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Ūnt Katāra (Echinops echinatus): Medicinal importance in perspective of Unani medicine and pharmacological studies

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Abstract

Echinops echinatus commonly known as ‘Ūnt Katāra belonging to the family Asteraceae is a much-branched, pubescent, annual herb, 1-3 feet tall; branches widely spreading from the base. This species is distributed widely across the India. The plant exhibits a wide range of pharmacological activities such as aphrodisiac, diuretic, anti-pyretic, analgesic, anti-inflammatory, hepatoprotective, antidiabetic and antidyslipidemic properties. Taraxasterol acetate, 7-O-glucoside, an alkaloid 7-hydroxyechinozolinone, apigenin and its derivatives, echinacin and echinatin are the most important chemical constituents. The current review focuses on the updated information from various scientific studies and reports available in the context of the phytoconstituents and pharmacology of this plant and therapeutic uses of *Echinops echinatus* in Unani system of medicine.

Keywords: *Echinops echinatus*, Ūnt Katāra, apigenin, aphrodisiac, unani medicine

1. Introduction

The Unani System of Medicine (USM) is a comprehensive medical system, which meticulously deals with the various states of health and disease. It provides promotive, preventive, curative and rehabilitative healthcare. The demand for Unani medicine is increasing exponentially because of people’s faith in its safety and efficacy. It serves mankind from centuries by alleviating ailments through drugs derived from natural resources like plants, minerals and animals. The plants, however have been used more often as compared to the two other sources [1]. Herbal drugs are rapidly gaining traction in the world of medicine and the use of natural drugs has grown significantly worldwide. It has been estimated that around 80% of the global population receives their main health care from traditional medicine, with the majority of these treatments originating from plant extracts or their active ingredients [2]. In USM, a lot of single and compound drugs are used to alleviate diverse pathological states. The Asteraceae comprises about 1100 genera [3] and 30,000 species [4] making it one of the largest flowering plant families worldwide. The genus *Echinops* encompasses about 120 species of flowering plants [5]. One member of this genus is Ūnt Katāra, a well-known drug of Unani Medicine which is used for medicinal purposes both internally and externally [6-9]. ‘Ūnt Katāra is a traditionally used drug in Ayurvedic and Unani medicine. This plant is willingly consumed by camels, hence its colloquial name, “Ūnt Katāra” [7, 9, 10]. This is a very ancient plant of India which is mentioned by *Charak* and *Shushrut*. It is a yard tall thorny plant with many thorns on its branches and leaves. It is often misidentified with *Tricholepis glaberrima (Brahmandandi)* [11, 12] and according to some *Argimone mexicana L.* (Satya nashi) is considered to be a type of ‘Ūnt Katāra [12]. Actually, its resemblance with *Argimone mexicana L.* is due to the presence of thorns all over the plant [12] and leaves which are similar but slightly smaller, longer and spined [11]. Leaves have white hairs on the bottom. Its plant is often 1 foot to 2½ feet high [12]. It flourishes abundantly, exhibiting excellent growth during the summer season [7]. Throughout the winter season, its foliage remains verdant until it begins to bear fruits. Its root is 4 to 6 inches long [12]. Aerial parts of the plant contain alkaloids; echinopsine, echinopsidine and echinozolinone [13]. A paste of the plant is fed to barren cows to increase fertility [14].

The ethanolic extract showed anti-inflammatory activity. Taraxasterol acetate has been isolated from the plant as one of the potent anti-inflammatory constituents. Four phenolic compounds; apigenin, apigenin-7-O-glucoside, echinacin and echinaticin isolated from the plant show anti-fungal activity^[15].

This current review aims to highlight the medicinal properties of *Ūnt Katāra* in view of its phytoconstituents and pharmacological activities; to signify its potential in the treatment of various ailments as mentioned in the USM and to explore its pre-clinical studies.

2. Materials and Methods

The plant was searched in the classical Unani literature with keywords '*Ūnt Katāra-Echinops echinatus*, and mentioned in detail with reference to its description, Mizāj, medicinal properties and therapeutic uses. Published works available on PubMed, Google scholar were referred to collect all the available information regarding its phytochemicals and pharmacological studies. All relevant articles were referred including classical Unani books, English books, research and review papers. Standard Unani medical terminology published by Central Council for research in Unani medicine was used for the appropriate Unani terminologies.

3. Observations

3.1 Geographical distribution

The species is found practically throughout the India^[16], ascending to 5000 feet on the hills^[17, 18]. It is abundantly found in the hills of Himalayas, Kokan, hills and forest areas of all states of India and also found in hot areas of Saudi Arabia, Bangladesh, Sri Lanka, Afghanistan and Pakistan^[7, 19].

3.2 Botanical Description

E. echinatus is a much-branched rigid pubescent annual herb, 1-3 feet high^[16, 20], widely spreading from the base^[18, 21].

Stem: Stem and branches are teeter more or less ribbed, cottony pubescent^[22].

Leaves: Lanceolate, sessile, alternate, 7.5-12.5 cm long, glabrous or minutely scaberulus above, white with cottony wool beneath, oblong, deeply pinnatifid, the lobes triangular and oblong, sinuate and spinescent, the spines often 2.5 cm long^[18, 19, 20, 21].

Flower: Flower heads white, compact and globose, up to 2 inches in diameter, involucre^[18]. Strong white bristles that resemble pappus hairs surround the involucre. The outer involucre bracts are oblanceolate, pungent and glabrous. The intermediate bracts typically have one or two of the bracts produced into sharp spines that can sometimes exceed 2.5 cm long, causing the balls to frequently bristle with many spines. The innermost bract is 5-8 and is approximately 13 mm long^[20]. It connates for more than half of its length into a tube that encircles the achenes, with the free segments being acute or obtuse at the apex ciliate and with scarious margins. Anther-tails are fimbriate, pappus is short, yellowish formerly a short cylindrical brush above the achene^[21].

Fruit: Achenes 4 mm, long, obconic, densely villous^[19, 21].

Flowering & fruiting period: October to May^[20]

3.3 Taxonomical Classification^[23]

Kingdom: Plantae
Phylum: Magnoliophyta
Class: Magnoliopsida
Order: Asterales
Family: Asteraceae
Genus: Echinops
Species: Echinatus

3.4 Description in Unani literature

Its fruit is walnut sized, full of thorns^[10, 12], located at the terminal end of each branch and is spongy inside^[6, 8, 9]. The fruit has small flowers with a white wool like substance inside^[6, 8]. Its flowers are yellow and white^[8, 9, 11]. Its leaves are green-coloured with a slightly bitter taste but fragrant, with small spines on them^[7]. The plant has small and prickly root about 4 to 6 inches long^[12] with mild bitter taste^[7]. The taste of all parts of this plant is slightly bitter^[7, 24]. There is another variety of *Ūnt Katāra* which has got indigo-coloured flowers^[6, 8].

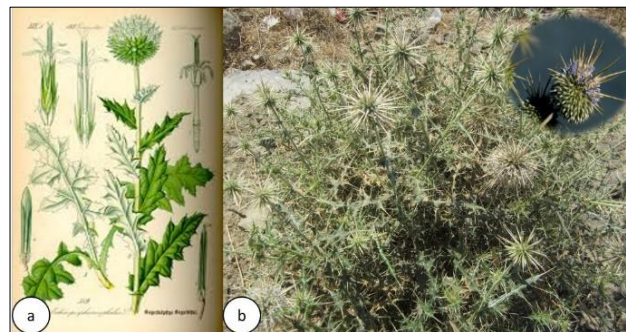


Fig 1: showing a. Illustration and b. *Ūnt Katāra* plant with flowers & fruits in the field

3.5 Mutarādifāt (Vernacular names)

Arabic: Shawk al-Jamal^[7, 10, 11], Ashtarghar^[24]

Gujrati: Shuliyo, 'Utakanto, Utkato^[16, 19, 25]

Hindi: Utakanta, Utakatira^[17, 25]

Marathi: Kadechubak, Utanti, Utati, Utkatara^[25].

Persian: Astartkhar^[10].

Sanskrit: Kantalu, Utakantaka, Kantaphala, Karamadana, Mukhadantarujapha, Shrigala, Tikshnagra^[16, 25]

Urdu: Ūnt Katāra, Brahm dandi badi^[7]

English: Indian Globe Thistle, Camel's thistle^[16, 26].

3.6 Ajzā-i-Musta'mala (Parts used)

Whole plant viz., *Bīkh-i-Ūnt Katāra* (Roots), *Post Bīkh Ūnt Katāra* (Root bark), *Barg-i-Ūnt Katāra* (leaves), *Gul-i-Ūnt Katāra* (Flowers), *Samar Ūnt Katāra* (fruits) are the most commonly used parts^[7, 16].

3.7 Mizāj (Temperament)

As per some physicians it is hot and dry in 2nd degree^[6, 7, 8] and according to others, it is hot and dry in 3rd degree^[9, 10, 11, 12].

3.8 Miqdār Khūrāk (Dose)

The therapeutic dose of *Ūnt Katāra* is mentioned as 3-5 g^[10, 12].

3.9 Muddat Ta'thīr (Shelf life of drug)

The shelf-life of *Ūnt Katāra* is 3 years^[7].

3.10 Afāl (Action)

The plant is bitter; *Muqawwī-i-Mi'da* (Stomachic), *Dafi'-i-Humma* (Antipyretic), *Musakkin Alam* (Analgesic), *Muqawwī-i-Ā'sāb* (Nerve tonic). It is considered to be tonic and *Mudirr-i-bawl* (Diuretic). Root is *Musqit-i-Janīn* (Abortifacient), *Muqawwī-i-Bāh* (Aphrodisiac). Seeds are sweet; *Muqawwī-i-Bāh* (Aphrodisiac) [16, 17, 21, 25].

3.11 Istemālāt (Therapeutic uses)

The whole plant being aromatic [16] is used in diseases such as *Khafaqān* (Palpitation), *Bechainī* (Restlessness), *Fishār al-dam* *Ḍa'if* (Low blood pressure) [7]. A fragrant perfume is prepared from the leaves and flowers of *Ūnt Katāra*, which provides freshness. The whole plant exerts tonic nerve functions being beneficial to use in diseases such as *Du'f-i-Ā'sāb* (General nervous weakness), *Du'f-ba'd al-Maraḍ* (post-disease weakness), *I'ya* (Fatigue), *Fālij* (hemiplegia), *Laqwā* (Facial palsy) and *Fālij Atfāl* (Poliomyelitis). It stimulates the circulatory system and the excretory system, it has excellent diuretic property therefore, beneficial in *Warm-i-Kulya* (Nephritis), *Waram-i-Majrā-i-bawl* (Urethritis), *Waram Hālibayn* (Ureteritis), *Warm-i-Mathāna* (Cystitis), *Ihtibās-i-bawl* (retention of urine). Being diuretic, it is also very beneficial in *Amrāz qalb* (Cardiac diseases) [7]. Leaf of *Ūnt Katāra* has tonic functions for which it is used in *Adam-i-Ishtihā* (anorexia). It also performs digestive functions, using it alone or in combination with other digestive medicines is helpful in *Du'f-i-Haḍm* (Indigestion) [7].

It is used in dry cough, ophthalmia [17] and its decoction as an alterative is given in dyspepsia, scrofula, syphilis and fevers while its infusion is given in seminal debility, impotence, hysteria etc. [16]. It increases the appetite, stimulates the liver; used in the diseases of brain, chronic fever, pain in the joints, inflammation [21].

3.12 Tarkīb Iste'māl (Method of administration)***Amrāq-i-Sha'r* (Diseases of hair)**

Powdered roots mixed with acacia gum destroy lice when applied to hair [27].

***Amrāq-i-Ri'a* (Diseases of lungs)**

0.72g of powder of shade dried root of *Ūnt Katāra* when taken with betel (*Piper betle* L.) is useful in *Su'āl* (cough) and *Dam'a* (asthma) [11, 12].

***Amrāq-i-Mi'da* (Diseases of stomach)**

Taking equal amount of pounded root of *Ūnt Katāra* and date palm kernel seed with *misrī* (sugar) in morning in the dosage of 6 g with water is beneficial in relieving indigestion [11].

3.16 Compound formulations

Table 1: Unani formulations having *Ūnt Katāra* as one of the ingredients with their dose, method of administration, action and uses [7, 9, 11, 30]

S. No.	Unani formulation	Part used	Dose and method of administration	Action and uses
1	<i>Ma'jūn Lajwantī</i>	Root	4 Masha/oral	<i>Muqawwī-i-Bāh</i> (aphrodisiac)
2	<i>Tila-i-Majlūk</i>	Root bark	Topical	Effective in deformity due to masturbation
3	<i>Sharbat Ashtarkhar</i>	Root	Oral	<i>Waram-i-Tihāl</i> (splenitis), <i>Waram-i-Jigar</i> (hepatitis), <i>Istisqā</i> (Ascites), <i>Yaraqān</i> (Jaundice) and all phlegmatic diseases
4	<i>Arq Tiryāq-i-Chashm</i>	Flower	Topical	<i>Jālā</i> (Cataract), <i>Ratawndhī</i> (Night blindness)
5	<i>Mukhal Gul-i-Ashtarkhār wala</i>	Flower	Topical	<i>Jālā</i> (Cataract), <i>Ratawndhī</i> (Night blindness)
6	<i>Muqawwī-i-Bāh Laddū</i>	Root	12g/ Oral	<i>Sur'a al-Inzāl</i> (Premature ejaculation), <i>Jarayān</i> (Spermatorrhoea)
7	<i>Safūf Muqawwī Bāh</i>	Root	Oral	<i>Du'f al-Bāh</i> (anaphrodisia)

***Amrāq-i-Mardāna Makhṣūsa* (diseases of male reproductive system)**

Root of *E. echinatus* is an incomparable medicine for sexual disorders in males. Its root is used as one of the ingredients in Unani compound formulation for the treatment of *Du'f-i-Bāh* (Anaphrodisia/ loss of libido) in males. The formulation is advised to be taken in a dosage of 5 drops with a half-pound milk or 24g of butter [11].

Amrāq-i-Nizām-i-Bawl* (Diseases of urinary system)**Idrār-i-Bawl* (diuresis)**

Consuming a mixture of 6 g of root bark of *Ūnt Katāra* dissolved in water and combined with *misrī* (Sugar) prompts urination to commence in case of intermittent urination [11].

Miscellaneous***Humma-i-balgham* (Phlegmatic fever)**

Leaves of *Ūnt Katāra* are very effective in fevers. Drinking decoction of leaves and water after adding 7 peppercorns is of benefit in the treatment of phlegmatic fevers [11].

***Indimāl-i-Qurūḥ* (Wound healing)**

Powdered roots are applied to wounds in cattle to destroy maggots [29].

***Dhayābītus* (Diabetes)**

The water extract, leaf paste and leaf powder of the plant is used to cure diabetes [28].

***'Usr-i-Walādat* (difficult labor)**

Applying the paste of powdered root of *E. echinatus* on the pregnant woman's navel and below the navel causes prompt delivery [11].

3.13 Maḍarrat (Toxicity, side effects and adverse effect)

Abundant and excessive use of *Ūnt Katāra* can result in *Du'f al-Mathāna* (Bladder weakness), leading to *Kathra al-Bawl* (polyuria). Its use is contraindicated in *Dhayābītus* (diabetes), *Salas al-Bawl* (Urinary incontinence) and *Bawl fi'l Farāsh* (Nocturnal enuresis) due to potential significant harm⁷. Overuse for an extended period can have adverse effects on both brain and kidney functions [10, 24].

3.14 Musleh (Correctives)

Sharbat-i-Ghora (Syrup of unripe grapes) is used as corrective for adverse effects [10, 24].

3.15 Badal (Substitutes)

When *Ūnt Katāra* (*Echinops echinatus*) is not accessible, it's recommended to resort to alternatives or substitutes. *Anjdān* (*Ferula asafoetida*) [10, 24].

8	<i>Majūn Mukhtaṣar</i>	Root	Oral	-
9	<i>Ghee Iksīr al-Athar</i>	Root	Oral	<i>Taqwiyat-i-A'sāb</i> (Nervine Tonic), <i>Jiryān</i> (Spermatorrhoea), <i>Kathrat Ihtilām</i> (excessive nocturnal emission)
10	<i>Mumsik Lep</i>	Root	Topical	<i>Imsāk</i> (Retention)

3.17 Chemical constituents

A range of phytoconstituents like triterpenoids, flavonoids, glycosides, phenolic compounds, and alkaloids were extracted from the plant using its roots, leaves, flowers, and various aerial parts. Taraxasterol, its acetate, lupeol, beta sitosterol, its glucoside, apigenin and its 7-O-glucoside are isolated. Echinacin and echinatin have also been isolated

from the plant. Echinacin and apigenin exhibited anti-fungal activity against *Alternaria tenuissima* [31]. 2',5,7 trihydroxy-3,6-dimethoxyflavone-7-O-β-D-galactopyranosyl-[1@4]-O-α-L-rhamnopyranoside is isolated from the seeds of *E. echinatus* Roxb [32]. Some important phytoconstituents are described in Table 2.

Table 2: Secondary metabolites isolated from *Echinops echinatus* [13, 33-37]

S. No.	Compounds name	Plant part	Pharmacological activity
Terpenes			
1	Lupeol	Root	Anti-inflammatory
	Lupeol acetate	Whole plant	
	Taraxasterol acetate	Root	
Flavonoids			
2	Apigenin	Flower, aerial parts	Antifungal Antifungal
	Apigenin 7-O-glucoside	Flower, aerial parts	
	Echitin	Flower	
	Echinoid	Whole plant	
	Kaempferol	Whole plant	
	Kaempferol-3-O-α-L-rhamnoside	Whole plant	
	Myrecetin-3-O-α-L-rhamnoside	Whole plant	
Alkaloids			
3	Echinopsine (1-methyl-4-quinolone)	Aerial parts	
	Echinoxolinone	Aerial parts	
	Echinopsidine	Aerial parts	
	7-hydroxyechinoxolinone	Flower	

3.18 Pharmacological studies

3.18.1 Anti-inflammatory activity

The whole plant ethanolic extract of *E. echinatus* demonstrated anti-inflammatory effects against carrageenan and formaldehyde induced oedema in rats, with inhibitions of 67.5% and 51.8% at doses of 800mg/kg administered via intraperitoneal and oral routes, respectively [34]. Taraxasterol acetate, a triterpenoid extracted from this plant, exhibited anti-inflammatory effects in rats with carrageenan-induced pedal oedema. The highest inhibition, reaching 68.3% and 63.2%, was observed at a dosage of 200mg/kg, whether administered intraperitoneally or orally [38].

3.18.2 Analgesic activity

The methanolic extract from both the root and aerial parts of the plant demonstrated analgesic properties in both the hotplate and tail immersion models. The aerial part displayed the most significant activity, increasing reaction times to 7.99 and 7.77 seconds, respectively, at a dosage of 500 mg/kg. This effect was comparable to the standard drug pentazocine [39]. Additionally, the ethanolic extract from the leaf and stem of *E. echinatus* exhibited an antipyretic effect in rabbits at a dosage of 750 mg/kg [40].

3.18.3 Hepatoprotective activity

The traditional claim that *E. echinatus* can treat jaundice was validated by a study done by Eram *et al.* (2013) on rabbits intoxicated with CCL₄ [41]. ALT and AST levels were significantly reduced by the ethanolic aerial parts extract of at 500 and 750 mg/kg; the lower dose (500 mg/kg) had a greater effect [42]. Flavonoids were extracted from the entire

E. echinatus plant. These may be the cause of the extracts' hepatoprotective properties [43, 44].

3.18.4 Antidiabetic activity and antidyslipidemic activity

In alloxan-induced diabetic rats, the 70% hydro-alcoholic root extract of *E. echinatus* was shown to exhibit strong anti-diabetic effects. After receiving 200 mg/kg of the extract, the blood glucose levels of the treated animals (164 mg/dL) were lower than those of the negative control (277.6 mg/dL) after 21 days of therapy. Furthermore, the extract demonstrated the capacity to repair pancreatic islet cells and restore the normal structure of the kidneys' proximal and distal convoluted tubules as well as glomeruli [45].

In rats with diabetes induced by alloxan, the methanolic root extract of *E. echinatus* had a noteworthy anti-diabetic activity at doses of 100 and 200 mg/kg. Additionally, the extract demonstrated a significant reduction in blood triglycerides, serum cholesterol, serum alkaline phosphate, serum low-density lipoprotein, and serum very low-density lipoprotein while increase in high-density lipoproteins [46].

3.18.5 Diuretic activity

An *in-vivo* Lipschitz test model was used to evaluate the diuretic efficacy of methanolic extracts of aerial portions and roots in albino rats. Urine volumes and sodium and potassium ion concentrations were the parameters of the study, and frusemide was used as the standard. Comparing the urine volume and electrolyte excretion of the methanolic extracts at 250 mg/kg and 500 mg/kg body weight to the control, there was a major increase. The diuretic efficacy of both extracts was substantial. The conclusion reached was

that the diuretic activity may be attributed to the components found in methanolic extracts^[47].

3.18.6 Antifertility effect

Several species of *E. echinatus* have been employed in the treatment of several reproductive health issues. Despite conventional claims to the contrary, only *E. echinatus* has been tested for these biological functions.

The terpenoidal fraction of *E. echinatus* showed anti-fertility activities in male rats at doses of 30 and 60 mg/kg, in line with its traditional use^[48]. Previous research also showed that at doses of 50, 100, and 200 mg/kg, the root ethanolic extract of *E. echinatus* had anti-fertility effects by causing a decrease in the size of the testes, epididymis, ventral prostate, vas deferens, and seminal vesicle. Moreover, the extract inhibited spermatogenesis in rats, reducing sperm motility and density^[49]. It was observed that antifertility effect may be a combination of the effect on the developing spermatids as well as that on spermatozoa motility^[50].

3.18.7 Protective effect

Additionally, Rats treated with 100 mg/kg of the root extract's butanol fraction showed protection against testosterone-induced prostatic hypertrophy. Compared to the crude extract and other fractions, the butanol fraction shown a greater 5 α -reductase inhibitory effect (IC₅₀ = 0.22 mg/ml), with the water soluble fraction coming in second (IC₅₀ = 0.43 mg/ml)^[51]. *E. echinatus* root petroleum ether extract inhibited 5 α -reductase in a similar manner. The enzyme is involved in the pathophysiology of hirsutism in women, acne, alopecia, baldness in males, and Benign Prostatic Hyperplasia^[52].

3.18.8 Anti-fungal activity

Four phenolic compounds, namely apigenin, apigenin-7-O-glucoside, echinacin, and echinaticin, were extracted from the entire *E. echinatus* Roxb plant. These compounds were tested against *Alternaria tenuissima* conidia germination, the causal agent of leaf blight disease in pigeon pea. All compounds exhibited significant efficacy against the pathogen within concentrations ranging from 25 to 150 μ g/ml. particularly, echinacin demonstrated exceptional effectiveness at 150 μ g/ml and was identified as the most potent compound. Consequently, echinacin is proposed for utilization as a control strategy against *Alternaria* blight in pigeon pea fields^[53].

4. Conclusion

This review consolidates data on the traditional and scientific applications of *E. echinatus*, underscoring its efficacy in treating a diverse range of ailments. The plant demonstrates promising potential as a source for antidiabetic, antidyslipidemic, analgesic, anti-inflammatory, antifungal, hepatoprotective, antifertility, diuretic, and protective agents. Overall, it emerges as a valuable natural resource for both pharmaceutical and industrial advancements.

5. Consent and ethical approval

It is not applicable

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7. Competing interests

Authors have declared that no competing interests exist.

8. References

- Kalam MA, Ghufuran A. Medicinal importance of climbers used in Unani system of medicine. In: Shahzad A, *et al.*, editors. Biotechnological strategies for the conservation of medicinal and ornamental climbers. Springer International Publishing Switzerland; c2016. p. 65-66.
- Kalam MA, Munshi YI, Karim S. Bisfāij (*Polypodium vulgare* L.): A review on medicinal importance of rhizome with Unani prospective and modern pharmacology. *Int J Unani Integr Med.* 2017;1(2):04-06.
- Singh V, Kumar S. Asteraceae of Sikkim. New Delhi, India: Deep Publications; c2001. p. 209.
- Sarma GC, Borah RL. Systematic survey of Asteraceae of Dibrugarh district of Assam India. *Indian J Plant Sci.* 2012;1:4-39.
- Jiménez SI, Lazkov GA, Hidalgo O, Garnatje T. Molecular systematics of *Echinops* L. (Asteraceae, Cynareae): A phylogeny based on ITS and trnL-trnF sequences with emphasis on sectional delimitation. *Taxon.* 2010;59:698-708.
- Azam HM. Azam M. Urdu translation. Central council for research in unani medicine. 2012;1:494.
- Ahmed GHNK. Munafa-ul-Adviyat Unani. Dawa Khana Hakim Niyazi, Niyazi Unani Ayurvedic clinical research centre consultant. 2022;2:295-297.
- Ghani HN. Khazain-ul-Advia. Idāra Kitāb-us-Shifa, New Delhi, 2011, 298-299.
- Multāni HC. Hindustan WA Pakistan ki jadī butiyān aur unke fawaid. Lahore: Maktaba Daniyal. YNM p. 14-15.
- Kabiruddin H. Makhzan-ul-Mufradat al Ma'rūf Khawas-ul-Advia. Sheikh Mohammed Bashir and sons. p. 100-101.
- Abdullah HM, Sharma PKK. Hind wa pak ki jadi butiyān aur Unke 'Ajīb wa Gharīb fawaid. Idāra Kitāb-us-Shifa; c2012, 106-111.
- Goswami HRL. Bayān-ul-Advia. Idāra Kitāb-us-Shifa; c2019, 26-27.
- Chaudhuri PK. Echinosolinone, an alkaloid from *Echinops echinatus*. *Phytochemistry.* 1987;26(2):587-589.
- Reddy KR, Sudarsanam G. Plants used as veterinary medicine in Chittoor district of Andhra Pradesh, India. *Int J Crude Drug Res.* 1987;25(3):145-152.
- Krishnan KS. The wealth of India. A dictionary of Indian raw materials & industrial products. First supplement series (Raw materials). Council of Scientific & Industrial Research. New Delhi. Vol.3: D-I;46-47.
- Nadkarni KM. Indian Materia Medica. Third Edition. 1:468-469.
- Chopra RN, Nayar SL, Chopra IC. Glossary of Indian medicinal plants. Council of Scientific & Industrial Research. New Delhi; c1980, 104.
- Anonymous. The wealth of India. A Dictionary of Indian raw materials & industrial products. New Delhi: CSIR. 1952;3:D-E:127.

19. Pullaiah T. Encyclopaedia of world medicinal plants. New Delhi. 2006;2:843-844.
20. Hooker JD. The Flora of British India. Caprifoliaceae to Apocynaceae. Vol. 3: 358.
21. Kirtikar KR, Basu BD. Indian Medicinal plants. 2nd revised edition 2012;2:1415.
22. Afaq SH, Latif A, Rauf A. Ethnomedicobotany of western Uttar Pradesh. Aligarh: AMU Press, Publication Division. 2011, 134.
23. Aslam PM, Santosh J, Jyotiram S, Manojkumar P. Pharmacognostical, phytochemical and pharmacological of *Echinops echinatus* Roxb: A comprehensive review. [Internet]. Available from: <http://www.wjpsonline.org/>.
24. Abdul Hakim HM. Bustān al-Mufradat Jadīd. Idāra Kitāb-us-Shifa. New Delhi; c2015, 103.
25. Marg KKS. The useful plants of India. CSIR, New Delhi, 189.
26. Khare CP. Indian Medicinal Plants (An illustrated dictionary). Springer; c2007, 230.
27. Caius JF. The Medicinal and poisonous plants of India. Scientific Publishers.
28. Jayakumar GP, Ajithabai MD, Sreedevi S, Vishwanathan PK, Remeshkumar B. Ethnobotanical survey of the plants used in the treatment of diabetes. Indian Journal of Traditional Knowledge. 2010;9(1):100-104.
29. Vardhana R. Floristic plants of the world (Vol. 1-3). New Delhi: Sarup; c2006.
30. Chand DK. Guldasta Shahi (Risala Quwwat-i-Bāh). Maktaba Daniyal, Lahore, YNM p-10.
31. Rastogi RP, Mehrotra BN. Compendium of Indian Medicinal Plants. CDRI, Lucknow & NISCIR, New Delhi; 1990-1994;5:321.
32. Folk Medicine at the H.E.J. Research Institute of Chemistry. International Centre for Chemical and Biological Sciences.
33. Patel AJ. Isolation and characterization of lupeol from *Echinops echinatus* Roxb. Root. Eur J Pharm Med Res. 2016;3:385-387.
34. Singh B, Gambhir SS, Pandey VB, Joshi VK. Anti-inflammatory activity of *Echinops echinatus*. J Ethnopharmacol. 1989;25:189-199.
35. Ram SN, Roy R, Singh B, Singh RP, Pandey VB. An acylflavone glucoside of *Echinops echinatus* flowers. Planta Med. 1995;62:187.
36. Singh S, Upadhyay RK, Pandey MB, Singh JP, Pandey VB. Flavonoids from *Echinops echinatus*. J Asian Nat Prod Res. 2006;8:197-200.
37. Chaudhuri PK. 7-hydroxyechinozolinone, a new alkaloid from the flowers of *Echinops echinatus*. J Nat Prod. 1992;55:249-250. DOI: 10.1021/np50080a019.
38. Sing B, Ram SN, Pandey VB, Joshi VK, Gambhir SS. Studies on anti-inflammatory activity of taraxasterol acetate from *Echinops echinatus* in rats and mice. Phytotherapy Research. 1991;5(3):103-106.
39. Patel AJ, Patel NM, Patel AA, Patel J, Patel S. Comparative analgesic activity of root and aerial part methanolic extracts of *Echinops echinatus* Roxb. Int J Pharm Innov. 2011;1:23-29.
40. Alam MK, Ahmed S, Anjum S, Akram M, Shah SM, Wariss HM, et al. Evaluation of antipyretic activity of some medicinal plants from Cholistan desert Pakistan. Pak J Pharm Sci. 2016;29:529-533.
41. Gupta R, Vairale MG, Chaudhari PR, Wate SR. Ethno medicinal uses of some plants used by Gond tribe of Bhandara district, Maharashtra in the treatment of diarrhoea and dysentery. Indian J Tradit Knowl. 2009(7):7.
42. Eram S, Ahmad M, Arshad S. Experimental evaluation of *Echinops echinatus* as an effective hepatoprotective. Sci Res Essays. 2013;8:1919-1923. DOI: 10.5897/SRE2012.0766.
43. Wang M, Sun J, Jiang Z, Xie W, Zhang X. Hepatoprotective effect of kaempferol against alcoholic liver injury in mice. Am J Chin Med. 2015;43(2):1-14. DOI: 10.1142/S0192415X15500160.
44. Zhang H, Tan X, Yang D, Lu J, Liu B, Baiyun, et al. Dietary luteolin attenuates chronic liver injury induced by mercuric chloride via the Nrf2/NF-κB/P53 signaling pathway in rats. Oncotarget. 2017;8:40982. DOI: 10.18632/oncotarget.17334.
45. Fatima S, Afroz S, Qureshi AS. Anti-diabetic activity of hydroalcoholic root extract of *Echinops echinatus* and its beneficial effects on nephropathy in experimental rats. Indian J Res Pharm Biotechnol. 2017;5:19-27.
46. Sarvaiya DD, Sheth NR, Dudhrejia AV. Antidiabetic and antioxidant activity of roots of *Echinops echinatus* Roxb. Pharmacologyonline. 2017;2:10-39.
47. Patel AJ, Patel NM, Patel AA, Patel J, Patel S. Comparative diuretic Activity of Root and Aerial Part Methanolic Extracts of *Echinops echinatus* Roxb. Der Pharmacia Lettre. 2011;3(5):168-72.
48. Padashetty SA, Mishra SH. Effect of terpenoidal fraction of *Echinops echinatus* roots on reproductive parameters of male rats. J Nat Med. 2007;61:452-457. DOI: 10.1007/s11418-007-0173-4.
49. Chaturvedi M, Mali PC, Dixit VP. Antifertility effects of the roots of *Echinops echinatus* (Roxb.) in male rats. J Phytol Res. 1995;8:115-118.
50. Chaturvedi M, Mali PC, Dixit VP. Fertility regulation in male rats with the help of *Echinops echinatus* root extract. J Phytol Res. 1995;8(2):115-118.
51. Agrawal M, Nahata A, Dixit VK. Protective effects of *Echinops echinatus* on testosterone-induced prostatic hyperplasia in rats. Eur J Integr Med. 2012;4:177-185. DOI: 10.1016/j.eujim.2012.01.004.
52. Nahata A, Dixit VK. Evaluation of 5α-reductase inhibitory activity of certain herbs useful as antiandrogens. Andrologia. 2014;46:592-601. DOI: 10.1111/and.12115.
53. Singh UP, Pandey VB, Singh KNR, Singh DN. Antifungal activity of some new flavones and flavone glycosides of *Echinops echinatus*, Canadian Journal of Botany. 1988;66(9):1901-1903.