



## Flax- the wondrous little seeds

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Flax (*Linum usitatissimum* L.) commonly known as flax or linseed is a flowering plant that belongs to family Linaceae, cultivated as food and fibre crop in regions with temperate climatic conditions. The cultivated plants attain a height of 1.2m with slender stem. The leaves are bluish green, lanceolate and the flowers are pale blue in colour with five petals that develop into a dry dehiscent capsule containing several glossy brown seeds. The species is native to the region extending from the eastern Mediterranean through Western Asia and the Middle East to India. First cultivated in Egypt but has now being cultivated all around the world. The world production of flax (linseed) was 3.2 million tonnes, led by Kazakhstan with 29% of the total production (FAOSTAT, 2018, retrieved 2020).



The flax grown for fibre is harvested about a month after the plants flower while as the flax grown for seed is allowed to mature until the capsules become completely dry and start splitting.

The flax grown for seeds can be ground into the meal or turned to produce linseed oil. Flax may also be grown as an ornamental plant in gardens. There are two basic types of flax seeds, brown and golden. The golden variety has a slightly milder flavour while the brown flax has a more prominent nutty flavour. However nutritional benefits are the same with each. Most nutrition experts recommend

ground over whole flaxseed as the ground form is easier to digest. Whole flaxseed may pass through intestine undigested. Flaxseed is well-known for the content of chemical compounds with specific biological activity and functional properties: polyunsaturated fatty acids (PUFA) omega-3 family, soluble dietary fibres, lignans, proteins and carbohydrates. Flaxseeds are emerging as an important functional food ingredient because it provides oil rich in omega-3, digestible proteins and lignans. In addition to being one of the richest sources of  $\alpha$ -linolenic acid oil and lignans, flaxseed is an essential source of high quality protein and soluble fibre and has considerable potential as a source of phenolic compounds. Of all lipids in flaxseed (approximately 30%), 53% are  $\alpha$ -linoleic acid (ALA), 17% linolenic acid (LA), 19% oleic acid, 3% stearic acid and 5% palmitic acid, which provides an excellent n-6: n-3 fatty acid ratio of approximately 0.3:1 and are one of the best plant based sources of heart healthy omega-3 fatty acids. Therefore, the seed may be an alternative for supplying this fatty acid to populations concentrated in regions of the world where there is not large access to marine foods, which are the best sources of n-3 fatty acids and also for the people who prefer vegan foods. The flax seeds proteins vary with the genetic and environmental

conditions. Cold climatic region have less protein and high oil content in the seeds. The fibre content varies between 22% to 26%, twice the percentage of high fibre beans. Flax is low in carbohydrates (sugars and starches), providing only 1 gram (g) per 100 g. Flaxseeds are a source of many vitamins and minerals as calcium, magnesium and phosphorus. It is of great importance, being that a 30g portion of the seed constitutes 7% to 30% of the Recommended Dietary Allowances (RDAs) for these minerals. Other bioactive compounds of flaxseed are from the class of phenolic compounds, including lignans, flavonoids and phenolic acids.

Flaxseeds have potential health benefits besides the nutrition. Alpha Linolenic Acid (ALA) that are present in high amounts in flaxseeds can be metabolized in the body into docosahexaenoic acid (DHA) ( $\omega$ -3) and eicosapentaenoic acid (EPA) ( $\omega$ -3). All the omega three fatty acids (ALA, EPA and DHA) have been widely reported for several conditions including cardio-vascular disease, hypertension, atherosclerosis, diabetes, cancer, arthritis, osteoporosis, autoimmune and neurological disorders. Paschos *et al.*, 2007 reported significant decrease in systolic and diastolic blood pressure in dyslipidemic patients with 12 weeks of dietary flaxseed supplementation (8 g/day of ALA) Dietary fibres, lignans, and  $\omega$ -3 fatty acids, present in flaxseed have a protective effect against diabetes risk. Researchers have shown that flaxseed inhibits the formation of colon, breast, skin and lung tumours and also reduces blood vessel cell formation in female rats, all suggesting a protective effect against breast, colon and ovarian cancer (Truan *et al.*, 2012). In addition to that flax seeds have been shown to benefit many aspects of human health such as digestive health as the fibre content acts as the laxative and prevents constipation. Packed with Omega-3 fatty acids, lignans and antioxidants, flaxseed makes for a powerful ally in the fight against aging. The vitamin E present in flax seeds is essential for hair health. Among all the steady fast

methods of weight loss, flaxseeds are one of the most effective foods that help to lose extra kilos. Enriched with fibre, Omega 3 fatty acids and anti-oxidants, flaxseeds increase body's efficiency to lose weight. Flaxseed is especially beneficial for women. It's known to help women's fertility by improving their chances of conception. Flax seeds also help in promoting normal ovulation and in restoring hormonal balance. It also protects postmenopausal women from risk of cardiovascular disease (Mason and Thompson, 2014). These little tiny wondrous seeds also known as 'alsi', may look small but are a big source of wellness and hence, called powerhouse of nutrition.

#### Tips for including flax seed in diet:

- Flaxseed should ideally be consumed in the grounded form rather than as the whole seed or in form of oil.
- Begin slowly if not used to a high-fibre diet.
- Should be consumed with plenty of fluids.
- Eat roasted seeds rather than raw.

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