



Swertia chirata: A medicinal herb and its uses in Unani system of medicine

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Abstract: *Swertia chirata* Buch.-Ham. ex Wall. is one of the important herb widely explored in the Unani system of medicine. The drug is very potent and efficacious with numerous beneficiary therapeutic actions for treating various human diseases. The plant is originated from Nepal and commonly occurs in the Himalayan region from Kashmir to Arunachal at an altitude of 4 to 10 thousand feet. It has 2 to 4 feet of height and having a prominent bitter taste. The parts of the plants are considered as rich sources of phytochemical ingredients which might play a vital role in disease suppression and extensively exploited in different traditional systems of medicines such as Unani, Ayurveda, and Siddha. Phytochemical analysis of the plants revealed alkaloids, flavonoids, steroids, glycosides, triterpenoids, saponins, xanthenes, and ascorbic acid. The main chemical ingredients include Swertiamarin, Amarogentin, Swechirin, Mangiferin, Sweroside, Gentianine, Amaroswerin, Oleanolic acid, Swertanoone, and Ursolic acid. This drug is commonly known as a bitter tonic in traditional system of medicine for the treatment of fever, loss of appetite, digestive disorders, diabetes, jaundice, skin, and various other diseases. The main emphasis in this review has been given on the evidence-based knowledge about *Swertia chirata* from Unani perspective.

सार: स्वर्तीया चिराता बुच.-हाम. एक्स वाल. यूनानी चिकित्सा प्रणाली में व्यापक रूप से प्रयोग की जाने वाली महत्वपूर्ण जड़ी-बूटियों में से एक है। विभिन्न मानव रोगों के इलाज हेतु कई लाभकारी चिकित्सीय क्रियाओं के साथ दवा बहुत शक्तिशाली एवं प्रभावकारी है। इस पौधे की उत्पत्ति नेपाल से हुई है और आमतौर पर 4 से 10 हजार फीट की ऊंचाई पर कश्मीर से अरुणाचल तक हिमालय के क्षेत्र में होता है। इसकी ऊंचाई 2 से 4 फीट की और स्वाद अत्यधिक कड़वा होता है। पौधे के सभी भागों को फाइटोकेमिकल अवयवों के समृद्ध स्रोत के रूप में माना जाता है, जो रोग के दमन में एक महत्वपूर्ण भूमिका निभा सकते हैं और यूनानी, आयुर्वेद और सिद्ध जैसी विभिन्न चिकित्सीय पारंपरिक प्रणालियों में व्यापक रूप से शोषित हो सकते हैं। पौधे के फाइटोकेमिकल विश्लेषण से अल्कलॉइड्स, फ्लेवोनॉइड्स, स्टेरॉयड, ग्लाइकोसाइड्स, ट्राइटेरपीनॉइड्स, सैपोनिन, ज़ेथोन और एस्कोर्बिक एसिड का पता चला। मुख्य रासायनिक अवयवों में स्वार्टियामेरिन, अमारोर्गेटिन, स्वेचीरिन, मंगिफेरिन, स्वेरोसाइड, जेंटियानिन, अमारोस्वरिन, ओलीनोलिक एसिड, स्वर्टानोन और अरसोलिक एसिड शामिल हैं। इस दवा को आमतौर पर बुखार, भूख न लगना, पाचन विकार, मधुमेह, पीलिया, त्वचा और अन्य विभिन्न रोगों के उपचार के लिए पारंपरिक चिकित्सा पद्धति में एक कड़वे टॉनिक के रूप में जाना जाता है। इस समीक्षा में मुख्य जोर यूनानी दृष्टिकोण से स्वर्तीया चिराता के बारे में साक्ष्य आधारित ज्ञान पर दिया गया है।



Keywords: *Swertia chirata*, Unani drug, Disease, Ultra-Dilute, Phytochemical, Bitter.

INTRODUCTION

Swertia chirata Buch.-Ham. ex Wall. in the Unani system of medicine is known as Chirayata. The plant has been used by Unani Physicians, as a single drug and in the compound, formulations to treat various ailments like liver disorders, diabetes, bronchial infections, malaria, and asthma and are reported to have a wide spectrum of pharmacological properties. It has its medicinal importance since it plays a significant role in the treatment of various diseases. All the parts of the plants at the fruiting stage having maximum content of metabolites are used in the Unani system of Medicine. In India, it is known as Chiretta in Hindi and Bhunimba or Kirata tikata in Sanskrit. The plant ranges from Bhutan to Kashmir in the region of Himalayas at the heights of 1200 to 1500 meters^{1,2,3,4}. Besides this, the plant is very well explored in the forests of Nepal. Therefore, this Unani herb is also known as the Nepali Neem and has been introduced to Europe in 1839. Chirayata grows up to the height of 1.5 meters and having erect stems^{1,6}. The stem is orange-brown or purplish in color and contains large continuous yellowish pith. The leaves of the plants are in opposite pairs which are about 10 cms in length and without stalks. Its root is simple, tapering, stout and short, about 7-8 cm long and usually half an inch thick. The tiny flowers are green-yellow in color. The fruits are small, one-celled capsule with a transparent yellowish pericarp^{3,7}. The plant contains ophelic acid, sawertiamarine, mangleferin, amarogenitine and glycoside chiratin, which are the product of hydrolysis⁸. The plant also contains tannin, resin, and ash. *S. chirata* is a beneficial bitter taste tonic that is used as a laxative and appetizer. It improves nutritional disorders and helps in maintaining the standard of the body. The herb is widely used in relieving acidity, nausea, biliousness, and also broadly taken as a laxative, vermifuge, sedative, and alterative⁹.

VERNACULAR NAMES^{10, 11, 12}

English:	Chirata (Indian Gentian)
Hindi:	Charayatah
Urdu:	Chiarayata,
Sanskrit:	Anaryatikta, Bhunimba, Chiratika, Ardhatika, varantaka,
Arabic:	Qasabuzzarirah
Persian:	Nenilawandi, Qasabuzzarirah
Panjabi:	Charaita
Bengali:	Chireta
Burma:	Sekhagi
Marathi:	Chirayita
Tamil:	Nilavembu, Shirattakuchi
Telugu:	Nilavembu
Kannada:	Nilavebu
Malayalam:	Nilaveppa
Gujarati:	Chirayata
Nepal:	Cherata
Deccan:	Charayatah

**TAXONOMICAL CLASSIFICATION** ^{13, 14, 15, 16}

Kingdom:	Plantae
Phylum:	Tracheophyta
Class:	Magnoliopsida
Order:	Gentianales
Family:	Gentianaceae
Genus:	<i>Swertia</i>
Species:	<i>chirata</i>
Scientific name:	<i>Swertia chirata</i>

Occurrence and distribution: The plant reproduced through the sexually grown structure; seed which shed off in the months of October and November. Seeds are small and the plant is grown through the nursery via seedling transplantation. Forty species of *Swertia* have been reported in India ^{10,17}, of them, *Swertia chirata* has its importance in the medical industry. The plant is a critically endangered medicinal herb that ranges from Kashmir to Bhutan in sub-temperate regions of the Himalayas at an altitude of 1200 and 2100 m ^{17,18} on the moist and shady places¹⁹.

Description:

Macroscopic: Mostly all parts of the plant are excessively used in the therapeutic studies. The plant has special a type of yellowish color in a fresh drug sample. The stem is smooth, yellowish-brown to purplish in color with a height of 1m and 6 mm in diameter. The lower part is cylindrical whereas the upper part is somewhat quadrilateral in shape. The leaves are broad at the base, cauline, opposite, smooth on both surface and tapered at the apex. The inflorescence is a large leafy panicle of a solitary-axillary cluster of 3-5 flowers. The flowers are hermaphrodite, tetramerous, and yellow-green outside and purple inside. The thalamus consists of the oval-shaped ovary with two carpels. Fruit an ovoid capsule. The plant produces a large number of globose, brownish, and minute seeds ⁵.

Microscopic: The outermost layer epidermis is covered with a thick layer of the cuticle which is more prominent on the upper surface. The cells of the upper epidermis are larger than the lower epidermis and have straight walls. Inner to this is undifferentiated mesophyll cells containing chloroplast and in the center vascular tissues are present. Stomata are of the cruciferous type and found only on the lower surface. The transverse section of the stem shows a single layer of the epidermis, externally covered with a thick-layer cuticle. Below this, cortical cells having parenchymatous nature are present. Inner to this, distinct endodermis is present. In cortical cells needle-shaped crystals and dark brown resin with oil droplets present. The transverse section of the root shows less developed periderm. Cortex is parenchymatous and made up of thin-walled homogenous and polyhedral cells. Secondary phloem consists of radial rays of polyhedral cells having phloem rays, sieve elements, and phloem parenchyma. Secondary xylem is solid and present in the center. Winged petiole having V shape with three prominent ridges presents on the lower surface ⁵.

Part used: The whole plant is used medicinally ^{1, 5}.

Temperament:

Hot² Dry ^{21,5,20,21}



ACTIONS

Sr. no.	Unani Action	English Equivalent	References
1.	<i>Muhallil-e-Waram</i>	Anti-Inflammatory	1,2,3,5,7
2.	<i>Mulattif</i>	Demulscent	1,2,3,5,7,21
3.	<i>Qabiz</i>	Anti-diarrhoeal	1,2,3,5,7
4.	<i>Mujaffif</i>	Desiccant	1,2,3,5,7,21
5.	<i>Muqawwi-e-Qalb</i>	Heart tonic	1,2,3,5,7,21
6.	<i>Muqawwi-e-Jigar</i>	Liver tonic	1,2,4,5,7
7.	<i>Jali</i>	Detergent	1,21
8.	<i>Musaffi-e-Dam</i>	Blood Purifier	1,2,3,7
9.	<i>Muqawwi-e-Basar</i>	Eye Tonic	1,2,7,21
10.	<i>Mulayyan</i>	Laxative	1,21
11.	<i>Dafa-e-Humma</i>	Antipyretic	1,2,3,7
12.	<i>Huma-e-Muzmina</i>	Chronic fever	1,2,3,7
13.	<i>Qatil-e-Deedan-e-Ama</i>	Anthelmintic	1, 3,5
14.	<i>Hazim</i>	Digestive	1,2,3,5
15.	<i>Kasir-e-Riyah</i>	Carminative	1, 21
16.	<i>Mushtahi</i>	Appetizing	1,2,3,5,7,21
17.	<i>Isqati</i>	Abortifaciant	1,21
18.	<i>Mudirr-e-Boul</i>	Diuretic	1,21
19.	<i>Mudirr-e-Haiz</i>	Emmenagogue	21
20.	<i>Mulayyin</i>	Laxative	21
21.	<i>Muqawwi-e-Me'da</i>	Stomachic	21

THERAPEUTIC USES

Sr. no.	Unani Therapeutic Use	English Equivalent	References
1.	<i>Istisqa</i>	Ascites	1,7
2.	<i>Juzam</i>	Leprosy	1,4,7
3.	<i>Iltihab</i>	Inflammations	1,2
4.	<i>Usr-ul-Baul</i>	Dysuria	1,7
5.	<i>Taqteer-ul-Boul</i>	Dribbling of urine	7
6.	<i>Irq-un-Nisa</i>	Sciatica	1,5,7
7.	<i>Zeequnnafas</i>	Asthma	1,4
8.	<i>Sual-e-had</i>	Bronchitis	1,5
9.	<i>Junoon</i>	Insanity	1
10.	<i>Salas-ul-Boul</i>	Incontinence of urine	1,21
11.	<i>Waram-e-Reham</i>	Uteritis	1,21
12.	<i>Amraz-e-Jild</i>	Skin diseases	1,3,7
13.	<i>Khushumat-e-Jild</i>	Dryness of skin	1,2,5,7
14.	<i>Hikka</i>	Itching	1,2,5
15.	<i>Zo'f-e-Ishteha</i>	Anorexia	7,21
16.	<i>Su'e-Hazm</i>	Dyspepsia	4,21
17.	<i>Zof-e-Hazm</i>	Poor digestion	4,7
18.	<i>Sarsam</i>	Meningitis	2,7
19.	<i>Humma Ajamiya</i>	Malarial fever	1,5
20.	<i>Salsul Baul</i>	Incontinence of Urine	1
21.	It cures <i>Safrawiyat</i>	Biliousness	5
22.	<i>Qurooh</i>	Ulcers	2,21
23.	<i>Sailan-urReham</i>	Leucorrhoea	8



24.	<i>Deedan-e-Ama</i>	Intestinal worms	4
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CORROCTIVES

Sr. no.	Unani name of Drug	English Name	References
1.	Asl-us-soos	<i>Glycyrrhiza glabra</i> L.	1
2.	Anisoon	<i>Pimpinella anisum</i> L.	1,7
3.	Mastagi	<i>Pistacia lentiscus</i> L.	1,7

SUBSTITUTES

Sr. no.	Unani name of Drug	English Name	References
1.	Sandal	<i>Santalum album</i> L.	1
2.	Zafran	<i>Crocus sativus</i> L.	1
3.	Saleekha	<i>Cinnamomum cassia</i> (L.) J. Presl.	1
4.	Masoor	<i>Lens culinaris</i> Medicus	1, 7

DOSAGE

Sr. No.	Dose (g)	References
1.	4-7g	1, 2,7, 20
2.	5g	3

IMPORTANT FORMULATIONS

Sr. No.	Formulation	Reference
1.	Majoon Musaffi-e-Khoon	22
2.	Arq-e-Chirata	23
3.	Jawarish Jalinoos	23
4.	Zimad-e-Khanazeer	24
5.	Arq-e-Juzam	24

Phytochemistry: The large number of biological activities of *S. chirata* are associated to the presence of a various group of phytoconstituents related to different classes such as xanthonones and their derivatives, lignans, alkaloids, flavonoids, terpenoids, iridoids, secoiridoids, and various other compounds such as chiratin, ophelic acid, palmitic acid, oleic acid, and stearic acid^{25,26} The plant also contains some other important bioactive constituents such as amarogentin, swertiamarin, mangiferin, swerchirin, sweroside, amaroswerin, and gentiopicrin having pharmacological efficacy¹⁶.

Pharmacology: Anti-Inflammatory: The plant is the rich source of Mangiferin, Swertanone, Oleanolic acid, Chirato1, β -Amyrin, and Xanthonones, which hampers the inflammation²⁷.

Hepato-protective: This plant has biologically active compounds like Swertiamarin, Swerchirin, Sweroside, and Syringaresinol which act as one of the important factors for the suppression of the hepatic disease. The aqueous extracts of the plant also have the potential against the liver disorders²⁸. Similar findings for the in-vivo hepatoprotective property have been claimed by Balasundari et al.²⁹.

Anti-Diabetic: Different studies have been successfully performed to treat diabetes with *S. chirata* extract. Presence of different active phytoconstituents such as Mangiferin, Swertiamarin, Amarogentin, Swerchirin, Isobellidifolin, and Bellidifolin in the plant extract is the main cause Anti-Diabetic effect^{16, 27}.



Anti-carcinogenic: Aleem et al. observed that the Mangiferin, Swertiamarin, Oleanolic acid, and Amarogentin are the active compounds responsible for the anti-carcinogenic property¹⁶. It has also been observed by various scientists that *S. chirata* has anti-carcinogenic properties. Banerjee et al. in his study suggested that the plant is rich in xanthenes which is one of the main components for the anti-carcinogenic agent^{30,31}.

Anti-viral: It has been observed by Verma et al. that *S. chirata* plant extract at 1:64 dilutions inhibited (70%) HSV-1 plaque formation and even in 24 hours PID showed a significant reduction of positive fluorescent. Complete inhibition was observed at a concentration of 0.1 mg/ml compared with controls. In this preliminary study, the plant extract of *S. chirata* showed antiviral properties against Herpes simplex virus type-1³². Khan et al. demonstrated a similar observation against Herpes simplex virus type-1³³.

Antimicrobial: *Swertia chirata* contains Swertiamarin, β -Amyrin, Sweroside and Oleanolic acid which act as a promoter for the antimicrobial property^{16,27}. In an *in vitro* study, Awasthi et al. evaluate that the plant extract showed a remarkable inhibitory effect against various gram-positive and gram-negative bacteria, whereas moderate inhibitory effect against various tested fungi³⁴. Besides this, Bhargava et al. also examined the role of aqueous extract of plant against the Gram-negative and Gram-positive bacteria, *K. pneumoniae*, *E. coli* and *S. aureus* respectively³⁵.

Anthelmintic: Isolated compounds Amarogentin, amaroswerin, sweroside from *S. chirata* are responsible for Anthelmintic property³⁶. Similar observation against the microbes was expressed by Medda et al.³⁷. While Iqbal et al. observed a significant effect in the reduction in egg per gram of feces in the *in vivo* study and anthelmintic effect of the methanolic extracts in the *in vitro* study³⁸.

Anti-Malarial: Benerjee et al. evaluate the role of Xanthenes isolated from *S. chirata* against the deadly and disastrous malarial disease³⁹. Similar findings for the antimalarial activity were reported by Ravishankar et al.⁴⁰. Bhat et al. also revealed that the aqueous and organic solvent extracts from *S. chirata* have a significant inhibitory effect on *P. falciparum* under *in vitro* conditions⁴¹.

Miscellaneous effects: The plant has also been reported to have Anti-hepatitis B virus, CNS depressant, Antipyretic, Antileishmanial²⁷, Antioxidant, wound-healing, as well as Gastroprotective effect⁴².

Clinical Trial: Gundeti et al. conducted a pilot study on AYUSH 64, a polyherbal Ayurvedic compound drug on influenza. The drug comprises of various ingredients viz., *Alstonia scholaris*, *Picrorhiza kurroa*, *Swertia chirata* and *Caesalpinia crista*. The findings of the study suggested that the oral administration of AYUSH-64 encouraged to improve the ILI symptoms with a low dose of usage of acetaminophen and antihistaminic. Additionally, no side effect was observed and the drug was found safe on hematology and biochemical parameters⁴³.

CONCLUSION

This plant is the reservoir of various active phytoconstituents. These are the main cause to explore different pharmacological properties against various ailments. In the Unani system of medicine, the plant is explored in the form of tonic and used as a potent blood purifier. The finding of the study revealed that the *Swertia chirata* manifests an advantageous role in the medication of various common deadly disorders prevailing in India. Further research needed to be done on the characterization, identification of novel, natural bioactive molecules, mechanism of action, and efficacy should be tested against other deadly diseases.



DECLARATION OF CONFLICT OF INTEREST

We have no conflict of interest to declare

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