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Research Article

Pharmacognostical and Phytochemical Evaluation of *Picrorhiza Kurroa.*

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ABSTRACT
The aim of the present study was to perform pharmacognostical and phytochemical evaluation tests on the roots of *Picrorhiza kurroa.* The various parts of the plant are used traditionally as antipyretic; useful in dyspepsia, bronchitis, inflammations, piles and diseases of the nervous system. It is also used in gastrointestinal, urinary disorder, leukoderma, snake bite, scorpion sting and inflammatory affections. Therefore, an attempt to carry out pharmacognostical studies of plant by various parameters like macroscopy, microscopy, physio-chemical constants and preliminary phytochemical screening was carried out. These studies will help for further development of new drug for better treatment with fewer side effects.

KEYWORDS
Picrorhiza kurroa, Indian medicinal plant, Physico-chemical constant, Phytochemical.

1. INTRODUCTION

The World Health Organization (WHO) defines traditional medicine as the "diverse health practices, approaches, knowledge and beliefs incorporating plant, animal or mineral based medicines, spiritual therapies, manual techniques and exercises applied singularly or in combination to maintain well-being, as well as to treat, diagnose, or prevent illness". Picrorhiza kurroa is an important medicinal plant used in traditional as well as modern medicines. The genus Picrorhiza and its species Picrorhiza kurroa Royle appeared first time on a drawing published by Royle on August 24, 1835 in his Illustration of botany and still known by names Picrorhiza kurroa Bentham or alternatively Picrorhiza kurroa Royle ex Bentham.[1] In Greek, Picros means bitter and rhiza means root. The specific name derived from Karu, the Punjabi name of the plant, which means bitter as well.[2] The Scientific classification is depicted in Table 1 and while Table 2 described morphological characteristics. It is used in treatment of liver disorder, fever, asthma, jaundice caused by environmental pollution, industrial toxicants, food adulteration, malnutrition, excessive consumption of alcohol and certain infections. It is also used in gastrointestinal, urinary disorder, leukoderma, snake bite, scorpion sting and inflammatory affections.[3-6] The root has a very bitter and sharp taste. It is also used as brain tonic and in epilepsy.[7] It contains bitter principle constituent Picrorhizin. It is soluble in water and alcohol.[8]

2. MATERIALS AND METHODS

2.1. Plant material collection

The roots of *Picrorhiza kurroa* were purchase in the month of April, 2012 from local area of Pune. These were authenticated by Dr R.B.Bhagat of Arts, Commerce, Science College, Pirangut, Pune.

2.2. Preparation of the sample

The fresh roots were preserved in 70% ethyl alcohol for histological studies and the rest were dried in shade for two weeks, then powdered, sieved with sieve no. 20 and were packed separately in air tight containers for further analysis. The various pharmacognostical parameter like macroscopy, microscopy, physio-chemical constants, and preliminary phytochemical screenings were studied.

2.3. Preparation of Extract

The roots (1.0 kg) were crushed to a coarse powder and extracted with ethanol using Soxhlet's extractor for 24 h. The extract was concentrated under reduced pressure and then dried in air. This ethanolic extract of roots of Picrorhiza kurroa (SPK) was stored in a refrigerator and reconstituted in water for injection just before use.

2.4. Microscopical Studies

The fresh roots were fixed in formalin 5ml + acetic acid 5ml + ethyl alcohol 90ml for 24 hours and dehydrated with graded series of tertiary butyl alcohol (TBA). Infiltration of the specimens was carried out by gradual addition of paraffin wax until TBA solution attained supersaturation.

Dewaxing of the sections was by customary procedure. The sections were stained with Toluidine blue, safranin and fast green and Photomicrographs were taken on Photomicroscope.

2.5. Physicochemical studies

The loss on drying, ash values, extractive values, were determined as per WHO guidelines.

2.5.1. Loss on Drying

Accurately weighed quantity of sample was taken in a tarred glass bottle and initial weight was taken. The sample was heated at 105°C in an oven and weighed. This procedure was repeated until a constant weight was obtained. The moisture content of the sample was calculated with reference to air-dried drug and the results are in (Table no. 3).

Loss on drying (%) = loss in weight x 100/ w --- (1)

Where w = weight in gm.

2.5.2. Ash Value

Weigh accurately 2 to 3gm of air–dried parts in a tarred platinum or silica dish and incinerate at a temperature not exceeding 450°C until free from carbon, cool and weigh. If a carbon free ash cannot be obtained in this way exhaust the charred mass with hot water, collect the residue on an ashless filter paper, incinerate the residue and filter paper until the ash is white or nearly so, add the filtrate, evaporate to dryness and ignite at a temperature not exceeding 450°C. Calculate the percentage of ash with reference to the air – dried drug.

2.5.3. Extractive Values

The extractive values for various solvents of air-dried sample were evaluated.

i) Water-soluble extractives.
ii) Alcohol soluble extractives

2.5.4. Water soluble extractive values

5 grams of dried parts were added to50ml of boiled water at 80ºC in a stoppered flask separately. It was then shaken well and allowed to stand for 10 minutes so as to cool it and filtered. 5ml of filtrate was transferred to an evaporating dish, which was 7.5 cm in diameter, the solvent was evaporated on water bath, allowed to dry for 30 minutes, finally dried in an oven for 2 hours at 100ºC and residue was weighed. Percentage of water-soluble extractives was calculated with reference to the air-dried drug.

2.5.5. Alcohol soluble extractive value

5 grams of dried parts were macerated with 100 ml of Alcohol in a closed flask, shaking frequently during the first 6 hours and allowed to stand for 18 hours separately. Thereafter, it was filtered rapidly taking precaution against loss of methanol. Evaporated 25ml of

filtrate to dryness in a tarred flat bottom shallow dish dried at 105°C and weighed. Percentage Alcohol soluble extractive was calculated with reference to the air-dried leaves.

2.5.6. Preliminary Phytochemical Screening

The petroleum ether, chloroform, methanol and aqueous extracts of *Picrorhiza kurroa* were investigated for various phytoconstituents present like alkaloids, carbohydrates, glycosides, terpenoids, sterols, tannins and phenolic compound, saponins, protein and amino acid.

3. RESULTS AND DISCUSSION

3.1. Macroscopic Characters

It is 2.5-6 cm long and 3-6 mm thick, straight or slightly curved. It is externally greyish-brown in colour with rough surface having pleasant odour and bitter in taste.

3.2. Microscopy

The transverse section of the root of Picrorhiza kurroa showed the outermost characteristic 20-25 layers of cork and vascular bundles are present in cortex. The vascular bundles are surrounded by single layer endodermis of thick-walled cells. The secondary phloem is composed of phloem parenchyma.

3.3. Physicochemical studies

The physicochemical studies showed the loss on drying (8.42 % w/w), total ash (5.23% w/w), acid insoluble ash (2.84% w/w), water soluble ash (3.35% w/w). Ethanol soluble extractive (23.67%w/w), water soluble extractive (12.2 w/ w), chloroform soluble extractive (4.1 w/w) and petroleum ether soluble extractive (2.0% w/w), these showed the quantity of chemical constituents present in a crude drug sample. The details are in Table 3.

3.3.1. Preliminary Phytochemical Screening

The ethanolic extracts of Picrorhiza kurroa was investigated for various phytoconstituents present like alkaloids, carbohydrates, glycosides, tannins and saponins. The findings are given in Table 4.

4. CONCLUSION

The results of pharmacognostical and phytochemical evaluation tests on the roots of Picrorhiza kurroa gave satisfactory results. The preliminary studies provide an idea about phytocomponent present in it. It may be useful for further studies and will contribute to scientific knowledge.

Table 1. Scientific classification.

Kingdom	**Plantae**
Order	Scrophulariales
Family	Scrophulariaceae
Genus	Picrorhiza
Species	kurrooa and scrophulariiflora

Table 2. Morphological characteristics.

Sr. N0.	**Parameter**	**Result**
1	Colour	Greyish Brown
2	Size	2.5-6 cm long
3	Odour	Pleasant
4	Taste	Bitter
5	Texture	Rough

Table 3. The physicochemical parameters.

Sr. No.	**Name of Parameters**	**Results**
1	pH (10% aqueous solution (v/w)	4.84
2	Loss on drying at 105oC (% w/w)	8.42
3	Total Ash (% w/w)	5.23
4	Acid-insoluble ash (% w/w)	2.84
5	Water-soluble ash (% w/w)	3.35
6	Water-soluble extractive (% w/w)	12.17
7	Alcohol-soluble extractive (% w/w)	23.67

Table. 4. Phytochemical analysis.

Sr. No.	Parameter	Result
1.	Alkaloids	Absent
2.	Carbohydrates	Present
3.	Flavonoids	Present
4	Glycosides	Present
5	Tannins	Present
6	Saponins	Present
7	Proteins	Present
8	Starch	Absent

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