



Flaxseed

A Review of Health Benefits



Flax (*Linum usitatissimum*) is a blue flowering crop that produces small, flat seeds ranging in color from golden yellow to reddish brown. The seeds are commonly consumed in one of three ways: whole seed, ground seed (powder or meal), or flaxseed oil. In the last decade, flaxseed has garnered attention due to its reported health benefits. The American Botanical Council reported a 177% increase in sales of flax products in 1999 alone.

Most of the benefits reported from flaxseed consumption are believed to be due to the following three important components found in flaxseeds, **α-linolenic acid** (ALA), **lignans**, and **fiber**.

Flaxseed Oil

Flaxseed oil differs from whole and ground flaxseed by being devoid of both fiber and lignans. It is a unique oil in that it is composed of 73% polyunsaturated fatty acids (PUFA), 18% monounsaturated fatty acids (MUFA) and 9% saturated fatty acids (SFA), making it a low-saturated fat food. It is also the richest known source of the omega 3 (n-3) fatty acid, ALA, which comprises 55% of the total fatty acids. In fact, the percent of fat as ALA in flaxseed oil is 5.5 times higher than the next highest sources, walnuts and canola oil.



Composition of Flaxseed Based on Serving Size of One Tablespoon

| Form of Flaxseed | Weight (g) | Energy (kcal) | ALA (g) | Total Dietary Fiber (g) | Soluble Fiber | SDG Content (mg) |
|------------------|------------|---------------|---------|-------------------------|---------------|------------------|
| Whole Seed | 11 | 50 | 2.5 | 3.0 | 0.75 | 8.8 |
| Ground Seed | 8 | 36 | 1.8 | 2.2 | 0.55 | 6.4 |
| Flaxseed Oil | 14 | 124 | 8.0 | 0.0 | 0.0 | 0.0 |

SDG, or secoisolariciresinol diglucoside, is the main lignan precursor for mammals.



Uses of Flaxseed

- Flaxseed is most commonly used as a laxative.
- Flaxseed is also used during menopause for hot flashes and breast pain.
- Flaxseed oil is used for various conditions including arthritis.
- Both flaxseed and flaxseed oil have been used for high cholesterol levels and in the prevention of cancer.

Flax and Heart Disease

Flax has been suggested to protect against cardiovascular disease (CVD). A number of mechanisms have been proposed by which flax may exert its beneficial effects on the cardiovascular system:

- **Reducing serum cholesterol**
- **Reducing platelet aggregation**
- **Reducing inflammatory markers**
- **Improving glucose tolerance**



Clinical Trials

- **Hypolipidemic Effects:**
The ability of whole flaxseed (or its powder) to reduce cholesterol in humans has been supported in several studies. A review of 9 clinical trials suggests that 15-50 grams of flaxseed a day (either whole or powder) can modestly reduce total and LDL cholesterol by 1.6 to 18% in both normo- and hypertensive patients without any significant effects on HDL or triglycerides.
- Flaxseed oil does not seem to be as effective in reducing cholesterol as whole flaxseed and flaxseed powder.

- **Anti-inflammatory and Antiplatelet Effects:**

Since atherosclerosis has been identified as an inflammatory disorder, there has been much interest in the effect of n-3 fatty acids on inflammation. Dietary supplementation with ALA significantly decreased inflammatory markers in a study in middle aged men.

- **Hypotensive Effects:**

Although ALA is a precursor of EPA and DHA, it may have independent effects on blood pressure and blood lipids.

- **Glucose Metabolism**

Some studies have suggested that flaxseed may improve glucose homeostasis. In a study, participants (after an overnight fast) were given bread made either from flaxseed or wheat flour. Blood glucose samples were taken at baseline and at 15, 30, 45 and 60 minutes after the meal. A 28% reduction was observed for those who consumed bread with flaxseed flour compared with those who consumed wheat bread. Favorable effects on glucose metabolism observed from flax consumption was believed to be due to improvement in insulin sensitivity. This is likely due to the soluble fiber content of flax, which may delay postprandial glucose absorption in the gut.



Flax and Cancer

A strong positive relationship has been established between high concentrations of plasma estrogen and an increased risk of developing breast cancer. Counteracting the effects of estrogen with antiestrogenic therapies decreases the incidence and growth of invasive and noninvasive breast cancer. However, some of the medications have serious side effects.

Flaxseed is the richest source of the mammalian lignan precursor secoisolariciresinol diglycoside (SDG). SDG is converted to the lignans enterolactone and enterodiol in the colon by intestinal bacteria. Lignans have a very similar chemical structure to some of the therapies available for breast cancer, and recent research has focused on using lignans for cancer treatment and their role in cancer prevention.



Breast Cancer

Flaxseed supplementation has shown beneficial effects on breast cancer in laboratory animals.

- In a study, mice were injected with human cancer cells and then fed a typical lab chow diet for 8 weeks. At 8 weeks, rats were randomly assigned into a group that continued with the chow diet or to a 10% flaxseed diet. At the end of the study, flax seed supplementation was shown to reduce the tumor growth rate and reduce metastasis by 45%.
- In another study, feeding nursing mice with a 10% flax seed diet protected the offspring from mammary gland tumors. When challenged with a carcinogen to induce mammary gland tumors, they had significantly lower incidence of tumors, tumor load, mean tumor size, and tumor number compared to those whose mothers had not received flaxseed supplementation.

Prostate Cancer

Flaxseed supplementation (particularly ground flaxseed) has shown to be beneficial for prostate cancer in both animal and human studies. The beneficial factor may be the lignans found in flaxseed.

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Pennington Nutrition Series No 5, 2007

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Edited : October 2009



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