



TUKH-E-KAHU (*LACTUCA SATIVA* LINN.): 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, *hummae damwi*, 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 Compositae.^{2,3,4,5} 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.⁴ *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 lactucarium 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 lettuce is only a cultivated variety of the wild species and cannot be an assigned a specific rank.⁴

Synonym: *Lactuca scariola* Linn. var. *sativa* C.B. Clark ^{1,4,9}

Scientific Classification¹⁰

Kingdom : Plantae
Order : Asterales
Family : Asteraceae
Genus : *Lactuca*
Species : *sativa*

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 crop.⁹ 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 Patta, Salaad Baaghi ⁹, Arabic: Baz-rul-khas^{11,12}, Persian: Tukhme kahu^{11,12}, Assam: Noniya ¹³, Urdu: Khurfah¹³, 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: Salattu ^{4,5,9,15}, Telgu: Kavvu, Shallattu^{4,5,14}, 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 lingulate, 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, grayish brown and 4-6 mm long.^{1,4}

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 session and in Arab cultivated in Bahaar season. Second one, firangistani 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) 2° *Khushk* (dry) 2°^{1,16,17}, **Leaf:** *Sard* (cold) 2° *Tar* (wet) 2°^{1,16,17,18}, **Afyun Kahu (exudate):** *Sard* (cold) 1° and *khushk* (dry) 4°¹⁷

Afa'al (Function) as per Unani literature

Seeds: *Mubarriid* (refrigerant), *musakkin* (sedative),^{17,19} *mukhaddir* (anaesthetic),^{1,16,17,18} *daafe hiddat safra wa josh khoon*,^{16,17,19} *munawwim* (hypnotic),^{16,18,19} *mujaffif* (desiccative), *musaffi* (blood purifier),¹⁶ *dafe tashannuj* (anti-convulsive),¹⁹ *lactogauge*,¹⁸ *musakkin atash*,^{17,18} *mudire bole* (diuretic).¹⁶

Oil of Lettuce: *Munawwim* (Hypnotic), *mohallile waram* (resolvent).¹⁶

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

Estemal (uses) as per Unani literature

Seeds: *Sahar* (insomnia),^{12,17} *suda* (headache),¹⁷ *taqteerul baul* (dribbling of urine), *sailane mani* (spermetorrhoea),¹⁶ *hummae damwi*,^{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,¹² astringent, antidiysenteric, thermogenic, stomachic, alexeteric, antiscorbutic, sudorific, demulcent, vermifuge aperients, alterant, vulnerary, tonic,¹³ cooling, diuretic,^{12,13} hypnotic,^{5,12} antispasmodic.¹¹

Estemal (uses) as per other literature

Insomnia, fever, spermetorrhoea, inflammation, cough, wakefulness, rheumatism,¹² burn,^{6,9,14} headache,¹ chronic bronchitis,^{9,12,14} painful ulcer,^{5,9,14} anaemia, sprue,⁵ asthma,^{2,12,14} stragury, haemorrhoids, nephropathy, tumours, gastric disorders, splenopathy, Jaundice, cystitis, systalgia, dipsia, dysentery, otalgia, vomiting, haematuria, gonorrhoea, scald,¹³ jaundice, gallbladder stone, stomatitis.⁵

Mazarrat (toxicity)

Baah ke liye,^{16,19,20} *Nisyaan 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 Khashkhash (*Papaver somniferum*),^{16,19,20} Dammul Akhwain (*Dracaena ombet*).¹⁶

Hasase Mustamela (parts used)

Seeds,^{16,17} Oil of lettuce,¹⁶ Milky latex,^{12,14,17} Leaves.^{14,16,17}

Taste: Mucilaginous¹

Miqdare khurak (dose)

Seed: 6 masha (6 gm) to tola (12 gm)¹⁶, Water of leaf: 2 to 4 tola¹⁷, Afyun kahu (exudate): 2 chawal to 1 ratti¹⁷

Important Murakkabat (Compound Formulation)

Arqe Kahu, *Qurse Tabasheer*, *Roghane Kahu*,¹⁹ *Qurse Musallas*, *Qurse Tabasheer Kafoori*,^{17,19} *Roghane labob sabah*.¹

Chemical Composition

Organic: Glycosides, steroids, phenolics, tannins, resin, alkaloid (lactucarium, it is mixture of lactocin and three bitter principles lectucin, lectopicrin and lactucic acid), organic acid (oxalic acid, malic acid, citric acid).^{1,12,14} *Lactuca sativa* contain antioxidants flavonol, quercetin and caffeic acid, ascorbic acid.²²

Inorganic: Sodium, potassium, magnesium, iron, copper, chloride, sulphur, and phosphorus.¹⁴ Vitamin A, vitamin B₁, vitamin B₂, nicotinic acid, vitamin C, vitamin E, vitamin G, vitamin K, folic acid.¹

Seeds: Alkaloid (lactucarium, it is mixture of lactocin and three bitter principles Lectucin, lectopicrin and lactucic acid), hyoscyamine,¹² palmitic acid, stearic acid, arachidic acid, oleic acid, linoleic acid, caproic 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-clinide A).⁹

Reported Pharmacological Activity

Hypoglycaemic activity: Lactucin and lactupicrin, isolated from *Lactuca scariola* have shown hypoglycaemic effect (Jaffery and Harborno).²³

Anti-inflammatory activities: 3,14-Dihydroxy-11,13-dihydrocostunolide (compound 1) and 8-Tigloyl-15-Deoxyl-actucin (compound 2) were isolated from extract of *Lactuca 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 *Lactuca 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 chronotropic 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 mimetic ageing in female albino mice.²² 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.²⁶ 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.²⁷

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 susceptibility²⁷

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 diseases²⁸.

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), leutinizing 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.²⁹

Neuroprotective effect: Intermediate polarity fraction of *L. sativa* ethyl acetate fraction exerts neuroprotection against glucose/serum deprivation (GSD)-induced cell injury, an in vitro model of brain ischemia. can be used in common neurodegenerative disorders such as stroke³⁰. Ethyl acetate fraction of *Lactuca sativa* exerts neuroprotective effect through decrease of oxidative stress and inhibition of proapoptotic pathways against glucose/serum deprivation (GSD) - induced neurotoxicity. Would be used for the management of ischemia-induced neuronal damage.³¹

Analgesic, 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.³²

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), *musakkin* (sedative), *mukhaddir* (anaesthetic), *daafe hiddat safra wa josh khoon*, *munawwim* (hypnotic), *mujaffif* (desiccative), *musaffi* (blood purifier), *dafe tashannuj* (anti-convulsive), *lactogauge*, *musakkine atash*, *mudire bole* (diuretic), *mohallile waram* (resolvent) activity in seed. Preliminary study validates these activities mentioned in the Unani and other text of traditional medicine. *Dafe tashannuj* (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.



Tukhme kahu (*Lactuca sativa* Linn.) (Seeds)

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