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Chiraita (*Swertia chirata)* in Unani Medicine: An Integrative Review of Traditional Claims and Scientific Evidence

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ABSTRACT

Background: Chiraita (*Swertia chirata*), a bitter medicinal herb of the family Gentianaceae, holds a significant place in the Unani system of medicine. Traditionally, it has been used both as a single drug and as an ingredient in compound formulations for the management of gynecological, inflammatory, febrile, digestive, and metabolic disorders. **Objective:** This review aims to systematically document the traditional therapeutic applications of Chiraita in Unani medicine and critically evaluate its phytochemical constituents and pharmacological activities as reported in modern scientific literature. The article comprehensively reviews the botanical characteristics, geographical distribution, ethnomedicinal uses, phytochemistry, and diverse pharmacological properties of *Swertia chirata*, with particular emphasis on its hepatoprotective activity and reported Unani formulations. **Methods:** A thorough literature survey was conducted using electronic databases such as PubMed, Google Scholar, ScienceDirect, and SCOPUS, employing keywords including "Chiraita," "Swertia chirata," "Chiretta," "phytochemical studies," and "pharmacological activities." Classical Unani texts *Khazain-ul-Advia*, *Makhzan-ul-Mufradat*, *Muheet-e-Azam*, and *Jami-ul-Advia wal Aghziya* were consulted to elucidate its *Mizāj* (temperament), *Afa'al* (actions), and *Istemal* (therapeutic uses). **Results:** Unani literature describes Chiraita as possessing a *Garm- Khushk* (hot and dry) temperament and recommends it for conditions such as *Dard-al-Raḥim* (dysmenorrhea), chronic fevers, inflammatory disorders, skin diseases, digestive ailments, and helminthic infestations. Phytochemical studies have identified secoiridoid glycosides, xanthones, alkaloids, flavonoids, and triterpenoids. Experimental studies report notable anti-inflammatory, analgesic, antioxidant, antibacterial, antidiabetic, anthelmintic, hepatoprotective, and anticarcinogenic activities. **Conclusion:** The review supports traditional Unani claims regarding the therapeutic potential of Chiraita. Nevertheless, well-designed clinical and mechanistic studies rooted in Unani principles are required to validate its efficacy and enable its rational integration into contemporary healthcare.

Keywords: Chiraita, *Swertia chirata, inflammatory disorders,* analgesic, antioxidants, *Dard-al-Raḥim (dysmenorrhea),* phytochemical constituents

BOTANICAL NAME*: SWERTIA CHIRATA*

INTRODUCTION:

Swertia chirata (Buch-Ham. ex Wall.), a member of the family Gentianaceae, is a small, erect, annual herb indigenous to the Himalayan foothills.[1] In the Unani system of medicine, it is known as *Chiraita*, whereas in common parlance it is widely referred to as *Chirata*; however, the plant is recognized by various vernacular names across different regions. Owing to its intense bitterness and broad therapeutic utility, Chiraita has been regarded as one of the most valuable medicinal plants in traditional systems of medicine. [2]

The genus *Swertia* comprises approximately 135 species of annual and perennial herbs distributed across several Asian countries, including India, Nepal, Bhutan, China, Japan, and Bangladesh. Within India, nearly 40 species of *Swertia* have been documented, of which *Swertia chirata,* commonly known as Chiretta, is considered the most therapeutically potent and extensively utilized species.[1] Due to indiscriminate harvesting, habitat destruction, and lack of systematic cultivation, *S. chirata* has faced a significant decline in its natural population and is presently categorized as a critically endangered species.[1,3]

Habitat and Distribution:

In Asia, species of *Swertia* are predominantly distributed in high-altitude regions, typically occurring at elevations ranging from 1200 to 3600 meters above sea level. Their natural habitat extends across the hilly and mountainous terrains of countries such as India, China, Nepal, Bhutan, Japan, and Pakistan. Within India, *Swertia* species are chiefly confined to the western and eastern Himalayan regions. [4]

The north-western Himalayas, comprising Jammu and Kashmir, Himachal Pradesh, and Uttarakhand, harbor a particularly rich diversity of *Swertia* species. These plants predominantly grow in mountainous zones of the tropical and temperate belts at altitudes ranging from approximately 3600 to 13,000 feet. The majority of species are found at elevations between 1200 and 3000 meters in the temperate Himalayan region extending from Kashmir to Bhutan, while a limited number are also reported from the Khasi Hills of northeastern India and the Western Ghats. [1,5]

Common Name: *Chiraita*

Table no 1: Scientific Classification of *Chiraita* [6,7]

Kingdom	Plantae
Phylum	Tracheophyta
division	Angiosperm
Sub Division	Dicotyledon
Class	Magnoliopsida
Order	Gentianales
Family	Gentianaceae
Genus	*Swertia*
Species	*Chirata*
Binomial name	*Swertia chirata*

Vernacular Names: [8]

English: *Chirata* (Indian Gentian)

Hindi: *Charayatah*

Urdu: *Chiarayata*

Sanskrit: *Anaryatikta, Bhunimba, Chiratika, Ardhatika, Varantaka*

Arabic: *Qasabuzzarirah*

Persian: *Nenilawandi, Qasabuzzarirah*

Panjabi: *Charaita*

Marathi: *Chirayita*

Tamil: *Nilavembu, Shirattakuchi*

Telugu: *Nilavembu*

Kannada: *Nilavebu*

***Mahiyat*: (Botanical Description)**

Chiraita is an annual or biennial herb that grows 0.6–1.5 m in height. The stem, about 2–3 ft long, is erect with a cylindrical middle portion and a quadrangular upper part marked by distinct decurrent lines at each angle. It appears orange-brown to purplish, containing a large, continuous yellowish pith.

The leaves are lanceolate, arranged oppositely in pairs, sessile, acuminate, and cordate at the base, usually 4 cm long with five to

seven veins. The root is simple, yellowish, short and tapering, measuring about 7–8 cm in length and roughly half an inch in thickness, often appearing oblique or bent.

Flowers are small, numerous, and tetramerous, borne in large leafy panicles. They are greenish-yellow with tinges of purple and sometimes bear white or green hairs. The calyx is gamophyllous with four lobes, while the corolla has four twisted, overlapping lobes united at the base, each bearing a pair of hairy nectaries. There are four stamens positioned opposite the corolla lobes at its base. The ovary is unilocular with laminal-parietal placentation, and it bears two stigmas.

The fruit is a two-valved, egg-shaped capsule with a thin, transparent, yellowish pericarp, enclosing many small, dark brown seeds. The multicoloured corolla and the presence of nectaries favour cross-pollination in *Swertia chirata*.[3,4]

Figure 1: *Swertia chirata* (A)Seeds, (B)Plant in nature, (C)Root of a mature plant, (D)Dry plant material, (E)High shoot multiplication in a plant tissue culture system

Figure 2: *Swertia chirata (Chiraita)*

Microscopic:

A transverse section of the root reveals 2–4 layers of cork, followed by 4–12 layers of thick-walled parenchymatous secondary cortex cells, some with radial wall thickening and tangentially elongated, sinuous walls. The secondary phloem consists of sieve tubes, companion cells, and phloem parenchyma with thin walls. The secondary xylem is made up of lignified vessels, tracheids, fibres, and parenchyma; in older roots, the central wood becomes spongy or hollow, while the outer xylem ring remains heavily lignified. Vessels display scalariform thickening, along with simple and bordered pits, and tracheids show similar features. Fibres possess simple pits. The secondary cortex contains mucilage, abundant acicular crystals (especially in the cortex and phloem), and resin masses appearing as dark brown deposits. [9]

***Mizāj* (Temperament):** [10,11]

Garm 2^0 *- Khushk* 2^0

***Afa'al* (Actions):**

Dard-al-Raḥim (dysmenorrhea)

Muḥallil -i-Awrām (anti-inflammatory)

Mulaṭṭif (attenuant) *Qābiḍ* (astringent) *Mujaffif* (drying agent)

Muqawwī-i-Qalb (cardiotonic) *Muqawwī-i-Jigar* (liver tonic) *Jālī* (detergent)

Muṣaffī-i-Dam (blood purifier)

Muqawwī-i-Baṣar (eye tonic)

Dāfi'-i-Ḥummā (antipyretic)

Ḥummā Muzmina (chronic fever)

Qātil-i-Dīdān-i-Am'ā' (anthelmintic)

Hāḍim (digestive)

Kāsir-i-Riyāḥ (carminative)

Mushtahī (appetiser)

Isqāṭi (abortive)

Mudirr-i-Bawl (diuretic) *Mudirr-i-Ḥayḍ* (emmenagogue) *Mulayyin* (laxative)

Muqawwī-i-Mi'da (stomachic) [10,12]

***Istemal* (Therapeutic uses):**

- It's beneficial in treating *Dard-al-Raḥim* (dysmenorrhea).
- It cures *Ṣafrāwiyyat* (biliousness).
- It is used to cure *Iltihāb* (inflammations) and *Qurūh* (ulcers).
- It's beneficial for *Zeeq-un Nafas* (asthma), *Su'āl -Hadd*(bronchitis).
- It is used to treat *Sayalān al-Raḥim* (leucorrhoea), *Waram al-Raḥim* (metritis), and *Qai- Hamal* (vomiting in pregnancy).
- Its *khaisanda* is used to treat skin diseases like *Khushūnat-i-Jild* (Dryness of skin), *Ḥikka* (Itching).
- It's *joshanda* is beneficial to treat viral fevers, *Ḥummā Ajāmiyya* (Malarial fever), and *Sarsām* (Meningitis).Its *Safūf* is used to kill *Dīdān-i-Am'ā'* (intestinal worms).
- It is used in urinary diseases like *Taqṭīr al-Bawl* (Dribbling of urine), *Salas al-Bawl*

(Incontinence of Urine), *'Usr al-Bawl* (Dysuria).

- It is beneficial in *Zo'f-i-Ishteha* (Anorexia), *Su'-e-Hazm* (Dyspepsia), *Zof-e-Hazm* (Poor digestion).
- It is used in the treatment of *Istisqa, Juzam* (Leprosy), *Irq-un-Nisa* (Sciatica), *Junoon.*

(Insanity) [13,14, 15]

***Miqdār*(dose):**

5-7g

2-3 g. [14,16]

***Muzir* (Adverse Effect):**

Lungs.[30]

***Musleh* (corrective):**[10,11]

Asl-us-soos (*Glycyrrhiza glabra*) *Anisoon* (*Pimpinella anisum*)

***Badal* (Substitute):** [10,11]

1. *Sandal* (*Santalum album L.*)
2. *Zafran* (*Crocus sativus L.*)
3. *Saleekha* (*Cinnamomum cassia L.*)
4. *Masoor* (*Lens culinaris Medicus*)

***Murakkabat* (Compound Formulation)** [9,15]

Majoon e Muṣaffī-i- Khūn, majoon e masikul baul, araq e juzam, zimad e khanazar, jawarish e jalinoos.

Chemical Constituents:

- **Amarogentin (Chirantin): (Secoiridoid glycoside):** Extremely Bitter-Topoisomerase Inhibitory, Chemopreventive, Antileishmanial.
- **Amaroswerin (Secoiridoid glycoside):** Gastroprotective.
- **Gentianine(Monoterpenealkaloid):** Anti-Inflammatory, Anaesthetic, Antihistaminic, Anticonvulsant, Hypotensive, Antipsychotic, Sedative, Diuretic, Antimalarial, Antiamoebic, Antibacterial.
- **Swerchirin (Xanthone):** Antimalarial, Hypoglycemic, Hepatoprotective, ProHaemopoietic, Mild Chemopreventive.
- **Swertiamarin (Secoiridoid glycoside):** Analgesic**.**
- Xanthones: CNS depressant effect.
- **Magniferin (Xanthone glucoside):** Anti-Inflammatory, Cytokine Modulating, Chemoprotective**.**
- **Triterpenoids:**

- **Swertanone -** Anti-Inflammatory
- **Taraxerol -**Analgesic
- **Oleanolic Acid –** Emollient
- **Ursolic Acid** - Anti-Inflammatory, Chemoprotective, Antimicrobial.
- **Pentacyclic Triterpenoids (***Kairatenol)* – hypoglycemic
- **Flavonoids**: (luteolin and apigenin) – antioxidant [17,18]

Pharmacological activities:

Anti- inflammatory:

Ethanolic root extract of *Swertia chirata* exhibits pronounced anti-inflammatory and analgesic effects. In experimental models such as carrageenan-induced paw oedema and acetic acid-induced writhing tests, the extract significantly reduced both swelling and pain. These effects are attributed to the suppression of pro-inflammatory mediators, including prostaglandins and bradykinins. [19, 20]

Analgesic:

The ethanolic root extract of *Swertia chirata* was chosen for pharmacological screening and analgesic and anti-inflammatory activities in animal models. The extract of *Swertia chirata* and aminopyrine exhibit a marked inhibitory effect on the writhing response induced by acetic acid. These results strongly suggest that the extract possesses peripheral analgesic activity and its mechanism of action may be mediated through inhibition of local peritoneal receptors or arachidonic acid pathways, involving cyclo-oxygenases and/or lipoxygenases.[21,22]

Antioxidant Activity:

The methanolic extract of *Swertia chirata* possesses remarkable antioxidant potential, attributed to its rich content of flavonoids and secoiridoid glycosides. These constituents actively neutralise reactive oxygen species (ROS), reduce lipid peroxidation, and prevent oxidative damage to cellular membranes and biomolecules. [23,24]

Antibacterial Activity:

Bioactive compounds, particularly xanthones, isolated from *Swertia chirata* exhibit potent antibacterial activity against pathogenic microorganisms such as Streptococcus pneumoniae and Escherichia coli, with effects comparable to ciprofloxacin. Thesecompounds likely act by disrupting bacterial cell wall integrity and inhibiting nucleic acid synthesis. [25]

Anti-carcinogenic and Anti-tumour activities:

Amarogentin-rich fractions of *Swertia chirata* have been reported to exhibit potent anticarcinogenic activity in DMBA-induced skin carcinoma models. The extract reduces lipid peroxidation, enhances liver detoxification enzymes, and modulates oxidative stress pathways, resulting in the suppression of tumour growth. [26,27]

Anthelmintic activity:

Crude aqueous and methanolic extracts of *Swertia chirata* display significant anthelmintic activity against Haemonchus contortus both in vitro and in vivo. At 25 mg/mL, the extracts caused paralysis and death of worms, comparable to standard pharmacological agents. The activity may result from interference with the parasites' neuromuscular function or energy metabolism.[28]

Antidiabetic Activity:

Swertia chirata exhibits profound antidiabetic properties, primarily due to its bitter principles such as amarogentin and swertiamarin, along with xanthone derivatives. These compounds stimulate insulin secretion from pancreatic β-cells, promote glucose utilization in peripheral tissues, and reduce intestinal glucose absorption, collectively contributing to decreased blood glucose levels.[18,29]

Hepatoprotective Activity:

Swertia chirata exhibits significant hepatoprotective activity in experimental models of liver injury. Ethanolic extracts have been shown to protect against paracetamol-induced hepatotoxicity by reducing elevated serum liver enzymes (AST, ALT, ALP, and bilirubin) and restoring normal hepatic architecture. This protective effect is primarily attributed to its antioxidant constituents, which reduce lipid peroxidation and enhance endogenous antioxidant defenses.[30]

Discussion

The therapeutic claims of Chiraita (*Swertia chirata*) described in Unani medicine are largely supported by experimental pharmacological studies. Its traditional use in gynecological disorders, inflammatory conditions, fevers, and hepatic ailments corresponds with demonstrated anti-inflammatory, analgesic, antipyretic, antioxidant, and hepatoprotective activities. These effects are primarily attributed to bioactive constituents such as secoiridoid glycosides, xanthones, flavonoids, and triterpenoids. However, the majority of available evidence is derived from in vitro and animal studies, underscoring the need for controlled clinical trials.

Conclusion

Chiraita (*Swertia chirata*) is an important medicinal plant with deep roots in Unani medicine and considerable support from experimental pharmacological studies. Although many of its traditional therapeutic uses are being corroborated by contemporary scientific research, additional clinical studies are required to clearly define its efficacy, safety profile, and optimal dosage, enabling its appropriate incorporation into evidence-based medical practice.

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