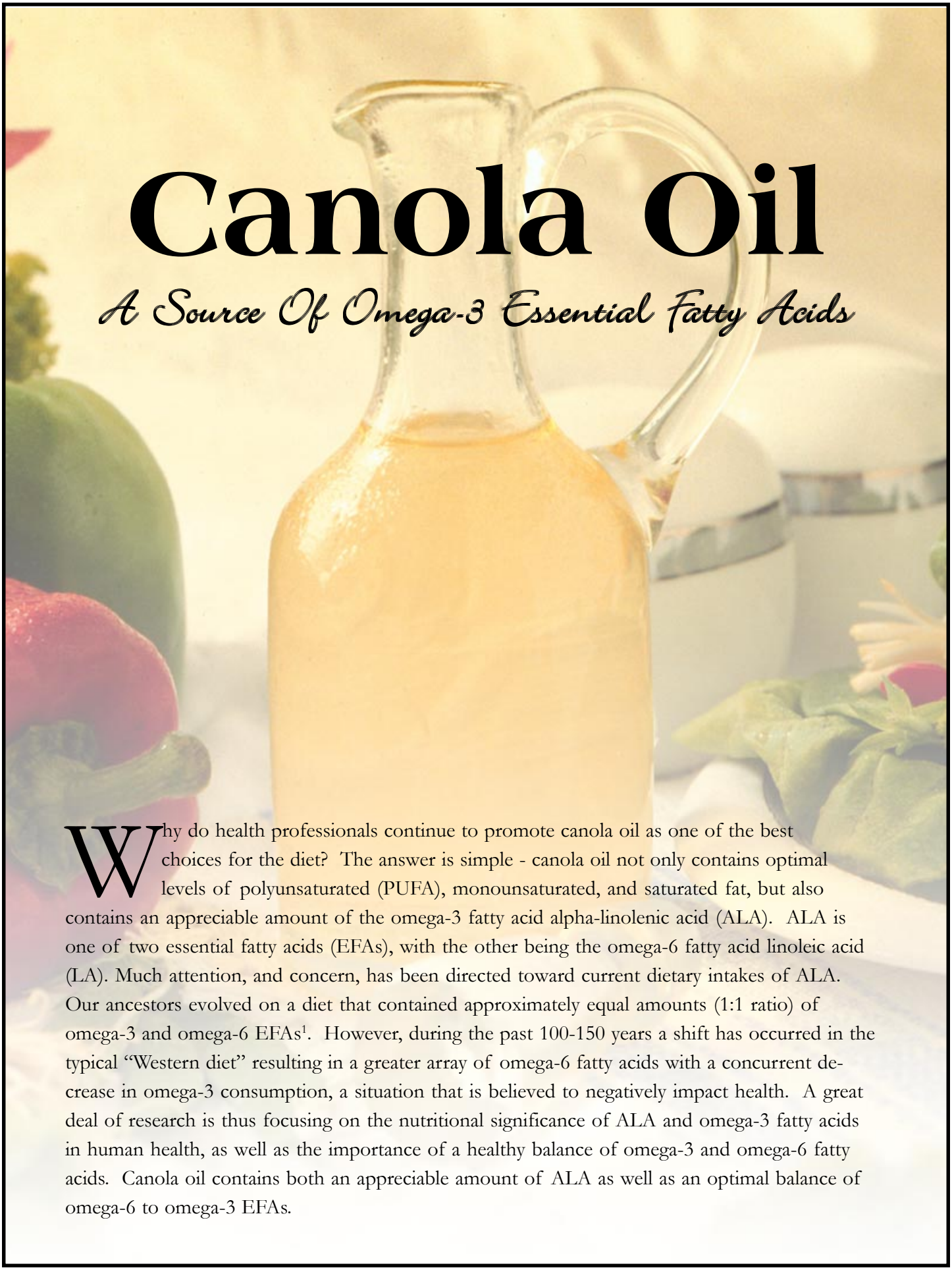


# Canola Oil

## A Source Of Omega-3 Essential Fatty Acids

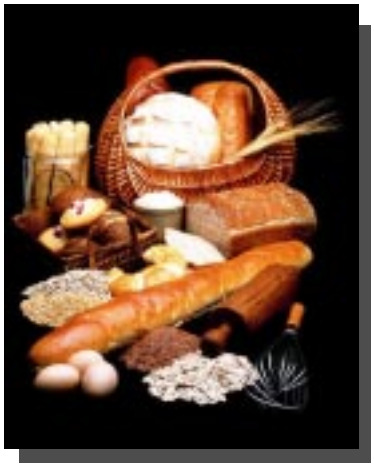
Why do health professionals continue to promote canola oil as one of the best choices for the diet? The answer is simple - canola oil not only contains optimal levels of polyunsaturated (PUFA), monounsaturated, and saturated fat, but also contains an appreciable amount of the omega-3 fatty acid alpha-linolenic acid (ALA). ALA is one of two essential fatty acids (EFAs), with the other being the omega-6 fatty acid linoleic acid (LA). Much attention, and concern, has been directed toward current dietary intakes of ALA. Our ancestors evolved on a diet that contained approximately equal amounts (1:1 ratio) of omega-3 and omega-6 EFAs[1]. However, during the past 100-150 years a shift has occurred in the typical "Western diet" resulting in a greater array of omega-6 fatty acids with a concurrent decrease in omega-3 consumption, a situation that is believed to negatively impact health. A great deal of research is thus focusing on the nutritional significance of ALA and omega-3 fatty acids in human health, as well as the importance of a healthy balance of omega-3 and omega-6 fatty acids. Canola oil contains both an appreciable amount of ALA as well as an optimal balance of omega-6 to omega-3 EFAs.

***What is the Function of Essential Fatty Acids?***

Essential fatty acids are termed essential because they are "necessary for life", meaning they cannot be produced by the body and therefore must be obtained from the diet. EFAs are incorporated into the membranes of our body cells to keep them fluid. As a result, they act as "gatekeepers" to allow the entry of important nutrients and the removal of toxins. Once incorporated into cell membranes, both LA and ALA are converted to longer chain PUFAs - LA to the omega-6 fatty acids and ALA to the omega-3 fatty acids. These PUFAs in turn are converted to hormone like substances known as eicosanoids. Eicosanoids affect physiological functions such as cell growth and division, platelet aggregation (blood clotting), inflammatory responses, hemorrhage, vasoconstriction and vasodilation of blood vessels, blood pressure, and immune function.

***The Importance of an Optimal Omega-6 to Omega-3 Ratio***

Critical for proper functioning of body cells is an optimal dietary ratio of omega-6:omega-3 fatty acids. This is because the omega-6 and the omega-3 fatty acid families form different eicosanoids with different activities and they compete with one another for the enzymes responsible for the synthesis of these eicosanoids. For instance, some eicosanoids stimulate pro-inflammatory and hypertensive events whereas other eicsoanoids have opposite effects. Thus, a proper balance of EFAs in the diet is important. Health Canada recommends an omega 6:omega 3 fatty acid dietary ratio of 4:1 to 10:1[2]. The U.S. Food and Drug



Administration has yet to set an official recommendation in this area.

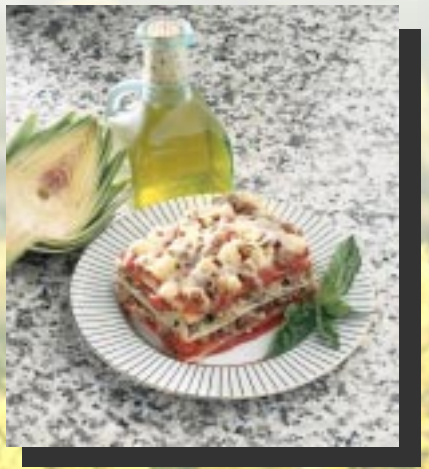
It is speculated that in today's Western society the ratio of omega-6:omega-3 fatty acids may be as high as 20-30:1[3]. Today's elevated dietary omega-6:omega-3 ratio is largely attributed to the vast array of vegetable oils such as corn, sunflower and soybean oils, that are high in the omega-6 fatty acid, LA.

Technological developments in food processing have also depleted much of the ALA and omega-3 content from foods, which further contributes to an imbalanced omega6:omega 3 ratio. Overall, we are consuming too much LA and not enough ALA and other omega-3 fatty acids, a situation that may negatively impact health. Research suggests that an elevated omega-6:omega-3 EFA ratio may shift the physiologic state to one that increases the risk of enhanced blood clotting, hypertension and inflammation. Restoring a more moderate omega-6:omega-3 balance is imperative for good health. This can be achieved by increasing the dietary consumption of omega-3 fatty acids such as ALA from foods like canola oil, while concurrently limiting foods high in LA.

***Clinical Importance of ALA and Omega-3 Fatty Acids***

***Cardiovascular Disease (CVD)***

CVD is an area of research where the consumption of ALA appears to show the greatest potential for health benefit. Three distinct, but interdependent, pathological phenomenon may occur that ultimately lead to CVD: thrombosis, fibrillation, and atherosclerosis. Various clinical manifestations such as stable angina from atherosclerosis; infarction (obstruction of blood vessels) and stroke from thrombosis; and sudden death (cardiac arrhythmia) as a result of fibrillation may result.



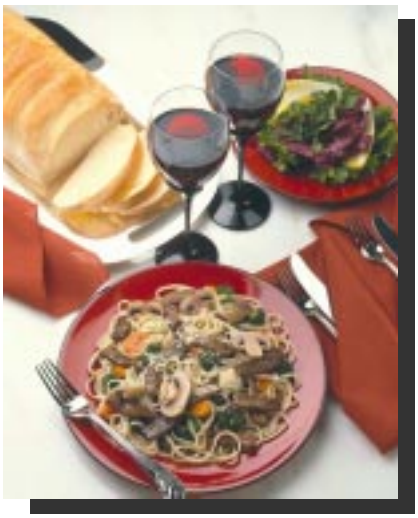
Numerous intervention studies have established the beneficial effects of ALA on cardiac events.

• The Health Professional Follow-up Study[4], which began in 1986 with a cohort of 51,529 health professionals, demonstrated that a 1% increase in ALA intake expressed as percent of energy was associated with a 40% reduction in the risk of non-fatal coronary heart disease (CHD).

• The landmark Lyon Diet Heart Study[5] included participants who had previously survived a myocardial infarction. The experimental group consumed a typical Mediterranean style diet rich in ALA, whereas the control group consumed a typical Western-type diet low in ALA. Results demonstrated a 75% reduction in non-fatal myocardial infarctions, and a 70% reduction in total death amongst the experimental group in comparison to the control group.

• The Nurse's Health Study[6] consisted of a 10-year follow-up of 76,283 women with no previously diagnosed cancer or CVD. Results demonstrated a higher intake of ALA was associated with a lower relative risk of fatal and non-fatal myocardial infarction.

• In the Moselle study[7], the diets of two groups of fifty Moselle farmers were analyzed for different constituents. It was reported that a higher dietary intake of ALA, coupled with lower intakes of LA (dietary LA:ALA ratio of approximately 5:1), markedly decreased platelet reactivity (i.e. the tendency of platelets to "clot").



• Research has shown ALA[7] to be more efficient at preventing ventricular fibrillation than other omega-3 fatty acids such as eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).

• ALA has also been shown to inhibit the growth of athero sclerotic plaques[8], and is effective in the reduction of serum triglyceride levels, total blood cholesterol levels, as well as LDL-cholesterol, without altering HDL- cholesterol levels[7]. Altering lipid profiles is especially important in the prevention and management of atherosclerosis.

In addition to cardiovascular health, extensive research has demonstrated that ALA has promise in a number of other areas:

***Inflammatory Disorders***

ALA may have protective effects in inflammatory disorders such as rheumatoid arthritis[9] and systemic lupus erythmetosus[10]. The anti-inflammatory actions of ALA are attributed to its ability to inhibit the production of pro-inflammatory eicosanoids such as thromboxane B2.

***Immune Function***

ALA has been shown to have positive effects on immune function, which is the body's ability to defend itself against infection. This may be particularly important in the management of autoimmune disorders[11]. The positive effects of ALA on immune function is believed to be attributed to its effects on membrane phospholipids, as well as eicosanoid and cytokine production[12].

***Cancer***

Preliminary research is demonstrating that diets high in ALA and omega-3 fatty acids may have protective effects against certain forms of cancer including cancer of the breast, colon, and pancreas[13].

***Canola oil as a Source of ALA***

Canola oil is one of the most available and versatile sources of the omega-3 fatty acid ALA at a level of about 11%. Canola also has an optimal omega-6:omega-3 ratio of about 2:1 which is superior to other commonly consumed vegetable oils such as corn and soybean,

whose omega-6:omega:3 ratio is 58:1 and 7:1[14] respectively.

At the present time, there is no Recommended Dietary Allowance (RDA) for EFAs in the United States[15]. However, Health Canada has established a Recommended Nutrient Intake (RNI) for EFAs, specifying the minimum daily intake of ALA should be 0.5% of total energy[2]. Similarly, the British Nutrition Task Force also recommends a minimum daily intake of 0.5% energy from ALA[16]. In September of 2002, the prestigious National Academy of Sciences' Institute of Medicine (IOM) released recommendations for several dietary constituents directed towards reducing the onset of chronic disease[17]. For an adult consuming 2000 calories per day, one tablespoon of canola oil daily meets the Health Canada recommendation of 0.5 % energy from ALA (or about 1g).

***"Nutritional research continues to confirm that the unique fatty profile of canola oil including as a source of ALA, appears to be beneficial in preventing several coronary heart disease and inflammatory risk factors including high blood cholesterol and lipid levels as well as blood clotting (thrombosis)."***

**For more information on the health benefits of using canola oil, contact the Northern Canola Growers Association or visit our website at *northerncanola.com***

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