

Flaxseed

By Robin Resnick

What is Flaxseed?

Flaxseed comes from the flax plant. It is a blue flowering crop grown on the Prairies of Canada and the Northern United States for its oil-rich seeds. The seeds of flax are tiny, smooth and flat, and range in color from light to reddish brown.¹ There is little if any nutritional difference between the flaxseeds that are different shades. Flaxseed has a nutty taste.²



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Flax is an annual plant that has one main stem. At low plant populations, branching at the base similar to tillers in a cereal grain is seen. The stems terminate in a multi-branched inflorescence that bears blue to white flowers. Flax grows to a height of about 24-36 inches. The plant has a tap root, which may penetrate to 40 inches if growing conditions are good. It requires a 50-day vegetative period, 25-day flowering period, and about 35 days to mature. In years when moisture is available the maturation period may extend until a hard frost kills the crop. In a wet fall new flowers are often observed until frost. Flax is a self-pollinated crop. Seed is produced in a boll or capsule. A complete boll can have 10 seeds, but most bolls will have fewer, averaging around six seeds.⁴

Flaxseed, is also known as linseed. It contains the highest concentration of any plant of alpha-linolenic acid (ALA). ALA is an omega-3 essential fatty acid. That is, it needs to be supplied by the diet, since the human body can not manufacture it. ALA is a polyunsaturated fat. Otherwise known as a good fat. Any fat that contains ALA is considered heart-healthy. Therefore, flaxseed oil is heart healthy. Flaxseed meal, which is what you get when you ground the whole flaxseed, also contains lignans. There may have antioxidant actions and may help protect against certain cancers.⁵

Using everything from the seed to the stem, the plant yields a list of products and benefits. There are many healthful benefits to flaxseed including chickens that consume flaxseed lay eggs that are high in omega-3 fatty acids. The oil from flaxseed is used primarily for industrial uses such as furniture finish and even

linoleum floor coverings. The stem fiber of the flax plant is processed to make paper and cloth products.⁶



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Nutrition Information

If you examine the nutrition information of the flaxseed, you will see that in a one ounce serving, there are five grams of carbohydrates with four of those fiber. It should also be noted that the majority of the fat in flaxseed is monounsaturated, and there is no cholesterol. Flaxseed also contains some iron and calcium. Women in particular need to ensure that they get enough of these nutrients in their daily food intake. In order to get the full nutritional benefit of the flaxseed, you must ground the seeds.

Nutrition Facts	
Serving Size 1 ounce (30g)	
Servings Per Container 1	
Amount Per Serving	
Calories 170 Calories from Fat 140	
% Daily Value*	
Total Fat 14g	23%
Saturated Fat 1g	5%
Polyunsaturated Fat 4g	
Monounsaturated Fat 9g	0%
Cholesterol 0mg	0%
Sodium	
Total Carbohydrate 5g	2%
Dietary Fiber 4g	8%
Sugars 1g	
Protein 6g	
Vitamin A 0%	Vitamin C 0%
Calcium 8%	Iron 6%
Vitamin E 37%	Folate 4%
Magnesium 22%	Phosphorus 14%
* Percent daily values are based on a 2,000 calorie diet.	

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Health Benefits

Omega-3 fatty acids

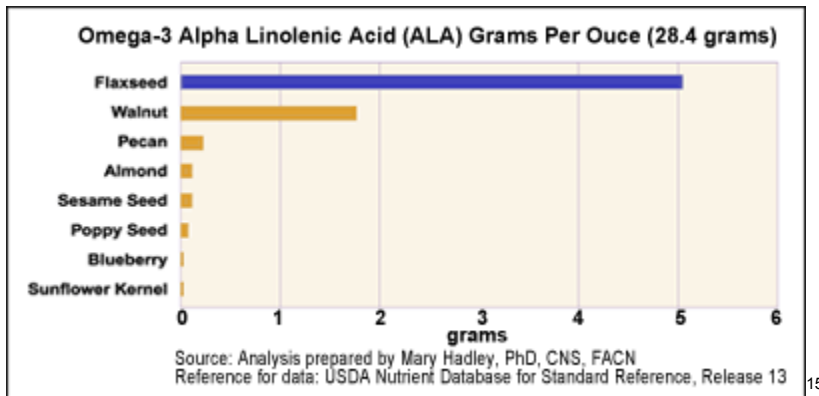
What are Omega-3 fatty acids? Roberta Lee, MD, medical director of the Center for Health and Healing at Beth Israel Deaconess Medical Center in New York explains that “the omega 3s -- "good" fats -- that researchers are looking at in terms of their possible effects on lowering cholesterol, stabilizing blood sugar, lowering the risk of breast, prostate, and colon cancers, and reducing the inflammation of arthritis, as well as the inflammation that accompanies certain illnesses such as Parkinson's disease and asthma”.⁹

According to the Mayo Clinic, health benefits attributed to omega-3 fatty acids include anti-inflammatory properties and beneficial effects on high blood pressure, cholesterol and triglycerides.¹⁰ Omega-3s make platelets in the blood less likely to stick together and they reduce blood clotting, thereby lessening the chance of a heart attack.¹¹ Its high content of alpha linolenic acids has made the ancient flax seed become our modern miracle food. Alpha linolenic acid is a type of omega 3 fatty acid.

It should be noted that the Food and Drug Administration (FDA) has not determined a reference data for the intake of omega-3 fatty acids. Therefore you will not see omega-3 fats specified on nutrition labels.¹²

The American Institute for Cancer Research (AICR) recently recommended that people eat more omega-3s and fewer omega-6s (the other essential fatty acid that is found in vegetable oils). Fish such as herring, salmon, sardines and trout are high in omega-3s. Flaxseed is a good vegetarian source of Omega-3 fatty acids. However, your body uses vegetarian sources of omega-3s less efficiently than the ones found in fish oils.¹³ This is because the alpha-linolenic acid found in flaxseed oil is not identical to the omega-3 fatty acids found in fish oil, the body has to convert alpha-linolenic acid from flaxseed oil to the same type of omega-3 fatty acids found in fish oil.¹⁴

The following chart shows that Flaxseed has significantly more omega-3 fatty acids than the other food listed.



Dr. Mehmet Oz, MD. A heart surgeon at NY Presbyterian/Columbia University Medical Center includes Flaxseed oil in his diet to ensure he is getting enough omega-3 fatty acids which lower the risk of heart disease. Dr. Christine Northrup, MD. An OB/GYN and the author of “Women’s Bodies, Women’s Wisdom” and “The Wisdom of Menopause” includes ground flaxseed in her diet so that she knows she is getting omega-3 fatty acids.¹⁶

Lignans

The latest research suggests that it is the presence of lignans in the ground flax that boast the most benefit. Lignans are a phytonutrient found in both the seeds and grains and are a type of carbohydrate. Flaxseed yields over 800 mcg./g of lignans whereas flaxseed oil has fewer than 2% of lignans. This particular lignan is a phenolic compound or polyphenol called secoisolariciresinol glucoside (SDG). Their significant ability to prevent cancer is recognized by the National Cancer Institute. In addition to having anti-cancer properties SDG’s also have anti-viral, anti-bacterial and anti-fungal properties.

Lignans can be found in both animals and plants and are converted in the colon by friendly bacteria. Increased immune system function is effective against numbers of diseases. Lignans contain phytoestrogens that mimic estrogen in the body and can be used as an alternative to Hormone Replacement Therapy. Increased phytoestrogens have the potential to lower breast and colon cancer. Recent research indicates that lignans may be able capable of inhibiting the formation of tumors.¹⁷

Populations with high fiber diets and high intakes of the phytochemicals called lignans have very low rates of hormone-dependant cancers, such as breast cancer.¹⁸ Lignans are found predominantly in whole grains, fruits, and vegetables. And, flaxseed is the richest source of lignans.¹⁹

When you eat lignans, bacteria in the digestive tract convert them into estrogen-like substances called enterodiol and enterolactone, which are thought to have anti-tumor effects. Lignans and other flaxseed components may also have

antioxidant properties—that is, they may reduce the activity of cell-damaging free radicals.

Recently small studies of cancer patients who consumed flaxseeds have produced some encouraging results. In one study men with prostate cancer who ate an ounce of ground flaxseeds (almost three tablespoons) a day as part of a very-low-fat diet were able to slow the progress of their cancers between the time they were diagnosed and the time of surgery. A similar study of women awaiting surgery for breast cancer found that those who ate a flaxseed muffin daily (with about four tablespoons of ground flaxseeds per muffin) had a slower tumor growth rate. Studies of animals, too, suggest some anti-cancer benefit from flaxseed.²⁰

Fiber

Flaxseed has very high amounts of dietary fiber, both soluble and insoluble, similar to dietary fiber in other grains, for example, oats, wheat, corn, rice, dry beans, soybeans, etc.

Total Dietary Fiber Content (%) of Certain Plant Seeds.

Fiber Component	Flax Seed	Oat Bran	Oat Meal	Wheat Bran	Corn Bran	Rice Bran
Total dietary fiber	40	17	11	49	78	75
Soluble fiber	10	8	5	5	3	4
Insoluble fiber	30	8	6	43	76	71

All available literature tends to support that dietary fiber is important to digestion and has been a factor in preventing cancer, especially colon cancer. One ounce of flaxseed provides 32 percent of the USDA's Reference Daily Intake (RDI) of fiber. Flaxseed must be ground to get maximum benefits of the omega-3 fatty acids and dietary fiber. The fiber in the flaxseed provides a natural laxative effect.²²

The soluble fiber in the flax plant is mainly in the form of mucilage gum. Similar to the fiber found in oat bran and pectin, research has shown mucilage gum helps lower blood levels of cholesterol.²³

Other Benefits & uses

Flaxseed contains NO gluten. For people with celiac disease, wheat allergies and wheat intolerance, flaxseed can provide needed carbohydrates without the worry of gluten.

Flaxseed can be substituted for eggs in recipes. Ground flaxseed may be kept for many months in the refrigerator or freezer. Whole flaxseed can be kept for several years.²⁴

Some studies found that fish oil and flax seed oil may be helpful in managing irritable bowel disease.²⁵

Flaxseed is also used in food for pets, show animals, and other companion animals.

Nothing in the flaxseed is wasted. From the fiber of the flax plant, we get linen. And the flaxseed oil, also called linseed oil, has many industrial uses. Some of them are that it is an important ingredient in paints, varnishes, and linoleum.²⁶

Flax Seed also works great for the purpose of creating aromatherapy products such as wraps and pillows.²⁷

Studies & Research

Findings from three Agency for Healthcare Research and Quality (AHRQ) evidence reviews indicate that:

- Omega-3 fatty acids do not affect fasting blood sugar or glycosylated hemoglobin in people with type II diabetes, nor do they appear to affect plasma insulin levels or insulin resistance.
- Alpha-linolenic acid (ALA), a type of omega-3 fatty acid from plants such as flaxseed, soybeans, and walnuts, may help reduce deaths from heart disease, but to a much lesser extent than fish oil.
- Based on the evidence to date, it is not possible to conclude whether omega-3 fatty acids help improve respiratory outcomes in children and adults who have asthma.
- Omega-3 fatty acids appear to have mixed effects on people with inflammatory bowel disease, kidney disease and osteoporosis, and no discernible effect on rheumatoid arthritis.²⁸

Flaxseed, like soy, contains phytoestrogens and is being studied for possible benefits. A study of women with high cholesterol levels reported that flaxseed improved menopausal symptoms and reduced some risk factors for diabetes. However, it had no significant effect on cholesterol levels. Others have reported beneficial effects on cholesterol, although more evidence is required to confirm any of these findings. Flaxseed has no effect on bone density, and long-term safety of flaxseed ingestion is not known. Animal and laboratory studies suggest flaxseed helps block growth factors involved with breast cancers.²⁹

Omega-3 fatty acids may be especially important in improving endothelial function. Recently, the scientific community has been concentrating on the benefits of these fatty acids. The most important fish oil fatty acid is one called

docosahexaenoic acid (DHA). We have long known that fish is healthy, but it is now proven that the omega-3s in fish fat improve endothelial function by enhancing NO (a gas that's critical for endothelial health) production, increasing HDL cholesterol levels and reducing LDL and triglyceride levels. Further, fish oils have been shown to reduce production of free radicals and substances that cause inflammation in the body. But don't just eat any fish. Salmon has 10 times the amount of omega-3 fatty acid as flounder. Herring has almost 16 times the amount. And mackerel has almost 27 times the amount.

There are several great plant sources of omega-3 fatty acid as well. Flaxseed is a superior plant source of omega-3 fatty acid, containing almost 33 times the amount of omega-3 fatty acid as wheat germ.³⁰

After years of telling consumers to eat less fat, health professionals are now advising them to eat *more* of one particular kind -- omega-3 fats, a group of polyunsaturated fatty acids that seem to play a role in the prevention of heart disease. The journal *Archives of Internal Medicine* recently published a review of what scientists know -- and what they've yet to find out -- about this heart-healthy fat.³¹

Yet another study has found that omega-3 fatty acids, and by extension, flaxseed, can reduce the risk of macular degeneration -- an eye disease that destroys vision by damaging nerve cells in the eye. The results of a Harvard study, published in August 2001 in the *Archives of Ophthalmology*, showed that people with a high intake of omega-6 (vegetable oils) were more likely to develop macular degeneration, while those with a combination of lower omega-6 intake and high omega-3 intake were less likely to have the disease.³²

The Nurse's Health Study which was reported in the *American Journal of Clinical Nutrition* in 1999, consisted of a 10-year follow-up of 76,283 women with no previously diagnosed cancer or cardio-vascular disease. After adjustment for age, standard coronary heart disease risk factors, and dietary intake, results demonstrated that a higher intake of ALA (omega-3 fatty acids) was associated with a lower relative risk of fatal and non-fatal myocardial infarction.³³

Diets rich in foods containing lignan precursors (whole grains, nuts and seeds, legumes, fruits and vegetables) are consistently associated with reductions in cardiovascular disease risk. However, it is likely that numerous nutrients and phytochemicals found in these foods contribute to their cardioprotective effects. In a prospective cohort study of 1,889 Finnish men followed for an average of 12 years, those with the highest serum enterolactone levels (a marker of lignan precursor intake) were significantly less likely to die from cardiovascular disease than those with the lowest levels. Flaxseeds are among the richest sources of lignan precursors in the human diet, but they are also good sources of other nutrients and phytochemicals with cardioprotective effects, such as omega-3 fatty acids and fiber. Three small randomized controlled trials found that adding 38-50

g/day of flaxseed to the usual diet for 4-6 weeks resulted in modest 8-14% decreases in LDL cholesterol levels, while three other randomized controlled trials did not observe significant reductions in LDL cholesterol after adding 30-40 g/day of flaxseed to the diet. Although the results of prospective cohort studies consistently indicate that diets rich in whole grains, nuts, fruits and vegetables are associated with significant reductions in cardiovascular disease risk, it is not yet clear whether lignans themselves are cardioprotective.³⁴

Possible issues

Raw flaxseeds contain small amounts of cyanogenic glucosides, which can be toxic if consumed in large quantities. Cooking seems to break down the toxic components.

Pregnant women should be careful to not eat too much flaxseed; in animal studies, flaxseed given to pregnant rats lowered the birth weight of their male offspring.

Breast cancer patients taking the drug tamoxifen should consult their doctor before eating flaxseed.³⁵ The prostaglandins in the flaxseed could interfere with the drug actions.

It is still too early to say that flax can prevent or cure cancer and to recommend it for that purpose. It's important to remember that plant estrogens, like human hormones, are not always benign. At high doses—and no one knows how much is too much—lignans might turn into cancer promoters. Indeed, some animal studies have found that high doses of plant estrogens can cause cancer cells to proliferate. We have no idea where that line—between enough and too much—might be drawn. All we can do is wait for further developments.³⁶

Conclusion

All the evidence suggests that including flaxseed in our diet on a daily basis can be beneficial and healthy in several ways: from lowering your risk of heart disease, to helping with regularity. And, there are many options to including flaxseed in your diet; such as adding ground flaxseed to cereal, yogurt or sprinkling it on salads, as well as baking with it. So if you aren't already eating some form of flax on a daily basis, now is the time to begin.

¹ <http://www.flaxcouncil.ca/flaxnut1.htm#General>

² <http://www.stevensfarm.com/fag.htm> Frequently asked Questions

³ <http://www.stevensfarm.com/>

⁴ <http://www.stevensfarm.com/flaxharv.htm> Golden Flaxseed Growth and Development

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- ⁵ <http://www.berkeleywellness.com/html/ds/dsFlaxseed.php> UC Berkeley Wellness letter, May 2002
- ⁶ <http://www.ameriflax.com/default.cfm?page=ffacts>
- ⁷ <http://www.stevensfarm.com/flaxharv.htm> Golden Flaxseed Growth and Development
- ⁸ <http://www.ameriflax.com/default.cfm?page=fnutrition>
- ⁹ <http://content.health.msn.com/content/article/62/71499.htm> The Benefits of Flaxseed by Carol Sorgen, WebMD Feature on Monday, March 10, 2003
- ¹⁰ Mayo Clinic Women's HealthSource - December 31, 2001 Flaxseed: A Good Thing in a Small Package
- ¹¹ http://www.wholehealthmd.com/refshelf/foods_view/1,1523,328,00.html Wholehealthmd.com "Flaxseeds" Why Eat it?
- ¹² <http://www.ameriflax.com/default.cfm?page=ffacts>
- ¹³ Health Magazine, December 2004 , (Nutrition Know-How) Is your diet off balance? By Eric Steinmehl
- ¹⁴ <http://www.ext.colostate.edu/pubs/columnnnn/nn030414.html> The many benefits of flaxseed By Pat Kendall, Ph.D., R.D Food Science and Human Nutrition Specialist Colorado State University Cooperative Extension April 14, 2003
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- ¹⁷ <http://www.thewolfeclinic.com/supplements/flax-lignans.html>
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- ²¹ <http://www.ag.ndsu.nodak.edu/plantsci/flaxseed.htm> North Dakota State University, Fargo, North Dakota 58105, FLAXSEED as Functional Food for People... and as Feed for Other Animals, Prepared by Jack Carter, Professor Emeritus
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- ²³ <http://www.ext.colostate.edu/pubs/columnnnn/nn030414.html> The many benefits of flaxseed By Pat Kendall, Ph.D., R.D Food Science and Human Nutrition Specialist Colorado State University Cooperative Extension April 14, 2003
- ²⁴ <http://www.ameriflax.com/default.cfm?page=ffacts>
- ²⁵ <http://www.healthcastle.com/ibd-diet.shtml> Healthcastle.com
- ²⁶ <http://www.berkeleywellness.com/html/ds/dsFlaxseed.php> UC Berkeley Wellness letter, May 2002
- ²⁷ <http://www.stevensfarm.com/faq.htm> Frequently asked Questions
- ²⁸ <http://www.ahrq.gov/news/press/pr2004/omega3pr.htm> AHRQ Evidence Reports Confirm that Fish Oil Helps Fight Heart Disease April 22, 2004
- ²⁹ <http://www.healthandage.com/Home/%21gm%3D20%21gsq%3Dflaxseed%21gid6=4004;jsessionid=80908C7FE58613A0CF564968869E36B5> Health and Age, Menopause May 12, 2004

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<http://www.healthandage.com/Home/%21gm%3D20%21gsq%3Dflaxseed%21gid2=2547;jsessionid=80908C7FE58613A0CF564968869E36B5> How to Promote and Maintain a Healthy Endothelium - Article XV (Part 3 of 4) Ed G. Lakatta, MD July 18, 2003

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<http://www.healthandage.com/Home/%21gm%3D20%21gsq%3Dflaxseed%21gid2=1691;jsessionid=80908C7FE58613A0CF564968869E36B5> ■Omega-3s, the Heart-Healthy Fats Source: Tufts University January 11, 2002 (Reviewed: January 26, 2004)

³² <http://content.health.msn.com/content/article/62/71499.htm> The Benefits of Flaxseed by Carol Sorgen, WebMD Feature on Monday, March 10, 2003

³³ www.ameriflax.com/qabooklet.pdf American Journal of Clinical Nutrition, 1999, Dietary intake of alpha-linolenic acid and risk of fatal ischemic heart disease among women.

³⁴ <http://lpi.oregonstate.edu/infocenter/phytochemicals/lignans/> The Oregon State University Linus Pauling Institute Micronutrient Information Center, Cardiovascular Diseases

³⁵ <http://www.ext.colostate.edu/pubs/columnnn/n030414.html> The many benefits of flaxseed By Pat Kendall, Ph.D., R.D Food Science and Human Nutrition Specialist Colorado State University Cooperative Extension April 14, 2003

³⁶ <http://www.berkeleywellness.com/html/ds/dsFlaxseed.php>
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