

## Flaxseed and flaxseed oil (*Linum usitatissimum*)

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While some complementary and alternative techniques have been studied scientifically, high-quality data regarding safety, effectiveness, and mechanism of action are limited or controversial for most therapies. Whenever possible, it is recommended that practitioners be licensed by a recognized professional organization that adheres to clearly published standards. In addition, before starting a new technique or engaging a practitioner, it is recommended that patients speak with their primary healthcare provider(s). Potential benefits, risks (including financial costs), and alternatives should be carefully considered. The below monograph is designed to provide historical background and an overview of clinically-oriented research, and neither advocates for or against the use of a particular therapy.

### Related Terms:

- Alashi, alpha-linolenic acid, Barlean's Flax Oil, Barlean's Vita-Flax, brazen, common flax, eicosapentaenoic acid, flachssamen, flax, gamma-linolenic acid, Graine de Lin, leinsamen, hu-ma-esze, Linaceae, linen flax, lini semen, lino, lino usuale, linseed, linseed oil, lint bells, linum, *Linum catharticum*, *Linum humile* seeds, keten, omega-3 fatty acid, phytoestrogen, prebiotic bread, sufulsi, tesi-mosina, Type I Flaxseed/Flaxseed (51-55% alpha-linolenic acid), Type II Flaxseed/CDC-flaxseed (2-3% alpha-linolenic acid), winterlien.

### BACKGROUND

- Flaxseed and its derivative flaxseed oil/linseed oil are rich sources of the essential fatty acid alpha-linolenic acid, which is a biologic precursor to omega-3 fatty acids such as eicosapentaenoic acid. Although omega-3 fatty acids have been associated with improved cardiovascular outcomes, evidence from human trials is mixed regarding the efficacy of flaxseed products for coronary artery disease or hyperlipidemia.
- The lignan constituents of flaxseed (not flaxseed oil) possesses *in vitro* anti-oxidant and possible estrogen receptor agonist/antagonist properties, prompting theories of efficacy for the treatment of breast cancer. However, there is not sufficient human evidence to make a recommendation. As a source of fiber mucilage, oral flaxseed (not flaxseed oil) may possess laxative properties, although only one human trial has been conducted for this indication. In large doses, or when taken with inadequate water, flaxseed may precipitate bowel obstruction via a mass effect. The effects of flaxseed on blood glucose levels are not clear, although hyperglycemic effects have been reported in one case series.
- Flaxseed oil contains only the alpha-linolenic acid component of flaxseed, and not the fiber or lignan components. Therefore, flaxseed oil may share the purported lipid-lowering properties of flaxseed, but not the proposed laxative or anti-cancer abilities.

### SCIENTIFIC EVIDENCE

#### Uses

*These uses have been tested in humans or animals. Safety and effectiveness have not always been proven. Some of these conditions are potentially serious, and should be evaluated by a qualified healthcare provider.*

**Grade**\*

<p><b><u>Attention deficit hyperactivity disorder (ADHD)</u></b></p> <p>Preliminary evidence supports the idea that deficiencies or imbalances in certain highly unsaturated fatty acids may contribute to attention deficit hyperactivity disorder (ADHD). Based on one trial, alpha linolenic acid-rich nutritional supplementation in the form of flax oil may improve symptoms of ADHD. More research is needed to confirm these results.</p>	<p><b><u>C</u></b></p>
<p><b><u>Breast cancer (flaxseed, not flaxseed oil)</u></b></p> <p>There is a lack of information from human studies that flaxseed is effective in preventing or treating breast cancer.</p>	<p><b><u>C</u></b></p>
<p><b><u>Diabetes (flaxseed, not flaxseed oil)</u></b></p> <p>Human studies on the effect of flaxseed on blood sugar levels report mixed results. Flaxseed cannot be recommended as a treatment for diabetes at this time.</p>	<p><b><u>C</u></b></p>
<p><b><u>Dry eye syndrome</u></b></p> <p>Taking flaxseed oil capsules by mouth may reduce dry eyes associated with Sjogren's syndrome patients.</p>	<p><b><u>C</u></b></p>
<p><b><u>Heart disease (flaxseed and flaxseed oil)</u></b></p> <p>People who have had a heart attack are reported to benefit from diets rich in alpha-linolenic acid, which is found in flaxseed. Good studies that examine the effect of flaxseed on heart disease in humans are not available. It is unclear whether flaxseed supplementation alters the course of heart disease.</p>	<p><b><u>C</u></b></p>
<p><b><u>High blood pressure (flaxseed, not flaxseed oil)</u></b></p> <p>In animals, diets high in flaxseed have mixed effects on blood pressure. One study in humans suggests that flaxseed might lower blood pressure. The evidence in this area is not clear, and more research is needed before a recommendation can be made.</p>	<p><b><u>C</u></b></p>
<p><b><u>High cholesterol or triglycerides (flaxseed and flaxseed oil)</u></b></p> <p>In laboratory and animal studies, flaxseed and flaxseed oil are reported to lower blood cholesterol levels. Effects on blood triglyceride levels in animals are unclear, with increased levels in some research, and decreased levels in other research. Human studies in this area report mixed results, with decreased blood levels of total cholesterol and low-density lipoprotein ("bad cholesterol") in some studies, but no effect in other studies. Most human research has not been well-designed, and further research is needed before a recommendation can be made.</p>	<p><b><u>C</u></b></p>

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<p><b><u>HIV/AIDS</u></b></p> <p>There is a lack of strong evidence available in this area, and no recommendation can be made without further research.</p>	<b><u>C</u></b>
<p><b><u>Kidney disease/Lupus nephritis (flaxseed, not flaxseed oil)</u></b></p> <p>There is a lack of strong evidence available in this area. More research is needed before a firm recommendation can be made.</p>	<b><u>C</u></b>
<p><b><u>Laxative (flaxseed, not flaxseed oil)</u></b></p> <p>Early studies in humans suggest that flaxseed can be used as a laxative. However, more information is needed to compare effectiveness and dosing to more commonly used agents.</p>	<b><u>C</u></b>
<p><b><u>Menopausal symptoms</u></b></p> <p>There is preliminary evidence from randomized controlled trials that flaxseed oil may help decrease mild menopausal symptoms. Additional research is necessary before a clear conclusion can be drawn and this remains an area of controversy. Patients should consult a doctor and pharmacist about treatment options before starting a new therapy. Overall effects on bone mineral density and lipid profiles remain unclear.</p>	<b><u>C</u></b>
<p><b><u>Menstrual breast pain (flaxseed, not flaxseed oil)</u></b></p> <p>Early information from one study in women, the results of which have not been fully reported, suggests that flaxseed may reduce menstrual breast pain. However, further study is needed before a recommendation can be made.</p>	<b><u>C</u></b>
<p><b><u>Obesity</u></b></p> <p>There is limited research on the effects of flaxseed flour and its effects in obese patients.</p>	<b><u>C</u></b>
<p><b><u>Pregnancy (spontaneous delivery)</u></b></p> <p>It has been proposed that alpha-linolenic acid, provided as flax oil capsules, may delay the timing of spontaneous delivery, but the available evidence does not support this use.</p>	<b><u>C</u></b>

### Prostate cancer (flaxseed, not flaxseed oil)

There is limited high quality research of the effects of flaxseed or alpha-linolenic acid (which is in flaxseed) on the risk of developing prostate cancer. This area remains controversial as there is some data reporting possible increased risk of prostate cancer with alpha linolenic acid. Prostate cancer should be treated by a medical oncologist.

C

*\*Key to grades: A: Strong scientific evidence for this use; B: Good scientific evidence for this use; C: Unclear scientific evidence for this use; D: Fair scientific evidence against this use (it may not work); F: Strong scientific evidence against this use (it likely does not work).*

### TRADITION/THEORY

*The below uses are based on tradition, scientific theories, or limited research. They often have not been thoroughly tested in humans, and safety and effectiveness have not always been proven. Some of these conditions are potentially serious, and should be evaluated by a qualified healthcare provider. There may be other proposed uses that are not listed below.*

- Abdominal pain, acute respiratory distress syndrome (ARDS), allergic reactions, antioxidant, benign prostatic hypertrophy (BPH), bipolar disorder, bladder inflammation, blood thinner, boils, bowel irritation, bronchial irritation, burns (poultice), catarrh (inflammation of mucous membrane), colon cancer, cough (suppression or loosening of mucus), cystitis, depression, diarrhea, diabetic nephropathy, diverticulitis, dry skin, dysentery, eczema, emollient, enlarged prostate, enteritis, eye cleansing (debris in the eye), gastritis, gonorrhoea, headache, infections, inflammation, irritable bowel syndrome, liver protection, malaria, melanoma, menstrual disorders, ovarian disorders, pimples, psoriasis, rheumatoid arthritis, skin infections, skin inflammation, sore throat, stomach upset, stroke, ulcerative colitis, upper respiratory tract infection, urinary tract infection, vaginitis, vision improvement.

### DOSING

*The below doses are based on scientific research, publications, traditional use, or expert opinion. Many herbs and supplements have not been thoroughly tested, and safety and effectiveness may not be proven. Brands may be made differently, with variable ingredients, even within the same brand. The below doses may not apply to all products. You should read product labels, and discuss doses with a qualified healthcare provider before starting therapy.*

#### **Adults (over 18 years old)**

- Flaxseed oil is available in liquid and capsule form, flaxseed powder, flour, and soluble fiber. 10 to 250 grams have been taken by mouth.
- Whole or bruised (not ground) flaxseed can be mixed with liquid and taken by mouth. Generally, 1 tablespoon in this form is mixed with 6 to 12 ounces of liquid and taken by mouth up to three times a day. Some studies use doses of soluble flaxseed mucilage/fiber as high as 60 to 80 grams per kilogram (1 kilogram equals 2.2 pounds) of the person's weight. These liquid forms of flaxseed should not be confused with preparations of flaxseed oil.
- Anecdotally, 30-100 grams of flaxseed flour can be mixed with warm or hot water to form a moist compress and applied to the skin up to three times a day. It is not clear how long a flaxseed poultice should be used.

## Children (under 18 years old)

- Not enough information is available to advise use of flaxseed or flaxseed oil in children.

## SAFETY

*The U.S. Food and Drug Administration does not strictly regulate herbs and supplements. There is no guarantee of strength, purity or safety of products, and effects may vary. You should always read product labels. If you have a medical condition, or are taking other drugs, herbs, or supplements, you should speak with a qualified healthcare provider before starting a new therapy. Consult a healthcare provider immediately if you experience side effects.*

## Allergies

- People with known allergy to flaxseed, flaxseed oil, or any other members of the Linaceae plant family or *Linum* genus should avoid flaxseed products. Severe allergic reactions have been reported.

## Side Effects and Warnings

- There are few studies of flaxseed safety in humans. Flaxseed and flaxseed oil supplements do appear to be well tolerated in the available research, and there is long-standing historical use of flaxseed products without many reports of side effects. However, unripe flaxseed pods are believed to be poisonous and should not be eaten. Raw flaxseed or flaxseed plant may increase blood levels of cyanide, a toxic chemical (this effect has not been reported when flaxseed supplements are taken at recommended doses). Do not apply flaxseed or flaxseed oil to open wounds or broken skin.
- Based on animal studies, overdose of flaxseed may cause shortness of breath, rapid breathing, weakness, or difficulty walking, and may cause seizures or paralysis. Theoretically, flaxseed (*not* flaxseed oil) may increase the risk of cell damage from a reaction called oxidative stress. Studies report conflicting results in this area. Based on one study, flaxseed or flaxseed oil taken by mouth may cause mania or hypomania in people with bipolar disorder. In theory, the laxative effects of flaxseed (*not* flaxseed oil) may cause diarrhea, increased number of bowel movements, and abdominal discomfort. Laxative effects are reported in several studies of people taking flaxseed or omega-3 acids. People with diarrhea, irritable bowel syndrome, diverticulitis, or inflammatory bowel disease (Crohn's disease or ulcerative colitis) should avoid flaxseed due to its possible laxative effects. Nausea, vomiting, and abdominal pain are reported in two individuals shortly after taking flaxseed products by mouth; these reactions may have been caused by allergy.
- Large amounts of flaxseed by mouth may cause the intestines to stop moving (ileus). People with narrowing of the esophagus or intestine, ileus, or bowel obstruction should avoid flaxseed (*not* flaxseed oil). Individuals with high blood triglycerides should avoid flaxseed and flaxseed oil due to unclear effects on triglyceride levels in animal research. People with diabetes should use caution if taking flaxseed products by mouth, as the omega-3 fatty acids in flaxseed and flaxseed oil may increase blood sugar levels.
- One study reports that the menstrual period may be altered in women who take flaxseed powder by mouth daily. Due to the possible estrogen-like effects of flaxseed (*not* flaxseed oil), it should be used cautiously in women with hormone sensitive conditions such as endometriosis, polycystic ovary syndrome, uterine fibroids, or cancer of the breast, uterus, or ovary. Some natural medicine textbooks advise caution in patients with hypothyroidism, although little scientific information is available in this area. Flaxseed and flaxseed oil may increase the risk of bleeding, based on early studies that show decreased clotting of blood.

Caution is advised in patients with bleeding disorders, in people taking drugs that increase the risk of bleeding, and in people planning to undergo medical, surgical, or dental procedures. Dosing of blood-thinning medications may need to be adjusted. In animal studies, flaxseed has increased the number of red blood cells.

- Several studies in humans report an increased risk of prostate cancer in men taking alpha-linolenic acid (which is present in flaxseed) by mouth. One small study of men with prostate cancer reports that flaxseed supplements do not increase prostate specific antigen (PSA) levels. Until more information is available, men with prostate cancer or at risk for prostate cancer should avoid flaxseed and alpha-linolenic acid supplements.

### **Pregnancy and Breastfeeding**

- The use of flaxseed or flaxseed oil during pregnancy and breastfeeding is not recommended. Animal studies show possible harmful effects, and there is little information in humans. Flaxseed may stimulate menstruation or have other hormonal effects and could be harmful to pregnancy.

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## **INTERACTIONS**

*Most herbs and supplements have not been thoroughly tested for interactions with other herbs, supplements, drugs, or foods. The interactions listed below are based on reports in scientific publications, laboratory experiments, or traditional use. You should always read product labels. If you have a medical condition, or are taking other drugs, herbs, or supplements, you should speak with a qualified healthcare provider before starting a new therapy.*

### **Interactions with Drugs**

- Taking flaxseed (*not* flaxseed oil) by mouth may reduce the absorption of other medications. Drugs used by mouth should be taken one hour before or two hours after flaxseed to prevent decreased absorption. People taking mood stabilizers such as lithium should use caution. Flaxseed contains alpha-linolenic acid, which may theoretically lower blood pressure. Individuals taking medications to lower blood pressure should use caution when taking flaxseed. Laxatives and stool softeners may increase or enhance the laxative effects of flaxseed. Flaxseed and flaxseed oil can lower cholesterol levels in animals, but studies in humans show mixed results. In theory, flaxseed may increase the effect of other medications that lower lipid (cholesterol and triglyceride) levels in the blood. Hormonal drugs may be affected. Dietary flaxseed may increase the effects of tamoxifen, a medication used to treat cancer. Consult a qualified oncologist and pharmacist before making decisions about treatment or health conditions.
- Although studies report conflicting results, the omega-3 fatty acids in flaxseed and flaxseed oil may increase blood sugar, reducing the effects of diabetes treatments, including insulin and glucose-lowering medications taken by mouth. Flaxseed (*not* flaxseed oil) is a rich source of plant lignans. Lignans are sometimes referred to as phytoestrogens and may possess estrogen-like properties. It is not known if flaxseed can alter the effects of birth control pills or hormone replacement therapies. Flaxseed and flaxseed oil theoretically may increase the risk of bleeding, and caution should be used when flaxseed products are taken with drugs that increase the risk of bleeding. Some examples include aspirin, anticoagulants ("blood thinners") such as warfarin (Coumadin®) or heparin, anti-platelet drugs such as clopidogrel (Plavix®), and non-steroidal anti-inflammatory drugs such as ibuprofen (Motrin®, Advil®) or naproxen (Naprosyn®, Aleve®).
- Flaxseed may also interact with muscle relaxants (such as metaxalone), drugs used for acid reflex (proton pump inhibitors such as lansoprazole), or prostaglandins (such as iloprost or

treprostinil).

### Interactions with Herbs and Dietary Supplements

- Consumption of flaxseed (*not* flaxseed oil) may reduce the absorption of vitamins or supplements taken by mouth at the same time. Therefore, vitamins and supplements should be taken an hour before or two hours after a dose of flaxseed to prevent decreased absorption. Flaxseed may alter the effects of psyllium and vitamin E in particular.
- Use caution if combining flaxseed with other mood-altering herbs, including St. John's wort (*Hypericum perforatum*), kava (*Piper methysticum*), or valerian (*Valeriana officinalis*). Hormonal herbs and supplements may be affected. Flaxseed contains alpha-linolenic acid, which may theoretically lower blood pressure. Use caution when combining flaxseed with other herbs or supplements that can lower blood pressure.
- Because of the laxative effects of flaxseed, caution should be used when it is taken with other supplements that have laxative effects.
- Studies on the effects of flaxseed on blood sugar in people with type 2 diabetes report mixed results. Use caution when combining flaxseed products with supplements that may raise blood sugar levels. In theory, flaxseed may contain estrogen-like chemicals. Use caution when combining flaxseed (*not* flaxseed oil) with supplements believed to have estrogen-like properties.
- Early studies in humans show that flaxseed and flaxseed oil theoretically may increase the risk of bleeding. Caution should be used when flaxseed products are taken with herbs and supplements that are believed to increase the risk of bleeding.
- Flaxseed may lower blood cholesterol levels. Caution is advised when using herbs or supplements that may also lower cholesterol. Cholesterol levels may require monitoring, and doses may need adjustment.
- Use cautiously when taking flax with other herbs or supplements taken to treat or prevent cancer due to a possible interaction.

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### AUTHOR INFORMATION

- This information is based on a systematic review of scientific literature edited and peer-reviewed by contributors to the Natural Standard Research Collaboration ([www.naturalstandard.com](http://www.naturalstandard.com)).

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### REFERENCES

*Natural Standard developed the above evidence-based information based on a thorough systematic review of the available scientific articles. For comprehensive information about alternative and complementary therapies on the professional level, go to [www.naturalstandard.com](http://www.naturalstandard.com). Selected references are listed below.*

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