TUKHI-E-KAHU (LACTUA SATIVA L.) : PHARMACOLOGICAL AND PHYTOCHEMICAL PROFILE AND USES IN UNANI MEDICINE

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ABSTRACT

Plant origin drugs have played a vital role in the prevention and treatment of diseases in Unani medicine and it becomes popular day by day due to its low cost and less adverse effect. One such drug is Tukhme kahu (Seeds) belong to the family Asteraceae is an important herbal drugs which have hypoglycaemic activity, anti-dysenteric, anodyne, sedative, anaesthetic, hypnotic, desiccative etc. and is recommended for various disease like insomnia, headache, dribbling of urine, humnae damni, alopecia etc. Several activities have been validated such as sedative, Hypoglycaemic, anti-inflammatory activity etc. Further more potent antioxidant activity has been reported making it an important drug all together, Tukhme kahu can potentially act as a strong traditional herbal drug due to its multiple pharmaceutical effects and is therefore generating interest in drug discovery and development of formulations. The present review provides a summary of recent knowledge of significant traditional uses, pharmacognosy, phytochemical, and pharmacological activities of the plant Lactuca sativa Linn.

Key Words: Lactuca sativa Linn., Seeds, Tukhme kahu, pharmacological activity, antioxidant, hypoglycaemic, Unani Medicine

INTRODUCTION

In Unani system of medicine Kahu is equated with Lactuca sativa Linn.1 It belongs to family Compositaceae.2,3 In ancient Egypt period Lettuce was first cultivated for the production of oil from its seed.6 Lactuca L. genus comprises of about 100 species, out of which 17 European, about 10 North American, 33 tropical east African and about 40 Asian species.7 This family have 25 species which occur in India.8 Lactuca scariola is found wild in western Himalayas, Lactuca virosa is a variety closely allied to lactuca scariola is a native to Europe, Lactuca sativa is a common garden variety. All species emits milky latex when a stem is cut,4 it is called lactucaarium used in 19th century as an adulterant for opium.8 Throughout the word Lactuca Sativa is cultivated as a salad crop. The garden lettuce is considered to have originated in the warmer temperate regions of the old world. The two cross readily and according to some, the garden variety is a common garden variety and the wild species and cannot be assigned a specific rank.9

Synonym: Lactuca scariola Linn. var. sativa C.B. Clark 1,4,9

Scientific Classification

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Plantae</th>
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<tr>
<td>Order</td>
<td>Asterales</td>
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<tr>
<td>Family</td>
<td>Lactuca</td>
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<tr>
<td>Genus</td>
<td>sativa</td>
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Habitat

Lactuca sativa is native to Southern and West Asia. This familiar herb is wild on the western Himalaya. It is cultivated throughout India as a cold weather crop9 and as a culinary vegetable. Lactuca sativa is a common or garden variety.11 Tukhme Kahu is the seed of Lactuca scariola Linn commonly known as “Prickly Lettuce” seeds or “Wild Lettuce” seeds. Lettuce, virosa is a variety closely related to L. scariola. Lactuca sativa Linn is the common or garden variety12

Vernacular Name

Unani: Kahu Bustaani, Salaad Pattaa, Salaad Baaghi 9, Arabic: Baz-rul-khas11,12, Persian: Tukhme kahu11,12, Assam: Noniya 13, Urdu: Khurfa13, English: Garden lettuce 1,9,14, Hindi: Kahu, Salad 2,5,11,12,14, Bangali: Kahu 2,4,12,14, Gujarati: Loni, Ghol, Luni13, Tamil: Salattu4,5,9,12, Telgu: Kavu, Shallattu4,5,14, Sindhi: Lunak 13

Botanical Description

Lactuca Sativa Linn. is an erect, glabrous, annual herb up to 0.5-1.2 m. Height, widely grown for its crisp, highly developed radical leaves which appear before the flowering starts.1,4 Leaves: Leaves are 12.5-25.0 cm long, thin nearly oblong, orbicular, obovate or oblongate, plane bullate or curled.1,4 Flower: Flower heads of yellow ray, born on panicle. Achenes dark brown or grayish brown, lenticular-oblong with slender beak and white pappus.1,4
Fruits: Fruits are pointed near both ends lenticular-oblong, greyish brown and 4-6 mm long.14

Mahiyat (Unani morphology)
Kahu is a herb and it is of two variety one is Sahrai (wild) and other is Bustani (garden).16,17 Sahrai kahu is of two types, first one have more wide leaves, height of plant is eight gaj, sweet, soft, stem is thin, flowers are white and in India it is cultivated in winter season and in Arab cultivated in Bahar season. Second one, frangistani is again two types first one has green, sweet and soft leaves and second one have blue margin leaves.16 The leaves of garden kahu are used as vegetable and seeds are used as medicine. Exudate is obtained from Kahu plant, known as Afyun kahu. It is also used for medicinal purpose.17

Mizaj (Temperament)
Seed: Sard (cold) 2º; Khushk (dry) 2º 16,17,18, Leaf: Sard (cold) 2º; Tar (wet) 2º 16,17,18, Afyun Kahu (exudate): Sard (cold) 1º and khushk (dry) 4º 17

Afa’al (Function) as per Unani literature
Seeds: Mubarrad (refrigerant), musakkin (sedative),17,19 mukhaddir (anaesthetic),1,16,17,18 dafde hiddat safra wa josh khouun,16,17,18 munawwim (hypnotic),16,18,19 mujaffif (desiccative), musafii (blood purifier),16 dafe tashannuj (anti-convulsive),19 lactogauge,18 musakkinat atash,17,18 madire bole (diuretic),16 OIL of Lettuce: Munawwim (Hypnotic), mohallile waram (resolvent).17

Afyun Kahu (exudate): Musakkin (sedative), mukhaddir (anaesthetic), munawwim (hypnotic).17 Leaves: Mudir (diuretic), mohallile waram (resolvent), munawwim (hypnotic).16

External uses as per Unani literature
Seeds: Sahar (insomnia),12,17 suda (headache),17 taqteerul baal (dribbling of urine), sailane muni (spermortorrhea),16 humnae damwet,16,17 alopecia (hair fall),1 malenkholia, junoon,17 ehtlam (nightfall).17,18

OIL of lettuce: Sahar (insomnia), malenkholia, mirgi (epilepsy).16

Afa’al (function) as per other literature
Anodyne, sedative,11,12 expectorant, refrigerant, demulcent,13 astringent, antisynderetic, thermogenic, stomachic, alecteric, antiscorbutic, sudorific, demulcent, vermifuge, aperients, alterant, vulnery, tonic,13 cooling, diuretic,12,13 hypnotic,5,12 antispasmodic.11

External uses as per other literature
Insomnia, fever, spermortorrhea, inflammation, cough, wakefulness, rheumatism,12 burn,6,9,14 headache,1 chronic bronchitis,6,12,14 painful ulcer,5,14 anaemia, sprue,1 asthma,7,12,14 stragury, haemorrhoids, nephropathy, tumours, gastric disorders, splenopathy, Jaundice, cystitis, sialtasia, dip sia, dysentery, otalgia, vomiting, haematuria, gonorro, scald,13 jaundice, gallbladder stone, stomatitis.5

Mazarra (toxicity)
Baab ke leye,16,19,20 Nasyaan paida karta hai.16,20

Leaves: Urticarial eruption, milk sap: irritant, produce only negative responses when tested for mutagenicity using Ames test (Salmonella typhimurium TA 100, TA 98).21

Musleh (Correctives)
Mastagi (Pistacia lentiscum),16,20 Shahad khalis (Pure honey).19

Badal (Substitutes)
Tukhme Khushkhash (Papaver somniferum),16,19,20 Dammul Akhwain (Dracaena ombert).16

Hasase Mustamela (parts used)
Seeds,16,17 Oil of lettuce,16 Milky latex,12,14,17 Leaves.14,16,17

Taste: Mucilaginous1

Miqdare hurak (dose)
Seeds: 6 masha (6 gm) to tola (12 gm) 16, Water of leaf: 2 to 4 tola 17, Afyun kahu (exudate): 2 chawal to 1 ratti 17

Important Murakhabat (Compound Formulation)
Aroq Kahu, Qurse Tabasheer, Roghane Kahu.10 Qurse Musallas, Qurse Tabasheer Kafoori,17,18 Roghane laboh sabah.1

Chemical Composition
Organic: Glycerides, steroids, phenolics, tannins, resin, alkaloid (lactucarium, it is mixture of lactocin and three bitter principles lectucin, lectopicrocin and lactucic acid), organic acid (oxalic acid, malic acid, citric acid).1,12,14 Lactua sativa contain antioxidants flavonol, quercetin and cafeic acid, ascobic acid.22
Inorganic: Sodium, potassium, magnesium, iron, copper, chloride, sulphur, and phosphorus,1,4 Vitamin A, vitaminB vitamin B2, nicotinic acid, vitamin C, vitamin E, vitamin G, vitamin K, folic acid.1

Seeds: Alkaloid (lactuicarium, it is mixture of lactocin and three bitter principles Lectucin, lectopicrocin and lactucic acid), hyoscynamine,12 palmaric acid, stearic acid, arachidic acid, oleic acid, linoleic acid, caprico acid.4

Leaves: Starch, sugar, gum, cellulose, lignose, fat,12 calcium, phosphorus, iodine, florine, thiamine, riboflavin, niacin, carotene.9

Roots: Glycosides (lactoside A, lactoside C, macro-cliniside A).3

Reported Pharmacological Activity
Hypoglycaemic activity: Lactucin and lactupicrocin, isolated from Lactua scariola have shown hypoglycaemic effect (Jaffery and Harborne).23

Anti-inflammatory activities: 3,14-Dihydroxy-11,13-dihydrocostunolide (compound 1) and 8-Tigloyl-15-Deoxyactucin (compound 2) were isolated from extract of Lactue sativa shows significant anti-inflammatory activity in Wistar rats (160-240 g) of both sexes induced by carrageenan at a dose 5 and 10mg/kg.24

Anxiolytic effect: In male mice weighing 25-30 g extract Lactue sativa at doses of 200 and 400 mg/kg (P < 0.001) significantly increased the number of entries and time spent in the open-arms, with associated decrease in closed-arms when compared to the control treated group.25

Sedative effect: Alcoholic extract causes sedative effect, reduction of motor activity and behavior in toads and flaccid paralysis on higher dose was observed also antispasmodic effect on isolated smooth and striated muscle, in-vitro negative chronicotropic and inotropic effect on normal and tachycardia (stressed) heart was observed.21
Antioxidant / Antiaging effect: Ethanolic extract of *Lactuca sativa* significantly decreased D-galactose induced mienetic ageing in female albino mice. Methanolic leaf extract investigated for in vitro inhibition of oxidative damage induced by UV-radiations to the *Salmonella typhi* bacteria and in vivo effect on the production of body enzymes i.e. catalase and superoxide dismutase. shown significant antioxidant potential. Antioxidant activity was determined in ethanolic extracts by means of spectrophotometric methods. A favorable antioxidant property was found in the examined lettuce. Result indicates that lettuce extract displays the antioxidant activity.  

Antimicrobial activity: lettuce extract, tested with bacteria, shows smallest susceptibility to the ethanolic extract of lettuce exhibited by the bacteria *Staphylococcus aureus* and *Proteus vulgaris*, while the other selected bacteria and fungi showed higher susceptibility.  

Protective effects: Ethanolic extract of lettuce (*Lactuca sativa* L. var. *longifolia*) leaves against the toxicity caused by carbon tetrachloride (*CCl₄*) in reproductive system of rats augments the antioxidants defence mechanism. It may have a therapeutic role in free radical mediated diseases.  

Protective against radiation effect: Study conducted to clarify the potential role of lettuce oil against damages due to exposure to gamma radiation induced in rats. Exposure caused a significant increase in the level of glucose, total cholesterol (TC), triglycerides (TG), malondialdehyde (MDA) and follicle stimulating hormone (FSH) while a significant decrease was recorded in glutathione content (GSH), superoxide dismutase (SOD) and catalase activities, white blood cells (WBCs), red blood cells (RBCs), haemoglobin content (Hb), haematocrit percentage (Hct%), mean corpuscular volume (MCV), platelets (PLT), leuitinizing hormone (LH) and testosterone hormone. Whereas rats treated with lettuce oil when exposed to radiation, the results showed an improvement in all previous parameters. Study concluded that lettuce oil might reduce the biological hazards in rats induced by gamma irradiation.  

Neuroprotective effect: Intermediate polarity fraction of *L. sativa* ethyl acetate fraction exerts neuroprotection against glucose/sucrose deprivation (GSD)-induced cell injury, an in vitro model of brain ischaemia. can be used in common neurodegenerative disorders such as stroke. Ethyl acetate fraction of *Lactuca sativa* exerts neuroprotective effect through decrease of oxidative stress and inhibition of proapoptotic pathways against glucose/sucrose deprivation (GSD) - induced neurotoxicity. Would be used for the management of ischaemia-induced neuronal damage.  

Alagelse, anti-inflammatory, anti-depressant and anti-coagulant properties: Aqueous extracts of leaf exhibited highest analgesic and anti-inflammatory activities followed by leaf Methanol and chloroform (MC); 1:1, cell suspension exudate, seed aqueous and seed MC extracts. The coagulation time of aspirin (positive control) and MC extract of leaf was comparable, suggesting strong anti-coagulant effect. Aqueous and MC extracts of seed have the least immobility time in the forced swimming test, the leaf extracts and cell suspension exudate also expressed moderate anti-depressant activities.  

**DISCUSSION AND CONCLUSION**

*Lactuca sativa* Linn. is a very significant herbal drug in Unani system of medicine. The present review summarizes some very important pharmacological studies and phytochemical investigations. Unani pharmacological action shows *Mubarrid* (refrigerant), *mussakin* (sedative), *mukhaddir* (anaesthetic), *daag e hidlat safra wa josh khoon, munawwim* (hypotonic), *mujaffij* (desiccative), *mussafi* (blood purifier), *daf e tashanmu* (anti-convulsive), lactogauge, *mussakinen* atash, *mu dibre bole* (diuretic), *mohalilie waram* (resolvent) activity in seed. Preliminary study validates these activities mentioned in the Unani and other text of traditional medicine. *Dafe tashanmu* (anti-convulsive), *Mubarrid* (refrigerant), lactogauge etc activity needs validation. Reported for its hypoglycaemic, neuroprotective, antioxidant activity etc. These reported activities indicate that it can be a very promising drug for therapeutic utility. Further investigation can be done to find out the mechanism of action, active principles, and utility of *Lactuca sativa* Linn, so that it can be established as a standard drug owing to its scope.

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