



KUTKI: An Important Himalayan Herb

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ABSTRACT

India occupies a special place in the globe in the ancient system of medicine and has a great biodiversity of medicinal and aromatic plants. Medicinal plants have served as the basis for medical treatments for a large portion of human history and this type of traditional medicine is still commonly used today. There is still a tonne of medicinal plants that have not yet been identified or used for their supposed therapeutic benefits, *Kutki* is one such common ayurvedic herb that may be found deep within the Himalayas, yet most of us are either unaware of it or are just vaguely familiar with its healing properties. It is traditionally recommended and used in Ayurveda, mainly for hepatic disorders. Other different pharmacological activities of *P. kurroa* include anti-inflammatory, anti-microbial, anti-diabetic, immunomodulator etc. It is commonly known as *Kutka or, Karu* and belongs to the family Scrophulariaceae. More than 50 secondary metabolites have been found in the dried rhizome and roots of this plant, predominantly which is used for medicinal purposes. While being used for various conditions the indiscriminate exploitation of this plant for medicinal purposes, has made it endangered in various regions.

KEY WORDS: - Hepatoprotective, Endangered, Phytoconstituents, Himalayan herb, Metabolites.

INTRODUCTION

Picrorhiza is derived from the Greek language, where 'picros' means "bitter" and 'rhiza' means "roots" referring to the 'bitter taste of root.' The specific word is given from a Punjabi name of the plant "Karu" meaning bitter. *P. kurroa-Kutki* is a shrub naturally grown at high altitudes in the sub-Himalayan zones of China, Pakistan, India, Bhutan, and Nepal. The roots and rhizomes have significant medicinal significance and are now known to contain various useful photoactives.

In Nepal, rhizomes of this plant are widely used for medicinal purposes by specialists trained in the Tibetan medical system (Ghimire et al., 2005), while in *Ayurveda* it is mentioned for its potent hepatoprotective action and for diverse clinical conditions such as anorexia, burning sensation, fevers, especially intermittent fevers, prediabetes etc. *P.kurroa-Kutki*, as a medicinal plant, has been mentioned in all the three major ancient treatises of *Ayurveda* i.e. *Charaksamhita*ⁱ, *Sushrut-samhita*ⁱⁱ and *Ashtang-hrudaya*ⁱⁱⁱ. It is also used as an anti-inflammatory, anti-microbial, anti-diabetic, immunomodulator, anti-asthmatic and in the management of obesity.^{iv} Predominantly it is used for Hepatobiliary and gastrointestinal disorders. The plant's dried roots and rhizomes are its most valuable component and are frequently used for therapeutic purposes. Small doses of *P. kurroa* is considered as stomachic, cholagogue, laxative, and if taken in large amounts then cathartic (Arya et al., 2013). *Nighantus* have also examined and discussed the qualities and dosages of *P. kurroa* for treating various illnesses. In Indian Mythology it is believed that this herb *katuka* is known as *Dhanwantary-grasty* because it is claimed to have been given by *Dhanwantary*, the God of medicine himself.^v Majority of the *Nighantus* compiled during the mediaeval time, like *Bhavprakash Nighantu*^{vi}, *Madanpal Nighantu*^{vii}, *Kaiyadev Nighantu*^{viii}, *Raj Nighantu*^{ix}, and many others, reference of *P. kurroa-Kutki's* clinical uses are found. *Adarsha Nighantu* also explains how to properly use the herb's root portion as the recommended daily dose.^x Due to over exploitation from natural habitat, this plant has been declared as an endangered species (Bhat et al., 2012; Singh et al., 2011). The International Union for Conservation of Nature (IUCN) reported that this species should be protected under the rare endangered species (RET) category.

NIRUKTI OF KUTAKI

- a. **Tikta:** Means bitter, it is bitter in taste thus called *Katuki/ Katuka*
- b. **Katuka:** Because it increases the bile secretion in our body.

The Scientific name of kutki is *Picrorhiza kurroa* and it comes under the family Scrophulariaceae. In English it is called as yellow Gentian, Indian Gentian and, Hellebore.

CLASSIFICATION IN AYURVEDIC TEXTS

Charaka has mentioned kutki in *Bhedaniya*, *Lekhaniya*, *Stanyashodhana Mahakashaya* and in *Tikta-skandh*, while *Sushruta* and *Vagbhata* both has mentioned Kutki in *Patolyadi*, *Pippalyadi* and *Mustadi Gana*.



Figure 1. Roots of Picrorhiza kurroa



Figure 2. Plant of Picrorhiza kurroa



Figure 3. T. S. of P. kurroa root (Showing chakra)

SYNONYMS

Hindi/ Sanskrit: -

Kurri, Kuru, Kutka, Tikta, Tiktahini, Rohini

Matsyashakla- as its smell is like Matsya(fish)

Katukarogan- as it is very bitter in taste

Matsyapitta- taste is like pitta of Matsya(fish)

Krishnbheda- when consumed it causes black discoloration of stools

Chakrangi- the T.S. of this plant resembles a chakra (circular in shape)

Shakuladani- as it is consumed by fish (shakula)

Kandruha- it can regrow from the cut part

AYURVEDIC PROPERTIES

कट्टी तु कटुका पाके ततक्ता रूक्षा तिमा लघुः ।

Kutki is Katu (Pungent) in Vipaka, Tikta (Bitter) in rasa, has sheet veerya (Potency) and possesses Ruksha (Dryness) and Laghu (Lightness) Guna.

BOTANICAL DESCRIPTION

P. kurroa is a hairy perennial herb with bitter roots. It usually grows in rocky surfaces in organic and moist soil, up to 20cms. **Leaves** are 5- 15 cm long, Oblanceolate, toothed, narrowed to a winged stalk, and are alternately arranged on the stem. **Flowers** are small, pale, or purplish blue, borne in cylindric spikes, and are 5 lobed. Flowering period lasts long and usually takes place from June to august. **Fruits** are ovoid capsular in shape. The plant **roots** are typically connected to rhizome and are elongated, tubular, straight or slightly curved with a few longitudinal and spotted scars. The plant's most beneficial part is its **rhizome** which is often thick, subcylindrical, straight or curved, and has a tinge of greyish- brown. It is visually distinguished by longitudinal furrows and spherical scars left by the roots.

VARIETIES

There are two varieties describes in *Nighantu* i.e., *Katuka rohini* (*P. kurroa*) and *Ashoka rohini* (*E. paniculate*)^{xi}

PHYTOCHEMICAL PROPERTIES

This incredible herb contains iridoid glucosides such as picroside I, picroside II, picroside III, picroside IV, kutkoside, pikuroside, d-mannitol, and flavonoids like apocynin and vanillic acid. Kutkin comprising of kutkoside and the iridoid glycosides (Picroside I and Picroside II) which are used in more than 2000 herbal formulations. The other major chemical constituents are Kutkiol, Kutkisterol, apocyanin, phenol glucosides, androsim, and picein iridoid glycosides, Kutkoside, minecoside, picrorhizin, arvenin III. The genus *Picrorrhiza* in total consists 22 types of IGs (a form of natural material used for therapeutic purposes). The seven different kinds of such glycosides as kutkoside, kutkin, pikuroside, picroside V, bartsioside, boschnalioside, and mussaenoidic, together called "iridoid glycosides" make *P. kurroa* unique.

They are found in the plant's leaves, roots, and rhizomes.^{xii}

EFFECT ON DOSHAS

The bioactive ingredients in this bitter herb balances the *Pitta* (fire and air) dosha and *Kapha* (earth and water) dosha and often an excess of it can aggravate the *Vata* (air) dosha. Due to its dry and light features, the herb aids in reducing the *pitta* and *kapha* doshas in the head and chest, which helps to maintain a normal body

temperature. It also aids in cutting through the thick rheum matter created by elevated *kapha dosha*. Being a *Pitta* pacifier, it also strengthens the vital organ and detoxifies the blood and liver while promoting cellular growth and tissue regeneration. Kutki exhibits a beneficial influence on the various *Dhatus* (i.e., body tissues), including *Rasa* (i.e., Plasma), *Rakta* (i.e., Blood), *Mamsa* (i.e., Muscles), *Asthi* (i.e., Bones), and *Shukra* (i.e., Reproductive Fluids), due to its inherent qualities and *dosha*^{xiii}

PHARMACOLOGICAL ACTIONS

This bitter ingredient is wonderful for boosting metabolism, encouraging healthy elimination of extra fat and cholesterol, and stimulating the digestive fire. The pharmacological importance of *Picrorhiza kurroa* has been demonstrated due to picroside (picroside-I and picroside-II) and other metabolites like picroside-III, picroside-IV, kutkoside, etc. The mechanisms of these metabolites appear to be mainly acting through anti-oxidant, anti-inflammatory and antiapoptotic mechanisms.^{xiv} Cucurbitacins and other Phenolic components are the other constituents that are extracted from *P. kurroa*.

Hepato-protective action: - *P. kurroa* roots and rhizomes have been used in *folk* and traditional medicine systems to protect the liver. In liver injury mainly “Kupffer cells” cause problems in regeneration process and here the extract of this plant plays its role by suppressing the cells^{xv}. Picroside-II, the active ingredient in *P.kurroa-Kutki*, reduces fatty acid accumulation in liver cells via modulation of fatty acid uptake and synthesis^{xvi}. Also powder of the roots and rhizomes of this plant is used to treat certain liver diseases like jaundice and liver infections.

Respiratory action: - *Kutki* is useful in all types of respiratory issues as it has antiinflammatory, anti-microbial, and anti-asthmatic properties. Phenolic Glycoside named androsin is found prominently active in anti-asthmatic effects. It helps in expelling the mucus and helps in thinning and, loosening of rheum particles from chest and nasal canals. It is beneficial in treating bronchitis, asthmatic conditions, cough, common cold, sore throat etc. It also inhibits histamine release in lungs thus reducing the inflammation.

Anti- microbial action: - Apocynin, a constituent of *P. kurroa*, is a catechol, which is a strong anti-inflammatory agent, while cucurbitacin's are highly cytotoxic and antitumor in nature. Dried stem part of this plant exhibits broad antibacterial action against various pathogenic microorganisms.^{xvii}

Anti-diabetic action: - *Kutki* helps in production of insulin from the beta pancreatic cells, and helps in reduction of conversion of glucose from starch, thus leading to low blood glucose level.

Anti- Oxidant action: - Ethanolic extract of rhizome scavenge the free radicals, which in turn can prevent several diseases. It can be used as a natural antioxidant supplement and plays an important part in disorders linked to oxidative stress.^{xviii}

In Vitiligo: - Vitiligo can be prevented using *Kutki*. The plant has been observed to aid in repigmentation recovery in vitiligo.^{xix}

In Ulcers: - Picrorhiza is known as a potent immune stimulant and herb that restores liver tropho. *Kutki* emphasizes on endothelial growth and mucus production in the gastric wall and helps in recovery of the inflamed mucosal layer. The anti-inflammatory and anti-ulcer properties of *kutki* root and rhizome plays an essential role in the treatment of several ulcers, including ulcerative colitis, peptic ulcers, canker sores, mouth ulcers, etc.

In Arthritis: - Due to its anti-inflammatory and anti-arthritic properties, *kutki* root is frequently used to alleviate pain and inflammation associated with arthritis (*Amavata*). Apocynin, which is found in the root of *Kutki* is a potent NADPH (nicotinamide adenine dinucleotide phosphate), oxidase inhibitor and has anti-inflammatory and antioxidant properties. *Kutki* decrease the levels of inflammatory cytokines (IL-1 β , IL-6, and TNF- α) and increased levels of proinflammatory cytokines (IL-10), and suppresses inflammatory TNF-receptor-1, and other inflammatory mediators.^{xx}

In Heart diseases: - *Kutki* strengthens the heart muscles, due to its antioxidative nature. It prevents lipid build up, hence lowering the cholesterol level and thus reduces the risk of heart attacks, blood clots, atherosclerosis etc. It also dilates the blood vessels, which help controls the high blood pressure.

ADULTERATION

The stems and roots of the same plant are commonly used to adulterate the rhizomes of *Katuka/katuki*. *Gentiana kurroa* Royle, *Gentiana decumbens* Linn. f., *Gentiana tenella* Fries, *Hellebore niger* Linn. are used as substitute for *Katuka*.^{xxi} Roots of *Picrorhiza scrophulariiflora* Pennell, *Actaea spicata*, *Cimicifuga foetida*, *Coptis teeta*, *Cosciniium fenestratum*, *Swertia chirata* are sold in the drug market under the name Kutaki or Karu.^{xxii}

CLASSICAL THERAPEUTIC USES

1. **Hridroga-** *Katuki* and *Madhuka* are taken with sugar dissolved in water in *Pittaj Hridroga*^{xxiii}
2. **Kushtha-***Katuki*, *ativisha*, *ushira* and *Chandana* are collectively given for internal usage.^{xxiv}
3. **Hikka-** *Kutki churna* is given with *Swarn Gaiirik*.^{xxv}
4. **Jwar-Daha-** *Kutki* is mixed with *Karpura* and *Abhinav* and heated for a while, then *ghee* mixed with this can be taken orally.^{xxvi}
5. **Pittaj-Jwara-** It is said that there is no other *aushadhi* as *Kutki* for *Jwara*. *Kutki* is mixed with *Mishri* and can be taken orally.^{xxvii}

IMPORTANT FORMULATIOS CONTAINING KUTKI

Due to the therapeutic capabilities and intense bitterness of *Kutki*, it has been used for various Ayurvedic formulations such as *Arogyavardhani vati*, *Tiktaka ghrita*, *Mahatiktaka ghrita*, *Sarva jvarahara lauha*, *Katukadya ghrita*, *Mahayograj Guggulu*, *Sudarshan churna*, *Katukadya avaleha*, *Kaalmeghasava*, AYUSH- 64.

CONCLUSION

From the above review it is evident that the plant *P. kurroa* is a significant plant species in terms of its ethnobotanical relevance. It is commonly used in the conventional health care system. This plant is incredibly promising since, in addition to its roots and rhizomes, it also produces a range of components in its leaves, stem, and seeds. While due to over exploitation of this plant, it is listed as threatened by the IUCN (International Union for Conservation of Nature) therefore it is important to protect and conserve this plant, so that new drug formulations can be developed.

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