



PHARMACOGNOSTICAL AND PHYTOCHEMICAL EVALUATION OF PICRORHIZA KURROA ROYLE EX BENTH (SCROPHULARIACEAE) RHIZOME

Dr. Priti Arikar

MD Final year scholar, Department of Dravyaguna, ITRA Jamnagar.

Vd. Bhupesh R. Patel

HOD, Department of Dravyaguna, ITRA Jamnagar.

ABSTRACT Now days, one of the major lacunae in the ayurvedic system of medicine is adulteration of medicinal plant species i.e., Raw drugs. Drug sellers for their financial gains adulterate the raw drugs with cheap, similar looking drugs or other substances. So, it has become necessary for the Ayurvedic Physician and Pharmaceuticals to identify raw drug before its clinical use. Therefore, this study was designed to establish various pharmacognostical and pharmaceutical standards to ensuring identification of valuable ayurvedic herb Katuki (Picrorhiza Kurroa Royle ex Benth) belongs to the family Scrophulariaceae. The drug is reputed for its hepatoprotective, anti-inflammatory, anti-cancerous, anti-microbial antioxidant activity, anti-diabetic properties, and also having properties like Bhedana, Lekhana, Pittavirechaka etc. For the medicinal purpose Rhizome is the part used. thus, macroscopic and microscopic characters of powder rhizome preliminary phytochemical tests and HPTLC were studied. The Macroscopic study of rhizome and its powder indicate organoleptic characters, While microscopic study of powder rhizome showed the presence of starch grains, xylem, phloem, cork, pith, lignified fibers. Preliminary phytochemical study also reveals that the LOD 1.88%, Ash value 0.77%, water extractive value 20.22% and alcohol extractive value as 25.56%, alcohol soluble values are indicative of the bioavailability of the plant. & HPTLC study reveals that the particular Rf values gives an identification criteria for the species. 0.03 in track 1, 0.03 and 0.55 in track 2, and 0.25 in track 3 are commonly found on both short and long UV Rays.

KEYWORDS : Katuki (Picrorhiza Kurroa Royle ex Benth). Pharmacognosy, Scrophulariaceae.

INTRODUCTION:

Picrorhiza kurroa belongs to the family Scrophulariaceae is well known herb for its hepatoprotective actions and its wide range of pharmacological activities. The drug is known to be in medicinal use since 5000 years. Generally, occurs in Alpine Himalayas from Kashmir to Sikkim, alt. 9-15,000 ft, common. It is a hairy herb with perennial, bitter rootstock. The rhizome has fleshy scales, on transverse section blackish circular ring is seen. **Leaves** are 5-10 cm long, rather coriaceous, tip rounded, base narrow into a winged sheathing petiole. **Spikes** 5-10 cm long sub cylindric obtuse many flowered, sub hirsute, bracts oblong or lanceolate as long as calyx. **Sepals** 6 mm long ciliated corolla is short stamened from 6 mm long with longer filament 8 mm. **Rhizome** is straight or slightly arched cylindrical upto 12 cm long and 4-10 mm in diameter. Katuki is known to help in removing excess Pitta from the body thus acts as Pittavirechani. Katuki having Tikta Rasa (bitter) Sheeta Veerya, Katu Vipaka, Laghu and Ruksha Guna with its Bhedana and Lekhana effect. The pharmacognostical and phytochemical studies of rhizome, which is one of the important useful parts of plant was carried out for identification point of view and to find out various medicinal importance of the plant.

Taxonomic position of Picrorhiza kurroa Royle ex. Benth.

Kingdom: Plantae

Class: Dicotyledonae

Subclass - gamopetalae

Order: perstinales

Family: Scrophulariaceae

Genus: Picrorhiza

Species: Picrorhiza Kurroa

Types Of Katuki: The Nighantu works have described two varieties of Katuki i.e., Katukarohini (P. kurroa), Ashoka rohini (E. paniculata)

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., Gentianatenella Fries, Helleboursniger Linn. are used as substitute for Katuka. Roots of Picrorhizascrophulariiflora Pennell, Actaea spicata, Cimicifugafoetida, Coptisteeta, Coscinumfenestratum, Swertia chirata are sold in the drug market under the name Kutaki or Karu. Roots of Lagotis glauca Gaertn. are sometimes intentionally collected and mixed by the local sellers of Kashmir and Kullu regions.

Aims And Objectives:

1. To evaluate macroscopic characters of Picrorhiza kurroa and its powder by organoleptic method.
2. To study microscopic characters of rhizome of Picrorhiza kurroa.
3. To establish identification criteria for the species through HPTLC study.

MATERIAL AND METHODS:

A) Materials

The useful part of Katuki is rhizome, thus only rhizome and its powder were studied for macroscopic and microscopic characters.

B) Collection Of Sample

The rhizome of Picrorhiza kurroa was procured from Pharmacy of Hospital.

C) Preparation Of Powder

The procured drug was sorted out for foreign matter. After that finely powdered with the help of mesh no 60 in laboratory of Dravyaguna department, xxxx, xxxxxxxx. It was then packed and stored in air tight containers till further use.

D) Pharmacognostical Study

Macroscopic Study

Macroscopic characters of Picrorhiza kurroa rhizome and its powder were evaluated using organoleptic methods like texture, colour, odour, taste. Organoleptic methods include the tests that can be done by one's sensory organ and quality of drug can be assessed.

Microscopic Study

The dried rhizome was soaked overnight in distilled water. Free hand sections were taken and observed as such to see their cell contents and then stained with phloroglucinol and hydrochloric acid to observe the lignification of the cell wall. Sections and diagnostic characters were observed with their detail photographs separately.

Preliminary analytical tests were also performed to authentication and identification of species, the powder was subjected to determine various physico-chemical constants by the standard procedures mentioned in API. For HPTLC study chromatographic method was also done for confirmation and identification criteria of the respective drug by using various solvents by following standard procedures from Care Keralam Laboratory, Thrissur.

RESULTS:

Macroscopy



Fig 1 Macroscopic presentation of katuki

It is a low, hairy herb with a perennial woody bitter rhizome, 15–25 cm long, covered with dry leaf-bases. It occurs as pieces, 2–4 cm long and 0.3–1.0 cm in diameter. Scales at distant intervals are present, frequently small protuberances, which probably represent accessory buds, are observed both at the rhizomes.

Table no. 1 Macroscopic characters of Raw Katuki Rhizome

Parameters	Katuki (Rhizome)
Length	2±4 cm
Width	0.3±1 cm
Odour	Slightly pungent
Colour	Greyish brownish
Shape	Cylindrical to curved

Table no. 2 Organoleptic characters of powder

Organoleptic character	Findings
Colour	Greyish Brown
Odour	Slightly unpleasant
Taste	Very bitter
Texture	Rough

Microscopic Characters:

Transverse section of the rhizome shows cork composed of several layers of uniformly arranged, tightly packed, thin-walled cells. Cork surrounds a broad cortex, composed of thin-walled; mostly irregularly rounded-oval parenchymatous cells and some of them merge into the secondary phloem tissue, which consists of sieve tubes, companion cells and parenchyma. Cambium is narrow and wavy consisting of several layers of compressed cells. The secondary xylem is composed of thick-walled vessels with annular, spiral or reticulate thickening, tracheid and fibres. Pith is composed of thin-walled parenchymatous cells. Starch grains found throughout the sections.

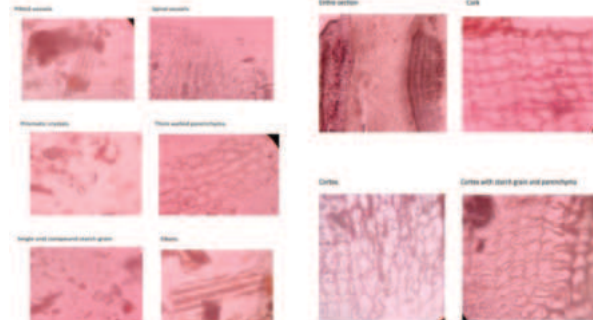


Fig. 2 Microscopy of powder

Fig. 3 T.S. of Rhizome

Physico-chemical Parameters:

Various physico-chemical tests were performed as per the standard procedures mentioned in Ayurvedic Pharmacopoeia and their results were noted down.

Table no. 3 Analytical Study

Name of analysis	Katuki
Loss of drying	1.88%
PH (5% aqueous sol. by PH Paper)	6.5%
Ash value (%)	0.77%
Water soluble extractive (%)	20.22%
Alcohol soluble extractive (%)	25.56%

HPTLC Study: The respective metabolites soluble with the particular solubility with system of methanol and water (35:65), and emits the particular Rf values gives an identification criteria for the species.

DISCUSSION

Macroscopically, *Picrorhiza kurroa* is a low, hairy herb with a perennial woody bitter rhizome, 15–25 cm long, covered with dry leaf-bases. It occurs as pieces, 2–4 cm long and 0.3–1.0 cm in diameter. Scales at distant intervals are present; frequently small protuberances, which probably represent accessory buds, are observed both at the rhizomes and the stolones. Colour is greyish-brown, light, cylindrical, straight or slightly curved, often with remains of aerial stem which is very dark brown and wrinkled longitudinally, upper and lower surfaces bear a few small root scars, numerous scale leaves and thin scars. The T.S. of rhizome of *Picrorhiza kurroa* shows outer cork composed of several layers of uniformly arranged, tightly packed, thin-walled cells. Pitted vessels, Spiral vessels, Prismatic crystals, Cork cells in surface

view, Cork cells in transverse view, Starch grain (simple and compound), Fibers, Thick-walled parenchyma cells, Pith are present. All Observations were found correct as per the standard references.

Physicochemical Analysis: The physical parameters are almost constant for a plant therefore these are helpful to standardize the crude drug. These parameters are important for detection of drug adulteration or improper handling of raw materials. Fine powder of *Katuki* (*Picrorhiza kurroa* Royle ex Benth.) found to be free from any foreign particles which may be due to good quality of drug.

Loss On Drying: An excess of water in drug encourages microbial growth, presence of fungi and deterioration following hydrolysis. This is especially important for material that absorbed moisture easily and deteriorate quickly in presence of water. Moisture content, that is loss on drying of the sample was determined and it was found 1.88%.

Ash Value: It is used to determine quality and purity of a plant. The total ash method is design to measure the total amount of material remaining after ignition. This includes both physiological ash which derived from the plant tissue itself and non -physiological ash which is residue of the extraneous matter adhering to plane surface, it was found 0.77%.

Extractive Values: This method determines the number of active constituents extracted with solvent (Water / Alcohol) from a given number of samples. It gives some idea about the nature of chemical constituent soluble in that particular solvent present in a drug. Obtained value showed that *Picrorhiza kurroa* had the water-soluble value as 20.22% and alcohol extractive value as 25.56%. Alcohol soluble values are indicative of the bioavailability of the plant.

pH Values: The pH value conventionally represents the acidity and alkalinity of an aqueous solution. pH of the sample showed the same value i.e. 6.5 which was slightly acidic in nature. All the values that have been found are similar as per the API Standard.

HPTLC Study

The respective metabolites soluble with the particular solubility with system of methanol and water (35:65), and emits the particular Rf values gives an identification criteria for the species. In this Profile, Rhizome of *Picrorhiza kurroa* at 254 nm, 10, 9 and 10 spots at track 1, 2 and 3 respectively while at 366 nm number of spots number of spots were 7, 9 and 7 at track 1, 2, and 3 respectively.

The Rf values found common in track 1 at 254nm and 366 nm are 0.03, 0.14, 0.25, 0.38, 0.53, 0.75, 0.85. In track 2 common values was 0.03, 0.14, 0.24, 0.36, 0.44, 0.55, 0.75, 0.87. In track 3 0.02, 0.25, 0.38, 0.53, 0.75, 0.87 are found respectively at 254 nm and 366 nm. 0.03 in track 1, 0.03 and 0.55 in track 2, and 0.25 in track 3 are common on both the UV Rays.

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REFERENCES

1. Flora of British India by J.D. Hooker, C.B. K.C.S.I. published under the authority of the secretary of state for India in Council. London, L. Reeve and Co., 5 Henrietta Street, Covent Garden. 1885. volume iv
2. Flora of British India by J.D. Hooker, C.B. K.C.S.I. published under the authority of the secretary of state for India in Council. London, L. Reeve and Co., 5 Henrietta Street, Covent Garden. 1885. volume iv
3. P.V. Sharma (1982) Dhanvantray Nighantu.
4. J.L.N. Sastry, Tanuja M. Nesari (2018) A textbook of Dravya Guna Vijnana, page no. 159-162.
5. Dorsch W, Stuppner H, Wagner H, Gropp M, Demoulin S, et al. (1991) Antiasthmatic effects of *Picrorhiza kurroa*: Androsin prevents allergen and PAF-induced bronchial obstruction in guinea pigs. *Int Arch Allergy Appl Immunol* 95(2-3): 128-133.
6. Quality standards of Indian medicinal plants, edited by Neeraj Tandon, Volume 9 Chapter no. 28, published by ICMR New Delhi, page no. 293
7. Quality standards of Indian medicinal plants, edited by Neeraj Tandon, Volume 9 Chapter no. 28, published by ICMR New Delhi, page no. 298