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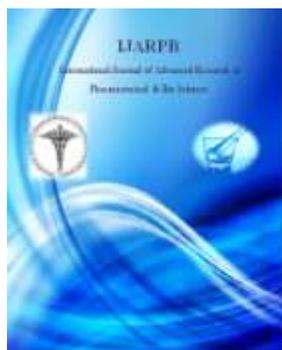
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Pharmacognostical Evaluations of Some Herbal Plant

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ABSTRACT

Picrorrhiza kurroa belongs to the family of *Scrophulariaceae*. The rhizomes are prescribed in the treatment of asthma, Diabetes, Hypertension, fever and several ailments of the liver and spleen. Mungbean (*vigna radiate*) belongs to the family of *fabaceae*. Roots of *V. roxburghii* (*Orchidaceae*). In Ayurvedic system of medicine, the root is considered to be bitter, heating, alexiteric, antipyretic, useful in dyspepsia, bronchitis, inflammations, rheumatic pains, and tremors. Evaluation of the fresh, powdered and anatomical sections of rhizome, root and seed were carried out to determine the micromorphological profiles. Macroscopic studies of roots the, seed, and rhizome indicated size, apex, shape, entire margin, colour test, and texture. In the microscopic studies, the roots showed the presence of spongy velamen tissue, cortex, phloem and xylem, and lignified cells. The rhizome showed presence of cork cells, small vascular bundles, Long Tracheids, and Starch grains. The seed presence of epidermis, parenchymatous cells, and starch grains showed the presence of protein cells. The results of the study could be useful in the identification and preparation of a monograph of the plant.

KEY WORDS: *Picrorrhiza kurroa*, Mungbean, *Orchidaceae*, Microscopy.

(Research Article)**INTRODUCTION**

The Indian subcontinent is considered as a primary or secondary source of origin of orchids. Orchids are the largest and the most diverse group among the angiosperms. They are cultivated for beautiful flowers. They are widely known for their economic importance but less for their medicinal value¹. The *Orchidaceae* is the second largest family of flowering plants in India. *Vanda* is a genus in the family *Orchidaceae*, which includes *Vanda roxburghii* R.Br. commonly called as Rasna². It is an epiphytic herb with leafy stem, which is stout giving rise to many thick fleshy roots. The roots are of two kinds viz. clinging roots and aerial roots. The clinging roots are rather small and creep into cracks in the bark of the tree, on which the plant grows. These clinging roots not only fix the epiphyte to its support but also absorb the nutrients that are found within the debris accumulating on the bark.

The aerial roots hang in the air and are absorbing in nature. Both kinds of roots are provided with a very delicate fibrous special type of absorptive tissue called the velamen which is dead and perforated³. Rasna root is said to be fragrant, bitter and useful in rheumatism and allied disorders in which it is prescribed in a variety of forms⁴. One of the species that emerged from such an inventory is *P. kurroa* Royle. *P. kurroa* forms a major ingredient of many Ayurvedic preparations prescribed in the treatment of asthma, Diabetes, Hypertension, fever and several ailments of the liver and spleen⁵. *Picrorhiza* is a small perennial herb from the *Scrophulariaceae* family. *P. kurroa* has a long, creeping rootstock that is bitter in taste, and grows in rock crevices and moist, sandy soil. The leaves of the plant are flat, oval, and sharply serrated. The flowers, which appear June

through August, are white or pale purple and borne on a tall spike; manual harvesting of the plant takes place October through December. The plant is self-regenerating but unregulated over-harvesting has caused it to be threatened to near extinction. Mungbean, *Vigna radiata* var. *radiata* (L.) Wilczek, is one of the major pulse crops supplementing the cereal-based diet of the poor in Asia today. Mungbean is an erect or sub-erect herb, 0.5-1.3m tall. Flower is pale yellow. The seed color exhibits a wide range of variations from yellow, greenish yellow, light green, shiny green, dark green, dull green, black, brown, and green mottled with black. Pod color is black, brown or pale gray when mature. 100 seeds weight is 3-7g⁶.

MATERIALS & METHODS**Collection of Plant materials**

The dried roots / rhizomes of *P. kurroa* and *V. roxburghii* were procured from the local market of Mumbai and were authenticated at Agharkar Research Institute, Pune. The voucher specimen ((AHMA R 095 and No. AHMA R 096) is deposited in the Institute for reference. Certified, authenticated dried seeds of Kopargaon variety (Certificate number 876) of mungbean (*V. radiata*) were procured from Maharashtra State Seeds Corporation Ltd; Akola - 444104.

Macroscopy

The following macroscopic characters for the fresh leaves were noted: size and shape, colour, surfaces, venation, presence or absence of petiole, the apex, margin, base, lamina, texture, odour and taste.

(Research Article)**Microscopy**

The rhizomes of *P. kurroa* and *V. roxburghii* were soaked in distilled water overnight prior to histological studies. The thin transverse sections of the rhizome were taken and then boiled with 20% w/v chloral hydrate solution for 5-10 minutes. Further the sections were stained with alcoholic phloroglucinol (1%w/v) solution and concentrated hydrochloric acid (1:1). These sections were mounted on glass slide and were

observed under microscope (Magnification 45x). The seed of *V. radiata* were soaked in distilled water overnight prior to histological studies. The thin transverse sections of the seed were taken and then stained with dilute iodine solution. The transverse sections of the dried root, rhizome, and seed as well as a small quantity of the powdered were also cleared, mounted and observed. Powder microscopy done with standard procedure⁷⁻⁹.

RESULTS**Morphology**

Morphological evaluation refers to evaluation of the drug by colour, size, shape, taste and special features like texture etc. These characteristics

were studied for the roots of *V. roxburghii*¹⁰⁻¹¹, *P. kurroa* and seed of *V. radiata* (Table 1 and Fig. 1-3).

**Figure 1:** Roots of *V. roxburghii***Figure 2:** Rhizome of *P. kurroa***Figure 3:** Seed *V. radiata***Table 1:** Morphological characters of root of *V. roxburghii*, rhizome of *P. kurroa*, and seed of *V. radiata*

Morphological characteristics	Roots of <i>V. roxburghii</i>	Rhizome of <i>P. kurroa</i>	Seed <i>V. radiata</i>
Colour	Brown	Brown	Shiny green or golden green in colour with black hilum
Size	5-7cm long, 2-7 mm in diameter	3-4 cm long, 2-3 in diameter	3-4 mm broad
Odour	Fragrant	Characteristics	Characteristics
Taste	Bitter	Bitter	Characteristics
Texture	Longitudinally wrinkled	Longitudinally wrinkled	Smooth texture

(Research Article)**Microscopical study****T.S of Roots of *V. roxburghii***

The transverse section of the root of *V. roxburghii* showed the outermost characteristic spongy velamen tissue. The velamen was followed by the cortex. The central stele showed a number of

phloem and xylem strands alternating radially. Pith was seen in the central portion of the stele made up of parenchymatous and lignified cells (Fig. 4).

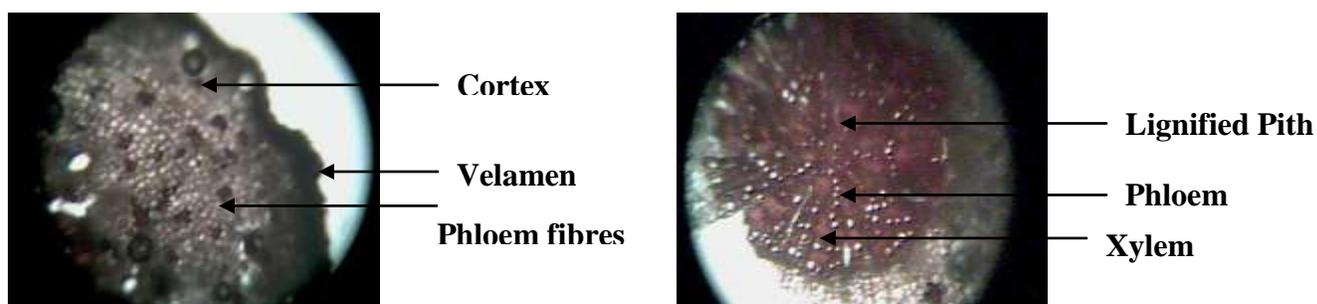


Figure 4: T.S. of *V. roxburghii* root

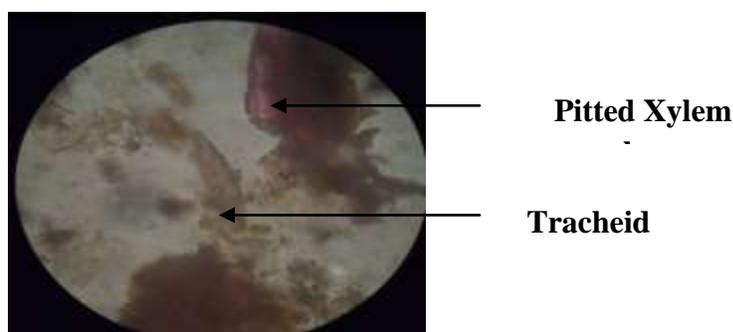


Figure 5: Powder characteristics of *V. roxburghii* root

The powder was muddy brown in colour showing xylem vessels with pitted and reticulate thickenings, tracheids and phloem fibres (Fig. 5). The transverse section of the aerial root shows an outer spongy tissue called the velamen. It consists of 5 layers of compact cells, the walls of which are thickened by fibrous supporting ribs, which are lignified and reticulately arranged. The velamen is followed by a wide cortex, the

outermost layer of which consists of a row of specialized tissue known as the endodermis, the cells of which are radially arranged and suberized excepting the passage cells. The passage cells, which serve as channels for flow of water absorbed by the velamen are thin walled parenchymatous cells having large no. of chloroplasts. Some of the cortical cells show pitted thickenings. The endodermis and one layer

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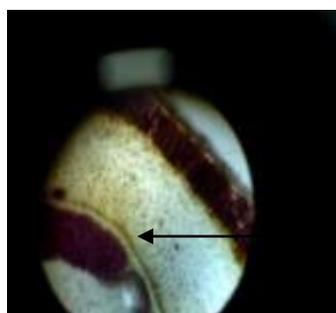
of cells outside it get thickened and lignified. The casparian thickenings and subsequent wall modifications of the endodermis appear first facing the phloem strands and then spread laterally towards the xylem where the endodermis remains unthickened and forms passage cells.

Following the endodermis is the pericycle, composed of single layer of cells, which are thin walled below the passage cells opposite the xylem and thick walled and lignified facing the phloem. It encloses the central stele which shows the typical monocotyledonous structure with a number of phloem and xylem strands alternating radially. The phloem bundles are surrounded on both sides and also internally by

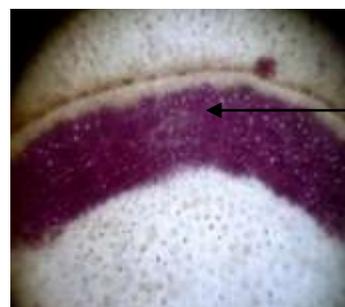
schlerenchymatous fibres which join the pericyclic fibres. Thus each phloem bundle is completely surrounded by a schlerenchymatous sheath. The phloem consists of phloem parenchyma, sieve tubes and companion cells.

The xylem consists mostly of tracheids, fibres and a few vessels. The vessels are mostly pitted and some have reticulate thickenings. The tracheids are mostly cylindrical with tapering or truncated ends. They are elongated and have pitted thickenings on their walls. The fibres are long, pointed on both ends.

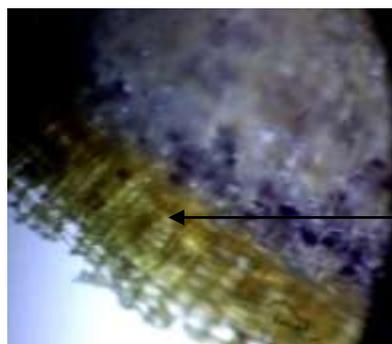
The central portion of the steel is occupied by the pith, the cells of which are parenchymatous, isodiametric, and thick-walled lignified and pitted¹¹.



Vascular bundle



Pith



Cork

Figure 6: T.S. of *Picrorhiza kurroa* rhizome

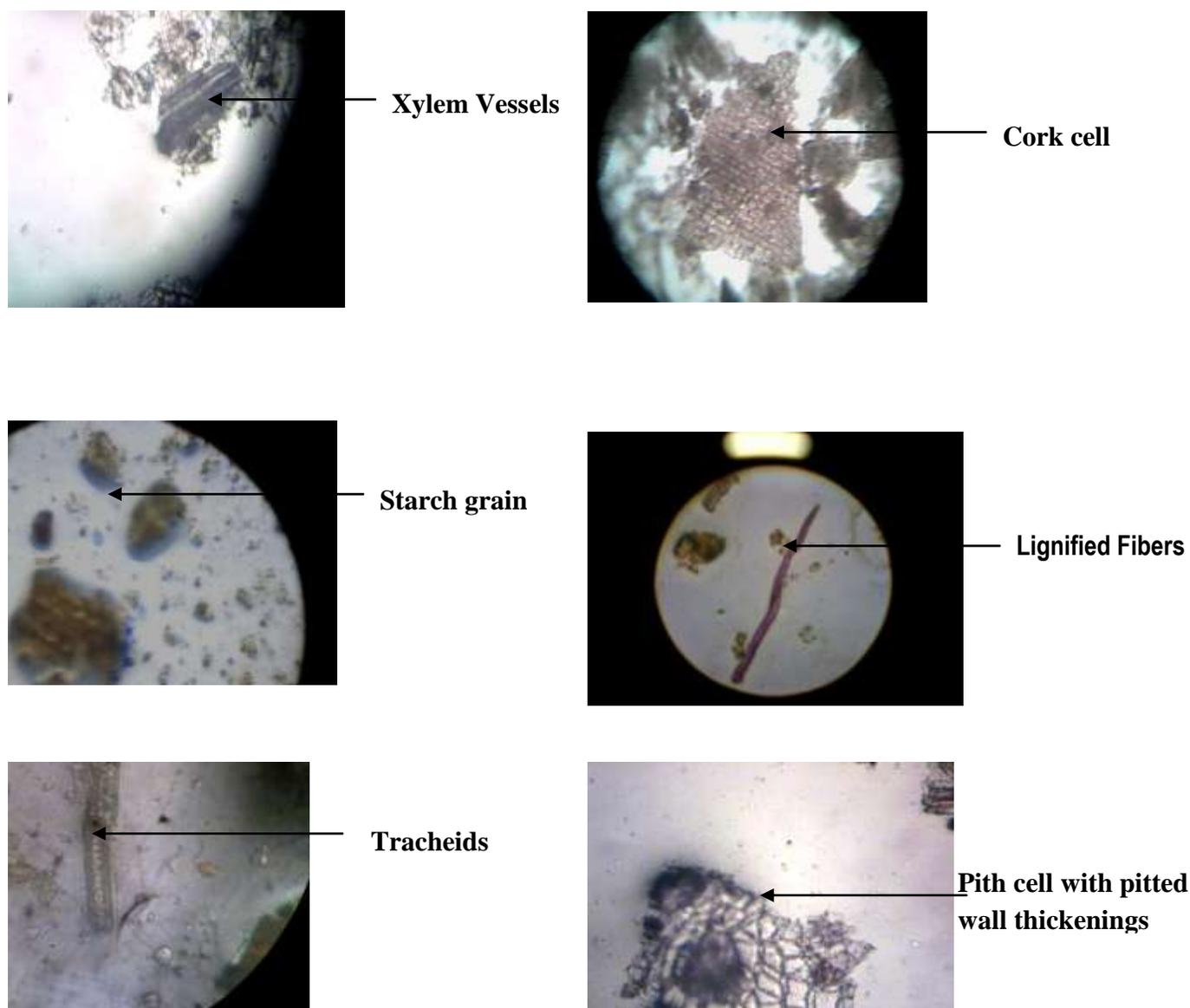
(Research Article)

Figure 7: Powder characteristics of *Picrorhiza kurroa* rhizome

Transverse section of the rhizome shows 20-25 layers of the cork cells. In some cases one or two small vascular bundles are found to be present in the cortex region. Long Tracheids, with lignified thick walls and more or less cylindrical with blunt tapering ends were observed along with vessels having transverse oblique articulations. Starch grains were abundantly found in all cells (Fig. 6-7). All these characters were compared with the

reported one in Indian Herbal Pharmacopoeia. These characters were found to be identical, thus confirming the identity by both morphological and microscopical examination. The microscopic powder characteristics of *Picrorhiza kurroa* rhizome showed the presence of Xylem Vessels, Cork cell, Starch grain, Lignified Fibers, Tracheids and Pith cell with pitted wall thickenings¹².

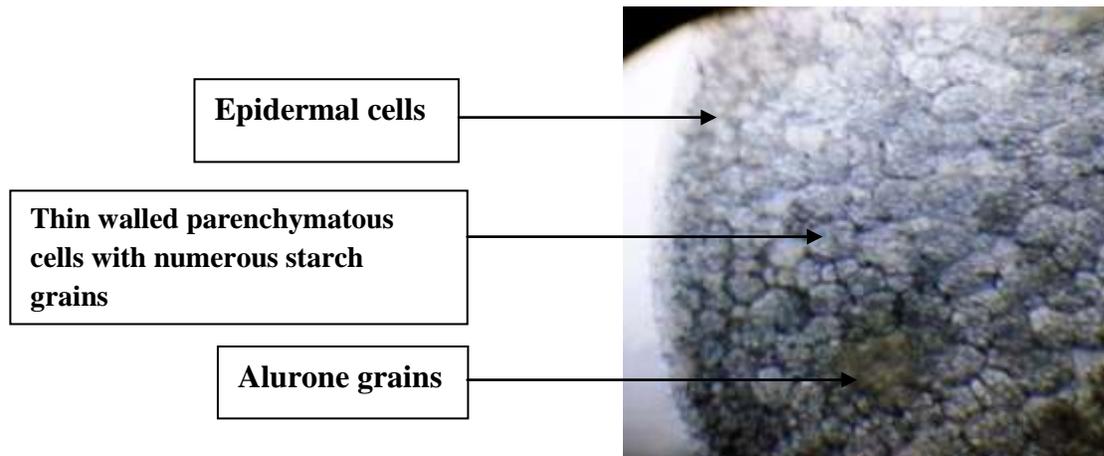


Figure 8: T.S of *V. radiata* seed (Unstained section)

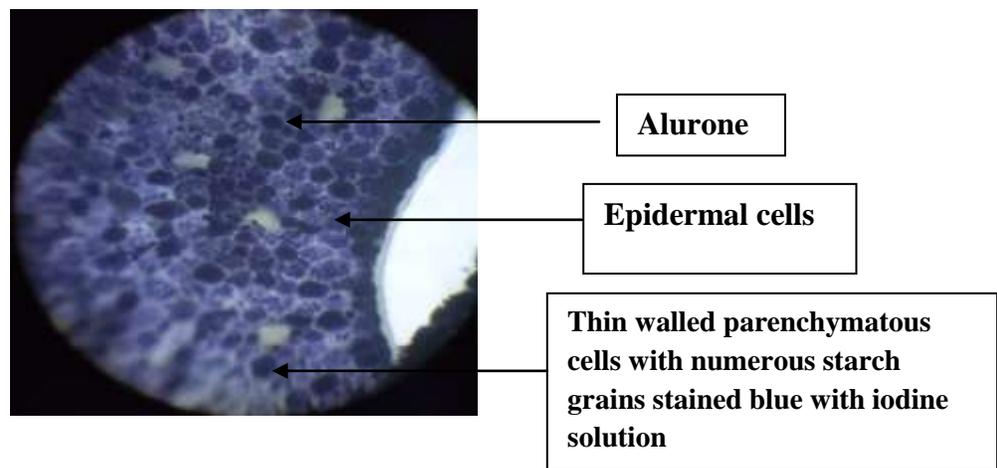


Figure 9: T.S of *V. radiata* seed (Stained section with dilute iodine solution)

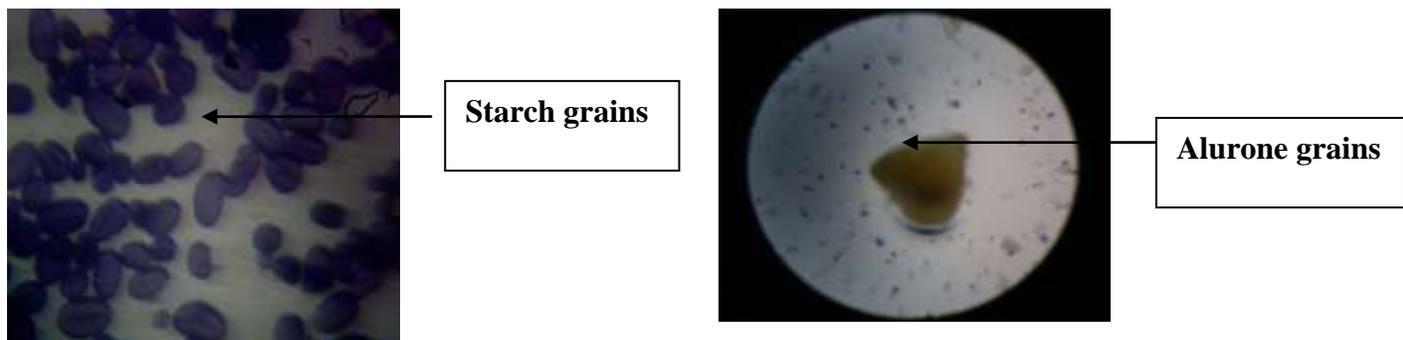


Figure 10: Powder characteristics of mungbean seeds

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Transverse section of seed showed the presence of single layered thin walled epidermis and thin walled parenchymatous cells containing numerous starch grains. The transverse section also showed the presence of group of irregularly arranged protein cells throughout the section. When stained with phloroglucinol and hydrochloric acid the section did not show presence of lignified tissues. The histological sections of the mungbean seeds are represented in the Fig. 8-10. The microscopic powder characteristics of mungbean showed the presence of abundant starch grains, protein containing cells.

DISCUSSION

The standardization of a crude drug is an integral part of establishing its correct identity. Before any crude drug can be included in a herbal pharmacopoeia, pharmacognostic parameters and standards must be established. *V. roxburghii* root and Rhizome *Picrorhiza kurroa* is a plant that has been confused with other species due to their relative similarities. Characteristics of mungbean seeds which are being reported for the first time the results of these investigations could, therefore, serve as a basis for proper identification, collection and investigation of the plant. The macro and microscopy are parameters that are unique to the plant and are required in its standardization.

CONCLUSION

These parameters could be useful in the preparation of the herbal section of Indian Herbal Pharmacopoeia.

REFERENCES

1. The Eastern Ghats, EPTRI-ENVIS Newsletter, Epiphytes and Orchids of Eastern Ghats, 2005, 11, No.3, 2.
2. Cooke T, The Flora of the Presidency of Bombay, Botanical Survey of India, 1967, 2nd Reprint edition, 3, Calcutta, 208.
3. Khare CP, Indian Medicinal Plants, Springer Science and Business Media, New York, USA, 2007, 37-38.
4. Singh A, Duggal S, Medicinal Orchids: An Overview, Ethnobot. Leaflets, 2009, 13, 351-363.
5. Russo A, Izzo AA, Cardile V, Indian Medicinal Plants As Antiradicals and DNA Cleavage Protectors, *Phytomedicine*, 2001, 8, 125-132.
6. Purseglove JW, *Phaseolus aureus* In Tropical Crops: Dicotyledons, London, Longman, 1974, 290- 294.
7. Indian Pharmacopoeia , Ministry of Health and Family Welfare , Controller of Publication, Government of India, New Delhi, 4th Edition, 1996, 2, A- 53, A- 54, A- 89.
8. Indian Pharmacopoeia, Ministry of Health and Family Welfare, Controller of Publications, New Delhi, Government of

(Research Article)

- India, New Delhi, 1996, 4, 2, A-73.
9. Khandelwal KR, Practical Pharmacognosy, Techniques and Experiments, Nirali Prakashan, Pune, 2002, 8, 149-153.
 10. Khare CP, Indian Medicinal Plants, Springer Science and Business Media, New York, USA, 2007, 37
 11. Kapoor LD, Handbook of Ayurvedic and Medicinal plants, CRC Press, Washington D.C. 1st Indian Reprint, 2005, 331-332.
 12. *Picrorhiza kurroa*, in Indian Herbal Pharmacopoeia, Revised Edition, Indian Drug Manufacturers, India, 2002, 289-292.