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PHYTOTHERAPEUTIC AND PHARMACOLOGICAL POTETIAL OF *LINUM USITATISSIUM* LINN. (FLAXSEED)

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ABSTRACT: *Linum Usitatissimum* Linn is the most potent herbal medicine, linseed is traditionally exploited for several nutritional and well-being. It is an annual plant with a height range of 60 to 120 cm. There are two types of flax seeds brown and golden, Golden flax seeds used in cold climate while brown used in hot climates. Flax seed is not only used for medicinal purposes but it also used in dietary food and snacks. The Urdu name of linseed is Tukhm e Katan, they are used in various illnesses like abdominal polycystic ovarian syndrome, irregular menstrual bleeding. Linseed has many biological active compounds omega-3 fatty acid, alpha linolenic acid, lignin, secoisolariciresinol, glucoside and fiber. Flax seed has anti-bacterial, anti-microbial, analgesic, carcinogenic, anti-inflammatory, diuretic, galactagogue, expectorant, properties. Laooq-e-Katan is a drug prepared by tukhm-e-katan for relieving pneumonia, cardiac asthma and bronchitis.

KEY WORDS: Sedative, Carcinogenic, fFax seed, Omega-3 fatty acid, Pharmacological action, Chemical constituents.

INTRODUCTION

Since the oldest civilizations, people have ingested flaxseed. In ancient Egypt and Greece, it was utilized for medical reasons, primarily to treat abdominal pain and as an energy source. The botanical name of flax seed is *Linum Usitatissimum* Linn. The word Latin Usitatissimum means "most useful," while the name Linum is extracted from the Celtic word lin, which means "thread."(1).

The term "linseed" is used in Europe for edible flax, although the term "flaxseed" is used in North America for flax used for human consumption. Linseed belongs to the family Linaceae. In Arabic it's known as Bizr Kitan, in Urdu it's known as Alsi, tukhme katan, and in English it is called flax or linseed.kernels, grains, and seeds are medicinally used, and seeds are also used as diet supplements (Fig. 1).

One of the oldest fibers discovered in human history comes from the flax plant, which is used to make linen cloth. *Linum Usitatissimum* is an annual plant. Linseed can reach a height of 120 cm, although the types farmed for oil production often reach maturity at a much lower height (60–80 cm) (2). Human society has used flax for a variety of purposes for decades. In general, flax is actually thought of as a plant with two main purposes: fiber and seeds. High strength and durability are two characteristics of the flax stem fiber.

The seeds contain lignans, digestible proteins, and oil containing omega-3 fatty acids. The potential for Alsi as a source of phenolic compounds is significant. It is high in soluble fiber and protein (3). Numerous biologically active substances with potent phytochemical and antioxidant capabilities build up in it (4).

PHYTOCHEMICAL SCREENING

Flax seed have many biomarkers, which gives many pharmacological activities. Flax seed has abundant fatty oil and lignans. Also, some chemicals are present which are given in Table 1.

PHARMACOLOGICAL STUDIES

Several recent investigations on *Linum Usitatissimum* have revealed that it has a variety of pharmacological properties.

ANALGESIC

Numerous researches have shown that flax seed is employed in medicine due to its analgesic properties, in addition to being used in cooking and other industries. Xylene tests were carried out with extract and naloxone group to assess its analgesic efficacy. The study assessed the possibility of using the extract as an analgesic. Linseed has analgesic properties. Its leaves have a flavanol predominance (5)

ANTI-INFLAMMATORY: -

Anti-inflammatory medicines block the different chemical substances that initiate inflammation in the body. Linseed also contains certain powerful biomarkers with anti-inflammatory effects. Lin seed fixed oil was administered to rats orally, intramuscularly, and intraperitoneally to test its anti-inflammatory effects on carrageenan and prostaglandin E2 (PGE2)-induced paw edema. Oil delivery after a carrageenan-induced paw edema model showed a considerable reduction in paw edema, however, the level of edema inhibition was less than that seen with intramuscular and intraperitoneal administration. Simultaneously, oral administration of the oil inhibited edema in the prostaglandin-induced edema model substantially less than intramuscular and intraperitoneal injection (6).

ANTIOXIDANT

By preventing an oxidative chain reaction, antioxidant activity blocks or stops nutritional oxidation, especially of lipids and proteins. flaxseed is a natural component with health advantages because it contains a high amount of fiber, phenolic compounds, and omega-3 fatty acids. For evaluation of antioxidant properties, flax seed powder is mixed with yogurt. The findings demonstrated that adding flaxseed powder considerably raised the pH, acidity, water-holding capacity, and viscosity of yogurts. Additionally, in contrast to the controls, the enhanced yogurts exhibited a higher antioxidant activity (7).

ANTICANCER

Flaxseeds have long been known for their cancer-fighting qualities. Because of the significant amount of lignans resulting from consumption. Secoisolariciresinol diglucoside (SDG), the most prevalent lignan, is consumed after the consumption of flax, which is then converted in the stomach into two mammalian lignan derivatives enterodiol (END) and enterolactone (ENL). It has previously been revealed that these lignans have anti-tumor actions against breast, colon, and lung cancer (8). According to a study, flaxseeds consumed in a daily amount of 40 gm may have a metabolic that could alleviate excess estrogen. This outcome may be favorable in the prevention and Breast cancer slowed by positive hormone receptors (9).

ANTIDIABETIC

Diabetes mellitus develops when blood glucose levels exceed normal limits. it is treated with different kinds of medication for the enhancement of pancreatic beta cells, which play a significant role in insulin secretion. Several studies show that flaxseed plays a significant role in the prevention of diabetes mellitus (10). Flax seed is well known for its anti-diabetic effects. The main linseed lignan is secoisolariciresinol diglucoside (SDG). Many studies show that SDG has anti-diabetic properties. In a study done on rats, SDG was found to lower the prevalence of diabetes (11).

ANTIMICROBIAL

A globally significant problem of antibiotic resistance is linked to casual medication use. One such well-known original super food is flax seed, which has been shown to have strong anti-microbial and anti-biofilm properties. Flax seed is also high in omega-3 fatty acids. Ethanolic extract of linseed was prepared against Porphyromonas gingivitis,

Aggregatibacter actinomycetemcomitans, and Tannerella forsythia. As a result, the extract shows bactericidal activity only for P. gingivitis (12). Another experimental study shows the anti-microbial activity of flax seed against Salmonella Typhi, Enterococcus, Escherichia coli, Bacillus subtilis, and Staphylococcus aureus by preparing ethanol and chloroform extracts. Chloroform extract shows more anti-microbial activity rather than ethanol extract (13).

ANTI-PYRETIC

The study of fixed linseed oil assessed the antipyretic effect of *Linum Usitatissimum* and revealed that it inhibits PGE2, leukotrienes, histamine, bradykinin, and arachidonic acid in addition to reducing inflammation, pain, and fever. According to studies, linseed oil is utilized in typhoid and paratyphoid vaccines. (14).

ANTI-ULCER

Studies showed by administering linseed oil and mucilage to rats that had ulcers brought on by ethanol, the anti-ulcer properties of linseed were assessed. The results indicated that oil is superior to mucilage due to its cytoprotective action (15).

LAXATIVE

Linseeds have laxative effects because they are rich in dietary fibers, which give an emollient effect on the intestine. Consuming roughly 50 grams of linseed flour daily with meals can help relieve constipation more effectively than lactulose (16). Mucilage that has swelled up creates a lubricating layer that aids in the passage of intestinal contents (17).

HYPERCHOLESTEREMIA

It has been discovered that linseed oil is a good source of n-3 series fatty acids, which primarily improve the lipid profile and have beneficial effects on the cardiovascular system (18). Men or women in both groups had mild hypercholesteremia to assess the effects of tukhme Katan on cholesterol. They received an approximately 15ml/day dose for four weeks to assess the effects of tukhme Katan. According to the results, linseed regularizes blood pressure and lowers LDL levels while raising HDL levels (19).

POLYCYSTIC OVARIAN SYNDROME

Polycystic ovarian syndrome is a very common health illness in females. it affects female health by disturbing their regular menstrual cycle, producing excessive androgen (male hormones), excessive production of facial hair, and enlarging ovarian follicles by fluid-filled in their surrounding cavities. Several biologically active substances can be found in flaxseed (Linum Usitatissimum), including -Linolenic Acid (ALA), phytosterogenic lignans (secoisolariciresinoldiglycoside-SDG), and dietary fibers. Patients with PCOS were administered linseed powder supplementation at a dose of 30g per day to determine its consequences. The outcomes showed that adding flaxseed powder to a diet had positive impacts on factors linked to body composition, insulin metabolism, has-CRP, TG, HDL, adiponectin, leptin, and the mF-G score (20).

MEMORY

The two basic components of learning are the attention and memory processes. Accumulation of lipid peroxide in the hippocampus is strongly correlated with loss of spatial memory. Studies on flax indicate that a rise in hippocampal ALA and DHA content resulted in a decrease in the inhibitors of spatial memory, which improves learning capacity (21). Studies reveal to determine the effect of linseed on memory four groups of six mice were used. Group 1 (negative control) distilled water, Group 2 (positive control) ginkgo Biloba, Group 3: linseed oil, and Group 4: linseed powder. As the result showed that linseed oil and extraction is more effective than ginkgo Biloba for enhancing memory (22).

BREAST CANCER

Breast cancer is regarded as one of the cancers with the highest mortality rates worldwide. Breast cancer can be caused by a variety of variables, including gender, unhealthy eating patterns and lifestyles, family history, alcohol or cigarette use, breastfeeding cessation, hormone therapy, being overweight or obese, and many others. Breast tumors with estrogen receptors are known as estrogen receptor-positive (ER+) tumors, while those without estrogen receptors are known as estrogen receptor negative (ER) tumors. Women with ER+ tumors respond better to hormone therapies than women with ER- malignancies (23). Following a diet containing 10 or 25 g of ground flaxseed for 7 or 16 weeks, 28 postmenopausal women saw an increase in the amount of 2OHE1 excreted in their urine without an increase in the excretion of 16OHE1, according to two clinical trials. According to this research, flaxseed may provide modest protection for postmenopausal women (24).

DISCUSSION

Linum Usitatissimum Linn (Alsi) seeds have been utilized for sine long time to treat a variety of ailments. Experiments have shown that it has various functions, including analgesic, antibacterial, and anticancer properties, etc.

CONCLUSION

According to the data, flaxseeds are the highest source of linolenic acid and lignans. It is also a good source of soluble fiber, antioxidants, and protein. The goal of reviewing Alsi's actions is that in the future, for hair protection such as hair growth stimulation and hair damage, linseed oil can be used as a dietary supplement, and as an oil of linseed is also used with sesame oil.

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Figure 1. Flowers and seeds of Flax seeds

Table 1. Phytochemical screening of Flax seeds

Chemical Class	Phytochemicals	REFERENCES
Protein	linin and colinin, glutelin.,	04
amino acids	arginine, histidine, lysine, tryptophan, phenylalanine, methionine, threonine, leucine, isoleucine, and valin	04
Mucilage	arabinoxylans, galactans, rhamnogalacturonans	06
Carbohydrates	sucrose and raffinose, cellulose	05
Fatty oil	α-linolenic acid (ω-3 fatty acids), oleic acid and linoleic acid, stearic acid, palmitic acid, headecenoic acid.	09
Ash	sulphats and chlorides of potassium, calcium, and magnesium	07
	cyanogenic glucoside, linamarin	08
	phenolic acids, cinnamic acids, flavonoids and lignins	11
Other	phytin, lecithin, wax, resin, pigments, malic acid, acetic acid and the enzymes lipase, protease and diastase, β carotenes	10