

**PHARMACOGNOSTICAL AND PRELIMINARY  
PHYTOCHEMICAL STUDIES OF *ACHYRANTHES  
ASPERA* LINN.**

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**ABSTRACT**

The whole plant of *Achyranthes aspera* has been used as remedy for a number of diseases such as dropsy, strangury, cough, kidney stones, dysentery and bowel complaints, According to traditional practice, a kheer prepared from the seeds of this plant is used to treat brain disorders. An attempt was made to fix the macroscopical, microscopical parameters of the leaf, quantitative microscopy, physical constants, and behaviour of the powder with chemical reagents and preliminary qualitative phytochemical studies of *Achyranthes aspera* were investigated. The phytochemical tests revealed the presence of sterols, flavanoids, tannins and carbohydrates.

**KEYWORDS:** *Achyranthes aspera*, epilepsy, traditional medicine

**INTRODUCTION**

*Achyranthes aspera* Linn. has been mentioned in the manuscripts of Ayurveda and Chinese medicine. It is described in "*Nighantus*" as purgative, pungent, digestive, a remedy for inflammation of the internal organs, piles, itch, abdominal enlargements and enlarged cervical glands. The diuretic properties of the plant are well known to the natives of Indian and European Physicians. A decoction of the plant is used as diuretic in renal dropsy and general anasarca. In Philippines the plant is used to relieve toothache,

dysentery and bowel complaint<sup>1</sup>. Decoction of root is useful in pneumonia, cough, and kidney stones and in large doses it acts as ecboic. The ash of whole plant is used in haemorrhoids.<sup>2</sup> The plant is used as expectorant, revulsive, anodyne, depurative, anthelmintic, sudorific, stomachic and to treat asthma, dyspepsia, bronchitis, and flatulence and menstrual disorders<sup>3</sup>. The roots are used to treat stomach pain and abdominal tumour as well as cough<sup>4</sup>. In the Chittoor district of Andhra

Pradesh, the tribals use this plant in the treatment of epilepsy and the Payasam or Kheer made of its seeds in milk is used as a good remedy for diseased brain.<sup>5</sup>

## MATERIALS AND METHODS

The leaves of *Achyranthes aspera* (*Amaranthaceae*) were collected near the foothills of Tirumala, Tirupati, Andhra Pradesh and was authenticated by Dr.K. Madhava Chetty, Herbarium keeper, Department of Botany, S.V. University, Tirupati. The macroscopy of the leaf was observed and the results are reported in table I. The leaves were collected, shade dried and coarsely powdered. The powder was subjected to various physical constants<sup>6</sup> and the results are tabulated in table III. The reaction of the powder towards various chemical reagents and response under UV light and preliminary phytochemical screening<sup>7</sup> are reported in table IV&V. As part of quantitative microscopy<sup>8</sup> stomatal number index, stomatal number, vein islet number and vein termination number were determined and are given in table II.

### Microscopy of *Achyranthes aspera* Linn(leaf)

The transverse section of leaf showed:

**1. Epidermis:** The epidermis is single layered. The upper and lower epidermal cells are more (or) less straight and wavy walled with thick cuticle. Covering and glandular were observed

on both the surfaces but lower surface possess greater number of trichomes. **Stomata:** Anomocytic type of stomata are seen on lower epidermis.

### 2. Mesophyll:

The upper surface possess 4-5 layers of collenchyma and the lower surface possess 2-3 layers of collenchyma. Thin-walled, parenchymatous cells, vascular bundles and rosette crystals of calcium oxalate were scattered in the mesophyll region.

### 3. Vascular Bundles:

Vascular bundle consists of xylem vessels, thin layers of cambium, phloem and pericycle. The pericycle is made of 2-3 layers of thick-walled, non-lignified cells.

## QUANTITATIVE MICROSCOPY -

### *Achyranthes aspera* Linn(leaf)

The Vein-islet number, Vein-termination number and Stomatal index of *Achyranthes aspera* Linn. was calculated and the results are tabulated in Table II

## PHYTOCHEMICAL STUDIES.<sup>9</sup>

The leaves were subjected to Petroleum ether, Chloroform, 90% Ethanol and Water. The obtained extracts were subjected to the following phytochemical studies and the results are tabulated in Table V.

## RESULTS AND DISCUSSION

The Pharmacognostical studies complies the macroscopical, microscopical parameters like Vein-islet number (11.5), Vein termination number (13.8), Stomatal index for upper Epidermis (6.5), Stomatal index for lower Epidermis (14), and phytochemical constants which correlate with the standard monographs available in “The Ayurvedic Pharmacopoeia of India” for the leaf of the plant. The behaviour of the power with glacial acetic acid and methanolic sodium hydroxide showed orange fluorescence. Preliminary qualitative phytochemical screening

revealed the presence of Flavonoids, Saponins, Steroids, Tannins, Carbohydrates Alkaloids and Proteins.

## CONCLUSION

The present study on *Achyranthes aspera* may be useful to supplement information in regard to its identification and authentication.

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**TABLE I : Macroscopy of *Achyranthes aspera* Linn (leaf)**

Particulars	Observation
Type	Simple.
Apex	Slightly acuminate
Margin	Wavy
Veination	Pinnate
Shape	Obovate
Texture	Pubescent due to presence of thick coat of long simple hairs
Petiole	Subsessile, exstipulate
Phyllotaxy	Opposite

**Table II : Quantitative microscopy**

Particulars	Observation found in <i>Achyranthes aspera</i>
Stomatal index (upper epidermis )	6.5
Stomatal index (lower epidermis)	14
Vein islet number	11.5
Vein termination number	13.8

**TABLE III :Physical constants of *Achyranthes aspera* Linn (leaf)**

S.No.	Ash type	Percentage of Ash
1.	Total ash	6.88%
2.	Acid insoluble ash	2.63%
3.	Water soluble ash	4.25%

**TABLE IV : Extractive values of *Achyranthes aspera* Linn (leaf)**

S. No.	Amount of powdered drug	Solvent used	Percentage of extract
1.	25 g	Chloroform	3.76% w/w
2.	25 g	Petroleum ether	3.16% w/w
3.	25 g	Water	4.32% w/w
4.	25 g	Ethanol	2.36% w/w

**TABLE V :Qualitative chemical analysis of the leaf extract of *Achyranthes aspera* linn.**

S.No	Tests for phytochemicals	Powder + Water	Petroleum ether extract	Chloroform extract	Ethanol extract	Aqueous extract
<b>I.</b>	<b>Alkaloids:</b> Dragendroff's test Mayer's test Hager's test Wagner's test	- ve - ve - ve - ve	- ve - ve - ve - ve	+ ve + ve + ve + ve	- ve - ve - ve - ve	+ve +ve +ve +ve
<b>II.</b>	<b>Carbohydrates:</b> Fehling's test	+ ve	- ve	- ve	+ ve	+ ve
<b>III.</b>	<b>Proteins:</b> Millon's test	+ ve	- ve	- ve	- ve	+ ve
<b>IV.</b>	<b>Glycosides:</b> Balget's test Legal's test Keller-Killiani test	+ ve + ve + ve	- ve - ve - ve	- ve - ve - ve	+ ve + ve + ve	+ ve + ve + ve
<b>V.</b>	<b>Tannins:</b> Aq. FeCl <sub>3</sub> Test Alc. FeCl <sub>3</sub> Test	- ve - ve	- ve - ve	- ve - ve	+ ve + ve	+ ve + ve
<b>VI.</b>	<b>Flavonoids:</b> Lead acetate test Shinoda test	+ ve + ve	- ve - ve	- ve - ve	+ ve + ve	+ ve +ve
<b>VII</b>	<b>Saponins:</b> Foam Test Lead acetate test	+ ve + ve	- ve - ve	- ve - ve	+ ve + ve	+ ve + ve
<b>VIII</b>	<b>Steroids:</b> Salkowski test Liebermann test	+ ve + ve	+ve + ve	- ve - ve	- ve - ve	- ve - ve

## REFERENCES .

1. Rasheeduz Zafar; **“Medicinal Plants of India”**; CBS Publishers and Distributors New Delhi. First Edition; 1-15; 2000
2. L.V. Asolkar, K.K. Kakkar, O.J. Chakre; **“Second supplement to Glossary of Indian medicinal plants with active principles”**; Part-I (A-K); Publication and Information Directorate (CSIR ) New Delhi, 15-16; 1992;
3. Kirtikar, K.R. and Basu. B.D.; **“Indian Medicinal Plants”**; Volume-III; International Book Distributors – Dehra Dun India. 2<sup>nd</sup> Edition.. 2065-2069; 1981
4. Dr. S. Vedavathy, V. Mrudula and A. Sudhakar; **“Tribal Medicines of Chittoor District, A.P. (India)”**; Herbal Folklore Research Centre, Tirupati.. 16, 17; 1997
5. **“The Ayurvedic Pharmacopoeia of India”**; The controller of Publications, New Delhi Volume-II; 7-9; 1999
6. C.R. Metcalfia and L. Chalk; **“Anatomy of Dicotyledons”**; Volume-1, First Edition; 1067-1074, 1950;.
7. William Charles Evans; **“Trease and Evan’s Pharmacognosy”**; Chapter-43: Techniques of Microscopy W.B. Saunders Company, London, Fourteenth Edition; 577- 578, 1997
8. **Indian Pharmacopoeia”**; Volume-II; Controller of Publications, New Delhi.; Appendix-3.37 & 3.38; Page No: A54; 1996
9. World Health Organization – Geneva; **“Quality control methods for medicinal plant materials** AITBS Publishers and Distributors; New Delhi.. First Indian Edition; 46, 2000;