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MINI-REVIEW article

Cirsium vulgare (Savi) Ten. (Spear Thistle): Plant characteristics, phytochemistry, and pharmacological properties

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Abstract: Since prehistoric times, man and his quest for drugs in the natural world have been linked. All societies have used plants for medicinal purposes. Plants are used as medicines, cosmetics, pharmaceuticals, and food supplements - *Cirsium vulgare* (Savi) Ten. (Bull thistle or spear thistle) is a traditionally significant plant used to treat various diseases. In addition to medicinal qualities, *Cirsium vulgare* can be utilized as survival food if necessary. It possesses several medicinal properties, including antibacterial, anticancer, antioxidant, anti-fungal, anti-inflammatory, anti-hemorrhoidal, and hepatoprotective effects. It is abundant with phytochemicals such as phenolic acids, flavonoids, terpenoids, esters, tannins, glycosides, and apigenin. The current article aims to emphasize the taxonomy, morphology, phytoconstituents, geographic distribution, and pharmacological effects of *Cirsium vulgare* that have been previously documented.

Introduction

Mother Nature has provided us with a huge variety of flora. From the beginning of human civilization, plants have been used for medicinal purposes [1]. Extracts from different plant parts possess medicinal properties and are used as an additive in various pharmaceutical formulations [2]. Medicinal plants have historically been the main source of healthcare for people in underdeveloped nations [1]. It is thought that the plant exerts these medicinal activities due to the presence of a lot of secondary metabolites. Many modern pharmaceutical medications are still made from plant compounds or were first identified through research on medicinal plants.

Cirsium vulgare (*C. vulgare*) is one of the traditionally important plants used to cure a variety of illnesses, belonging to the family of Asteraceae. There are 350 species of plants in the genus Cirsium of the family Asteraceae around the world. The objective of the present study is to do a rigorous review of the studies related to *C. vulgare* to identify the revealed phytoconstituents and studied pharmacological properties of this plant to rationalize the traditional uses of this medicinal plant, to comment on any future applications, as well as to enable thorough investigation in the future.

The taxonomy of *Cirsium vulgare* is kingdom: Plantae, order: Asterales, family: Asteraceae, genus: Cirsium, species: *C. vulgare*, botanical name: *Cirsium vulgare* (Savi) Ten, synonyms: *Carduus lanceolatus* L., *Carduus vulgaris* Savi. common names of *Cirsium vulgare*: bull thistle, spear thistle, scotch thistle, common thistle, bank thistle, boar thistle, button thistle, bur thistle.

Geographical distribution: *C. vulgare* is native to Europe, western Asia, northern Africa, Pakistan, and China (**Figure 1**). Habitats include abandoned fields, areas along roadsides and railroads, and miscellaneous waste areas. The plant is typically found in arid and semi-arid regions, as well as nitrogenous [3].
Morphology: C. vulgare is a spiny herbaceous biennial flowering plant with a deep tap root (**Figure 2**), which grows to a height of about 1.5 meters [4]. It has spiny wings on its stem. The dark green leaves have white, woolly undersides and stiff hairs above. The lobes of the leaves form a flat rosette. Flower colors are pink to mauve. The fruit is a one-seeded tufted achene with silky hairs.

Traditional uses: C. vulgare L. is traditionally used as a diuretic, liver tonic, and anti-inflammatory agent. It is also used to treat joint pain, skin conditions, and hemorrhoids [3-5].

Literature search: To find articles about *C. vulgare* that have been published up to this point, searches were conducted. Google Scholar, PubMed, Wiley online library, Web of Science, Springer, Elsevier, and different Journals online were searched numerous times using relevant keywords *(Cirsium Vulgare,* Phytoconstituent, antioxidant, anticancer, anti-inflammatory, uses).

Phytoconstituents: According to studies that have been conducted up to the present, the *C. vulgare* plant is abundant in different phytochemicals [7-10]. The phytoconstituents of this plant are mentioned in the following: *Phenolic acids:* In certain investigations, phenolic acids were the most common. *Flavonoids:* The most common compounds were studied in some research. *Terpenoids:* Terpenoids were the most prevalent in some studies. Among them, lup-20(29)-en-3-yl-acetate and lupeol were the most abundant terpenoids. *Apigenin:* Several apigenin compounds have been identified. Among them, a rarely occurring compound apigenin 7-*O*-β-(6″-butyl)-glucuronide four has been found. *Other phytocompounds:* Esters, hydrocarbons, aglycones, glycosides, luteolin, tannins, kaemferol, and quercetin.

Pharmacological properties: The *C. vulgare* plant has exhibited various pharmacological effects (**Figure 2**). These are: *Anticancer properties:* Extracts have demonstrated the ability to stop the growth and migration of cancer cells, such as prostate cancer lines and HT-29 [11]. *Antibacterial activity:* The activity against *Staphylococcus aureus, Staphylococcus epidermidisa, Pseudomonas aeruginosa, Proteus vulgaris, and Candida albicans* has been identified, where it has been found that it is more active against *Pseudomonas aeruginosa* than normal controls [12], and in some studies, the extract showed the highest antibacterial activity against *Bacillus subtilis* [7]. Overall, they have found that this plant extract showed broad-spectrum antibacterial activity against both gram-positive and gram-negative bacteria. *Antifungal activity:* The plant extract has shown strong antifungal activity against different fungi, including *Candida krusei, Aspergillus fumigatus, Penicillium chrysogenum, Candida albicans, Candida glabrata,* and *Candida parapsilosis*, while the highest antifungal effect was found against *Candida krusei, Aspergillus fumigatus* [7].



Figure 1: *Cirsium vulgare* plant

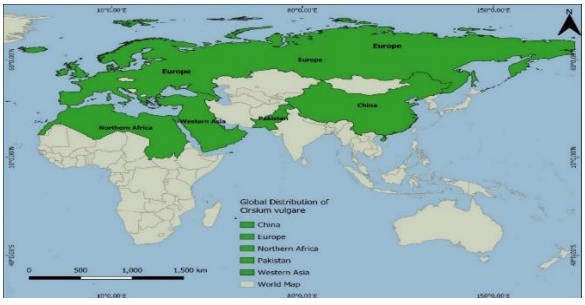


Figure 2: Global distribution of *Cirsium vulgare* plant

Antioxidant activity: The plant is rich in phenolic compounds, including apigenin-7-O-glucoside and chlorogenic acid [13]. Moreover, the plant extract is abundant in flavonoids (25.73 mg catechin/g), which are responsible for the strong antioxidant activity [12, 14].

Anti-inflammatory activities: It has been used for reducing inflammation. The C. vulgare extract considerably decreased gastric ulcers. Gastric ulcer illness is associated with increased expression of C-fos. This plant extract demonstrated a decrease in the C-fos expression following the rats' ingestion of the extract [15].

Wound healing properties: The plant extracts have resulted in quickening the process of wound healing [15-17].

Hepatoprotective action: According to studies, the plant's high antioxidant capacity may help protect liver tissue [5, 18, 19]. It has been found that *C. vulgare* is a good and harmless plant for the treatment of liver diseases [6].

Anti-hemorrhoidal actions: It is effective at cooling blood, halting bleeding, and eliminating blood stasis [5]. Again, a decoction of the plant has been used to cure bleeding piles [5].

In conclusion, *Cirsium vulgare* has a high composition of phenolic acids, flavonoids, terpenoids, and compounds that contribute to its bioactivities, which include antibacterial, anticancer, antioxidant, antifungal, anti-inflammatory, anti-hemorrhoidal, and hepatoprotective effects. *Cirsium vulgare* can also be a valuable resource for modern medicine and has potential applications in the food and pharmaceutical industries. This plant may be a good option for the development of medicines for hepatic infections, bacterial diseases, fungal infections, inflammations, and hemorrhoids.

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