

A REVIEW OVER THE POTENTIAL BENEFITS OF FLAXSEED: A MAGICAL NUTRACEUTICAL

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ABSTRACT:

Ayurveda, world's oldest living tradition, it is popular in India and other countries and has a solid philosophical and experimental base. Various plants, minerals, and lipids are described in Ayurvedic literature which are necessary for a healthy existence and the treatment of numerous life-threatening illnesses. One of the foods recommended for health in Ayurvedic scriptures is flax seed. Flax seeds, commonly referred to as "linseeds" or "Alsi," are an excellent source of nutritional fibre, manganese, B Vitamins, and the crucial fatty acid ALA, also called omega-3. Flax seeds are also high in minerals. Seeds come from flax, one of the oldest known fibre plants, which was cultivated in ancient China and Egypt. As a demulcent preparation for gastritis and enteritis, flax is used internally in Ayurveda to treat persistent constipation, functional abnormalities of the colon brought on by laxative abuse, and irritable colon. Its flowers are cardiotoxic, its oil is purgative, and its powdered seeds or press cakes are used externally to assimilate inflammation and act as an emollient in poultices for boils, carbuncles, and other skin ailments. The external use of its oil, or abhyanga, is referred to as vatanashaka. Burns respond very well to a mixture of lime water and flax oil.

Keywords: Flaxseed, Lignans, Omega 3 Fatty acids, Dietary fibre

INTRODUCTION:

Flaxseed has been dubbed a "superfood," which is a food that contains numerous critical elements such as lignans, dietary fibre, vitamins, minerals & omega-3 fatty acids. natural cuisine contains many bioactive ingredients and several health-improving benefits. Flaxseed consumption may play a significant role in illness prevention including those resulting from poor diet. The highest plant source of alpha-linolenic acid (ALA), flaxseed oil has a concentration of 53%, along with 19% of oleic acid. Because it contains a lot of ALA, flaxseed oil has n-6: n-3 ratio of fatty acid of roughly 0.3:1. ALA has an anticarcinogenic effect on the human body as a result of its anti-inflammatory and antiproliferative qualities, limiting the growth of malignant tumours and their metastases. Blood lipid levels are improved by flaxseed's alpha-linolenic acid. Plasma total cholesterol, LDL cholesterol, and VLDL cholesterol have all been reported to be dramatically reduced by it. 40% of the dietary fibre in flaxseed is made up of soluble fibre, which makes up 25%, and insoluble fibre, which makes up the remaining 75%. Gums, pectin, and beta-glucan are examples of soluble fibre that are crucial for lowering blood sugar and absorbing cholesterol

and triglycerides, both of which are essential for preventing cardiovascular disease, diabetes. Furthermore, soluble fibre influences gut flora and can be converted to human health is affected by short-chain fatty acids. Insoluble fibre includes cellulose, hemi-cellulose, and lignin, which also reduces constipation, bulks up the stool. Niacin and vitamin E are abundant in flaxseed, especially in the form of Tocopherol, which is a powerful antioxidant. The typical amount of tocopherol in flaxseed is between 39.5 and 50 mg/100 g. The risk of cardiovascular disease, Alzheimer's disease, and various cancers can be reduced with a sufficient intake of vitamin E.

FLAX SEED NUTRITIONAL PROFILE

Golden flaxseed and brown flaxseed are the two primary varieties of flaxseed. They have fairly comparable nutritional profiles and exactly the same number of short-chain omega-3 fatty acids are present. Flaxseed isn't just "an excellent supply of two fatty acids that are needed for human wellbeing acid and alpha-linolenic acid," but it also "an outstanding fiber source and a source of minerals and vitamins," as stated by the American Nutrition Association. This "neglected food" was given

special attention by the association. Flaxseed has very low levels of salt and cholesterol.

Synonyms

Flax seed, semen lini, Bizr El kettan, the seed and the flax-woven cloth have been found in ancient Egyptian tombs. Plant.

Source:

Dried ripe seeds of *Linum Usitatissimum*.

Scientific Classification

Family: Linaceae.

Kingdom: Plantae.

Genus: *Linum*.

Species: *Linum usitatissimum*.

Botanical Name: *Linum usitatissimum*.



Fig.1 Plant of Flaxseed

IMPORTANT FLAX COMPOUNDS

Alpha-Lineolenic acid (ALA)

Enterolactone (ENL)

Docosapentaenoic acid (DPA)

Linustatin

Lineolenic acid (LA)

Enterodiol (END)

Docosahexaenoic acid (DHA)

Secoisolariciresinol(SDG)

Eicosapentaenoic acid (EPA)

Linamarin.

FLAXSEEDS ARE ABUNDANT IN

Lignan

The main classes of phytoestrogens are lignans. These are chemical substances that resemble oestrogen and have antioxidant properties. With 0.3g per 100g, flaxseed is regarded as one of the best sources of lignans. Clinical Laboratory Science Critical Reviews released a study that came to the conclusion that "lignan-rich diets may be beneficial, particularly if consumed for life."

Fibre

Both soluble fibre and insoluble fibre are abundant in flaxseed. According to the Mayo Clinic, soluble fibre decomposes in water to create a gel-like substance that reduces cholesterol and blood sugar levels. Solvent-soluble fibre, on the other hand, "absorbs water, that adds weight to our digestive tract and helps in the quick flow of items throughout.

The fatty acids omega-3

These are regarded as "good fats" that are advantageous to the heart. The human body is unable to generate these necessary acids, thus getting them from food is the only way to get them. Also abundant in flaxseeds are vitamin B6, iron, potassium, copper, and zinc.

FLAXSEED'S CHEMICAL COMPOSITION

The seed is composed of 20% protein, 30% dietary fibre, and 40% fat. The environment in which the plant is grown has an impact on the chemical composition, which differs greatly between varieties. The cotyledons contain 76% of the seed's protein and 75% of its lipids. The endosperm only contains 23% of a lipid as well as 16% of the protein. The chemical make-up of flaxseed. Because of its lipid makeup, Omega 3 fatty acids are abundant in flaxseed, notably alpha-linolenic acid (ALA), that can make up to 52% of all fatty acids. Moreover, lignans, a colloidal gum, and high-quality protein are all found in flaxseed, making it a significant source of these phenolic compounds. These molecules interact during oil extraction and processing even though they are distributed throughout diverse several parts of the seed. it is extremely tough to digest.

Humidity %	Protein %	Lipid %	Fiber %
7.4	23.4	45.2	-
4-8	20-25	30-40	20-25

BENEFITS OF FLAXSEED

Hair and Skin

You can improve your skin, hair, and nails by adding two tablespoons flax seeds or one tablespoon of adding flaxseed oil to regular regimen. By delivering necessary fats and vitamins B, that Flax seeds' ALA fats help the skin and hair by preventing flakiness and drying. Additionally, it can lessen the effects of eczema, rosacea, and soreness. This is true for eye health as well because flax can help with eye syndrome. Another excellent choice is flax seed oil, which has an even greater concentration of good fats. To moisturize your skin and hair, consume one to two tablespoons internally. It can also be used as an organic skin moisturizer by combining it with essential oils.

Laxation Activity and Digestive Health

Flax seed has an impact whether it is consumed or roasted in a pastry item. If flax seeds are consumed in the quantity of 15g daily from a particular flax fibre dietary supplement for 2 weeks, this changes dietary habits, definitely helps person in improving their laxative difficulties. In constipation you can also take 1-3 tbsp of flax seed oil in carrot juice. The potential of flax seed to support digestive health may be one of its greatest benefits. Flax's ALA can assist preserve the health of the GIT and safeguard its microbial inhabitants. It has been demonstrated to be helpful for those with Crohn's or other digestive disorders since it can lower intestinal inflammation. One of the richest sources of magnesium in the world, flax is also particularly high in insoluble and soluble fibre, both of which can help with health. Around 5g, or 1/4 of the RDA, of fibre can be found in two tablespoons of flaxseeds. The fibre in flaxseeds feeds the good bacteria in your colon, which can help remove waste from your body.

Flaxseeds for cancer

Flaxseed is plant which is rich in lignans, which has the ability to prevent angiogenesis, slow the progression of disease, and reverse early malignant lesions. The phenotype of the malignant tumour can be influenced by flaxseed lignans, which changes its cellular properties. Additionally, flaxseed lignans modify signalling cascades at different stages of cancer by altering links in molecular signalling networks. Consequently, flaxseed lignans can stop the spread of a variety of malignancies. Numerous studies have demonstrated the health advantages of flax seed, including its ability to fight breast, prostate, ovarian, and Carcinoma of the colon. Flax seed consumption may lower the risk of breast cancer. According to a study that was reported in the journal of clinical cancer research. The conversion of the by converting three lignans in flaxseeds create enterolactone and enterodiol, that organically balance hormones, gut flora may help explain why flaxseed consumption lowers the risk of breast cancer.

Antioxidant activities

It's been established that flaxseed's antioxidant activity lowers cholesterol as well as platelet aggregation. Previous studies have shown that the mammals lignans enterodiol (ED) and enterolactone (EL), in addition to the flaxseed lignin secoisolariciresinol diglucoside, are effective antioxidants towards DNA damage and lipid peroxidation (SDG). We also tested the action of secoisolariciresinol, EL, and ED at supra-physiological concentrations on a reduction of activated cell chemiluminescence. It was believed that the 3-methoxy-4-hydroxyl substitutions of SDG and SECO were in charge of the lignan's antioxidant activity. The flaxseed component secoisolariciresinol diglucoside has been shown to successfully prevent or postpone the onset of both type-1 and type-2 diabetes. It has been suggested that SDG's hypoglycaemic impacts in type-2 diabetes are brought about by its antioxidant activity. The gluconeogenic pathway's rate-limiting enzyme, phosphoenol carboxy kinase, may be the reason for the hypoglycaemic effects of SDG on type-2 diabetes. The antioxidant capabilities of the flaxseed chutney were demonstrated by reduced

levels of lipid peroxidation (TBARS) and thus the predicted enzyme -glutamyl transpeptidase in rats treated with azoxymethane.

Antidiabetic properties

Daily lignan supplementation significantly, but statistically only marginally, improved glycaemic control in type 2 diabetes patients to have an impact on fasting glucose, lipid profiles, or insulin sensitivity [49]. Intake of flaxseed fibre reduced peak blood glucose levels in healthy individuals. After the oil has been removed, the flax cake with antioxidants can be given in rural areas as a supplement to diabetics. SDG extracted from flaxseed which is useful in delaying the time of action of diabetes in female Zucker mice. lignin and SDG lowered hyperlipidaemia, hypercholesterolaemia, hyperinsulinemia, and hyperleptinemia and decreased the build-up of visceral and hepatic fat caused by high-fat diets. These outcomes could lower the risk of cardiovascular disease linked to lifestyle disorders like diabetes, atherosclerosis, and hypertension as well as help prevent obesity. Flaxseeds are a potential food to help reduce the risk of diseases linked to a particular way of life because they also include PUFA and dietary fibre.

Nephrology uses for flaxseed

In animal models, such as Han: SP RD-, flaxseed derivatives, such as oil and flax lignans, modulate the course of renal injury. PKD stands for polycystic kidney disease [80]. overweight male SHR/N-cp rats were fed one of three diets that contained casein 20% or 20% soy-based protein isolate. With the exception of this, the three diets were equal and included comparable amounts of protein, minerals, vitamins, carbohydrates, and fat. All These diets were used to keep the animals for six months. All three teams demonstrated similar rates of body weight increase and food intake hyperinsulinemia and hyperglycemia during fasting. Although plasma glucose levels were similar in all three groups, rats given flaxseed meal had considerably lower plasma insulin concentrations than those given either Soy or casein protein isolate. Creatinine and mean plasma creatinine clearance and excretion of urine urea were likewise not significantly different among the

three teams. Contrarily, rats fed flaxseed had considerably lower urine protein excretion (P 0.01) than either casein- or soy protein concentrate-fed rats. The results show that dietary protein Flaxseed meal replaces the original ingredient to minimise proteinuria, glomerular, and Flaxseed meal obese SHR/N-cp rats also had tubulointerstitial lesion more efficient at lowering proteinuria and renal dysfunction than soy protein anomalies in this model's histology. decrease in proteinuria found that protein intake had no bearing on renal damage glucose regulation. which nutritional element(s) flaxseed contains It is unknown which meal(s) causes the kidney protective effect definite in their approach.

Flaxseed for healthy bones

By assisting in preventing excessive bone turnover, the Alpha linolenic acid, an omega-3 fatty acid, is found in flaxseed, helps to promote bone health. In diet Consuming foods high in these omega-3 fats lowers blood pressure. omega-6:3 fats ratio. when the ladies for at least a month, has experienced 14 hot flashes per week, were fed if they weren't taking oestrogen to treat their menopausal symptoms. The women consumed two teaspoons of ground flaxseed for 6 weeks twice daily. When consuming flaxseed, daily heat flushes were cut in half. In addition, the hot flashes of women's intensity decreased 57%. Adverse reactions included moderate diarrhoea (8 women) and stomach bloating (14 women).

Decrease Cholesterol

According to research published in the Nutrition and Metabolism journal, consuming flaxseed help body to organically lower its cholesterol levels. Because in digestive system the soluble fibre in flax seeds, fat and cholesterol are trapped and cannot be absorbed. Additionally, soluble fibre retains bile, which the gall bladder produces from cholesterol. The body is therefore forced to produce more bile, which uses up higher cholesterol levels in the blood and lowers total cholesterol by excreting it through the digestive tract. Function in reducing inflammation C-reactive protein levels were significantly lowered in diabetic participants with mild hypercholesterolemia after receiving lignan capsules (360 mg/d) for 12 weeks. Intestinal

microorganisms transform flaxseed lignans into enterolactone and enterolignans enterodiol. Enterolignans' relative bioavailability whole flaxseed comparison to ground flaxseed were 28% ($p = 0.01$), whereas it was 43% ($p = 0.01$) from crushed flaxseed. Information on this subject is lacking. The bioavailability of the enterolignans is significantly increased by crushing and milling flaxseed. During flaxseed administration, there was increase in the concentrations of serum enterolactone, eicosapentaenoic acid, docosaenoic acid, and alpha linolenic acid was doubled. It has been demonstrated that lignans reduce the risks for heart disease. It has been demonstrated that using flax seed or SDG has beneficial benefits both in models of polycystic kidney disease and lupus. It has additionally claimed that flax seed possesses hepatoprotective properties. The reported bioactivities can be explained mechanistically in a variety of ways, including by participation in hormone availability or metabolism, angiogenesis, antioxidation, and gene repression.

CONCLUSION

Since flax seeds is the most abundant and well-known source of these ingredients, the biological activities of flax seeds that have been the subject of the greatest research are those linked to ALA, lignans and to a lesser extent, soluble polysaccharides (gum). There are numerous flax seeds product that have positive effect on market. Therefore, flaxseeds to be genuinely natural antioxidant, procedures for the efficient extraction, modification and isolation of phytochemicals from flaxseeds must be devised. Peptides have potent immunosuppressive and antimalarial properties, while lignans are thought to have antioxidant and phytoestrogenic effect. Alpha linolenic acid has anti allergic and anti-inflammatory properties.

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