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AYURVEDIC ASPECT OF *KATUKI:* A LITERATURE REVIEW

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ABSTRACT

Katuki, also known as picrorrhiza, is a very rare and potent medicinal plant found only in the high Himalayan region. It is very popular in the world of alternative medicine especially in Ayurveda and used to treat several diseases such as *yakrit vikara, prameha, jwara, kustha, arocaka, rakta vikara* etc. Katuki balances the three doshas (*vata, pitta* and *kapha*) of the body, which can produce disease while get vitiated. Katuki is used as a single herb and also as an effective ingredient of various medicinal formulations. This review was done to collect all information regarding Katuki available in various classical as well as modern literature in one place. In the last few decades, there has been a comeback interest in katuki's pharmacology, pharmacognosy and phytochemistry which is very remarkable. The active phytochemical compounds of *P. kurroa* such as kutkin, picroside I, II, & III picrorhizin, kutkiol, kutkiserol, D-mannitol, glycosides etc. are found to have hepato-protective, anti-diabetic, anti-inflammatory, immune-modulatory, anti-microbial activity from various research studies.

KEYWORDS: Katki, picrorrhiza, hepato-protective, P. kurroa.

INTRODUCTION

Katuki is being used in the Indian ayurvedic science since the ancient times. Now-a-days, the use of katuki is increased to prevent and cure the various diseases due to its medicinal benefits and its efficacy on the human beings. As katuki has a soothing effect, it can eliminate the excessive heat from the body. Katuki balances the three doshas (vata, pitta and kapha) of the body, which can produce disease while get vitiated. It is beneficial especially in hepatic

diseases, diabetes and disorder of digestive system. It is found to have various chemicals named kutkin, picroside, picrorhizin etc. which acts as a hepato-protective.

AIMS AND OBJECTIVES

This study is done to evaluate the information available regarding katuki in various literature. The main objective of this study is to keep the comprehension of katuki under one title.

Fig. – Katuki plant and rhizome.

A. Scientific Name[1] : *Picrorhiza kurroa* Royel ex Benth

B. Family[1] : Scropulariaceae

C. Taxonomical classification according to Bentham and Hooker (1862-1883)

Kingdom:	Plantae
Subkingdom:	Viridiplantae
Infra kingdom:	Streptophyta
Super division:	Embryophyta
Division:	Tracheophyta
Subdivision:	Spermatophytina
Class:	Magnoliopsida
Superorder:	Asteranae
Order:	Lamiales
Family:	Scrophulariaceae
Genus:	Picrorhiza
Species:	Picrorhiza Royle ex Benth

D. Vernacular names[1]

English	:	Pierorhiza, Hellebore
Arabic	:	Kharbaqehindi

Bengali : Kutki, Kuru

Hindi : Kutki

Gujrati : Kadu

Tamil : Katukarogini

Punjabi : Kaundd

Telugu : Katuka

Malayalam : Kadukrohini

Marathi : Kali-Kutki

Assamese : Katki

Oriya : Katuki

Sanskrit : Katuka, Katurohini, Anjani, Arishta, Ashoka, Ashokarohini, Chakrangi, Matsyashakala, Matsyapitta

Table No 1: Showing synonyms of Katuki in different Nighantu.

Name	BN[3]	MPN[4]	DN[5]	PN[6]	RN[7]	Shali.N[8]	NA[9]	SN[10]	KN[11]
Asoka	+	+	-	-	-	+	-	-	-
Cakrangi	+	+	+	-	+	+	-	-	+
Kandaruha	+	-	+	-	+	+	-	-	+
Katambhara	+	-	-	-	-	+	-	-	-
Katuka	+	-	-	+	+	+	-	-	-
Katurohini	+	+	+	-	+	+	-	-	-
Katbi	+	-	-	-	-	+	-	-	+
Matsyapitta	+	+	+	-	+	+	-	-	+
Matsyasakala	+	+	+	-	-	+	-	-	+
Rohini	+	+	+	-	-	-	-	-	-
Sakuladani	+	+	+	-	+	+	-	-	+
Tikta	+	+	+	-	-	+	-	-	+
Aristha	-	-	+	-	+	-	-	-	-
Panduruha	-	+	-	-	-	+	-	-	-
Arsnabheda	+	+	+	-	+	-	-	-	-
Dvijangika	-	+	-	-	-	-	-	-	+
Matsya	-	+	-	-	-	-	-	-	-
Anughni	-	-	+	-	+	-	-	-	-
Sataparba	-	-	+	-	+	+	-	-	-
Biprangt	-	-	+	-	-	-	-	-	-
Janant	-	-	+	-	+	+	-	-	+
Bakula	-	-	-	-	+	-	-	-	-
Sadani	-	-	-	-	+	-	-	-	-
Matsyabhedini	-	-	-	-	+	-	-	-	-
Krishna	-	-	-	-	+	+	-	-	-

(+ denotes presence, - denotes absence)

BN- Bhavaprakash Nighantu, MPN- Madanpala Nighantu, DN- Dhanwantari Nighantu, PN- Priya Nighantu, RN- Raja Nighantu, Shali.N-Shaligram Nighantu, NA-Nighantu Adarsa, SN- Sankar Nighantu, KN- Kaiyadeva Nighantu.

E. Classical categorisation of Katuki

The classical categorisation of katuki in different classics are as follows.

1. Bhavprakash Nighantu- Haritakyadi Varga
2. Madanpal Nighantu- AbhayadiVarga
3. Dhanwantar Nighantu- Guduchyadi Varga
4. Priya Nighantu- Satapuspadi Varga
5. Raj Nighantu – Pippaladi Varga
6. Shaligram Nighantu - AstaVarg
7. Nighantu Adarsa (Purbardha) – Tiktolomikadi Varga
8. Sankar Nighantu- Prathambhag
9. Kaiyadeva Nighantu- Aushadhi Varga

Literary Reviews of Katuki: Katuki is known as Kutki or Katuka in Ayurveda. The earliest knowledge of this plant is found in Vedas which are usually accepted, as the oldest repository knowledge of Hindus. In Yajurveda the plant is described as a tonic which promotes the health. Its use in some of the diseased condition is also found in Atharva Veda. In Ayurvedic literatures starting from Charaka samhita, Sushruta samhita to various Nighantus we get scattered references of plant katuki.

F. Botanical Description[2]: Creeping herb, this spread by stolons. A whorl of radical leaves arises from rhizome tip. **Leaves-** Leaves are 5-10 cm long, oval in shape with a sharp apex, flat and serrate. **Stem-** Stem is represented by stolon and underground rhizome which bear leaves and flowering scape. **Root-** Primary root grow maximum up to 38cm in length, but usually 6-10inches long. Many adventitious roots arise from the rhizome. **Flowers-** Flowers are white or pale purple, bisexual and having convex thalamus. **Fruit-** Capsule, 1-15 cm long and oval shaped. **Seed-** Extremely small sized 1 mm long and 1mm wide. Embryo is enclosed in the large bladdery loose hyaline reticulate taste.

G. Distribution[2]

Found in the alpine Himalayas from Kashmir to Sikkim, at an altitude of 7000 to 1400 ft. In Himachal Pradesh it is found in Thamsar and Dainasar areas of Bara and chhota Bhangal in

Kangra district. Pangi - Bharmour of Chamba district, Rohtang pass in Kullu, Shimla district etc. especially in higher exposed Rocky slopes. Found in Nepal, China (Yunnan).

H. Ayurvedic Properties[1]

Rasa: Tikta

Guna: Ruksha, Laghu

Virya: Sita

Vipaka: Katu

Karma: Kapha-pitta hara

Table No 2: Showing the Properties of Katuki in different classics.

Properties	BN[3]	MPN[4]	DN[5]	PN[6]	RN[7]	Shali.N[8]	NA[9]	SN[10]	KN[11]
Rasa	Katu	Tikta	Tikta Katu	Tikta	Tikta Katu	Tikta	Tikta Katu	Katu	Tikta Katu
Guna	Laghu Ruksa Tiksna	Laghu Ruksa Sara	-	-	-	Laghu	-	Laghu Ruksa Tikshna	Laghu Ruksa
Virya	Sita	Sita	Sita	Usna	Sita	Sita	Sita	-	Sita
Vipak	Katu	Katu	-	-	-	-	Katu	-	Katu

BN- Bhavaprakash Nighantu, MPN- Madanpala Nighantu, DN- Dhanwantari Nighantu, PN- Priya Nighantu, RN- Raja Nighantu, Shali.N-Shaligram Nighantu, NA-Nighantu Adarsa, SN- Sankar Nighantu, KN- Kaiyadeva Nighantu.

I. Dosa Karma

Table No 3: Showing the actions of Katuki on dosha in different classics.

Name	BN[3]	MPN[4]	DN[5]	PN[6]	RN[7]	Shali.N[8]	NA[9]	SN[10]	KN[11]
Dosha Karma	Pitta Kapha Samak	Pitta Kapha Samak	Pitta Kapha Samak	Pitta Kapha Samak	Pitta Samak	Pitta Kapha Samak	Pitta Kapha Samak	Kapha Samak	Pitta Kapha Samak

BN- Bhavaprakash Nighantu, MPN- Madanpala Nighantu, DN- Dhanwantari Nighantu, PN- Priya Nighantu, RN- Raja Nighantu, Shali.N-Shaligram Nighantu, NA-Nighantu Adarsa, SN- Sankar Nighantu, KN- Kaiyadeva Nighantu.

J. Therapeutic indications

Table No 4: Showing Therapeutic Indications of Katuki in different classics.

Name	BN[3]	MPN[4]	DN[5]	PN[6]	RN[7]	Shali.N[8]	NA[9]	SN[10]	KN[11]
Jvara	+	-	-	-	+	-	-	+	+
Mutratisara (poly urea)	+	-	-	-	-	-	-	-	-
Svasroga	+	-	-	-	+	+	-	+	-
Kasa	+	-	-	-	-	+	-	+	+
RaktaVikar	+	-	-	+	-	+	-	+	-
Daha	+	-	-	-	-	+	-	+	+
Kustha	+	+	-	+	-	-	+	-	+
Krimi	+	-	-	+	-	+	-	+	+
Hridroga	-	+	-	-	-	-	+	+	-
Pandu	-	+	-	-	-	-	-	-	-
Visamajvara	-	-	+	-	-	-	-	+	-
Yakritroga	-	-	-	+	-	-	-	-	-
Kamala	--	-	-	+	-	-	-	-	-
Vibandha	-	-	--	+	-	-	-	-	-
Balasroga	-	-	-	-	+	-	-	-	-
Prameha	-	-	-	-	-	+	-	+	+
Stanya Sodhan	-	-	-	-	-	-	+	-	-
Kapha Pittajvara	-	-	-	-	-	-	+	-	-
Hikka	-	-	-	-	-	-	-	-	-
JvaraDaha	-	-	-	-	-	-	-	-	-
Pitta Jvara	-	-	-	-	-	-	-	-	-

(+ denotes presence, - denotes absence)

BN- Bhavaprakash Nighantu, MPN- Madanpala Nighantu, DN- Dhanwantari Nighantu, P.N- Priya Nighantu, RN- Raja Nighantu, Shali.N- Shaligram Nighantu, NA-Nighantu Adarsa, SN- Sankar Nighantu, KN- Kaiyadeva Nighantu.

K. Chemical Constituents[1]

Major chemical constituents of Katuki are D-mannitol, Katkiol, Kutkisterol, Apocyanin, Phenol, Glucoside, Minecoside, picrorhizin, Arvenin III, Picrosides I, II and IlI, Pikuroside, Kutkoside, Cucurbitacins, glycosides, Apocynin, Androsin, Picen, Vanilicacid, Veronicoside, Minecoside, 6-feruloylcatalpol etc.

L. Pharmacological activities

Immunomodulatory activity: The effect of an ethanolic extract of Katuki was studied on delayed type hypersensitivity, humoral responses to sheep red blood cells, skin allograft rejection, and phagocytic activity of the reticuloendothelial system in mice.[12]

Hepato-protective Activity: Katuki has been widely known and used as hepato-protective agent. In liver injury mainly Kuffer cells cause problems in regeneration process and it here when extract of this plant plays its role by suppressing cells.[13] Picroliva iridoid glucoside compound [mixture of Picroside-1 and Kutkoside from rhizome and roots of this plant is prominently known to help in regeneration. This hepatoprotective activity of picroliv was studied in rat's liver where hepatic injury was induced by ethanol.[14] This plant has been currently used in treating various liver diseases which includes fatty liver, viral hepatitis, ischemic injury, cirrhosis, radiation toxicity etc. Studies proved picroliv effective in hepatoprotective action against paracetamol, carbon tetrachloride, alcohol and aflatoxin Zhang, et al.[15]

Anti-inflammatory activity: Picroliv is also known for anti-inflammatory responses. Rhizome extracts was reported to be effective in a dose dependent manner in rats against carrageenan induced paw oedema and cotton pellet-induced granuloma formation.[18] Picroliv role was also studied for anti-inflammatory response in ulcerative colitis (UC) mice model which suggested that its administration could be a therapeutic approach.[15] Alcholic extract of kurroa and compounds kutkin, Picroside-1 and Kutkoside have been reported for their anti-inflammatory activity.[19]

Anti-Diabetic Activity: Extract of this plant is providing beneficial results in diabetes also. Study has demonstrated that its administration increased insulin production in rats which had Streptozotocin Evoked β-Cell Damage.[18] In vivo studies in rats suggested that its extract played potential role in type-2 diabetes induced by streptozotocin-nicotinamide.[16] An alcoholic extract of Picrorrhiza kurroa was found to lower blood glucose in basal conditions and after a heavy glucose load in normal rats. Maximum reduction in serum glucose was observed after 2 h at a dose level of 75 mg extract/kg of body weight. P. kurroa extract was also found to reduce the increase of blood sugar in alloxan-induced diabetic rats (43% at 75 mg/kg body weight and 60% at 150 mg/kg body weight). Chronic administration of the extract significantly reduced the blood sugar in alloxan-induced diabetic rats for several days (10 days). The extract was also found to reduce the increased blood urea nitrogen and serum lipid peroxides in alloxan-induced diabetic animals and to inhibit the body weight reduction and leukopenia induced by alloxan administration. These results indicate that P. kurroa extracts are able to ameliorate biochemical damages induced by alloxan in diabetic rats.[20]

Anti-Microbial Activity: The antibacterial and antifungal activity of Katuki extract was evaluated by using cup plate method, where they found methanolic extract inhibit bacterial strains *E. coli, B. subtilis, S. aureus* and aqueous extract inhibit fungal strain *A. niger* and *C. albicans.*[21] In another study by using agar well diffusion method they found ethanolic extract of rhizome showed high antibacterial activity in the range 10.3 to 16.16 mm against *S.aureus, B.cereus, E.coli, K.pneumoniae, S.typhi* and *S.pyogens* whereas the methanolic extracts showed high antibacterial activity against *S.aureus* (12.1 ± 0.13mm) and *P.aeruginosa* (13.06 ± 0.15mm) Kumar, et al.[22]

Anti-Oxidant Activity: Ethanolic extract of Katuki rhizome has been reported in scavenging free radicals which ultimately can prevent many ailments in humans. It has also its role in diseases related oxidative stress and it can also be given as natural antioxidants supplement.[24]

K. Parts Used[1]: Root, underground Stem.

L. Dosage[1]: Powder - 0.5- 1 gm. (therapeutic) and 3- 6 gm. (purgative).

M. Indication[1]: Jvara, Prameha, Svasa, Kasa, Raktavikara, Daha, Kustha, Krimi, Aochaka, Visamajvara.

N. Formulation and Preparations[1]

Arogyavardhini vati, Katukadya Louha, Sarvajwarahara Louha, Tiktadya ghrita, Jatyadi ghrita, Phalagrhita, Katukadya ghrita, Mahatiktaka ghrita, Punarnavasava, Kumaryasava, Sarivadyasava, Rodhrasava, Nimbadichurna, Sudershana, Katurohini churna, Katurohinikalpa, Tiktadi kwatha, Panchabhadra kwatha, Patoladi kwatha, Kiratakadi kwatha.

CONCLUSION

As we got detail information regarding katuki form various classical literatures, we can come into conclusion that katuki is one of the most effective drug use to treat various ailments specially hepatic disorders, which is also supported by various modern literatures based on research.

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