

Malva sylvestris L. application in dermatology

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Abstract

Malva sylvestris L., commonly known as Panirak in Iran, is a widely-used medicinal plant known for its efficacy in treating various skin conditions. Its flowers are particularly beneficial in healing cut wounds, eczema, infected dermal wounds, and skin inflammations. They exhibit strong antibacterial effects against several bacteria strains, including *Staphylococcus aureus*, *Streptococcus agalactiae*, and *Enterococcus faecalis*. Moreover, the plant extracts, especially the methanol extracts, possess significant cytotoxic activity against cancer cells, suggesting potential chemopreventive or chemotherapeutic properties. The leaves and flowers are also renowned for their soothing properties on sensitive skin areas. When used topically as a poultice, they aid in reducing swelling and eliminating toxins. Overall, *M. sylvestris* offers a versatile solution for various skin problems, such as wounds, eczema, and infections, due to its antibacterial, anti-inflammatory, and potential anticancer properties.

Keywords: Malva Sylvestris; Herbal drugs; Anti-bacterial; Anti-inflammatory; Eczema; Anti-oxidant

1. Introduction

Iran has a long and distinguished history in the traditional medicine. The heritage of this knowledge is rooted in the Babylonian-Assyrian civilization. Today, medicinal plants are used for remedy of various health problems in Iran. The mass of collected data and knowledge in Persian traditional medicine has been substantially documented and re-evaluate for the centuries [1]. Iranian scientists preserved a vast amount of Greco-Roman medicinal knowledge related to the uses of plants. Over time, they expanded and improved upon this knowledge through their own experiences and expertise. The scientific foundation of Persian Traditional Medicine is well-documented in various written works, such as the Canon of Medicine. This text was the main medical source in Europe until the 16th century [2]. Persian traditional medicine includes all the knowledge and practices that have been used in Iran since ancient times to diagnose, prevent and treat diseases. It is rooted in practical experiences and objective observations that have been passed down through generations [3]. According to the World Health Organization, 75% of people worldwide use herbs for their primary healthcare needs [4].

2. Traditional Medicine Use

There are 88 genera and more than 2300 species in the Malvaceae family, mostly found in tropical and temperate regions. These plants can be annual or perennial, and can be in the form of shrubs or small trees. *M. sylvestris* belongs to the Malva genus, which consist approximately 100 specie (Figure1) [5,6].

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Figure 1 *M.sylvestris* L. (a) Leafy flowered stems; (b) young leaves; (c) immature fruits [5]

Among the various species used in herbal medicine *M. sylvestris* stands out for its diverse usage, which has been documented since 3000 BC. Since the beginning of human history, it has been common to use plants to treat diseases. *M.sylvestris* (Malvaceae) has been utilized since 3000 BC due to its notable diverse uses. Archaeological research in the Syrian area has indicated the presence of *M.sylvestris* seeds in human fossils. Scientists believe that this plant has long been used both as an edible and for its possible healing properties. Different studies have indicated the universal importance of some of the medicinal applications of *M.sylvestris* in herbal medicine. This astonishing herb has antimicrobial, antioxidant, and anti-inflammatory effects and is considered one of the most therapeutic herb species historically used for topical curative purposes. In Iran, *M. Sylvestris* is recognized as an edible herb and has been consumed raw in various vegetable salads; however, it is most commonly used as a medicinal herb [7].

It is one of the medicinal herbs, also known as common mallow. *M. sylvestris* is native to Asia, Africa and Europe. One of the major areas which this plant grow is north east, south west and central of Iran. *M. sylvestris*, a plant that was once used as a softener by the ancient Greeks and Romans because of its emollient effect [8].

M.sylvestris has laxative, diuretic, spasmogenic and laxative properties. In addition, this medicinal plant has traditionally used to remedy different diseases such as coughs, tonsillitis, bronchitis, digestive problems, skin problems such as burns, eczema, and wounds [9].

3. Phyto-chemistry

Important compounds of *M.sylvestris* include polysaccharides, coumarins, flavonoids, malvin, malvidin 3-(6'-malonylglucoside)-5-glucoside, malon A, malvalin, scopoletin, polyphenols, niacin, folic acid, vitamin A, vitamin C, vitamin E and tannins(Figure 2) [10]. The pharmacological and biological activity can be attributed to the presence of anthocyanidins, naphthoquinones, flavonoids, or mucilaginous polysaccharides in high amounts in the plant. The main compounds of flavonoids are gosypetin 3-sulfate-8-O- β -D-glucoside, hypolatin 3'-sulfate, and three 8-hydroxyflavonoids recognized in *M.sylvestris* [11-12]. Research by Cutillo et al. (2006) confirmed the presence of various classes of terpenoids, including sesquiterpenes, diterpenes, and monoterpenes, in extracts of *M.sylvestris* [13].

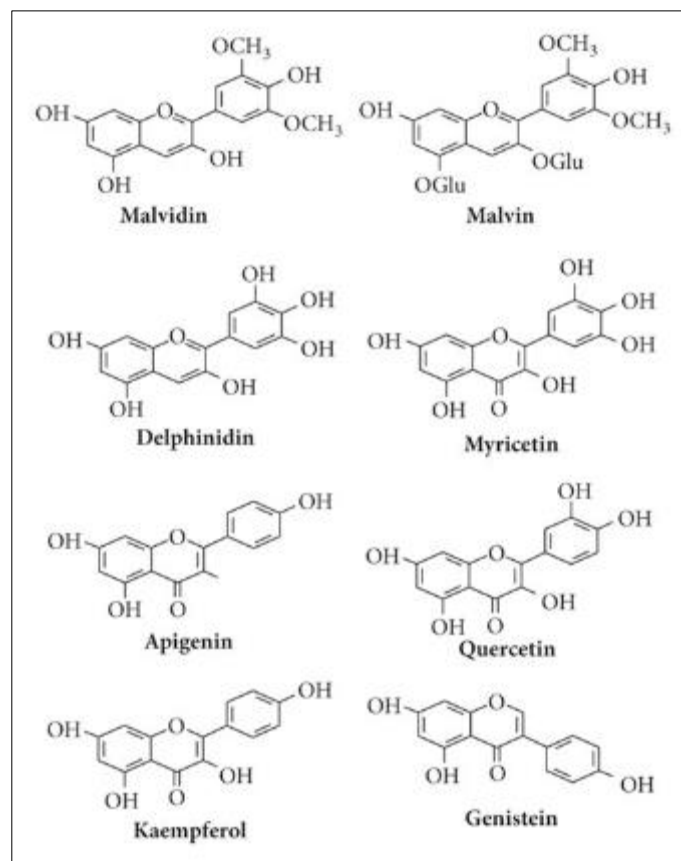


Figure 2 Flavonoids of *M.sylvestris*[14,15]

4. Anti-inflammatory activity

M.sylvestris can reduce skin redness and swelling with anti-inflammatory properties. The leaves of *M.sylvestris* have a topical anti-inflammatory effect, with malvidin 3-glucoside possibly contributing along with other ingredients. The global popularity of *M.sylvestris* has risen due to its anti-inflammatory compounds like malvidin 3-glucoside, scopoletin and quercetin. Martins et al. (2016) found that *M. sylvestris* reduces inflammation by affecting PGE₂ and PGD₂ mediators [14]. In a prior study Prudente AS et.al (2013) showed that the *M.sylvestris* hydroalcoholic extract has a potential effect for the cure of inflammatory skin diseases[14,15]. Baros et al. (2010) compared the antioxidants and free radical scavenging abilities of extracts from different parts of the malva plant, such as leaves, flowers, immature fruits and flowering stems. The study found that the leaves showed potent antioxidant properties including radical scavenging activity [16].

M.sylvestris is used to treat skin disorders and also exhibits antimicrobial and anti-inflammatory properties. Its biological activity may be attributed to antioxidants such as polyphenols, vitamin C, vitamin E, beta-carotene and other key phytochemicals. Della Greca et al (2009) identified 11 potent antioxidant substances in *M. sylvestris* extract. The antioxidant potential of *M. sylvestris* extract and its sub-fractions showed significant phenolic and flavonoid content. Further studies on the dichloromethane extract led to the isolation and identification of 10 phenolic compounds. The results suggest that phenolic compounds are likely to inhibit radical scavenging in plant extracts. Wild *M. sylvestris* leaves have higher antioxidants than cultivated species [17].

5. Analgesic activity

Massoud Sediqfar et al. (2020) investigated extracts from Malva and two other plants. Their findings indicated that the hydroalcoholic extract from the flowers of *M.sylvestris*, as well as the seeds of *C. carvi* and *M. sativa*, either alone or in combination demonstrate analgesic and anti-inflammatory effects. These properties suggest that these extracts could potentially be used as drugs for managing pain and inflammation, as they function by inhibiting prostaglandin synthesis and central inhibitory mechanisms [18]. A study on 72 male Wistar rats explored Malva parviflora's analgesic and anti-inflammatory effects. Results indicated that malva extract has a dose-dependent analgesic effect on acute and chronic

pain by inhibiting cyclooxygenase activity and prostaglandin secretion. It was also found to alleviate pain in the chronic phase due to its anti-inflammatory properties [19].

6. Wound Healing Activity

In a study conducted by Pirobluti A.G. et al. (2010), diabetic wounds in rats treated with *M. sylvestris* extract showed more organized collagen fibers, increased fibroblasts, and reduced inflammatory cells on days 9 and 18. Histological analysis on day 9 revealed enhanced tissue regeneration, while on day 18, the extract significantly decreased the wound size. The results indicate that *M. sylvestris* extract promotes faster wound closure and healing compared to the control group. Researchers identified anti-inflammatory and wound healing effects in rats, demonstrating the extract's effectiveness in promoting wound contraction and speeding up the healing process [20]. An investigation involving 27 mice studied the effects of 1% *M. sylvestris* extract, silver sulfadiazine cream, and cold cream. The progress of the wound was assessed on the 4th, 7th, and 10th days. Results showed that the *M. sylvestris* extract decreased inflammation and enhanced wound healing by the fourth and seventh day. Carbohydrates, the main soothing compound, are abundant in lime as well as in the carbohydrates present in Mallow leaves and flowers. The presence of flavonoids and anthocyanidins in mallow leaves may also contribute to their anti-inflammatory, antioxidant, and skin regeneration properties [21].

Nasiri et al. (2015) compared 5%, and 10% cream containing *M. sylvestris* with 1% silver sulfadiazine in a second-degree burn injury in an animal model. The studied groups included: base cream, normal saline, SSD, 5% MS, and 10% MS Wound area, macroscopic evaluation and inflammation during daily dressing were performed for 35 days. The results of the research showed no significant difference between the groups on the 1st and 3rd days after the injury, but a significant difference observed on the seventh day. By the 20th day, the wound healing rate in the 5% and 10% *m. sylvestris* group was approximately 90% compared to 63.9% in the SSD cream group. This suggest that *M. sylvestris* cream improved histological changes in the healing process more effectively than SSD cream, making it a potential topical treatment for skin burn wounds [22]. Jahandideh et al. (2019) examined the effects of a topical ointment containing 5% *M. sylvestris* plant extract and 1% sodium phenytoin on wounds during the stages of inflammation, proliferation and regeneration. The study showed that the ointment accelerates the activity of inflammatory cells, which are crucial in the wound healing process [23].

7. Eczema/ Atopic Dermatitis

Atopic dermatitis (AD) is the most common chronic inflammatory pruritic dermatological disease [24]. Approximately 80% of cases of atopic dermatitis first appear in infancy, and can develop de novo during adulthood. The prevalence of atopic dermatitis in children ranges from 2.7% to 20.1% across countries, while in adults it varies from 2.1% to 4.9% [24].

Table 1 Biological Activity of *M. sylvestris*

Biological Activity	Extract	Mechanism of Action	References
Antioxidant	<i>M. sylvestris</i> aqueous extract	-Significant amounts of total phenolic content and total flavonoid content, which have promising antioxidant potential.	(5)
Anti-inflammatory	Flower Hydroalcoholic extract, Leave and whole plant	-Modulates the inflammatory response	(17)
Wound Healing	<i>M. sylvestris</i> aqueous extract	-Enhances neovascularization & collagen deposition & Collagen fibers more organized	(21)
Eczema /Atopic Dermatitis	<i>M. sylvestris</i> extract	-Malvidin 3-glucoside ingredient sounds to be involved in this effect	(25)
Skin Anti-aging	<i>M. sylvestris</i> seed extract	-Increase well organized bands of collagen & more fibroblasts & The rise in antioxidant gene	(27)
Antimicrobial	Methanolic <i>M. sylvestris</i> seed extract	-High bactericidal activity	(28)

Barik Bin et al. (2010) investigated the efficacy and side effects of *M. sylvestris* in treating hand eczema. They found that it appears to be an effective therapeutic option for hand eczema and can serve as a safe alternative to corticosteroids and antihistamines [25]. Furthermore, Meysami M. et al (2021) showed that the topical application of *M. sylvestris* extract cream was effective in 51 children with AD over a 4-week period, resulting in a reduction of AD symptoms in children [26]. Table 1 summarizes dermatological activity of *M. sylvestris*.

8. Conclusion

The review highlights the therapeutic significance of *Malva sylvestris* (khubazi), showcasing extensive research conducted on its chemical components and pharmacological effects. *M. sylvestris* offers a versatile solution for a variety of skin problems including wounds, eczema, atopic dermatitis, skin whitening, anti-aging, and infections, thanks to its antibacterial, and anti-inflammatory properties.

Compliance with ethical standards

Disclosure of conflict of interest

The author has no conflicting financial interests or personal relationships that may have influenced the work disclosed in this study.

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Authors short biography



Dr. Farshad Akbarnejad received his DVM from Shahid Chamran University in Ahvaz. He is currently the head of the scientific and educational department at Dr. Akhavi Lab Co. in Iran. He has over 30 publications and has authored 10 books. Dr. Akbarnejad has presented speeches at numerous congresses and serves as an editor for several scientific journals. With over 17 years of experiences, his professional focus is on medicinal plants and cosmetic formulations.