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PROSPECTS OF PHYTOCOLOGICAL ACTIVITY OF LEPIDIUM SATIVUM: A REVIEW

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ABSTRACT

Lepidium Sativum is called as Garden Cress, belonging to the family Cruciferae. It is a fast growing erect glabrous annual herb. Seeds contain volatile aromatic oil glucotropaeolin, sinapine (choline ester of sinapic acid), sinapic acid, mucilaginous. The plant contains pantothenic acid, pyridoxine, rutin and glucoside glucoprotein. Five new dimeric imidazole alkaloids isolated from seeds known as lepidine B, C, D, E and F in addition to the known imidazole alkaloid lepidine and two new monomeric imidazole alkaloids semilepidinoside A and B. Plant has the following pharmacological activities like analgesic activity, fracture healing activity, prokinetic and laxative activities, nematicidal activity, Nephroprotective activity, acute renal failure, antibacterial activity, antidiarrhoeal activity, osteoarthritis, hepatoprotective activity, bronchial asthma and antihypertensive.

KEY WORDS

Lepidium Sativum, Dimeric imidazole, Nephroprotective activity, Osteoarthritis.

INTRODUCTION

Herbal medicines are the oldest remedies known to mankind. Herbs had been used by all cultures throughout history but India has one of the oldest, richest and most diverse cultural living traditions associated with the use of medicinal plants[1].

In the present scenario, the demand for herbal products is growing exponentially throughout the world and major pharmaceutical companies are currently conducting extensive research on plant materials for their potential medicinal value. In many journals, national and international, we find an increasing number of research publications based on herbal drugs. Herbal medicines form a major part of remedies in traditional medical systems such as Ayurvedic, Sidha, Unani, and Naturopathy. Hence all animal and clinical studies on herbal medicines were reviewed. The data for the years 1981-1983 were taken as baseline for the comparison of recent herbal drug research trends. The present study showed that interest has increased in herbal drug research in India, which supported the findings of Adithan (1996), with maximum utilization of the phytotherapeutic approach where in crude plant preparations were used. The maximum work was observed with polyherbal preparations. Recently there has been a shift in global trend from synthetic to natural medicine, which we can say 'Back to nature'. Medicinal herbs have been known for millennia and are highly esteemed all over the world as a rich source of therapeutic agent for prevention of disease and ailment. India is perhaps the largest producer of medicine herbs and is rightly called the "Botanical garden of the world". India in this regard has a very unique position in the world, where a number of recognized indigenous systems of medicine viz.,

Ayurveda, Siddha, Unani, Homeopathic, Yoga and Naturopathy are practiced and utilized for the health care of the people[2].

The use of medicinal plants was compiled in Ayurveda, which listed more than 8000 herbal remedies. India is one of the world's twelve leading biodiversity centers with the presence of over 45,000 different plant species. Of these, about 15,000-20,000 plants have good medicinal properties, of which only 7000-7500 are being used by traditional practitioners. The Siddha system of medicine uses around 600, Ayurveda 700, Amchi 600, Unani 700 and modern medicine about 30 plant species5. Projection is being made that next to information technology, herbal technology will be India's biggest revenue earner[3].

Plant Description:

Lepidium Sativum is also called as Garden Cress, belonging to the family Cruciferae. It is a fast growing erect glabrous annual herb. Grows 15-45 cm in height, leaves are entire, upper once are sessile where as lower petiolate. The flowers are white in clour, small and are in long racemes. The fruits are small pods, obovate, with two seeds per pod. The seeds are brownish red in color and become slimy when soaked in water. It is cultivated throughout India and Tibet as a culinary vegetable. Seeds are used in aphrodisiac, dysentery, muscular pain, blood and skin disease, tumors, emmenagogue, asthma. Fresh fruit is good for injuries, skin and eye disease. Leaves used as diuretic and antibacterial. Roots are bitter and acrid; it is useful in syphilis[4-6].

Lepidium Sativum

Scientific Classification:

Kingdom	**Plantae -Plants**
Subkingdom	Tracheobionta - Vascular plants
Superdivision	Spermatophyta - Seed plants
Division	Magnoliophyta - Flowering plants
Class	Magnoliopsida - Dicotyledons
Subclass	Dilleniidae
Order	Capparales
Family	Cruciferae - Mustard family
Genus	Lepidium L. - pepperweed
Species	Lepidium Sativum L. –gardencress[12]

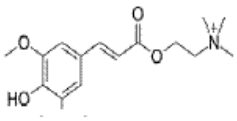
Vernacular Names:

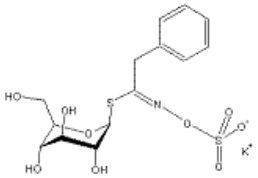
Hindi - Chaunsar

English	-	Garden Cress, Water Cress
Sanskrit	-	Candrasura
Bombay	-	Ahaliva
Telgu	-	Adatavitalu
Siddha/Tamil	-	Alivirai.
Unani	-	Habb-ul-rashaad
Urdu	-	Halim[6-8]

Phytoconstituents:

Seeds contain volatile aromatic oil and good source of iron[7]. It also contain alkaloid (0.19%), glucotropaeolin, sinapine (choline ester of sinapic acid), sinapic acid, mucilaginous matter (5%) and uric acid (0.108 g/kg).


Sinapine


Glucotropaeolin

Mucilage is the mixture of cellulose (18.3%) and uronic acid containing polysaccharides; acid hydrolysis yield L-arabinose,D-galactose, L-rhamnose, D-glacturonic acid and D-glucose. The plant contains pantothenic acid, pyridoxine, rutin and glucoside glucoprotein[8]. Five new dimeric imidazole alkaloids isolated from seeds known as lepidine B, C, D, E and F in addition to the known imidazole alkaloid lepidine and two new monomeric imidazole alkaloids semilepidinoside A and B. Their structures were elucidated on the basis of spectroscopic evidence[9]. A new steryl ester isolated from the aerial parts of Lepidium Sativum , has been identified as stigmast-5-en-3,β27-diol 27-benzoate[10]. Endosperm contains fat, dietary fibre, amino acid and protein[11].

Pharmacological effect of different researches:

- The analgesic effect of *Lepidium Sativum* showed in albino rats and Swiss albino rats using acetic acid induced writhing response in mice, formaldehyde induced paw licking response in rats and tail-flick response in mice. The drug showed significance inhibition of neurogenic pain and inflammatory pain[13].
- The fracture healing activity of ethanolic extract of *Lepidium Sativum* seeds in internally fixed rats femoral osteotomy model. Control and test group were administrated vehicle and extract respectively. X ray method was used for assessment of bone healing activity. After suitable time X –ray photograph reveled that fracture bones of test group animals were completely joined but no effective result found in control group[14].
- Prokinetic and laxative activities of *Lepidium Sativum* seed extract. The in vivo studies were conducted in mice and isolated tissue of mouse, guinea-pig and rabbit were suspended in tissue bath to measure isotonic contraction. The aqueous methanolic extract of *Lepidium Sativum* seeds at 30 and 100 mg/kg showed atropine-sensitive prokinetic and laxative activity in mice. The action medicated through cholinergic pathway[15].
- Nematicidal activity of selected flora of Pakistan. The result of the study indicate that the ethanolic extract of *Lepidium Sativum* seed showed appreciable mortality of second stage juveniles of *M. javanica* and *M. incognita* as well as *Cephalobus Lepidium Sativum litoralis*[16].

- Nephroprotective and Curative activity of *Lepidium Sativum* seeds in albino rats using cisplatin induced acute renal failure . 400 mg/kg ethanolic extract of *Lepidium Sativum was* used to determine efficacy against cisplatin (5 mg/kg, ip) induced nephrotoxicity. The level of brush border enzymes like Na+/K+ ATPase, Ca++ ATPase and Mg++ATPase were found significantly reduced after single dose cisplatin injection. It was overcome by treatment of same extract in curative and protective groups. The result concluded that *Lepidium Sativum* have significantly nephroprotective and curative activity[17].
- Evaluated the antibacterial activity of *Lepidium Sativum* seeds against food-borne pathogens. Active constituent were isolated from dried powdered seeds using different solvent. The antibacterial activity was evaluated using agar well diffusion method. The methanolic extract showed the effective antibacterial activity and this result suggested potential use of seeds of *Lepidium Sativum for* control of infective disease from food poisoning[18].
- Investigated the antidiarrhoeal activity of metohanolic extract of *Lepidium Sativum. (*MELS). The antidiarrhoeal activity was observed in three experimentally induced diarrhoea models i.e. castor oil induced diarrhoea; Prostaglandin PGE2 induced enteropooling in rats and charcoal meal test in mice. All the models showed positive results for antidiarrhoeal activity[19].
- Clinical trial of *Lepidium Sativum* in the management of *osteoarthritis.* seeds of plant were taken and converted to powder form. trial drug group were given drug churna and in placebo group the patient were given capsules containing starch. results showed that the drug provided very good relief in cardinal signs and symptoms like pain in joints, swelling, and stiffness[20].
- Diuretic activity of aqueous and methanolic extract of Lepidium Sativum garden grass in rats. Hydrochlorthiazide was used as positive control. On administration there was increase in urine volume, sodium content by both aqueous and methanolic extract but potassium excretion was increased only by aqueous extract. The diuretic effect was comparable to hydrochlorthiazide and methanol extracthas an advantage opotassium conserving effect[21].
- The hepatoprotective activity potential of *Lepidium Sativum* against carbon tetra chloride in rats. Rats were infused the drug and blood samples were collect for hemogram and serum analysis. Mean serum concentration of AST, ALT, ALP levels and bilirubin concentration was significantly increased in Ccl4induced hepatotoxic group of rats compared to control. However the value of all parameters was significantly reduced with[22].
- Antibacterial activity of aqueous and alcoholic extract of 34 Indian medicinal plant against Staphylococcus aureus, Staphylococcus epidermidis, and Staphylococcus subflava. The highest antibacterial activity was found in aqueous extract of *Lepidium Sativum* [23].
- Determine the clinical efficacy of *Lepidium Sativum* seeds in the treatment of bronchial asthma. Seed power of *Lepidium Sativum was* taken and patients were observed for the relief of clinical symptoms and frequency of asthmatic attack. None of the patient showed any adverse effect, and thus *Lepidium Sativum used* as effective antiasthmatic agent[24].

- Hypoglycemic activity of Lepidium *Sativum* aqueous extract in normal and induced diabetic rats. After acute or chronic oral treatment, the *Lepidium Sativum extract* produced a significant decrease on blood glucose level in streptozotocin (STZ) diabetic rats. Thus it can be concluded that aqueous extract of *Lepidium Sativum* exhibit a potent hypoglycemic activity in rats without affecting basal plasma insulin concentration[25].
- Antihypertensive and diuretic effect of the aqueous extract of *Lepidium Sativum* in normotensive and spontaneously hypertensive rats. Daily oral administration of *Lepidium Sativum* aqueous extract exhibited a significant decrease in B.P. in hypertensive rats and enhanced water excretion in normotensive rats. The study showed that daily oral administration of aqueous is extract for 3 weeks exhibited antihypertensive and diuretic activities[26].
- Anti-inflammatory activity of the ethanolic extract of seeds of Lepidium Sativum . The extract significantly inhibited carrageenan-induced pedal edema and reduced the yeast induced hyperpyrexia. The extract also showed significant significant increase in fibrinogen level and an insignificant decrease in prothrombin time, confirming its coagulating property[27].

CONCLUSION

Plants have been one of the important sources of medicines since the dawn of human civilization. This extensive flora has been greatly utilized as a source of many drugs in the Indian traditional system of medicine.

The traditional system of medicine is so engrained in our culture that, even now 75% of the Indian population depend on this indigenous system for relief. the factor responsible for the continued and extensive use of herbal remedies in India are their effectiveness, easy availability, low cost, comparatively less toxic effects and the shortage of practioners of modern medicine in rural areas.

Evidenced-based studies on the efficacy and safety of traditional Indian systems of medicine are limited. It has found that number of diseases for which Lepidium Sativum finds use as a medicine is fairly large, yet its curative efficacy has been assessed only in few cases. The preliminary qualitative phytochemical screening of the plant of Lepidium Sativum revealed the presence of alkaloids, cyanogenic glycosides (traces), flavonoids, tannins, glucosinolates, sterols and/or triterpenes. The pharmacological properties of the plant resemble those of the non-steroidal anti-inflammatory drugs (NSAID) which are known to share antipyretic, analgesic and anti-inflammatory activities and other many more pharmacological activities are antidiarrhoeal, antibacterial, nematicidal, osteoarthritis etc.

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