oils - it is also an ideal choice for deep frying because it can be heated to a higher temperature (smoke point 246 °C). This results in lower oil retention in the fried foods.

Fat	Quality	Smoke Point	
Soybean Oil	Unrefined	320°F	160°C
Soybean Oil	Refined	460°F	238°C
Sunflower Oil	Unrefined	225°F	107°C
Sunflower Oil	Refined	450°F	232°C
Canola Oil	High Oleic	475°F	246°C
Olive Oil	Extra Virgin (Unrefined)	405°F	210°C
Olive Oil	Refined	468°F	246°C
Peanut Oil	Unrefined	320°F	160°C
Peanut Oil	Refined	450°F	232°C
Avocado Oil		520°F	271°C
Butter		270°F	136°C

[Credit: Smoke Point of Oils]

Canola oil is one of the best oils for heart health. Made from the crushed seeds of the canola plant, it has less saturated fat than any other oil commonly used. Check out the numbers: Canola oil has 7% saturated fat, compared to 12% for sunflower oil, 13% for corn oil, and 15% for olive oil. Cutting down on saturated fats helps cut down on one's cholesterol levels.

Canola oil is also very high in healthier unsaturated fats. It is higher in the omega-3 fatty acid alpha-linolenic acid (ALA) than any other oil except flaxseed oil. ALA is particularly important to have in one's diet because one's body cannot make it. Studies show that ALA may help protect the heart through its effects on blood pressure, cholesterol, and inflammation. The FDA allows canola oil makers to label their products with a qualified health claim that there is "limited and not conclusive" scientific evidence that switching out saturated fat for the same amount of canola oil may reduce risk of heart disease.

According to Allemekinders, *et al.*, Canola oil-based diets have been shown to reduce plasma cholesterol levels in comparison with diets containing higher levels of saturated fatty acids. Consumption of canola oil also influences biological functions that affect various other biomarkers of disease risk. Previous reviews have focused on the health effects of individual components of canola oil.

Canola oil, which is extracted from the seeds of the canola plant, is generally recognised as safe by the United States Food and Drug Administration (FDA). Misinformation about canola oil may stem from the fact that the canola plant was developed through crossbreeding with the rapeseed plant. Rapeseed oil contains very high levels of erucic acid, a compound that in large amounts can be toxic to humans. Canola oil, however, contains very low levels of erucic acid. Canola oil is also low in saturated fat and has a high proportion of monounsaturated fat, which makes it a healthy and safe choice when it comes to cooking oils.

The fatty acid composition of canola oil is consistent with nutrition recommendations aimed at reducing the amount of saturated fat in the diet. When comparing dietary fats, Canola oil is the lowest in saturated fat (7% of total fatty acids), high in mono-unsaturated fat and a good source of omega-3 fatty acids. It also contains zero trans fat and cholesterol. It is therefore one of the healthiest oils available. In studies of both normal and hyperlipidaemic (elevated levels of lipids in the blood) subjects diets containing canola oil have been found to be equally as effective at reducing

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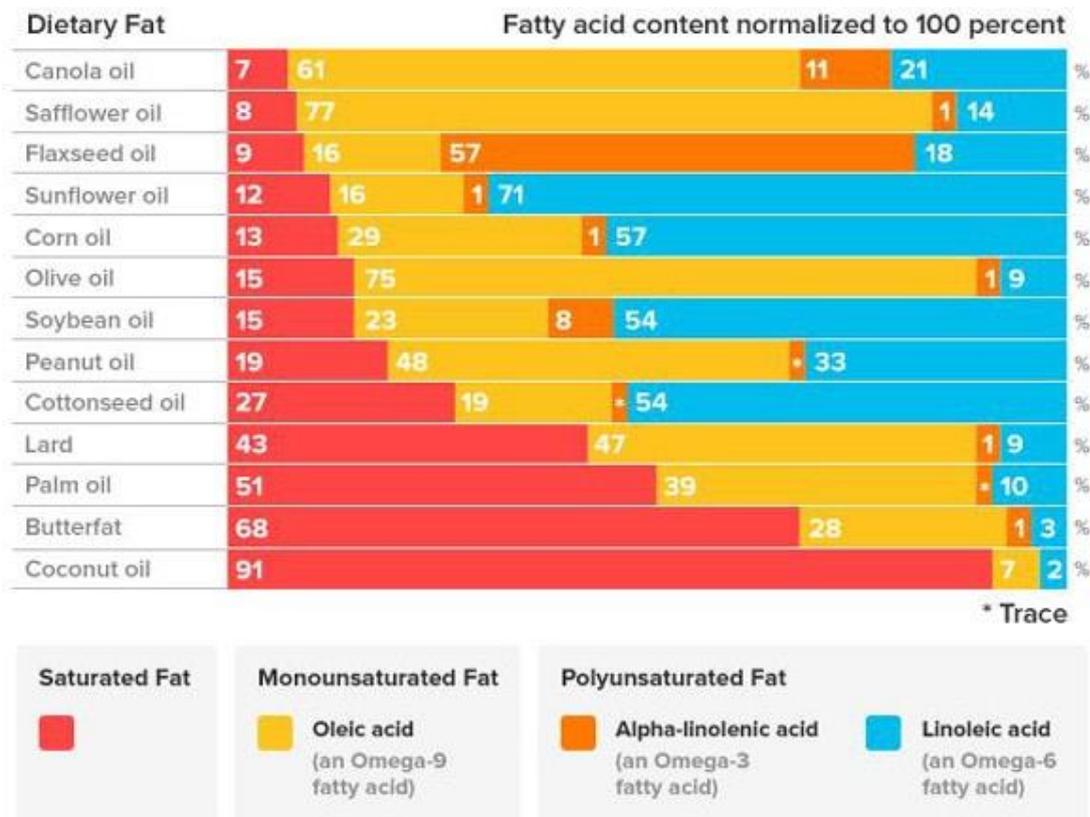
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plasma total and LDL (bad) cholesterol as diets containing corn, safflower, soybean or sunflower oil. Some scientific evidence also suggests that replacing like amounts of saturated fat with canola oil daily may reduce the risk of coronary heart disease due to the unsaturated fat content in the oil.



Source: POS Pilot Plant Corporation

[Picture Credit: Dietary Fats Comparison]

New research suggests canola oil may be one of the oils of choice for people with Type 2 diabetes. Researchers compared people with Type 2 diabetes who ate either a low glycaemic index diet that included bread made with canola oil, or a whole wheat diet known to reduce the risk of cardiovascular disease. The research found that those on the canola bread diet experienced both a reduction in blood glucose levels and a significant reduction in LDL, or 'bad', cholesterol.

Canola oil health benefits include reducing belly fat and lowering metabolic syndrome risk, say the researchers behind a new clinical trial. Metabolic syndrome is the name for a cluster of risk factors for heart disease, stroke, and type 2 diabetes, which affect one in three American adults, and research suggests that it can be fought by sticking to a Mediterranean diet rich in monounsaturated fats. American and Canadian researchers, who presented their findings at the American Heart Association's 2013 EPI/NPAM Scientific Sessions in New Orleans, found that canola oils used in cooking can decrease abdominal fat. "The monounsaturated fats in these vegetable oils appear to reduce abdominal fat, which in turn may decrease metabolic syndrome risk factors," said Penny Kris-Etherton, a professor at Penn State, in a news release. The clinical trial included 121 participants who had risk factors for metabolic syndrome, which include high abdominal fat, high triglyceride levels in the blood, low HDL cholesterol, high blood pressure, and high blood sugar. The participants were put on a heart-healthy 2000-calorie per day diet for four weeks, and given a daily smoothie

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with 40 added grams of one of five oils: canola oil, high-oleic canola oil, flax/safflower oil, corn/safflower oil, and a high-oleic canola enriched with omega-3 fatty acids.

Peer Reviewed Research on the Benefits of Canola Oil

The following is a brief overview of recent peer reviewed research articles on canola oil that was published in medical and scientific journals:

Zhuang, P., Mao, L., Wu, F., Wang, J., Jiao, J. & Zhang, Y. 2020. Cooking oil consumption is positively associated with risk of Type 2 diabetes in a Chinese nationwide cohort study. *J Nutr.* 2020 Jul 1;150(7):1799-1807.

Background: Evidence suggests that the relations between intakes of individual fatty acids and risk of type 2 diabetes (T2D) vary. However, associations between intakes of different cooking oils as sources of fatty acids and incident T2D remain largely unknown.

Objectives: We aimed to evaluate relations between intakes of individual cooking oils and incident T2D in a nationwide Chinese cohort.

Methods: Overall 15,022 Chinese adults aged ≥ 20 y from the China Health and Nutrition Survey (CHNS) without self-reported T2D at entry in the 1997, 2000, 2004, 2006, or 2009 rounds were followed up until 2011. Consumption of various cooking oils/fats including lard, peanut oil, soybean oil, canola oil, sesame oil, and refined blended plant oil was assessed using 3-d 24-h records in each survey and the cumulative mean intake was calculated. Multivariable-adjusted Cox proportional hazards regression models were constructed to estimate the HRs of T2D.

Results: A total of 1014 cases were recorded after a median follow-up of 14 y. The intakes of animal and plant cooking oils/fats were both associated with higher T2D risk. Compared with nonconsumers, multivariable-adjusted HRs and 95% CIs for the highest tertiles were 1.31 (1.03, 1.67) for lard, 1.36 (1.10, 1.66) for peanut oil, 1.14 (0.91, 1.43) for soybean oil, 1.11 (0.87, 1.43) for canola oil, 1.02 (0.79, 1.32) for sesame oil, and 1.42 (1.12, 1.82) for refined blended plant oil. Substituting 1 tablespoon/d (8 g \cdot 2000 kcal-1 \cdot d-1) of soybean oil for the sum of lard, peanut oil, refined blended plant oil, and other plant oils was associated with a 3% (HR: 0.97; 95% CI: 0.95, 0.99) lower risk of T2D.

Conclusions: Intakes of lard, peanut oil, and refined blended plant oil but not soybean oil, canola oil, and sesame oil are associated with higher T2D risk. Reducing the consumption of cooking oils in general may be protective against T2D among the Chinese population. This trial was registered at clinicaltrials.gov as [NCT03259321](https://clinicaltrials.gov/ct2/show/study/NCT03259321).

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Yahay, M., Heidari, Z., Allameh, Z. & Amani, R. 2021. The effects of canola and olive oils consumption compared to sunflower oil, on lipid profile and hepatic steatosis in women with polycystic ovarian syndrome: a randomized controlled trial. *Lipids Health Dis.* 2021 Jan 29;20(1):7.

Background: Polycystic Ovarian Syndrome (PCOS) is one of the most common endocrinopathies and metabolic disorders in women during their reproductive years. It is often associated with dyslipidemia and other risk factors of cardiovascular diseases (CVD). This study was aimed to evaluate dietary intervention effects with canola and olive oils compared to sunflower oil on lipid profile and fatty liver severity among women with PCOS.

Method: This study was a 10-week intervention including 72 women with PCOS. Patients were randomly assigned to three groups for receiving 25 g/day canola, olive, or sunflower oils for 10

weeks. The primary and secondary outcomes were to assess changes in lipid profile and in fatty liver severity, respectively.

Result: At the end of the study, 72 patients with a mean age of 29.31 were analysed. Canola oil consumption resulted in a significant reduction in serum levels of TG ($P = 0.002$) and TC/HDL ($P = 0.021$), LDL/HDL ($P = 0.047$), and TG/HDL ($P = 0.001$) ratios, however, there was no significant reduction in lipid profile following olive oil consumption. Canola ($P < 0.001$) and olive oils ($P = 0.005$) could significantly reduce the fatty liver grade. Moreover, HOMA-IR in both canola ($P < 0.001$) and olive ($P = 0.004$) groups was significantly decreased.

Conclusion: In total, compared to olive and sunflower oils, significant improvements in lipid profile, liver function, and HOMA-IR were observed following canola oil consumption in women with PCOS.

Trial registration: IR.MUI.

Research: REC.1397.315. Registered 30 JUNE 2019 - Retrospectively registered, <https://www.irct.ir/trial/38684>.

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Bay Area Hospital

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Biodiesel

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Brassica Vegetables

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Canola

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Canola Council of Canada

<http://www.canolacouncil.org/oil-and-meal/canola-oil/>

Canola Margarine

[https://www.google.co.za/search?q=canola+south+africa&source=lnms&tbm=isch&sa=X&ei=DC2kU5mcE4LA7AattoDgCQ&ved=0CAYQ_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=_&imgdii=_&imgrc=05eCChdqQC4H2M%253A%3B08LzREgKOU5QwM%3Bhttp%253A%252F%252Fwww.epic.co.za%252Fimages%252Fgallery%252FBlossom-Canola-Margarine-Tubs-1-Kg-\(8\).gif%3Bhttp%253A%252F%252Fwww.epic.co.za%252Fgallery.htm%3B640%3B480](https://www.google.co.za/search?q=canola+south+africa&source=lnms&tbm=isch&sa=X&ei=DC2kU5mcE4LA7AattoDgCQ&ved=0CAYQ_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=_&imgdii=_&imgrc=05eCChdqQC4H2M%253A%3B08LzREgKOU5QwM%3Bhttp%253A%252F%252Fwww.epic.co.za%252Fimages%252Fgallery%252FBlossom-Canola-Margarine-Tubs-1-Kg-(8).gif%3Bhttp%253A%252F%252Fwww.epic.co.za%252Fgallery.htm%3B640%3B480)

Canola Oil

https://www.google.co.za/search?q=canola+south+africa&source=lnms&tbm=isch&sa=X&ei=DC2kU5mcE4LA7AattoDgCQ&ved=0CAYQ_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=_&imgdii=_&imgrc=GiF91TXJnnJNRM%253A%3BMvYgVwQyHRWsZM%3Bhttp%253A%252F%252Fwww.soill.co.za%252Fwp-content%252Fuploads%252F2013%252F04%252FFamilyShot2014.png%3Bhttp%253A%252F%252Fwww.soill.co.za%252F%3B450%3B260

Canola Plant and Seed

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Smoke Point of Oils

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