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Medicinal importance of *Swertia chirayita* in Unani system of medicine

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Abstract

Background: Herbs orchestrate resurgence and vegetal awakening is supervised everywhere in the world. Medicinal plants always played an important role in the health development of mankind. Chirayita provides us new lead molecules for the development of drugs against various pharmacological targets. Plants included in this family are annual and persistent herbs or shrubs, indigenous to northern moderate stretch of the world.

Objectives: *Swertia Chirayita* is well known for its medicinal and pharmaceutical importance. In this review studies I will wanted to explore the various pharmacological properties of Chirayta in Unani system of medicine.

Methods: I searched Unani Pharmacopeia of India, Publication of National Herbarium Bangladesh, Bangladesh National Unani Formulary, ND Health facts & PubMed, internet data from inception up to 31 March 2018 observational data relating to Chirayta with Unani system of medicine.

Results: Evidence suggests that various listed of Unani Medicine formulated with the *Swertia Chirayita* among these few are tablet, capsule, syrup and semi-solid etc.

Conclusions: Basically, *Swertia chiretta* is a conventional medicinal plant that used in Unani system of medicine. Farming of this very essential and endangered medicinal species should be promoted.

Keywords: Medicinal plant, *Chirayita*, Unani medicine

Introduction

Swertia chirayita is an annual/biennial herb 0.6–1.5m tall. It has an erect, around 2–3ft long stem, the middle portion is cylindrical, while the upper is quadrangular, with a prominent decurrent line at each angle. Its stem is orange brown or purplish in color with large continuous yellowish pith (Bentley and Trimen, 1880) ^[1]. Leaves are lanceolate, in opposite pairs, no stalks, acuminate, cordate at the base, sessile, five to seven nerved and 4 cm long (Scartezzini and Speroni, 2000) ^[2]. The root is simple, yellowish, somewhat oblique, or geniculate, tapering and short, almost 7–8 cm long and usually half an inch thick. Flowers are small, numerous, tetramerous, large leafy panicles, green-yellow, and tinged with purple and green or white hairs (Joshi and Dhawan, 2005) ^[3]. The calyx is gamophyllous with four lobes, corolla-lobes four twisted and superimposed, united at the base where they have pairs of nectarines on each lobe covered with long hairs. Stamens 4, opposite the corolla lobe, at the base of the corolla. Ovary unilocular with ovules laminal placentation parietale; two stigmas. Capsules are egg-shaped, 2-valved with a transparent yellowish pericarp. Seeds are numerous, very small and dark brownish color (Chandra *et al.*, 2012) ^[4]. Multi-colored corolla and the presence of nectarines support cross pollination in *S. chirayita*.

Habitat and Cultivation

The chiretta thrives as well as flourishes in woodland gardens having a sunny edge, partial shade, in shade as well as in marshy lands. It is an annually growing plant that normally grows up to a height of three feet or one meter. The plants are in bloom between the period September and October. The flowers are greenish in color with a purple tinge and hermaphrodite in nature. In other words, the chiretta flowers possess both the male and female organs. This plant has a preference for sandy (light), loamy (medium) as well as clay (heavy) soil conditions. In addition, the chiretta plant thrives and flourishes well in acidic, neutral as well as basic or alkaline soils. The plant can grow well in semi-shade or somewhat woodland conditions and needs humid or damp soil. Precisely speaking, the plant thrives well in a humid and humus-rich soil in damp light woodlands along the streams or in marshlands. The plant actually develops best in areas where the summers are cool.

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Hence, it is no surprise that the chiretta can thrive and flourish both in conditions where there is full sunlight as well as partial shade. The chiretta plants are able to withstand temperatures as low as -15°C and still continue to grow well. The chiretta herb (*S. chirayita*) is propagated by its seeds. Sowing is generally done during the spring when the temperature is not above 10°C and in a situation when the soil contains plenty of humus. When the seedlings have grown adequately to be handled, they are taken out individually and planted into separate pots or containers. The young plants are re-planted outdoors during the early part of summer. The plants are usually harvested just when the seeds begin to set in and dried in the sun for use afterwards.

Vernacular Name

Bengali: Chirota
 Arabic: Kasbuz zarira
 Farsi: Naynehadondi
 Hindi: Chireta
 Snanskrit: Kirattikta
 English: Chirata
 Botanical name: *Swertia chirayita*
 Family: Gentianaceae

Unani Description

Mizaj: Second degree hot & dry.
 Taste: Bitter
 Dosage: 2-7 gram
 Meliorate: By the Anisun.
 Alternative: *Andrographis paniculata*

Chemical composition

Amarogentin (chirantin)

It is secoiridoid glycoside, and is the most acerbic substance found. It tastes bitter even at a dilution of 1:58,000,000 and can be procured from, *Swertia chirayita*. It acquires Topoisomerase inhibition, chemo-preventive and antileishmanial effects (Ray. *et al.*, 1999) [5].

Amaroswerin

It is a Secoiridoid glycoside collected from *Swertia chirayita* and found to be gastro-shielding (Niiho *et al.*, 2005) [6].

Gentianine

A sullen, translucent monoterpene alkaloid, obtained from several plant species of family Gentianaceae including *Swertia chirayita*. It possesses anti-inflammatory, anesthetic antihistaminic, anticonvulsant properties. And also having hypotensive, antipsychotic lenitive, diuretic antimalarial, antiamoebic and antibacterial properties. It is essential bioactive metabolites of gentiopicroside in rats. Virulency of gentianine is achieved. LD 50 for gentianine: LD50 (mice): 480mg/kg (oral); 300mg/kg (belly injection); 250-300mg/kg (IV injection) (Yang and Song, 2000) [7].

Swerschirin

A medicinally foremost xanthone, obtained from several plants of family Gentianaceae including *Swertia chirayita*; having antimalarial, hypoglycemic, hepatoprotective, pro-heamatopoitic and weak chemo preventive pharmacological effects (Hirkawa *et al.*, 1987) [8].

Swertiamarin

A Secoiridoid glycoside obtained from *Swertia chirayita* Karst; having analgesic property (Lei *et al.*, 1982) [9].

Xanthones

Over all Xanthones are important bioactive constituent present in the drug which shows CNS down regulation in mice and rats (Bhattacharya *et al.*, 1976) [10].

Mangiferin

This compound, which is isolated from chirayita species possesses strong anti-inflammatory activity in arthritic mice, and accounted for lowering down TNF-alpha, IL-1beta, IL-6, and IFN-gamma and up regulation of IL-10 in the joint homogenates of mice. It is also found to be a strong chemo protective agent (Yoshimi *et al.*, 2001) [11].

Lignan

A lignan (syringaresinol; a negligible fraction of herb) which is hepatoprotective in nature, and the ubiquitous β -sitosterol are also present (Rastogi and Mehrotra 1998) [12].

Triterpenoids

Chirayita also contains triterpenoids namely; swertanone, swertenol, episwertinol, gammacer-16-en-3 β -ol, 21-a-H-hop-22(29) - en-3 β -ol, taraxerol, oleanolic acid, ursolic acid, swerta-7, 9(11)-dien-3 β -ol, pichierenol. Among them swertanone has got the anti-inflammatory property. Taraxerol and oleanolic acid are found to be analgesic and emollient respectively. Ursolic acid has anti-inflammatory, chemoprotective and anti-microbial activities. (Chatterje and Pakrashi 1995) [13].

Pentacyclic Triterpenoids

A class of pentacyclic triterpenoids also belongs to this herb including β -amyrin, friedlin, chiratenol, kairatenol, oleanolic acid, ursolic acid. Among them kairatenol is found to be hypoglycemic in nature. (Rastogi and Mehrotra 1993) [14].

Action & uses in Unani

Tonic to heart, liver and eyes, resolvent, drying, astringent, liquifying, balgham, cough, scanty urine, melancholia, dropsy, sciatica, skin diseases. According to G. K. Nair and M. Mohanan, this herb is an excellent drug for intermittent fevers, skin diseases, and intestinal worms, bronchial asthma, burning of the body and regulating the bowels. An infusion of the herb made in hot water with aromatics like cloves, cinnamon etc. is given in doses of half to one fluid ounce. Ayurvedic practitioners often prescribe this infusion in doses of two ounces twice a day before meals as a tonic to check hiccup and vomiting.

Medicinal Use of Swertia chirata in different disease [15].

Swertia chirata contains powerful anti-oxidants, glycosides, and alkaloids. Some of these are *xanthone*, *oleic acid*, *palmitic acid*, *swerchirin*, *gentiopicrin*, *amarogentin*, *enicoflavine*, *chiratanin*, *stearic acid*, *swertanone*, *chiratul*, *swertiamarin*, and more.

- **Anti-inflammatory:** *Swertia chirata* has wonderful anti-inflammatory properties. It finds use in treating redness, pain, swelling, and joint diseases.
- **Laxative action:** People use the plant in the form of a decoction to get good bowel movement.
- **Anti-pyretic action:** The Chirayata is good for

reducing fevers especially malarial fevers.

- **Treats Liver:** The detoxifying effect on the liver is pronounced and so you can use it to treat liver problems. It enhances the metabolism, and this helps to lose weight. This is due to the presence of the methanol.
- **Anti-mutagenic property:** The *Swertia Chirata* interferes with the process of transformation of compounds into mutagens. This prevention of the mutagen-DNA reaction helps preserve the integrity of the cell functions.
- **Protects from ulcer:** The ethanol in the *Swertia Chirata* prevents ulcers from forming.
- **Removes GI tract complaints:** People use *Swertia Chirata* for gas, bloating, and GI upsets because it stops the production of acids in the stomach. It soothes the inflammation of the intestines. You can get relief from nausea and diarrhoea. It strengthens the stomach.
- **Immunomodulatory properties:** The chemical agents that change the immune response are known as the immunomodulators. One example is the stimulation of the antibody formation or stopping the white blood cell activity. *Swertia chirata* helps your body stay healthy with its immunomodulatory properties.
- **Kills Intestinal worms:** The herb exhibits anthelmintic properties that kills worms in the intestine.
- **Good for the blood:** It has blood purifying actions. Like most bitter herbs, the *Swertia chirata* shows good action in producing blood. This helps one overcome the symptoms of anemia fast.
- **Hypoglycaemic Effect:** Hexane fraction of the *Chirayata* showed significant blood sugar lowering when experimented on rats. It did not affect the liver glycogen concentrations. However, prolonged use showed rise in the liver glycogen. The hypoglycaemic effect is because the *Chirayata* stimulates the release of insulin.
- **Leishmanicidal Property:** It helps prevent the spread of the leishmaniasis disease caused by the bite of sand flies.
- **Helpful for treating mental disorders:** Certain kinds of mental disorders can be treated successfully with *Swertia chirata*. To tackle nervous forms of dyspepsia, one needs to have the infusion of the plant twice a day.
- **Antioxidant Action:** The presence of powerful anti-oxidant compounds in *Swertia Chirata* proves useful in preventing DNA damage. It slows the aging process. In addition, it prevents the incidence of diseases like cancer and cardiovascular diseases. Also, you are less likely to get a stroke.
- **Cure skin ailments:** The extract of the herb is useful for the effective treatment of skin ailments. You can treat all kinds of rashes, skin diseases, and inflammations of the skin with the paste of *Swertia chirata*. It helps heal wounds and oozing cuts in the skin fast. Mix with water and apply on the wound.
- **Tackles Urinary tract complaints:** For people having complaints in the region of the kidneys, get frequent urge to urinate, and have difficulty in urinating, will benefit by taking the extract of the *Chirayata*.
- **Use as a tonic:** For people recovering from an exhaustive illness, the tonic prepared from *Swertia chirata* helps.
- **Strengthens the stomach:** People with a weak stomach will benefit if they use the herb and its extracts. Use an

astringent stimulant especially if you have indigestion.

- **Use as an appetiser:** It provides stimulation for the digestive system. It can correct the disruptive factors of nutrition and provide good support for the health. It helps stabilize the metabolic system.
- **Treat vomiting:** You can use the extracts of the plant with honey to treat both hiccups and vomiting.
- **Cure general weakness:** During convalescence and periods of general weakness, one can use an infusion of the plant for getting strength. The other option is to use a tincture. To prepare an infusion, one uses spices such as cinnamon or cloves along with the herb. Bring to a boil, cool and store. You must have only one or two teaspoons of the infusion. One could use the root of the plant to make the infusion. However, it serves a different purpose. One must use honey if one takes the infusion prepared from the root.
- **Reduce heat with *Swertia chirata*:** Adding *Swertia chirata* will help decrease the heat of most things, including your laundry. This is most welcome during the hot season.
- **Protective action against cancer:** This is one of the best things about this herb. It provides a defense against cancers. This is particularly true for instances such as liver cancer.
- **Antiviral property:** The good anti-viral property of the herb helps treat herpes virus infections and those affected by papilloma virus.
- **Help control bleeding:** *Swertia chirata* helps control all types of bleeding including menstrual bleeding and nose bleeds.
- **Cure constipation:** This herb presents a good cure for constipation. Just have a decoction prepared from the plant until the condition improves.

Safety Evaluation

Concerns regarding safety of conventional drugs are vital issues of pharmaceutical industries. Studies have indicated that some commonly used medicinal plants may be mutagenic or cytotoxic especially over a long period of use. There is increasing evidence on the toxicity of crude extracts and isolated compounds from different plant species. However, despite its long history of use in traditional medicine, there is still a lack of scientific information concerning the safety evaluation of *S.chirayita*. It can be traced through the medicinal history as a nontoxic and safe ethnomedicinal herb and has been mentioned in medical papyri to expel fever, relieve headache, inflammation, and to stimulate the central nervous system. *S.chirayita* extracts, did not cause obvious toxic effects in mice as there were no significant differences in body weight and body temperature between the treated and control groups. A clinical study by Medda *et al.* (1999) [16] concluded that *S. chirayita* revealed no evidence of toxicity in both liposomal and niosomal forms. Furthermore, stringent efforts are required to further delineate the well-documented toxicological properties involving toxicity and mutagenic tests to evaluate the safety of this plant. Never the less, rigorous clinical studies involving different mechanisms are still needed to confirm the safety of *S. chirayita* in traditional medicine so that it can be used safely and effectively. Despite the fact that the benefits of medicinal plants is globally acknowledged, the need for better insight on the safety evaluation remains

essential, so as to differentiate between toxic effects and pharmacological importance of plant extracts (Aremu and Van Staden, 2013) [17].

Dosage

An infusion of the herb is generally employed. It is also

given as tincture. Its decoction is not recommended. The root is taken in doses of 5 to 30 grains with honey. This herb is used as part of many compound remedies.

Important Unani Formulations

Some important unani formulations of *Swertia chirata* are as follows¹⁸

Name	Functions	Produced by
Syp	Blood Impurities	Hamdard
Cap: Safi	Skin diseases (like-Acne, pimple, boil, skin eruption, psoriasis, vitiligo, <i>eczema</i> heat rash, itching, etc)	Laboratories (Waqf) BD.
	Constipation;	
	Measles;	
	Burning sensation	

Majone Juzam, Majone Musaffi Arq Bokhar etc.

Cautions

Chiretta should be avoided by people with gastric or duodenal ulcers. This herb is considered safe when taken as prescribed. Do not medicate yourself with this herb, only use it under the supervision of a qualified practitioner.

Future Trends

Swertia Chirata is now considered as the potential subject to cure Diabetes. In the Annual Professional Conference of Diabetes UK, held in Glasgow in March 2009, researcher announced this finding. They are of the opinion that the bark of this plant will be helpful in the cure. Its extracts are found to stimulate insulin production and improve its action on glucose control.

Conclusion

Chirayata is an excellent remedy for strengthening the stomach and promoting its action. It is used in the treatment of dyspepsia and diarrhea. Chiretta stimulates the digestion and helps to normalize blood sugar, which makes it useful for diabetics. Studies with animals suggest that this herb reduces the sugar levels only when they are high, which lowers the risk of hypoglycaemia.

Conflicts of Interest

The author declare no conflict of interests.

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