

TRADITIONAL USE OF KAHU (*LACTUCA SCARIOLA* L.) - A REVIEW

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ABSTRACT

Lactuca scariola Linn (prickly lettuce) is an important drug in Unani system of medicine. *Tukhme kahu* (Prickly lettuce seed) has traditionally been used for the treatment of headache, insomnia, nervousness, hypertension, palpitation, fever etc. Recently the discovery of active components from the plant and their biological function in disease control has led to active interest in the plant across the globe. It is easily available and cost effective drug which has drawn interest of many researchers and is screened for various bioactive substances. The present article explores the Unani classical and published scientific literature to compile the traditional and scientific data comprising pharmacognostic description, pharmacological studies, therapeutic uses, and safety profile of *Lactuca scariola* to date. The drug exhibits varied pharmacological activities such as sedative, hypnotic, diuretic, deobstruent, antipyretic, anti inflammatory, blood purifier, demulcent, refrigerant, anesthetic and antispasmodic, anti cancer, antibacterial, bronchodilator and vasorelaxant. The present review will provide comprehensive information on phytochemical and therapeutic uses with special reference to Unani medicine which will help to tap its unexplored potential with more scientific approach.

KEY WORDS: *Lactuca scariola*, *Tukhme Kahu*, Unani medicine, Sedative.

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INTRODUCTION:

Tukhme Kahu is the seed of *Lactuca scariola* Linn (Family - Asteraceae) which is commonly known as “Prickly Lettuce” seeds or “Wild Lettuce” seeds. *L. virosa* is a variety closely related to *L. scariola*. The species *Lactuca sativa* is the common or garden variety which is cultivated in many parts of India as a culinary vegetable (Nadkarni, K.M. 1954). The generic name *Lactuca* and the common name Lettuce derived from the Latin word *lactus* (milk), a milky fluid that flows from the stems when they break or are cut (Murray, J.A. 1983, Bunney, S.1992). It has been described by different closely related botanical names such as *Lactuca sativa*, *L. capitata*, *L. virosa*, *L. bracteata* and *sativa wall.* *L. capitata*, *L. virosa* (Nadkarni, K.M. 1954, Anonymous 1962, Watt, G. 1972, Khorey, R.N. et al.1985). *Kahu* plant and *Tukhme Kahu* has been used for a long time. According to Decandolle, 1895, it has been cultivated for more than 2000 years. Its medicinal properties were described by Hippocrates (430 BC). It was praised by Aristotle (356 BC). The species were described by Theophrastus (322 BC) and Dioscorides (60 AD). Galen (164 AD) gave the idea of general use. Arab physicians like Altabri (d. 861 CE) in “Firdausul Hikmat”, Razi (865-925 CE) in ‘Alhawi’, Ibnesina (980-1031 CE) in Alqanoon and Majusi (d. 1028) in “Kamil-us-Sana” have described the pharmacological actions and uses of *Tukhme Kahu* in detail under the heading of *Khas and Bazrul Khas (Kahu seeds)*. The common reported pharmacological actions are anxiolytic, sedative, antipyretic, diuretic and analgesic which have been identified and proved by scientific studies. Apart from the reported pharmacological actions, *Lactuca scariola* also have Anti cancer, antibacterial, Spasmolytic, bronchodilator and vaso-relaxant Activities. Keeping in view the increase incidence of cancer, increase resistance of antibiotics and failure of management of hypertension & asthma which are the leading problem of the healthcare system, the present review was conducted which aimed to provide the current and ancient literary knowledge to the researchers of the related fields.

Unani classical literature and ethno medical literature on recent developments in research on *Tukhme Kahu (Lactuca scariola)* including original articles and papers were taken into study for the report. All the reports of phytochemical, pharmacological and clinical studies from animal and human model system were included in the review. Reported data was analyzed and represented in the form of table for the current review.

Vernaculars

Tukhme Kahu is popularly known in different dialect and languages as follows. *Bazrul Khas* (Arabic) *Kahu*, *Salad Beej* (Bengali) Prickly Lettuce, Wild Lettuce (English), *Thridox* (Greek), *Guado*, *Lattuga* (Italian), *Kahu* (Punjabi), *Sallattu Virai* (Tamil), *Kavu Vitula* (Telugu), *Kahu ke beej* (Hindi), In Persian and Urdu, the drug is commonly known as *Tukhme Kahu* (Nadkarni, K.M. 1954).

Morphology

Ibne Baitar (1197–1248 H) described in “Aljame-ul-Mufradat-ul-Advia wa Aghzia” with reference to Dioscorides (60 AD), Galen (121–200 AD), Ibne Masoya and Razi (865–925 AD) as follows:–

Kahu (Khas) actually has two varieties based on its occurrence.

1. *Bustaani (Baaghi)* “*Lactuca Sativa*” Garden Lettuce. It is a cultivated variety.
2. *Barri (Jungali)* “*Lactuca Scariola*” Wild Lettuce.

Cultivated variety could be differentiated into two types. (1) This is 1½ meter high, soft, smooth and sweetish stem with pinnate wide leaves, delicately branched which has white flowers. Seeds are small and whitish in color. (2) The second harvested variety is English (*Firangi*) which is again of two types. Amongst which, one is well breakable and sweetish. Harvested *Kahu* is used as vegetable (Salad). Wild variety (*Barri*) of *Lactuca Scariola* has longer and thinner leaves than cultivated variety, the leaves are dark green and slightly bitter in taste. The latex is sometimes used as

the substitute of opium which is not as potent as of *Khash Khash* (*Papaver Somniferum*) (Ghani, M.N.K. 1921, Ibne-Sina, 2007).

Description:

It is found as an erect glance sent Annual or biennial, leafy, 60–150 cm high somewhat prickly plant at the Western Himalaya from Marri to Kunawar, at altitude of 6000–11000 feet. It is also found in Western Tibet at altitudes of 9000–12000 feet. Distributed to Siberia and West ward to the British Islets and canaries .Stem 3–10 cm high, sparingly prickly below, Capitula is 8–15 m long. Achenes have 6–8 mm body elliptical Setose at apex, 5–9 ribbed, grayish beak as long as body. Leaves are Pinnatifide or Lobed; achenes light colored, rarely sinuate, tending to turn edgewise into a vertical position. Flowers are Yellow, Achenes striate dark brown or grayish brown. Seeds are small whitish grey, about 1.0 cm long and 1–2 mm broad (Dymock, W. *et al.*, 1890, Chopra, R.N. *et al.*, 1956, Kirtikar, K.R *et al.*, 1987).

Unani description

Seeds are whitish or whitish grey, shiny, elongated and smaller in size. They are tasteless or have light bitter taste. According to some Pharmacognostic experts, the seeds are light and soft. Seeds, Oil, milky fluid that flows from the stems (Lactucarium) and Dried Leaves are used as a drug in Unani system of medicine. The *Mizaj* (Temperament) of *Tukhme Kahu* is described as Cold 2° & Dry 3°. But there exists a difference of opinion regarding the gradation in mizaj. A majority of the authors described the mizaj as cold in 2nd degree and dry in 3rd degree (Ghani, M.N.K.1921, Kareem, N.A.1765, Gulam, H.1879, Ansari, A.B.H 1885, Haleem, M.A. 1948) while others consider it as cold and dry in 2nd degree (Said Mohd. 1973, Hakeem, M.A. 1953, Ibne-Sina 2007).

Phytochemical Studies

The plant contains alkaloids 0.02 %, sugar and glycosides 6.5 %, volatile oil in traces; fat 2.2 %, Gums 2.16 %; Organic acids 1.06 %, Carotene 16 mg %, Vitamin B₁ 22%, Vitamin

C 44 mg %, Vitamin E 32 and Vitamin K 0.2 mg %.The phytochemical investigations of seeds revealed the presence of alkaloids, the bitter substance lettuce, oxalic acid, lactucopicrin (S. R. Baquar, 1989) and sesquiterpene esters (J. Alberto *et al.*, 1992).The alkaloid, lactucin, isolated from the seeds by Dolejs *et al.*, (1958) and Michal *et al.*, (1958), exhibited antipyretic activity (V. S. Agarwal, 1997) and a triterpenoid saponin isolated from stem possesses antibacterial activity (R. N. Yadava *et al.*, 2008).

Pharmacological studies

The methanolic extract of *Lactuca scariola* was found to possess spasmogenic, spasmolytic, bronchodilator, and vasorelaxant activities. The spasmogenic activity may be attributed to some cholinergic constituents, whereas spasmolytic effect may be due to Ca⁺⁺ channel blocking components that may cause relaxation of gastrointestinal, tracheal, and aortic smooth muscles (Khalid hussain janbaz *et al.*, 2013). *L. scariola* exhibited dose dependent potent analgesic activity. Methanolic extract of *L. scariola* can produce significant analgesic activity but failed to show anti-inflammatory effect (Fayyaz ahmad *et al.*, 1992). The methanol extracts prepared from leaves and stems of *L. scariola* showed cytotoxic activity against A549, HePG, MCF7 and HCT116 (Eman Elsharkawy1 *et al.*, 2013). A new triterpenoid saponin has been isolated from the seeds of *Lactuca scariola*. This compound shows antimicrobial activity against various bacteria and fungi (R. N. Yadava *et al.*, 2008). The antioxidant activity of *Lactuca scariola* (Asteraceae) was investigated by measuring the radical scavenging effect on DPPH (1, 1-diphenyl-2-picrylhydrazyl) radical and found that the methanolic extract of the aerial parts of *Lactuca scariola* showed strong radical scavenging activity (D. K. Kim, 2001). Lactucin and its derivatives lactucopicrin and 11beta, 13-dihydrolactucin, which are characteristic bitter sesquiterpene lactones of *Lactuca virosa* were evaluated for analgesic and sedative properties in mice. Lactucopicrin appeared to be the most potent analgesic of the three tested compounds.

Lactucin and lactucopicrin, but not 11beta, 13-dihydrolactucin, also showed sedative properties in the spontaneous locomotor activity test (Wesolowska A. *et al.*, 2006). A Randomized placebo controlled double-blind trial of *Tukhme Kahu* (seeds of *Lactuca scariola* Linn.) on mixed anxiety depressive disorder has shown a significant effect in reducing anxiety and depressive symptoms (Ghazala javed, *et al.*, 2009). The oil of *Tukhm-e-Kahu* (*Lactuca scariola* seeds) is used in Industries i.e. soap-making, paints and varnish (Anonymous, 1962; Ambasta, S.P. 1986). These studies may provide a scientific basis to validate the traditional use of *Tukhme Kahu* in the management of some gastrointestinal, respiratory, neurological and vasospastic ailments. The following table (Table -1) shows the Pharmacological studies mentioning the Reported action with references.

AFAL-O-KHAWAS

(Pharmacological actions)

The eminent Unani physician has described the *Afal-o-khawas* (Pharmacological Actions) in detail. It is commonly used as Musakkin (analgesic), Munawwim (sedative), Mudir baul (diuretic) and refrigerant. The following table (Table -2) shows the *Afal-o-khawas* (Pharmacological Actions) with Unani and ethno-medical references.

Therapeutic uses

According to ancient Unani text, *Tukhme kahu* and its compound formulations i.e. *roghan Kahu & roghan laboob saba, Mufarreh shaikur rais* etc has been recommended for the treatment of headache, insomnia, nervousness, fever, palpitation, burning micturition etc. The following table (Table -3) shows the therapeutic uses in different ailments with Unani and ethno-medical literature references.

Table- 1: Pharmacological studies with references

S.no.	Components used	Reported action
1.	<i>L. sativa L. scariola</i> (whole plant extract)	CNS stimulant and depressant action respectively in mice LD50 = 750 mg/kg, IP (Dhawan, B.N., <i>et al.</i> , 1977.)
2.	<i>Lactuca scariola</i> (seeds extract)	Anti-arrhythmic and cardiac function hemodynamic effect LD50 = 79.05 g/kg, IP (Weizhi, W, <i>et al.</i> , 1992)
3.	<i>Lactuca virosa</i> (isolated biologically)	Spontaneous locomotor activity and analgesic effect active crude preparation P-1, P-2, P-3 and Lactucin) (Gromek, D <i>et al.</i> , 1992)
4.	<i>Lactuca sativa</i> (Seeds oil)	Sedative effects in loco-motor activity, potentiation of the hypnotic effect of barbiturates, analgesic effect of barbiturates,(Said Mohd. 1973)
5.	Triterpenoid saponin, isolated from the stems of <i>L.scariola</i>	Antibacterial triterpenoid saponin (R. N. Yadava <i>et al.</i> , 2008)
6.	Methanolic extract of the aerial parts of <i>Lactuca scariola</i>	antioxidant activity (D. K. Kim, 2001)
7.	Lactucin & lactucopicrin	Analgesic and sedative activities in mice (Wesolowska A. <i>et al.</i> , 2006)
8.	Methanol extract of <i>L. scariola</i>	Spasmolytic, bronchodilator, and vasorelaxant Activities in rabbits (Khalid <i>et al.</i> , 2013)
9.	Methanolic extract of <i>L.</i>	potent analgesic activity in mice (Fayyaz ahmad <i>et</i>

	<i>scariola</i>	<i>al.</i> , 1992)
10.	Methanolic extracts of leaves and stems of <i>L. scariola</i>	Anticancer activity (Eman Elsharkawy1 <i>et al.</i> , 2013)
11.	The extract of <i>Tukhm-e-kahu</i>	Diuretic, sedative (Ansari A.N, 2009)
12.	<i>Tukhm-e-kahu</i> (<i>Lactuca scariola</i>)	Anxiolytic & antidepressant (Ghazala javed, <i>et al.</i> , 2009)

Table 2: Afal-o-khawas (Pharmacological Actions) with references

S.no	Afal-o-khawas (pharmacological actions)	Reference Unani Literature	Reference Ethno-Medical Literature
1.	Hypnotic	(Ghani, 1921, Kareem,1765, Gulam, 1879, Ansari, 1885, Haleem, 1948, Ibne-Baitar (1197-1248 AD), Antaki, (1597), Attar (1888), Azam, (1895), Said (1969), Abid, (1907)	Nadkarni 1954, Anonymous 1962, Dymock (1890), Bunney 1992, Watt, G. 1972, Khorey, 1985, Chopra 1956, Said, H.M. 1969, Ambasta 1986.
2.	Sedative	Kareem, 1765; Azam, 1895, Kabir, 1951, Ibne-Sina 2007	Nadkarni, 1954; Waren, 1956, Chopra, 1956; Watt, 1972 Mair,1973; Khory, 1985; Bunney 1992;
3.	Antipyretic	Kabiruddin, H. (1951), Ibne-Sina (2007)	Anonymous (1962), Khorey, 1985, Chopra 1956, Kirtikar, 1987, Said, 1969, mbasta, 1986,
4.	Diuretic	Ghani, 1921; Hakeem, 1953; Fazlullah, 1970. Ibne-Sina 2007.	Nadkarni, 1954, Chopra, 1956; Anonymous, 1962, Watt, 1972; Murray, 1983; Khory, 1985
5.	Expectorant	Kareem, 1765; Ahmad, 1887; Ghani,1921; Hakeem, 1953;	Nadkarni, 1954; Chopra 1956; Khory, 1985;
6.	Blood purifier	Kabir, 1951; Fazlullah 1970	Dymock, <i>et al.</i> .1890
7.	Aphrodisiac by decreasing anxiety level	Antaki, 1597; Kareem, 1765; Ansari, 1885; Attar, 1888; ; Abid, 1907; Ghani, 1921; Ibne-e-Sina, 2007,	-
8.	Anesthetic	Kareem, 1765; Gulam, 1879; Ansari, 1885; Ghani, 1921; Haleem, 1948; Hakeem, 1953.	-
9.	Antidote	Antaki, 1597; Kareem, 1765;	-

		Attar,1888; Ghani, 1921;	
10.	Anodyne	-	Nadkarni,1954; Charles. 1974; Murry, 1983; Khory, 1985;
11.	Anti inflammatory	Antaki, 1597; Ibn-e-Sina, 2007;	-
12.	Anti bacterial	-	R. N. Yadava <i>et al.</i> . 2008.
13.	Anti spasmodic	-	Watt,1972; Chopra,1956;
14.	Cooling	Kareem, N.A. (1765); Azam, M.K. (1895) Ibne-Sina (2007)	Dymock,1890; Nadkarni, 1954; Chopra, 1956; Khory, 1985;
15.	Demulcent	-	Nadkarni, 1954; Chopra, 1956; Khory, 1985; Kiritikar 1987.
16.	Deobstruent	Ghani, 1921; Fazlullah, 1970;	-
17.	Diaphoretic	-	Chopra, 1956; Watt, 1972; Charles, 1974; Murray, 1983
18.	Hair tonic	Azam,1895; Kabir,1951; Hakeem 1933	-
19.	Purgative	-	Watt, 1972; Murray, 1983
20.	Soothing	-	Watt, 1972
21.	Emmenagogue	Kareem, N.A. 1765; Ibne-Sina 2007;	-

Table 3: therapeutic uses with references

S.no.	Therapeutic uses	Reference (Unani & Ethno-Medical Literature)
1.	Insomnia	Antaki, 1597; Kareem, 1765; Attar, 1888; Ibne Baitar, 1197-1248 Ad; Azam,1895; Ghani, 1921; Nadkarni, 1954;Anonymous, 1962;
2.	Headache	Ibne Baitar, 1197–1248 AD; Antaki, 1597; Kareem, 1765;Gulam, 1879; Ansari, 1885; Ghani, 1921; Haleem, 1948; Hakeem, 1953; Kirtikar & Basu, 1987.
3.	Fever	Kabir, 1951; Nadkarni, 1954; Said, 1969; Khory, 1985)

4.	Nervousness	Nadkarni, 1954; Khory, 1985; Ghazala,2009;
5.	Palpitation	Nadkarni, 1954; Khory, 1985.
6.	Asthma	Nadkarni, 1954; Chopra, 1956; Watt, 1972; Murray, 1983;
7.	Chronic bronchitis	(Nadkarni, 1954; Chopra, 1956; Watt, 1972; Kirtikar & Basu,1987; Ibn Baitar, 1197-1248 AD)
8.	Chest pain	Kareem, 1765;
9.	Acute inflammation	(Antaki, 1597; Ibne-e-Sina, 1930; Nadkarni, 1954; Khory, 1985; Kirtikar & Basu, 1987)
10.	Burning micturition	(Kareem, 1965; Gulam, 1889; Ansari, 1885; Ghani,1921.
11.	Acute cold/ Coryza	(Kareem, 1765; Ghani, 1921; Hakeem, 1953;
12.	Dropsy	Murry, 1983;
13.	Nocturnal emission	Antaki, 1597; Ansari, 1885; Attar, 1888; Ghani, 1921; Ibne Sina, 2007; Nadkarni, 1954; Murry, 1983.
14.	Painful irritable ulcer	Nadkarni, 1954; Ambasta, 1986; Kirtikar Basu, 1987; Ibne Sina, 2007.
15.	Pertusis	Nadkarni, 1954; Chopra, 1956; Watt, 1972; Murray, 1983.
16.	Jaundice	Ibne Sina, 2007.
17.	Prevent hair fall	Kabir, 1951; Anonymous, 1962; Kirtikar & Basu, 1987.
18.	Relief of thirst	Azam,1895; Ghani,1921; Hakeem,1953; Ibne Sina, 2007.
19.	Scorpion sting	Antaki,1597; Kareem,1765;Attar,1888;Ghani, 1921; Ibne Sina, 2007
20.	Spermatorrhoea	Antaki, 1597; Ansari, 1885; Attar, 1888; Ghani, 1921; Ibne Sina, 2007; Nadkarni, 1954; Murray, 1983.
21.	Sunstroke	Antaki, 1597, Ibne Sina, 2007
22.	Dysmenorrhoea	Kareem, 1765; Ibne-e-Sina, 2007; Kirtikar & Basu, 1987; Murry, 1983.

Substitute:

The Majority of authors considered *Khash-khash* (Poppy seeds, *Papaver somniferum*) as substitute of *Tukhm-e-Kahu* (*Lactuca scariola* seeds). (Kareem, 1765; Ghani, 1921; Hakeem, 1953; Fazulullah, 1970; Ibne Sina, 2007). While others considered *Dammul Akhwain* (*Dracaena cinnabin*) as its substitute (Ansari, 1885; Kareem, 1765; Ibne Sina, 2007)

Dose:

Tukhme Kahu is prescribed in adult dose of 6–12 gms daily orally (Ghani, 1921; Hakeem 1953). Another reported dose is 3–5 gm (Ansari, 1888; Kabir, 1951).

Preparation:

Tukhme Kahu is used in form of *Safoof* (powder), *Joshanda* (decoction), single or in combination with other drugs. It's oil used as *Zamad* (Liniment) topically.

Harmful Effects:

The herbal drugs may pose harmful affects either in the form of adverse reactions or drug-drug interactions due to numerous phyto-constituents present in each part of a plant. However no serious health risk is noted till date but some authors have reported that continuous use of *Tukhme Kahu* in high doses can cause atony of body muscles, Dementia, Amnesia, Loss of vision and sexual debility (Antaki, 1597; Kareem, 1765; Abid, 1907; Ghani, 1921; Aziz, 1942; Hakeem, 1953; Ibne Sina, 2007).

Correctives:

Mastagi (*Pistacia lentiscus*) and Honey are reported as correctives of *Tukhme Kahu*

REFERENCES

Abid, H.S. (1907); “Tarjuma Nafisi”, Vol. I, Matba Munshi Nawal Kishore, Lucknow, 115.
Ahmad, B. (1987); Mufredat Hindi, *Munshi Nawal Kishore, Kanpur* : 102.

(Kareem, 1765; Ansari, 1885; Haleem, 1948; Hakeem, 1953, Ibne Sina, 2007).

CONCLUSION

Tukhme Kahu is an important drug in Unani system of medicine used for ages in the treatment of headache, insomnia, nervousness, hypertension, palpitation, fever, Asthma, Chronic bronchitis, acute cold/Coryza, Scorpion sting etc. *Lactuca scariola* has its own importance as it has Anti cancer antibacterial, antifungal, Spasmolytic, bronchodilator and vasorelaxant activities. The scientific analysis of *Tukhme Kahu* proves many of the activities mentioned in Unani classical literature. Further investigations are needed to find out the mechanism of action, active principle(s) and utility of *Tukhme Kahu* in clinical practice. Though the drug has been found to be safe but the potent curative effects of the drug need to be verified by more controlled and exhaustive clinical trials, especially in the field of cancer and hypertension so that it can be established as a standard drug.

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Ambasta, S.P. (1986): “The Useful Plants of India”, CSIR, New Delhi, 312.

Anonymous (1962); The Wealth of India, Vol. VI, CSIR, New Delhi, 12–16.

- Ansari A.N (2009) “Clinical evaluation of a Unani herbal formulation” *Hamdard medicus* 2009 Vol. 52 No. 3 51–57
- Ansari, A.B.H (1885); Ikhtiyarat Badie, Munshi Nwal Kishore, Lucknow.
- Antaki, D.Z. (1597); Tazkirah-e-Ulil Albad (Arabic), *Azharia Press* Egypt, 87.
- Attar, Z. (1888); Ikhtiyarat-i-Badiya (Persian), *Matba Munshi Nawal Kishore*, Lucknow, 156.
- Azam, M.K. (1895); Muheet-e-Azam (Persian), Vol. I, *Matba Nizami*, Kanpur, 196.
- Bunney, S. (1992); *The Illustrated Encyclopaedia of HERB’S. Chancellor Press*, London, 176.
- Charles, F. Millspaugh (1974); *American Medicine, Dover Publications Inc.*, New York.
- Chopra, R.N. and Nayer, S.L. (1956); *Glossary of Indian Medicinal Plants. SCIR*, New Delhi, 148.
- D. K. Kim, (2001); “Antioxidative components from the aerial parts of *Lactuca scariola* L.” *Archives of Pharmacal Research*, vol. 24, no. 5, 427–430.
- Dhawan, B.N., Patnaik, G.K., and Rastogi, R.P. (1977); “Screening of Indian Plants of Biological Action Part-VI”, *Indian J. of Exp. Bio.*, 15, 208.
- Dymock, W., Warden, C.J.H. and Hooper, D. (1890); *Pharmacographia Indica* : Vol. I, II and III; reprinted by the Institute of Health and Tibbi Research, Pakistan, *Hamdard* : XV (1-22) (edited by M. Saeed in 1972), *Hamdard National Foundation*, Pakistan, 13–14.242,.
- Eman Elsharkawy1 and Mona Alshathly (2013); “Anticancer activity of *lactuca steriolla* growing under dry desert condition of Northern Region in Saudi Arabia” *Journal of Natural Sciences Research* Vol.3, No.2.
- Fayyaz Ahmad, Rafeeq A. Khan, Shahid Rasheed (1992); “study of analgesic and anti inflammatory activity from plant extracts of *lactuca scariola* and *artemisia absinthium*” *journal of islamic academy of sciences*, 5:2, 111–114,
- Fazlullah, M. (1970); *Jamiaul Advia, Royal Printing Press*, Lucknow, 162.
- Ghani, M.N.K. (1921) : *Khazinatul-Adiva*, Vol. III, *Matba Munshi Nawal Kishore*, Lucknow : 253–254.
- Ghazala javed, Akhtar siddiqui, Vimal kumar & Mohammad Anwar (2009); “Efficacy of *Tukhm-e-Kahu* (seeds of *Lactuca scariola* Linn.) on mixed anxiety depressive disorder: a randomized placebo controlled double-blind trial” *Hamdard medicus* Vol. 52 No. 1 ,97–101
- Gromek, D; Kisiel, W; Klodzinska, A. and Chojncka-Wojcik, E. (1992); “Biologically active preparations from *Lactuca virosa* L.”, *Phytotherapy Research*, 6(5), 285–287.
- Gulam, H. (1879); *Kamilu-s-Sanah* (Urdu), *Munshi Nawal Kishore*, Lucknow, 142.
- Hakeem, M.A. (1953); *Bustan-al-Mufradat* (Urdu), *Matba Mujtabai Press*, Lucknow, 134,229,243.
- Haleem, M.A. (1948); *Mufradat-e-Azizi, Sahitya Mandir Press Ltd.*, Lucknow, 5.
- Ibne-Baitar (1197-1248 AD); *Aljami-ul-Mufradat al-Advia-Wal-Aghzia* : Vol. III, (Urdu Translation), *CCRUM*, 380.
- Ibne-Sina (2007); *Al-Qanoon Fil-Tib* : Vol. II (Urdu Translation by S. Ghulam Husain Kantoori), *Idara Kitab-us-shifa*, *Darya Ganj*, New Delhi, (July-2007) 222,
- J. Alberto Marco, J. F. Sanz, and R. Albiach, (1992); “A sesquiterpene ester from *Lactuca serriola*,” *Phytochemistry*, vol. 31, no. 7, 2539–2540, 1992.
- Kabiruddin, H. (1951); *Kitabul Advia, Mukhzanul Mufredat, Daftar al-Masih*, Hyderabad, 289–290.

- Kareem, N.A. (1765); Makhazanul-Advia (Urdu), Vol. I, *Munshi Nawal Kishore, Kanpur, 313.*
- Khalid Hussain Janbaz, Muhammad Farhaj Latif, Fatima Saqib, Imran Khan, M Zia-ul-Haq, and Vincenzo De Feo (2013); “pharmacological effects of lactuca scariola in experimental model of gastrointestinal, respiratory, and vascular ailments” *Evidence-Based Complementary and Alternative Medicine*, Volume 2013, Article ID 304394, 9 pages
- Khorey, R.N. and Katrak, N.N. (1985), *Materia Medica of Indian and Their Therapeutics*, Neeraj Publishing House, Delhi, India, 10–17,367.
- Kirtikar, K.R. and Basu, B.D. (1987); *Indian Medicinal Plants Vol. I,II and III*, International Book Distributors, Dehradun, India, vol-1 20–21, Vol-II 1438–1441, Vol-III 2936–2939 .
- Murray, J.A. (1983); *The Plant and Drugs of Sind. Indian Book Gallery*, Delhi, 107–108.
- Nadkarni, K.M. (1954); *Indian Materia Medica, Vol. I, Popular Prakashan, Bombay, 719–721.*
- R. N. Yadava and J. Jharbade, (2008) “New antibacterial triterpenoid saponin from *Lactuca scariola*,” *Fitoterapia*, vol. 79, no. 4, 245–249.
- S. R. Baquar, (1989); *Medicinal and Poisonous Plants of Pakistan*, Printas, Karachi, Pakistan, 1989.
- Said Mohd.(1973); *Al-Birune’s Book on Pharmacy and Materia Medica* Hamdard National Foundation Pakistan, karachi, 1973, p. 107, 248, 253–254.
- Said, H.M. (1969); *Hamdard Pharmacopoea of Eastern Medicine. The Times Press Sader Karachi*, Pakistan, 396.
- V. S. Agarwal, (1997); *Drug Plants of India*, Kalyani Publishers, New Delhi, India, 1st edition.
- Watt George (1972); *Dictionary of the Economic Products of India, Vol. VI, Part-1, Periodical Experts, Delhi, 3–4.*
- Watt, G. (1972); *Dictionary of the Economic Products of India, Vol. I, Cosmo Publication, Delhi, 3-4,578-579.* Weizhi, W., Hauzhau, W., Zhimin, Q.I., Zhijik, X., and Rixin, L. (1992): “Anti-Arrhythmic Action of Seeds of *Lactuca Sativa* and its Effects on Cardiac Function Hemodynamics”, *Chinese Traditional and Herbal Drugs*, 23(7), 366–368.
- Wesołowska A, Nikiforuk A, Michalska K, Kisiel W, Chojnacka-Wójcik E, (2006) “analgesic and sedative activities of lactucin and some lactucin-like guaianolides in mice” *jethnopharmacol. sep 19;107 (2):254–8.*

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