



GARDEN CRESS SEED – AN IMPORTANT MEDICAL SOURCE

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ABSTRACT:

Garden cress (GC), is a quick-growing edible plant, sometimes known as pepper cress. The annual plant known as garden cress (*Lepidium sativum*) is a member of the “Brassicaceae” family. A polymorphous species, *Lepidium sativum* is thought to have originated mainly in the highlands of Ethiopia and Eritrea. In India, garden cress (*Lepidium sativum*) is primarily planted for its seeds but is an underutilized food herb. Garden cress is a crucial medicinal crop in India it is also locally known as Asalio or Chandrasur. It is an upright, glabrous, annual, herbaceous plant that can reach heights of up to 15 cm. In India, the leaves and seeds of garden cress (*Lepidium sativum*) are used both as dietary supplements and for traditional medical purposes. Garden cress seeds are oval in shape and brownish red in color. Its seeds contain a wealth of nutrients, including iron, protein, dietary fiber, omega-3 fatty acids, and phytochemicals. The Garden cress seeds carbohydrates are made up of 90% non-starch polysaccharides and 10% starch. The seed bran has a high concentration of dietary fiber and a high-water absorption rate. Alpha linolenic acid (32-34.0%) is the primary fatty acid in Garden cress seed, which also includes 20–25% yellowish semidrying oil. The seeds have strong 1, 1-diphenyl-2-picrylhydrazyl (DPPH) and ferric-reducing antioxidant power (FRAP) properties. Garden cress is frequently used in traditional medicine to treat hyperactive pulmonary diseases like asthma, bronchitis, and cough. The effects of seeds are thought to be galactagogue, and recommended in bronchitis, rheumatism, muscular pain, and inflammation. Garden cress seed has anti-diabetic, laxative, hypocholesterolemic, fracture healing, analgesic, coagulant, diuretic, hepatoprotective, antidiarrheal, antispasmodic, and anti-cancer properties.

Key words: *Lepidium sativum*, medicinal crop, polysaccharides, alpha linolenic acid, hepatoprotective, anti-cancer properties.

INTRODUCTION:

Garden cress (*Lepidium sativum*), an annual herb from the “Brassicaceae” family, is high in phytochemical components that promote health. The seeds are small, oval-shaped, pointy & triangular at one end, smooth, about 2-3 mm long & 1-1.5 mm wide, and reddish brown in color. It may flourish in any climatic and soil setting. It may flourish in either full sun or semi-shade and in moist soil (R.G. Mali *et al.*, 2007).

Several therapeutic characteristics, including galactagogue, aperient, diuretic, alterative, tonic, demulcent, aphrodisiac, carminative, and emmenagogue, are attributed to *L. sativum* seeds. The majority of treatments for hypertension and kidney problems employed in seeds. (Gopalkrishnan L *et al.*, 2016)

In addition to Vitamins A and C, garden cress seeds have been shown to contain considerable amounts of Iron, Calcium, and Folic acid. A healthy amount of protein (23-25%), moisture (5.69%), fat (15-27%), fibre (7.01%), ash (4.65%), and carbohydrates (34-53%) are all present in garden cress seeds. Iron (17-33 mg/100 gm), zinc (4-5 mg/100 gm), and other minerals and vitamins are present in commendable amounts. Garden cress seeds contain phytochemicals like phenolic compounds, alkaloids, cardiac glycosides, flavonoids, and tannins. phenolic substances including gallic acid and caffeic acid are present in the seeds. To promote milk production, Garden cress seeds are given to breastfeeding and pregnant women as a natural food supplement. The seeds have good 1, 1-diphenyl-2-picrylhydrazyl (DPPH) and ferric reducing antioxidant power (FRAP) properties (Sharma S *et al.*, 2011).

HISTORY:

Garden cress, also known as *Lepidium sativum*., is a culinary herb grown in several parts of Asia and Europe. It is an annual herbaceous plant that is upright, glabrous, and edible. It is a plant that is native to Western Europe and South West Asia, originated in Ethiopia Garden cress can only be cultivated in soil that has been adequately treated, is rich in nutrients, and is sufficiently moist so that it can grow to a height of 60 cm. The rapidly expanding edible herb *Lepidium sativum* is known to contain about 175 species, the most significant of which are "garden cress" (*Lepidium sativum*), "Maca" (*Lepidium meyenii*), and "Walp" (*Lepidium peruvianum*) (K. Mummenhoff *et al.*, 2001).

Garden cress seed can be grown all year round, but winter is the best time. Plant parts such as seeds, leaves, and roots are valuable economically. However, the plant is grown for its seeds. The plant's leaves can be eaten raw in salads, cooked with other vegetables, or used as food garnishes. The seeds of the plant are also been consumed in various different ways since they are of immense medicinal values. It is also used as a common household cure to treat a variety of medical issues (Sneha L Doke *et al.*, 2014).

According to Bermejo and León (1994), *L. sativum* falls within the category of neglected and underutilized horticultural crops. One of Ethiopia's aromatic plant species, it contains a significant amount of essential (volatile) oil that is needed for its therapeutic benefits and other uses (Asfaw and Demissew, 2009). The seeds contain edible oil that increases hunger and has therapeutic benefits as an antiscorbutic. According to Getahun (1976), the plant's seeds have a number of medical applications, including use as a livestock drench for stomach disorders, human skin disorders, chapped lips, and sunburn, as an insect repellent, applied to the skin, and use by soldiers to feel warm at night and relieve stomach cramps. Due to its remarkable therapeutic potential, this herbaceous plant is widely used in both conventional and modern medical systems (Shehzard *et al.*, 2011).

The plant is described as hot, bitter, galactagogue, and aphrodisiac in ayurvedic literature. It supposedly eliminates Vata and Kapha. Fresh fruits from *L. sativum* are recommended as a treatment for wounds, skin conditions, and eye disorders. The seeds of the plant are one of the ingredients in the medication “Kasturyadi gutica”, which is helpful for Kapha (Kirtikar and Basu; 1933; Ayurvedic Pharmacopoeia, 1990).

NUTRIENT COMPOSITION:

Garden cress is advised for promoting good health because the whole seed contains 25–39% protein. It is a useful raw material for food because it also contains 2.4% crude fat, 6.4% minerals, 33% carbohydrates, 7.6% crude fiber, and 0.723% phosphorus. Because to its distinctive perfume, peppery flavor, and tangy nature, it also contributes to the food sector. Additionally, its sprouts are also used along with salads. In a recent experimental study, ascorbic acid (vitamin C) was estimated to be present in plants at levels of 11.74 mg per whole plant and 11.74 mg per stem (S. Kumar *et al.*, 2011).

Garden cress seed is incredibly nutrient-dense due to its distinct makeup. Due to their high fiber content, seeds may be helpful in the management of diabetes and constipation. In vitro starch hydrolysis rates and blood sugar levels in diabetic patients were decreased by garden cress seed. The mineral profile of seeds reveals high potassium and low sodium concentrations in all fractions, making them advantageous for those with high blood pressure and also suitable for athletes. According to a similar study, seeds have a total essential amino acid percentage of 47.08%, which indicates that they may be a useful source of essential amino acids for diets with healthy fatty acid profiles (H. Karazhiyan *et al.*, 2009).

HEALTH BENEFITS OF GARDEN CRESS SEEDS:

The use of an ethanolic extract of *Lepidium sativum* seeds (200 mg/kg for 16 days) has been shown to have significant nephron protective and curative effects against cisplatin-induced nephrotoxicity damage, as shown by the inhibition of antioxidant enzyme activity into the renal tissue, an increase in the active form of thio-barbituric acid, and glutathione depletion (S. Kumar *et al.*, 2011).

Aqueous methanolic extracts of the plant *Lepidium sativum* were used to treat hyperactive airways disorders in order to investigate the potential therapeutic or medicinal uses of this substance. Recent studies have suggested that these extracts suppressed the potassium (K⁺) and carbachol (CCh) induced contractions in a manner similar to dicyclomine. Anti-cholinergic, Ca antagonist, and PDE (phosphodiesterase) inhibitory pathways are combined to provide this inhibitory action (D. Mukhopadhyay *et al.*, 2010).

Acute (single dose) or chronic (15-day repeated administration) oral administration of aqueous extract of *Lepidium sativum* results in a significant reduction in blood glucose levels in streptozotocin-induced diabetic rats. Glycemia was brought back to normal after two weeks of daily oral dosing. When administered with a daily dosage of 20 mg/kg of *Lepidium sativum* extract, both diabetic and normal rats did not exhibit significantly different baseline insulin concentrations when compared to the untreated groups (J. Malar *et al.*, 2014).

In order to determine the hypolipidemic properties of *Lepidium sativum*, aqueous extracts of the plant *Lepidium sativum* were given to hyperlipidemic rats for eight weeks to determine its hypolipidemic properties. Following this time, the rats weight gain, feeding efficiency ratio, triglyceride levels, VLDL cholesterol, serum cholesterol, LDL cholesterol level, cholesterol/HDL-cholesterol, urea, serum (AST and ALT), serum creatinine, total lipid levels, and liver cholesterol levels all declined in comparison (H. Jouad *et al.*, 2002).

A mucilaginous substance found in garden cress seeds is composed of cellulose (18.3%) and polysaccharides containing uronic acid, which expand in the presence of water in the GI tract. This swelling results from the ionisable carboxyl groups found in polyuronide chains, which when exposed to water hydrate and swell, dispersing the cellulose micelles in the process. The amount of mucilaginous matter dispersion depends on the size of the cellulose micelles, the length of the chains, and the fraction of hydrated polyuronides. This feature demonstrates the laxative potential of garden cress seeds, which was demonstrated in mice using an aqueous methanolic extract of cress seeds at 30 and 100 mg/kg (T.R. McVicar *et al.*, 2012).

THERAPEUTIC VALUE:**2.1 ANTI-DIABETIC EFFECT:**

Lepidium sativum aqueous extract has demonstrated a hypoglycemic effect separate from insulin secretion. In both chronic and acute treatments, oral administration of 20 mg/kg (15 seeds/day) dramatically decreased blood glucose levels while having no impact on insulin secretion. Garden cress seed alkaloids were discovered to be efficient against a rise in blood sugar. In-vitro starch hydrolysis rate was reported to be reduced by 41% and the glycaemic response was observed to be lowered in participants with type II diabetes who consumed garden cress seed. In alloxan-induced diabetic and hyperlipidaemic male Wistar rats, significant decreases were seen in fasting blood glucose levels, glycosylated haemoglobin, lipid profile, total cholesterol, triglycerides, and lipoprotein fractions (LDL-c and VLDL-c), as well as a significant increase in HDL-c levels (Eddouks M *et al.*, 2002)

2.2 ANTI MICROBIAL ACTIVITY:

Petroleum ether extract from seeds at concentrations of 2.5%, 5%, and 10% demonstrated significant antifungal activity and an active antibacterial action against six distinct infections. At 2-8% of seed extracts, ethanol was shown to be particularly efficient against the development of three different types of fungi, *Fusarium equiseti*, *Aspergillus flavus*, and *Alternaria alternat* (Adam *et al.*, 2011).

2.3 ANTIANAEMIC EFFECTS:

Thirty adult ladies were given 25g of seed powder mixed with laddu to test the anti-anaemic activity of the seed. The study's findings showed that the group that consumed Garden cress seed saw a substantial increase in haemoglobin levels (P 0.05), but no change in body weight (Sharma RK *et al.*, 2012).

2.4 ANTIDIURETIC AND ANTIHYPERTENSIVE EFFECTS:

Daily oral treatment of 20 mg/kg aqueous seed extract for three weeks revealed no significant change in blood pressure in normotensive rats during the trial but a substantial drop in blood pressure in spontaneously hypertensive rats. Another claimed that oral treatment of the Garden cress seed's aqueous and methanol extract enhanced sodium excretion. Together with no discernible change in urine PH, the only difference in potassium excretion in rats treated with aqueous extract was an increase (Mohamed M *et al.*, 2003).

2.5 ANTI OXIDANT ACTIVITY:

Garden cress seed ethanolic extract may be nephroprotective, nephrocurative, and antioxidant against nephrotoxicity brought on by cisplatin. Malondialdehyde and superoxide dismutase catalase levels in kidney tissue increased, both of which have antioxidant benefits, whereas glutathione levels decreased (Yogesh Chand Y *et al.*, 2010).

2.6 EFFECT ON BRONCHIAL ASTHMA:

Research that included 60 patients—30 men and 30 women—with mild to moderate bronchial asthma, with ages ranging from 15 to 80, omitting those who were pregnant. The patients received one gramme of finely powdered seed powder orally three times every day for four weeks without receiving any medication. Spirometer tests were used to measure respiratory functions before and after the trial period, and it was shown that the various pulmonary functions had significantly improved. No patients had any negative effects (Paranjape AN, 2006).

CONCLUSION:

Proteins, dietary fibre, minerals, and vital amino acids are abundant in Garden cress seeds. Gc seeds have a high antioxidant capability since they contain phenolic chemicals. Studies on the toxicology of Gc seeds have shown that they can be regarded as safe and non-toxic. Gc seeds have a wide range of therapeutic qualities, including anti-diabetic, anti-hypertensive, anti-diarrheal, antispasmodic, and laxative effects. Moreover, it has the capacity to cure fractures and possesses hepatoprotective, diuretic, nephroprotective, galactogogue, anti-inflammatory, antipyretic, and analgesic properties. Sensorily approved health drinks and food products that included Gc seed or its fractions. Gc seed is a potentially useful multifunctional medicinal source.

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