



Flax Latin name:
Linum usitatissimum

Flaxseed:

Agriculture to Health

Jane U. Edwards, Ph.D., LRD
Nutrition Specialist

Flaxseed Varieties

Flaxseed is available either as yellow seeds or brown seeds. They have the same nutritional value.

Flaxseed Products

Whole Flaxseed

Whole flaxseed can be kept in cool, dry storage (0 to 80° F) for several years. Whole flaxseed needs to be ground so that nutrients and compounds can be utilized by the human digestive tract.

Ground Flaxseed

Grind at home with a coffee grinder or food processor. In some geographic areas it may also be available for purchase pre-ground. Ground flaxseed can be stored at refrigerator or freezer temperatures for several months.

Flaxseed Oil

Flaxseed oil is cold-pressed without solvents. The oil is usually sold in health food stores. Oil can be stored in the refrigerator for up to four months. Check the expiration date when purchasing.

Health Benefits

The health benefits of flaxseed have focused on the body's response to the high content of omega-3 fatty acids and fibers, especially lignan.

Heart Disease

Dietary fiber in flaxseed has been found to lower "bad" cholesterol (LDL-cholesterol). Omega-3 fatty acids also have been shown to reduce blood pressure, stroke risk and to increase time for blood clotting.

Anti-inflammatory Effects

The omega-3 fatty acids in flaxseed are metabolized to substances that exert an anti-inflammatory response and may have benefit for diseases such as rheumatoid arthritis.

Natural Laxative

The fiber in flaxseed exerts a natural laxative effect.

Diabetes

The fiber in flaxseed has been shown to reduce the blood glucose response to carbohydrate intake in healthy individuals. More research is needed to determine the effect on those with diabetes and pre-diabetes.

Menopausal symptoms

Phyto-estrogens from flaxseed, called lignans, may help reduce menopausal symptoms such as hot flashes.

NDSU
Extension Service

North Dakota State University
Fargo, North Dakota 58105

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Daily Amounts

Ground flaxseed

Suggested safe and effective daily intake is about 4 tablespoons (¼ cup) or about 36 grams. Raw flaxseed can be sprinkled onto cereal or stirred into juice or other foods. Flaxseed may also be incorporated into bakery products.

Flaxseed oil

One tablespoon of flaxseed oil has been suggested as a daily amount. Flaxseed oil is a source of omega-3 fatty acids. The oil does not contain lignans or other types of dietary fiber found in ground flaxseed (unless added back).

Flaxseed Recipe Substitutions

Flour substitutions

- Many recipes may allow a substitution of one-quarter to one-third of the flour with ground flaxseed.
- For example, in a recipe asking for 2 cups whole wheat flour, use 1½ cups whole wheat flour and ½ cup ground flaxseed.

Fat alterations

Because flaxseed has a high fat content, reduce the fat in baked products by 2-3 tablespoons for every ½ cup ground flaxseed used.

Nutrient Composition of Flaxseed (Percent of total weight)

Fat 41%

Omega-3 PU	57%
Omega-6 PU	16%
Monounsaturated	18%
Saturated	9%

Total dietary fiber 28%

Water insoluble (Cellulose and Lignan)	67%
Water soluble (Mucilage gum)	33%

Protein 20%

Moisture/Ash 11%

1 Tbsp ground flaxseed weighs 12 grams and has approximately 5 grams of fat



Dakota Pumpkin Muffins

(Flaxseed and Whole Wheat)

Preheat oven to 350° F

- 1½ c. whole wheat flour
- ½ c. ground flaxseed
- 2 tsp. baking soda
- 1 tsp. cloves
- 1 tsp. cinnamon
- ½ tsp. salt
- 1 c. chopped nuts
- Optional: ½ c. semi-sweet chocolate chips

Mix the dry ingredients together.

- 2 c. pumpkin
- ½ c. plain yogurt
- ¾ c. honey
- 1 tsp. molasses
- 2 eggs

Beat eggs and mix together with other wet ingredients.

Mix the wet and dry ingredients together. Place in greased muffin tins. Bake for 20-25 minutes until dry to an inserted toothpick. Makes approximately 15 muffins.

Nutrient Analysis (each muffin):

240 calories; 34 g carbohydrates; 6 g protein; 5 g dietary fiber; 11 g total fat; 6 g polyunsaturated fat.

Ground flaxseed: 6.5 g/muffin with 1.5 g omega-3
2 starch and 2 fat exchanges

For more information on this and other topics, see: www.ag.ndsu.nodak.edu/ag2health.htm