Pharmacognostic Investigation of *Valeriana hardwickii* Wall. A Threatened Herb

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**ABSTRACT**

**Aim:** *Valeriana hardwickii* Wall. belongs to family Valerianaceae grown in high altitude areas of north west Himalaya to Bhutan. Traditionally, the roots of the plant are used to treat insomnia; however, no reports are available regarding any pharmacognostic work on this plant. **Material and Methods:** The study includes morphological, microscopic and preliminary phytochemical investigations of the roots and rhizome. Anatomical studies of roots and rhizome shows the presence of diagnostic characters such as thick walled cortex cells, annular xylem fiber, pitted xylem vessel and rhizome hair. **Results:** The preliminary phytochemical screening of petroleum ether, dichlomethane and aqueous extract revealed the presence of triterpenoids, alkaloids, irridoidal glycosides and flavanoids. The study was carried out as per WHO guidelines. **Conclusion:** The outcome of this work will help the researchers to differentiate *V. hardwickii* from the other species of valerian.

**Keywords:** Pharmacognostic investigation, phytochemical screening, valerianaceae, *Valeriana hardwickii* Wall

**INTRODUCTION**

*Valeriana hardwickii* Wall. (Family: Valerianaceae) is a threatened medicinal herb distributed in high altitude areas of Himalayas.¹ The roots and rhizomes are popularly called as valerian and useful as sedative,² diuretic,³ anthelmentic⁴ and anti diarrheal.⁵ α-epikessyl glycol diacetate, kessyl acetate,⁶ borneol acetate,⁷ and epoxysessquithujene⁸ were reported from essential oil.

*V. hardwickii* is under threat due to its over exploitation in their natural habitat. The roots and rhizome are substituted for *Valeriana wallichii* commercially. There is a scarcity of pharmacognostic and pharmacological data on *V. hardwickii*. In the present study, we have reported macroscopic, microscopic, powder analysis in different solvent, which would help in proper authentication of dried plant and powdered drug.

**MATERIALS AND METHODS**

The roots and rhizomes of *V. hardwickii* were procured from procured from Natural Remedies Pvt., Ltd., Bangalore. Authentication of the plant sample was done by Dr. B.D Huddar, Head, Department of Botany, HSK College of Science and Arts Hubli. Voucher specimen (NRVP-03) was deposited in Department of Pharmacognosy and Phytochemistry, KLES College of Pharmacy, Hubli. The phytochemical parameters such as loss on drying,⁹ extractive values were carried out as per official standard procedure.¹⁰ Anatomical investigation was done by microtome sections and powder microscopy was performed according to the prescribed procedure.¹¹¹² The dried roots of *V. hardwickii* were pulverized. 100 g of coarse powder was successively extracted with petroleum ether (40-60°C) and dichloromethane at 40°C in a soxhlet extractor. The marc left after extraction was refluxed thrice with water on a water bath for 4 h. The extract was concentrated in a rotary flash evaporator and residue was dried in a desiccator.

The extracts were subjected to qualitative chemical examination to detect the presence of various phytoconstituents.¹³¹⁴
RESULTS AND DISCUSSION

The systematic pharmacognostical study will give valuable information for the future studies.

Macroscopy

Macroscopically the roots and rhizomes are brownish in color. Rhizomes are short; roots are slender, 1 mm in diam. Stolons one to several, or absent. Stems are erect, often hispidulous below, glabrous above except at nodes. Pieces of rhizome are often contain longitudinal striations. Strong, unpleasant odor and bitter taste.

Microscopy

Transverse section of roots and rhizome

Transverse section of *V. hardwickii* shows outermost cortex consist of rectangular to squarish thick walled cells; pericyclic fiber containing 8-10 layers of isodiametric parenchymatus cells; cambium region contain alternate arrangement of phloem and xylem. Meta xylem and protoxylens were present in cambium. Central pith region contain parenchymatous cells (Figure 1a).

Powder characteristics

A grayish-brown powder with a strong odor and a bitter taste. The abundant thick walled parenchymatus cells of the cortex filled with starch grains. Cells are fairly large, round, moderately thickened walls. Annular shaped lignified xylem fibers. The phloem fibers are long, thin walled, non-lignified with blunt ends. The pitted xylem vessels occur in small groups, lignified, usually reticulate thickened, small bordered pits at the base. A special character rhizome hair with unicellular, pointed end with circular base was observed (Figures 1b-f).

Physicochemical characters

The results of the physical constants of the drug powder are given in Table 1. Total ash of crude powder of *V. hardwickii* Wall. was 5.03 ± 0.19% and sulfated ash was 12.09 ± 0.39%. Low total ash and sulfated ash signifies that less inorganic matters are present in drug. Extractive yield was highest in water (28.12 ± 0.54%), followed by alcohol (21.26 ± 0.18%) and lowest yield was in petroleum ether (0.591 ± 0.06%). The results suggest high polar constituents are present in drug.
Phytochemical screening

Preliminary phytochemical screening is tabulated in Table 2. The results point out the presence of steroids, triterpenoids and iridoidal glycosides in petroleum ether extract. Alkaloids and iridoids in dichloromethane extract and aqueous extract contain alkaloids, flavonoids, and tannins.

CONCLUSION

The pharmacognostical study is one of the important tools in the identification of crude drugs. The present study provides useful information and helps in the correct identification of roots and rhizome of *V. hardwickii* Wall. In addition, the results of the present study could be useful for preparation of a monograph of the plant.

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