A review on Khubbāzī (*Malva sylvestris* L.): Phytochemical, pharmacological properties and therapeutic applications

ABSTRACT

Traditional system of medicine, especially Unani, highly value *Khubbāzī* (*Malva sylvestris* L.) for its therapeutic properties. Its leaves, seeds and flowers are utilized medicinally as *Barg-i-Khubbāzī*, *Tukhm-i-Khubbāzī* and *Gul-i-Khubbāzī* since time immemorial. It is used in Unani Medicine for various activities like concoctive, diuretic, anti-inflammatory, hepatoprotective, hence used to treat several ailments related to respiratory, skin and digestive systems such as cough, cold, coryza, sore throat, chronic bronchitis, intestinal ulcer and urinary issues like strangury, irritation in micturition etc. Pharmacological studies on various parts of the plant have been reported such as hepatoprotective, antioxidant, anti-inflammatory etc. which are supported by the bioactive compounds, alkaloid, glycosides, flavone etc. present in the plant. Scientific studies validated several actions documented in Unani literature, but further researches needed to explore the hidden properties of the plant. This review focuses on the plant's traditional uses, pharmacological properties.

Keywords: *Khubbāzī, Malva sylvestris, Mufattiḥ-i-Sudad-i-Jigar, Common mallow, Unani Medicine*

1. INTRODUCTION

The World Health Organization (WHO) reported that 65–80% of individuals in underdeveloped nations rely on traditional herbal therapy for their medical needs because they cannot afford modern medicine or because they live in poverty [1]. A number of traditional medicinal systems is practiced in different parts of the world including the Unani, Siddha, and Ayurvedic medicine systems in Indian subcontinent; traditional Chinese medicine in China, and Iranian Medicine in Persia. Medicinal plants are known to play an important role in the prevention of diseases and ailments. A large number of herbal drugs which bear certain pharmacological actions are still in use. In Unani Medicine several species such as *Khatmī* [2], *Khubbāzī* (*Malva sylvestris*), *Gu̱rhal* (*Hibiscus rosa-chinensis*), *Kanghī Būtī* (*Abutilon indicum*) [3] are used in medicine, some for culinary purpose and few others are grown as ornamental plant. The drug *Khubbāzī* (*Malva sylvestris* Linn.) is an herbaceous biennial-perennial plant belong to *Malvaceae* family, commonly known as common mallow. Its leaves, seeds and flowers are utilized medicinally as *Barg-i-Khubbāzī*, *Tukhm-i-Khubbāzī* and *Gul-i-Khubbāzī* since time immemorial. When chewed, they become mucilaginous. The flavour and odour of the drug are husk-like. The weight of 100 seeds is 0.1665 g on average.

It is native to North Africa, Europe, and Southwest Asia [3,4,5,6]. The drug *Khubbāzī* has been used in the Unani System of Medicine (USM) for thousands of years. It was described by Dioscorides (1st BC) in his treatise "*De Materia Medica*" and was used as medicine by both Greeks and Romans due to its mucilaginous and cooling properties [7]. The plant typically thrives in damp places, such include meadows, riverbanks, marshes, and ditches [8]. In rural areas, *M. sylvestris* has historically been used to treat a wide range of infections and illnesses, including as eczema, burns, tonsillitis, bronchitis, colds, coughs, and wound healing from cuts. Fluid extracts from the flowers and leaves of *M. sylvestris* are a useful treatment for diarrhoea, cystitis, and inflammatory illnesses of the mucous membranes [1]. The mucilage and flavonoids in the leaves and flowers are responsible for its therapeutic properties [9]. Young flowers, fruits, leaves, and shoots are eaten in salads; leaves and shoots are eaten cooked or in soups [10].Numerous studies' findings have demonstrated that Malva extract contains a variety of substances with anti-inflammatory and antioxidant qualities, such as phenolic derivatives, flavonoids, terpenoids, catalase enzymes, sulphite oxidase, fatty acids, and certain strolls (particularly essential fatty acids like omega-3 and omega-6), beta carotene, and vitamins C and E [11,12,13,14,41]. Numerous studies have demonstrated that this plant's various chemical composition may reduce the harmful effect of

carbon tetrachloride on Liver. It is also reported for kidney protective, antioxidant, wound-healing, antibacterial, anti-nociceptive, and anticancer qualities etc.[10]. The plant's historical significance, combined with its medicinal attributes, underscores its importance in traditional medicinal practices.

2. MATERIAL AND METHODS

All materials available on printed, electronic and online were used to prepare this review. For its description, identification, temperament, pharmacological investigations, actions, therapeutic uses etc. both modern and Unani books were consulted and published articles and research papers were searched from PubMed, Google scholar, Science direct, Scopus etc. The detail about the substance was searched by names *Khubbāzī*, Common mallow, *Malva sylvestris* Linn. 26 Unani and other books, 15 research papers and 02 websites up to 2022 were consulted for this review. Appropriate Unani terminologies were adapted from the Standard Unani Medical Terminology published by Central Council for Research in Unani System of Medicine in collaboration with the World Health Organization (WHO) and WHO international standard terminologies on Unani medicine.

3.DISTRIBUTION

M. sylvestris is distributed in the West temperate Himalayas from the Punjab to Kumaon, Kashmir (at altitudes of 2000-8000 ft.), Bombay, Mysore, Madras and in parts of the Deccan peninsula. It also appears as a weed in cultivation in Siberia, Caucasus, Europe, and North Africa [4,15,16,17].

4. BOTANICAL DESCRIPTIONS

Malva sylvestris is an erect glabrous herb. Leaves orbicular lobed, petioles as long as or longer than the leaves. Flowers dark purple or violet and measure about 2.5 cm wide (Fig.1). Flowering in cold season, fruits aggravated with 8-10 individual carpels. The carpels easily separated into discrete units, although they are all wrapped in a single sheath. Each carpel (fruit) has a single seed lodged in it. Individual seeds are very small, semi-lunar or reniform to spherical in shape (Fig.1), olive-brown to chocolate brown in colour, and 1.0-1.75 mm in diameter [4].

5. SCIENTIFIC CLASSIFICATION [15]

Phylum	:	Tracheophyta
Class	:	Magnoliopsida dicotyledons
Order	:	Malvales
Family	:	Malvaceae
Genus	:	Malva
Species	:	*Malva sylvestris*

6. *MUTARĀDIFĀT* (VERNACULAR NAMES)

Afghani	:	Gulikhadmī [18]
Arabic	:	Khubāzī [3,4,16,19] Bazrul Khubbāzī [20]
Bengali	:	Khubāsi [4]
Bombay	:	Khubāsi [18]
English	:	Common mallow [4,16,18,21] High mallow, Blue-Mallow [18,21] Marsh Mallow, Cheese cake, Leaves of bread, Dock [18]
Greek	:	Afīyurasfiyaghan [22]
Hindi	:	Kunzī, Vilāyatī Kangal [4,18], Chagīz [3,6,22]
Kannada	:	Saunabindigegida [4]
Persian	:	Nān-i-Kalāgh [3,4,6,18,22] Khubāzī, Khatmī Kochak [4,18,22] Tukhm-i-Khubāzī [20] Qūla, Panīrak, Khūbar[6]
Sanskrit	:	Suvarchalā [21]
Tamil	:	Tarikalamala [19]
Urdu	:	Khubbāzī [4,18]

7. DESCRIPTION OF *KHUBBĀZĪ* PLANT IN UNANI MEDICINE

According to Ibn Sina, *Khubbāzī* is a species of *Malūkhiya* which is also known as *Malūkia*. Mainly two species are used namely *Malūkhiya Bustānī* (*Malva sylvestris*) and *Malūkhiya Barrī* (*Malva rotundifolia*). Another species is also mentioned as *Malūkhiya Shajarī* which is actually *Khatmī* (*Althea officinalis*) [3,6].

The leaves of *Khubbāzī* are round and slightly rough and definitely rough on the back side and similar to *Khatmī* leaves but smaller in size. As long as its ingredients are fresh, a little mucilage comes out of them. After drying, there is no mucilage left. The test is dull of all ingredients, and its trees grow in moist soils during the *Kharīf season*. In some countries, it grows in early spring, it is also sown and self-generating. *Khubbāzī* lasts till spring and *Rabīʿ* until the hot summer season. There is also a type of *Khubbāzī* (*Malva rotundifolia*) that has small and tender leaves, small flowers, this type is produced in spring and lasts until summer. Its stem does not grow very high, but sometimes it is a little higher than the ground and lies on the ground. The petals of the flower are arranged in such a way that the shape of a gramophone tube is seen, some flowers are large and small [3,6].

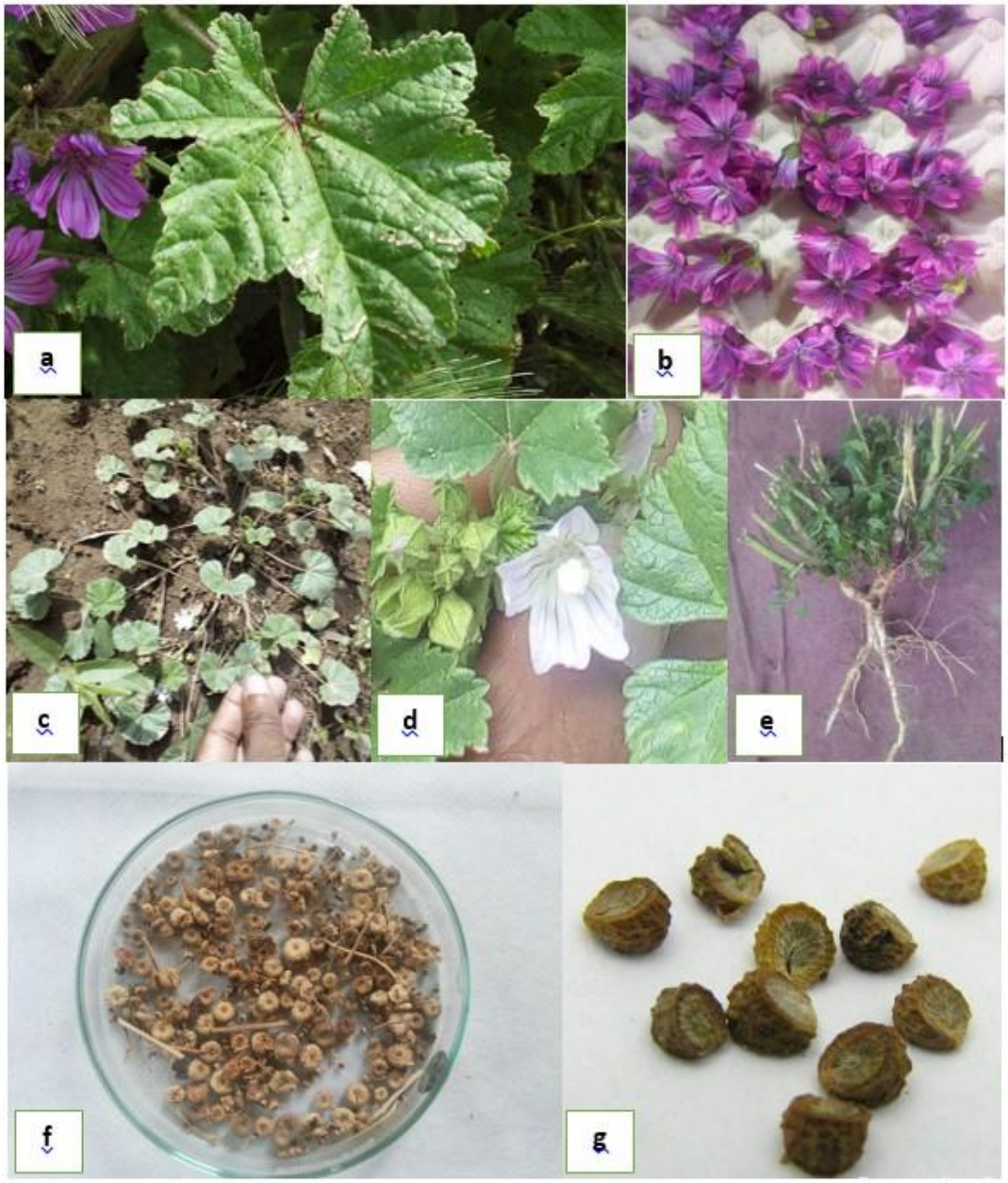

Fig. Showing *Malva sylvestris* plant ***a.***, flowers ***b.***, *Malva rotundifolia* plant ***c.***, flower ***d.***; Malva sylvestris root ***e.***, fruits ***f.***, and seeds ***g.***

7.1 *Ajzā' Musta'mala* (Parts used):Fruits, seeds, leaves carpels and flowers or whole plant are used medicinally [4,16,19,23].

7.2 *Mizāj* (Temperament):

- The temperament is *BāridRatab* (cold and moist) in 1st degree [3,4,6,23] according to Dā'ūd Antākī it is *Bārid* in 2nd degree and *Ratab* in third degree [23].
- Some said it *Bārid* and *Ratab* in 2ñd degree [3,6]

7.3 *Nafa'Khāṣ* (main action):*Mufattiḥ-i-Sudad-i-Jigar* (deobstruent of liver), and *Muḥallil-i-Waram* and mainly used for the treatment of *Zaḥīr* (dysentery), *Su'āl* (cough) [20,23].

7.4 *Af'āl* (action):The plant has *Mugharrī* (glutening drug)*, Mulaṭṭif* (attenuant), *Muzliq* (lubricant)*, Munḍij* (concoctive)*, Rādi'* (repellent)*, Mudirr-i-bawl* (diuretic), *Mulayyin* (laxative), *Muwallid-i-Laban* (galactagogue), *Muḥallil-i-Awarām* (anti-inflammatory), *Muqawwī-i-Am'ā'* (intestinal tonic), *Munaffith-i-Balgham* (expectorant), properties [3,4,6,17,20,24,25].

***7.5 Iste'mālāt*(uses):**The parts of the plant is used to treat various ailments such as *Nazla* (catarrh)*, Zukām* (coryza), *Su'āl-i-Hār,* (acute cough), *Su'āl Yābis,* (dry cough), *Saḥaj-i-Am'ā'* (intestinal abrasion), *Buḥḥa al-Ṣawt* (hoarseness of voice), *Qurūḥ-i-Mi'da* (gastric ulcer), *Qurūḥ-i-Am'ā'* (intestinal ulcer), *Ṣudā'* (headache), *Zaḥīr* (dysentery), *Waja' al-Kabid* (hepatalgia), *Sudad al-Jigar* (obstructions of liver) [3,4,6,17,20,24,25].

7.6 *Tarkīb-i-Iste'māl* (method of administration) in various diseases:

7.6.1 *Amrāḍ-i-Dahn* (diseases of mouth cavity):

- Chewing its leaves is beneficial in mouth ulcer [3,6].

7.6.2 *Su'āl* (cough):

- A decoction of its flowers or seeds prepared with honey is taken to cure cough [3,6].
- Decoction prepared with the branches of *Khubbāzī* sweetened by sugar is taken to cure cough [3,6].

7.6.3 *Diq al-Nafas* (breathlessness):

- Taking a decoction prepared with honey or sugar is useful to cure shortness of breath and chest stiffness [3,6].

7.6.4 *Amrāḍ-i-Ṭiḥāl* (splenic diseases):

- It is useful for pain and swelling of the spleen [3,6].

7.6.5 *Amrāḍ-i-Mi'wī* (intestinal disease):

Decoction prepared with the branches of *Khubbāzī* sweetened by sugar is taken to cure dysentery and ulceration of intestine[3,6].

7.6.6 *Amrāḍ-i-Nizām-i-Bawl* (diseases of urinary system):

- Ibn Sina says that, "eating *Gul-i-Khubbāzī* (flowers) with olive oil and application of *Ḍimād* (poultice) is useful kidney and bladder injuries" [3,6].
- Decoction prepared with the branches of *Khubbāzī* sweetened by sugar is taken to cure ulceration of bladder and inflammation of urinary tract [3,6].

7.6.7 *Amrāḍ-i-Jild* (skin disease):

- If the leaves of *Khubbāzī* are boiled in water and tied or applied on boils, the contents are released by bursting [3,6,22].
- Decoction prepared with the branches of *Khubbāzī* sweetened by sugar is taken to cure dry itching [3,6].

7.6.8 *Amrāḍ-i-Raḥim* (disease of uterus):

- Taking a sitz bath with the decoction of its ingredients is useful to cure inflammation of the uterus [3,6,22].

7.6.9 Animal poisoning:

- It is also used as an antidote for animal poisons [3].
- Its fresh leaves are ground and mixed with fresh cow's butter and applied to the body, to prevent from any harmful effect of insect bite [3,6].

7.7 *Miqdār-i-Khūrāk* (dose):The therapeutic dose of Khubbāzī is mentioned as 5-7 g. [4,17,25,26] Juice of *Khubbāzī* is used in a quantity of 175 ml. [6] Seeds are mentioned to take in the quantity of 9-17.5 g [3,6] or 9-12 g[20]. The dose of leaves is mentioned as 9 g and decoction 175 ml [3].

7.8 *Maḍarrat* (adverse effect):Excessive use can produceharmful effect such as *Du'f-i-Mi'da* (weakness of stomach) [3,6,20]. It may also harm for cold and moist temperament peoples [3,6].

7.9 *Musliḥ*(corrective):Fruit juice [4,6,20]*Zīra Siyāh* (*Carum carvi* L.) [3], and sour agents are used as correctives in case of hot temperament; and *Jawārish Falāfilī*, *Jawārish Kamūnī* are the correctives for cold temperament. In some places sugar and *Dārchīnī* (*Cinnamomum zeylanicum*) are also mentioned as corrective of *Khubbāzī* [6].

7.10 *Badal* (substitute):*Gul-i-Khatmī, or Tukhm-i-Khatmī* (*Althea officinalis*) can be used as substitute [3,20].

7.11 *Murakkabāt* (compound formulations)

Table 1. Compound formulations having *Malva sylvestris* one of the ingredients, with their dose, method of administration, action and uses

Name of compound formulations	Dose and administration	Action and uses
Ḍimād-i-Waram-i-Kulya Qawī	Local application	Anti-inflammatory, helps in nephritis [27]
Sharbat-i-Aijāz	25 ml with ‘Arq Gāozabān orally	Muqawwi Sadr, helps in dry cough and tuberculosis [28,29].
Sharbat-i-Nazla	20 ml twice a day orally	Anti-catarrh, helps in catarrh, coryza and cough [30].
La‘ūq-i-Sapistān	10-20 g orally	Expectorant, broncho-relaxant, helps in coryza, catarrh and chronic cough [4].
Dayaqūza	7 g with water orally	Its use dry cough and catarrh [29].

8. *KĪMIYĀWI AJZĀ’* (CHEMICAL CONSTITUENTS) PRESENT IN *KHUBBĀZĪ* PLANT

Phytochemical studies on mallow have revealed that its various parts contain flavonoids, glycosides, mucilage, tannins, terpenoids, oleic and lauric acids, β-sitosterol, stigmasterol isolated lipid fraction of seeds, phenol derivatives, polysaccharides, mucilage, coumarins, vitamins C and E, beta-carotene, fatty acids and various sterols, particularly essential fatty acids such as omega-3 and omega-6, chemical elements, enzymes such as sulphite oxidase and catalase, and amino acids. Flowers contain malvin (an anthocyanin), malvidin di-glucoside, carotene and ascorbic acid [4,21,31].

9. SCIENTIFIC STUDIES

9.1 Antioxidant activity: DellaGreca et al. (2009) showed the antioxidant activity of *Malva sylvestris* aqueous extract by its ability to scavenge the 2,2'-diphenyl-1-picrylhydrazyl (DPPH) and superoxide anion radicals and stimulate the formation of a phosphor-molybdenum complex. They found that the extract had high antioxidant activity and isolated eleven components that were responsible for it [32].

9.2 Anti-inflammatory activity: Several research groups have investigated *Malva sylvestris* anti-inflammatory properties. Sleiman and Daher (2009), stated that using rats as a model, they investigated the role of an aqueous extract of *M. sylvestris* aerial portion on lipemia, glycemia, inflammation, and stomach ulcer. In acute and chronic inflammatory models caused by carrageenan and formalin, doses of 50, 100, 250, and 500 mg/kg b.w were used. In both models, considerable anti-inflammatory efficacy was demonstrated at the majority of doses employed, with an optimum inhibition at 100 mg/kg b.w (60% inhibition) [33]. Martins *et al*. also stated that the anti-inflammatory effects of *M. sylvestris* alcoholic extracts were assessed by assessing the pro-inflammatory mediators PGE2 and PGD2 in phorbol 12-myristate 13-acetate-differentiated U937 cells activated with deferoxamine. They hypothesized that *M. sylvestris* anti-inflammatory actions were connected to regulation of these mediators [34].

9.3 Anticancer activity: Cancer is a broad term that refers to a wide range of diseases that can affect any part of the body. Cancer is the top cause of mortality worldwide, according to the WHO. According to reports, *M. sylvestris* has anticancer properties using an MTT test. Daniela *et al*. (2007) exhibited cytotoxic effect of *M. sylvestris* leaves extract on murine and human cancer cell lines. The biological assay revealed that *M. sylvestris* extracts greatly inhibit cancer cell line growth [35].

9.4 Wound healing activity: Pirbalouti *et al*. (2009) investigated the wound healing properties of a diethyl ether extract of M. sylvestris flowers in Wistar rats. Examined the efficiency of diethyl ether extracts of *Arnebia euchroma* roots and *Malva sylvestris* flowers at 200 mg/kg/day dose. Animals treated with extracts had significantly reduced wound areas (P <

0.05) compared to other groups. The extract-treated with goat lipid including *Arnebia euchroma* and *Malva sylvestris* revealed more well-organized bands of collagen, more fibroblasts, and less inflammatory cells. As a result, we determined that ointments containing *Arnebia euchroma* and *Malva sylvestris* showed a high potential for accelerating burn wound healing in rats [36]. Afshar *et al*. also investigated the efficacy of Malva sylvestris aqueous extract on cutaneous wound healing in BALB/c mice. The numbers of inflammatory cells in the silver sulfadiazine and *M. sylvestris* treated groups were significantly lower than the control group, whereas keratinization at the wound edges was significantly higher in both groups than the control group. The Malva-treated mice had improved healing characteristics, less fibrosis and scar formation, and fewer hair follicles were destroyed in this group. *Malva sylvestris* and silver sulfadiazine-treated groups had considerably less inflammatory cells than the control group [37].

9.5 Hepatoprotective activity:*Malva sylvestris* has been found to protect mice's livers against paracetamol-induced hepatotoxicity. Hussain *et al*. (2014) evaluated the hepatoprotective properties of *M. sylvestris* against paracetamol-induced hepatotoxicity in mice. The study's findings strongly show that *M. sylvestris* extract has strong hepatoprotective properties against paracetamol-induced liver injury. The extract of *M. sylvestris* dramatically lowered serum levels of these elevated liver enzyme markers in a dose-dependent manner, and histological analysis of liver tissues revealed hepatoprotective actions of *M. sylvestris* in restoring normal liver function [38].

9.6 Antinociceptive activity: Esteves *et al*. (2009) examined the antinociceptive efficacy of *M. sylvestris* aqueous extract in mice using traditional pain models. It demonstrated considerable antinociceptive efficacy in the writhing test (76.4% inhibition) and reduced both the neurogenic (61.8%) and inflammatory (46.6%) phases of the formalin model. Their findings imply that *M. sylvestris* contains intriguing compounds that act as antinociceptives [39].

9.7 Antimicrobial activity: Cheng and Wang (2006) evaluated the antimicrobial activity of anthocyanin derived from *M. sylvestris*. The anthocyanin shown promising antibacterial efficacy against *Staphylococcus aureus*, but not against *Aspergillus niger* or *E. coli*. Increasing the anthocyanin content of *M. sylvestris* improved its bactericidal action against *S. aureus* in a solid-culture experiment [40]. Walter *et al*. also investigated *M. sylvestris* antibacterial activity against two Gram-negative (E. coli and P. aeruginosa) and one Gram-positive (S. aureus) microorganisms. Significant antibacterial activity was revealed by their findings [41].

10. CONCLUSION

This review highlighted the significance of *Malva sylvestris* as a medicinal plant. The findings indicate that a substantial amount of research has been conducted on the chemical components, pharmacological effects, and many aspects of the Malva plant. This is a beneficial and innovative plant with potent medicinal effects. Studies have shown that this chemical may have health benefits due to its antibacterial, hepatoprotective, anticancer, wound-healing, and antioxidant characteristics. The principal phytochemical components discovered in methanolic extracts, as well as the distinctive organic activities and pharmacological capabilities of *M. sylvestris*, were discussed in this paper. The roots, flowers, and leaves are all used for therapeutic purposes in Unani medicine since time immemorial. As a result, we can state that *M. sylvestris*, also known as *Khubbāzī*, is a lucky traditional medicinal herb that has the potential to substantially benefit humanity.

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