



Research Article

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PHARMACOGNOSTIC STUDIES AND PHYSICOCHEMICAL INVESTIGATION OF *BALERIA PRIONITIS* LEAVES

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ABSTRACT

Baleria prionitis of Acanthaceae family is found throughout the northern and western parts of India and also grows as hedge plant in garden. Almost all the parts of this plant have medicinal importance and used traditionally for the treatment of various ailments like asthma, cough, oedema, gout and tooth ache. In the present investigation, the detailed macroscopic, histological, microscopic studies and physicochemical evaluation of roots of *Baleria prionitis* is carried out. Histological study revealed the presence of tubular collenchyma, phloem ray, calcium oxalate crystals, wood cells and endodermis. Microscopic study of the root powder showed starch grains, tannins, calcium oxalate crystals and fatty substances. Physicochemical characteristics such as foreign matter, loss on drying, ash value, alcohol soluble extractive value and water soluble extractive value were determined. The results of the present study help in sample identification, standardization of quality and purity of the plant which help in preventing adulteration.

Keywords: Pharmacognosy, Phytochemicals, *Baleria prionitis*

INTRODUCTION

Herbal medications have been guided the mankind to relieve the symptoms of disease and to become healthy spiritually, physically and mentally throughout life, since very old times¹. Although remarkable advances are observed in modern medicine in recent centuries, medicinal plants and herbal drugs still make an important contribution to health care². Herbal drugs constitute only those traditional medicines, which primarily use medicinal plants preparation for therapy. The earliest recorded evidence of their use in Indian, Chinese, Egyptian, Greek, Roman and Syrian text dates back to about 5000 years. The herbal medicine has traditions of ancient civilization and scientific heritage³. Though India has a rich tradition in the use of medicinal plants, the effort to develop drugs from plants has had limited success. Hence, plants have returned to the fore front in drug development as medicines, as source of active molecules and as lead to the discovery of new drugs. The use of medicinal plants to treat various diseases in India dates back to the times of Rig-Veda (3500-1800BC). Later, the monumental Ayurveda works like Charaka Samhita and Susruta Samhita followed by other Ayurveda drugs entering in to several medicinal preparations were in the management of health care. In fact these systems have been in practice even in remote areas of our country for centuries. World Health Organization (WHO) estimates that 80% of the people living in developing countries almost exclusively using traditional medicine and about 119 secondary metabolites of plants are used globally as drugs⁴. Since ancient times it is generally accepted that herbal drugs are more effective, safe and have less side effects which make it more popular^{5, 6}. The value of medicinal plants and herbal medicines in prophylactic use and treatment of disease can be enhanced and improved by analysis and quality control which should also include clinical research⁷.

Baleria prionitis of Acanthaceae family is found throughout the northern and western parts of India and also grows as hedge plant in garden⁸. It is distributed throughout India and Ceylon⁹. Almost all the parts of have medicinal importance and used traditionally for the treatment of various ailments. Root extract of *Baleria prionitis* is applied locally on skin to expel spine from the skin¹⁰. The oil prepared with whole plant is indicated for external application during acute stages of cyst in blood vessels¹¹. Root paste of plant is applied over boils and glandular swellings. Roots and flowering tops of *Baleria prionitis* are rich in potassium salts and diuretic¹². Leaves and stem of *Baleria prionitis* showed the presence of iridoides, glucosides, barlerin, acetyl barlerin¹³. Ash mixed with honey is given in bronchial asthma¹⁴. Roots are used in cough, asthma, as tonic, diuretic and antimicrobial. The Ayurvedic pharmacopoeia of India recommends oil extracts of *Baleria prionitis* for arresting graying hair¹⁵. Whole plant paste is applied externally as an ointment for gout. Leaves are chewed and sap is swallowed for curing mouth ulcers. Leaf paste is applied externally for tooth ache¹⁶.

Aim

The aim of the present study is the detailed pharmacognostic studies like macroscopical, histological and microscopic studies and physicochemical evaluation of *Baleria prionitis* roots of Acanthaceae family.

Collection and authentication

Roots of *Baleria prionitis* of Acanthaceae family were collected in September from Nahargarh, Jaipur. Authentication of plant (Authentication Number RUBL-20650) was done by Mr. Vinod Sharma, Herbarium In charge, Department of Botany, Rajasthan University, Jaipur, India.

Drying of plant material

Roots were separated from *Baleria prionitis* plant and washed with water, dried under the shade at room temperature for 15 days. Pulverized to a coarse powder and passed through a 60# sieve for uniform particle size.

MATERIALS AND METHODS

Macroscopical study

Macroscopic study includes morphological details of the plant which can be done with naked eye or magnifying microscope. This helps us to make a description of the plant¹⁷.

Histological study

Root of diameter 3 to 5 mm and length of approximately 2.5 cm was selected and boiled the sample for few minutes to soften the hard drug sample. It was then used for taking fine microscopic sections. The section was stained with hydrochloric acid and phloroglucinol. The best section was mounted in glycerin medium for observation. Image was taken with a digital camera incorporated in a microscope¹⁸.

Microscopical study

The microscopic examination gave several diagnostic characters. This study was conducted to locate the site of secondary metabolites in the root powder. The root powder was cleared by boiling with KOH (5%), stained with reagents like Iodine Solution, FeCl₃ Solution, Sudan red and Lectochloral and mounted in the microscope for further studies¹⁹.

Physicochemical study

In the present study, root powder was investigated for the physicochemical characterization to evaluate the quality and purity of the extracted drug. The physicochemical parameters like foreign matter, loss on drying, ash values, extractive values were determined as per WHO guidelines^{20,21}.

RESULTS

Macroscopical study

Shape- cylindrical or slightly curved
 Surface characteristics-Surface was fissured contain longitudinal corrugations
 Fracture-fibrous
 Colour-Brownish grey to yellowish brown
 Odour- Characteristic and persistent
 Taste-pungent

Histological study

Periderm stem bark is subtended by 5-7 layers of tubular collenchymas.
 Phloem ray of stem is heterogenous with uniseriate and multiseriate rays, 8-16 and 8-25 cells high respectively and 23 celled broad.
 Granular and needle shaped calcium oxalate crystals filling up many cells in almost all tissue barks.
 Cork is yellowish and sometime contain new phellogen layer separating the outer and inner cortex.
 Wood cells with blackish brown content
 Endodermis is uniseriate and surrounding the xylem and phloem ray. (Figure 1)

Microscopical study

The root powder was bright yellow in colour with characteristic odour. Starch grains, tannins, calcium oxalate crystals and fatty substances were observed in the root powder using reagents like Iodine Solution, FeCl₃ Solution, Sudan red and Lectochloral. (Table 1 and Figure 2, 3, 4 and 5)

Physicochemical Study

In the present study, the physicochemical parameters like foreign matter, loss on drying, ash values, extractive values were determined and results are given in Table 2.

Table 1: Microscopical study of root powder

Sl.No	Reagents	Observation	Inference
1.	Iodine solution	Blue colour	Starch grains
2.	Fecl3 solution	Blue black colour	Tannins
3.	Sudan red	Orange red to red	Fatty substance
4.	Lectochloral	Shining crystals	Calcium oxalate crystals

Table 2: Physicochemical study of root powder

Sl.No	Physical constants	Results (%w/w)
1.	Foreign matter	1.3
2.	Loss on drying	7.3
3.	Total ash value	8.07
4.	Acid insoluble ash value	1.75
5.	Water soluble ash value	4.30
6.	Alcohol soluble extractive value	4.07
7.	Water soluble extractive value	13.07
8.	Sulphated ash	2.03

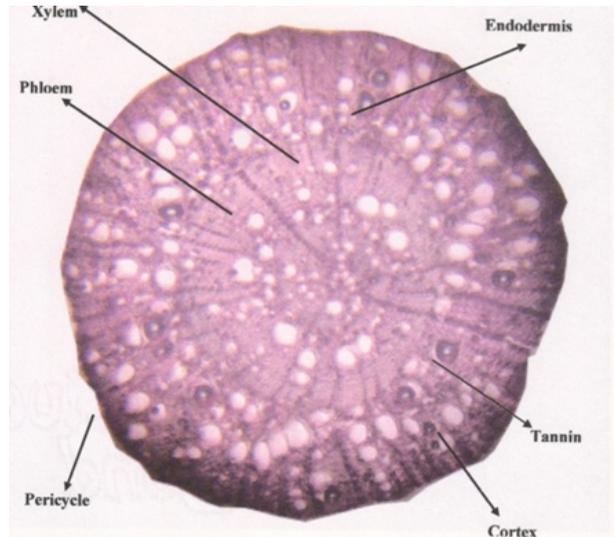


Figure 1: Histological study of *Baleriapronitis* roots

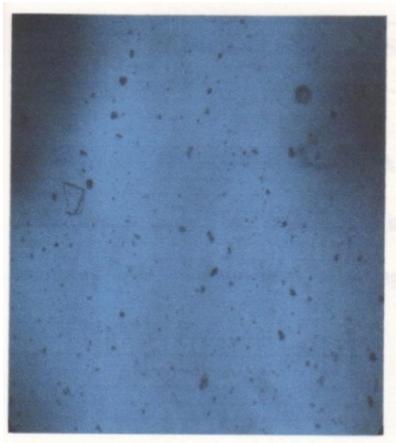


Figure 2: Starch grains in root powder

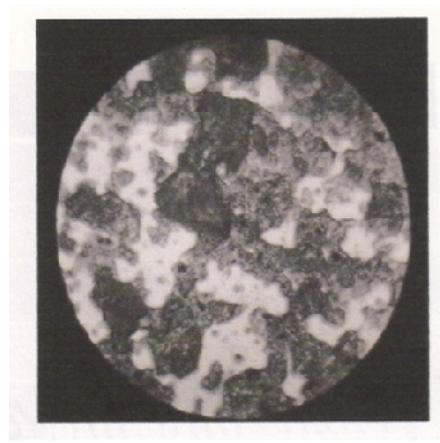


Figure 3: Tannins in root powder



Figure 4: Fatty substance in pink

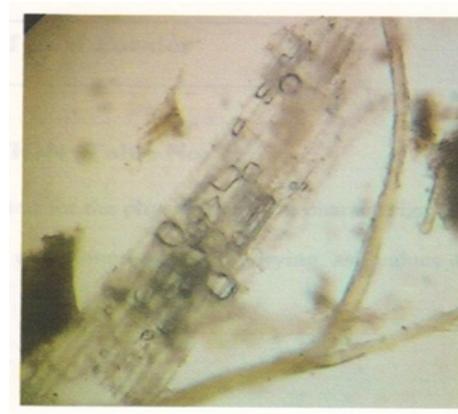


Figure 5: Calcium oxalate crystals in root powder orange colour in root powder

DISCUSSION

In this study morphological, histological, microscopical and physicochemical standards have been developed. Histological study showed periderm stem bark subtended by tubular collenchyma, phloem ray, granular and needle shaped calcium oxalate crystals, wood cells with blackish brown content and endodermis. Microscopic evaluation is one of the simplest and cheapest methods for the correct identification of the source of the materials²². Physicochemical evaluation of *Baleria prionitis* root powder has shown that the results are within limit (Table 2). This result indicates that the quality and purity of raw material was good enough. The physicochemical parameter like total ash is important as it shows the purity of drug, which implies presence or absence of foreign material like metallic salts and silica or earthy matter²³. The extractive values are primarily useful for the determination of exhausted or adulterated drug and helpful in the detection of adulteration. The water soluble extractive value shows the presence of inorganic compounds and acids. Alcohol soluble extractive values represent the presence of polar constituents like alkaloids, steroids, glycosides, phenols, flavonoids²⁴. The extractive values give an idea about the chemical constitution of the drug and from the study, the extractive value of water was highest followed by alcohol.

CONCLUSION

The results of the present study can serve as a valuable source of information and provide suitable standards for identification of *Baleria prionitis* roots of Acanthaceae family in future investigations and applications.

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