



**PHARMACOGNOSTICAL AND PHYTOCHEMICAL EVALUATION OF THE LEAVES  
OF AYAPANA TRIPLINERVIS (VAHL) R.M. KING & H.ROB**

\*Donna Mary Johnson, Dr Sajith Kumar P.N., Fathimathul Nisa M.K. and Aswathi D.

Department of Pharmacognosy and Phytochemistry, College of Pharmaceutical Sciences, Government Medical College, Kannur, Kerala- 670503.

\*Corresponding Author: Donna Mary Johnson

Department of Pharmacognosy and Phytochemistry, College of Pharmaceutical Sciences, Government Medical College, Kannur, Kerala- 670503.

Article Received on 27/01/2023

Article Revised on 16/02/2023

Article Accepted on 08/03/2023

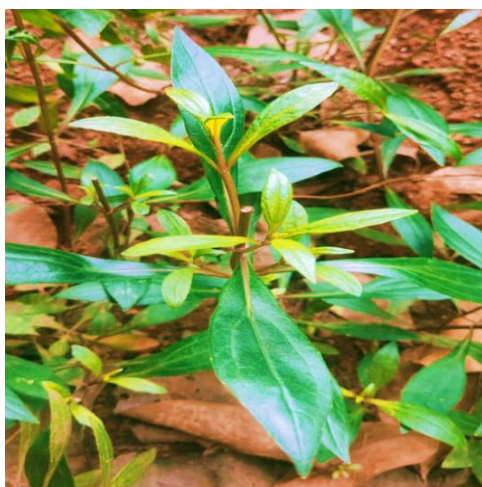
**ABSTRACT**

The plant *Ayapana triplinervis* (Vahl) R.M.King & H.Rob also known as *Eupatorium triplinerve* (Vahl) is a folklore medicine that is widely used for various disease conditions. It belongs to the Asteraceae family and is commonly known as Aya-pana, water hemp etc. In the following study, pharmacognostical evaluation of the leaves of the plant were carried out. The determination of the adulterants was done by physicochemical studies. Finally, the extracts were subjected to preliminary phytochemical screening and qualitative chemical test to identify various phytoconstituents present.

**KEYWORDS:** *Ayapana triplinervis*, *Eupatorium triplinerve*, pharmacognostical study, phytochemical study.

**1.INTRODUCTION**

*Ayapana triplinervis* (Vahl) R.M.King & H.Rob is commonly known as Aya-pana or Water hemp belongs to the Asteraceae family. It is native to South America and can appear in other Latin America, Caribbean, and Asian Countries. The plant parts are used for hepatoprotective, Anthelmintic, Anticancer, Antioxidant, Antibacterial and gastroprotective properties. The leaves contain flavonoids, polyphenols, alkaloids etc.<sup>[1]</sup> The methanol extract shows the greatest antioxidant activity.<sup>[2]</sup> The hydroalcoholic extracts of the leaves was evaluated for its anti-noceiceptic activity.<sup>[3]</sup>

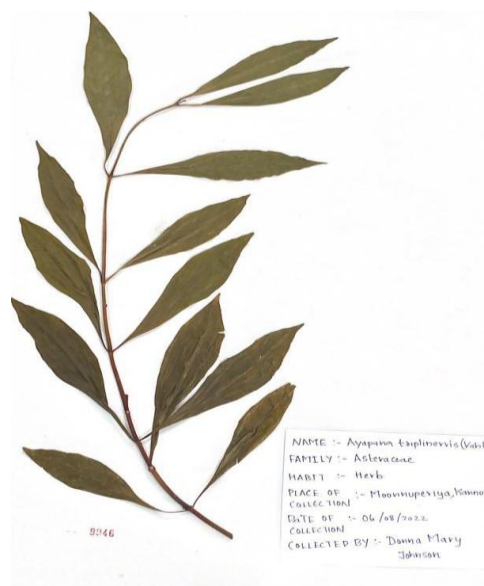


**Figure 1: *Ayapana triplinervis* (Vahl) R.M.King & H.Rob.**

**2. MATERIALS AND METHODS**

**2.1 Plant collection and Authentication**

The plant was collected from Moonnuperiya, Kannur, Kerala and was shade dried and powdered. The plant was authenticated by Dr Sreeja P, M.Sc., Ph.D. Department of Botany and Research Centre, Sir Syed College, Taliparamba, Kannur.



**Figure 2: Herbarium of *Ayapana triplinervis* (Vahl) R.M.King & H.Rob.**

## 2.2 Pharmacognostical Studies

### 2.2.1 Macroscopic evaluation

The macroscopical studies of the leaves of *Ayapana triplinervis* (Vahl) were evaluated. The external characters like colour, surface, phyllotaxy etc were examined.

### 2.2.2 Microscopical Studies

Thin sections were selected. It was stained with Saffranin and mounted in glycerin. The observation was taken through Olympus Trinocular microscope with Mag Cam DC fixed microscope adaptor using Mag Vision Software. Later a sufficient amount of powder was taken on a microscopic slide. 1-2 drops of saffranin was added. The sample was distributed evenly over the slide & mounted with glycerin. Observed through Olympus Trinocular microscope with Mag Cam DC fixed microscope adaptor using Mag Vision Software.

### 2.2.3 Physicochemical Evaluation

Physicochemical evaluation like ash values, extractive values, moisture content, swelling index, mucilage content etc was carried out.

### 2.2.4 Phytochemical Studies

Performed successive solvent extraction on leaves of *Ayapana triplinervis* (Vahl) using solvents in increasing polarity such as petroleum ether, benzene, chloroform, acetone, ethanol and water. Then preliminary phytochemical screening was carried out. The extracts obtained was subjected to qualitative chemical test.

## 3. RESULT AND DISCUSSION

### 3.1 Macroscopic evaluation

By the macroscopical evaluation the following characters were determined.

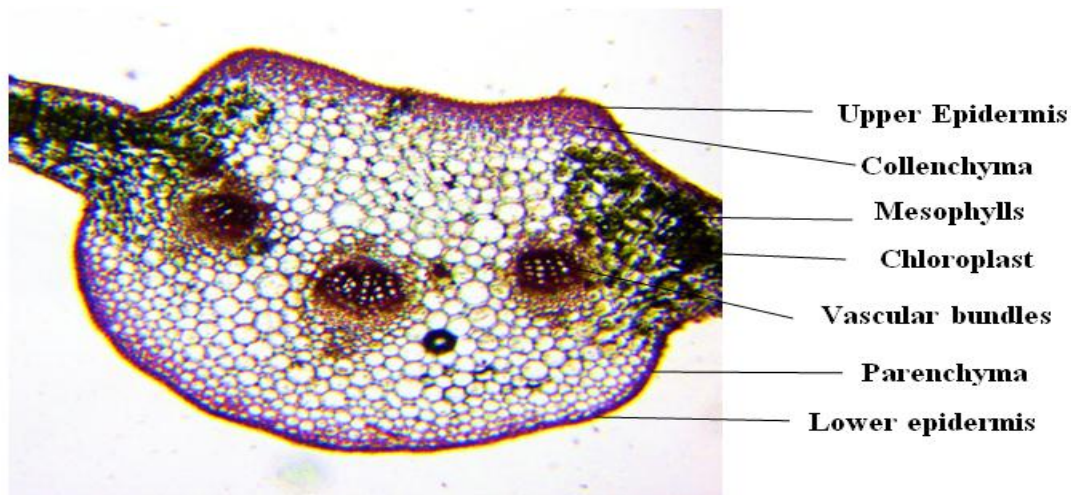
**Table 1: Organoleptic evaluation of leaves of *Ayapana triplinervis* (Vahl) R.M.King & H.Rob.**

| Colour     | Surface | Phyllotaxy | Type       | Margin | Venation   |
|------------|---------|------------|------------|--------|------------|
| Dark Green | Smooth  | Opposite   | Lanceolate | Entire | Reticulate |

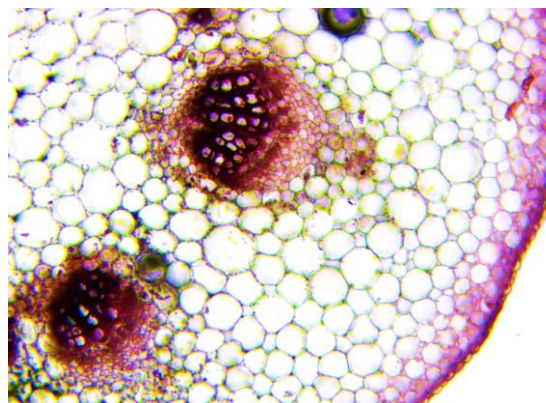
### 3.2 Microscopic Evaluation

#### 3.2.1 Transverse section

Following microscopic characters of the leaves of *Ayapana triplinervis* (Vahl) was observed.



**Figure 3: Transverse section of leaves of *Ayapana triplinervis* (Vahl).**



**Figure 4: Enlarged view of vascular bundles.**

### 3.2.1.1. Epidermis

The transverse section of leaf shows well defined upper and lower epidermis. On both sides the epidermis is thick and single layered. Under the upper epidermal layer contains 2-3 layers of collenchyma.

### 3.2.1.2. Vascular Bundles

The transverse section of the leaf from the midrib portion contains three distinct vascular bundles that are separated

from each other and surrounded by parenchymatous cells. Xylem vessels are visible. Region below the xylem contains the phloem tissues.

### 3.2.1.3 Mesophyll

The mesophyll consist of chloroplast.

### 3.2.2 Powder Microscopy

Following are the characters observed

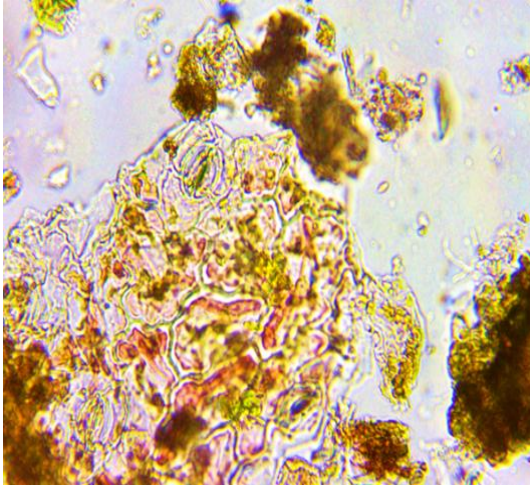


Figure 4: Anisocytic Stomata.

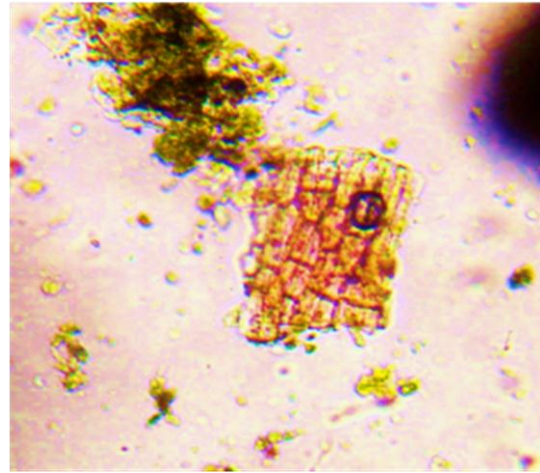


Figure 5: Parenchyma Cells.

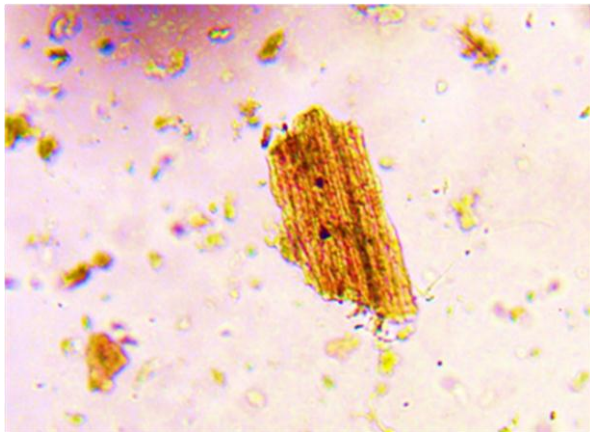


Figure 6: Vessel elements.

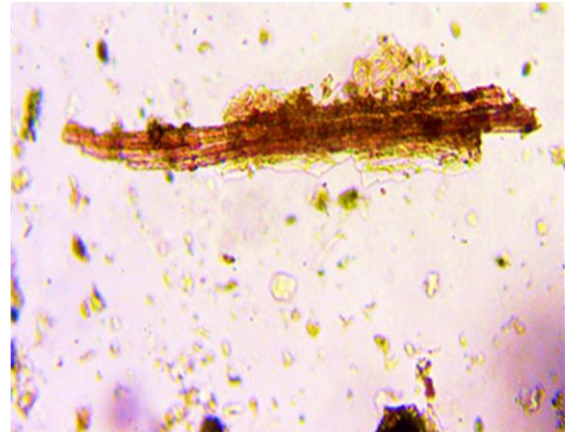


Figure 7: fibres.

### 3.3 Physicochemical Characters

The physicochemical characters like ash value, extractive value, moisture content, swelling index etc was determined for the identification of adulteration. Ash

value is used to detect foreign matters. Also, ash value and extractive value represents the quality and purity of the leaf powder.<sup>[4,5]</sup>

**Table 2: Physicochemical evaluation of *Ayapana triplinervis* (Vahl).**

| Parameters                       | Value (%W/W) |
|----------------------------------|--------------|
| Moisture content                 | 7.2          |
| Total Ash                        | 1.2          |
| Acid Insoluble Ash               | 0.4          |
| Water Soluble Ash                | 0.4          |
| Water Soluble Extractive Value   | 22           |
| Ethanol Soluble Extractive value | 14           |
| Mucilage content                 | 2            |
| Swelling Index                   | 2ml          |

### 3.4 Phytochemical Studies

Phytochemical screening is done to identify different class of phytoconstituents present.<sup>[6]</sup> The crude drugs were extracted using successive solvent extraction in six

different solvents of increasing polarity. And the following extracts were subjected to preliminary phytochemical analysis.

**Table 3: Preliminary phytochemical screening of *Ayapana triplinervis* (Vahl) leaf extract.**

| Solvent         | Colour and consistency                 | Average value of extract (%w/w) |
|-----------------|--|---------------------------------|
| Petroleum ether | Dark greenish black (Sticky semisolid) | 4.48                            |
| Benzene         | Dark greenish black (Sticky semisolid) | 2.22                            |
| Chloroform      | Dark greenish black (Sticky semisolid) | 1.12                            |
| Acetone         | Dark greenish black (Sticky semisolid) | 2.5                             |
| Ethanol         | Dark Reddish black (Sticky semisolid)  | 18.5                            |
| Water           | Dark reddish black (Sticky semisolid)  | 15.1                            |

Qualitative chemical test was carried out on each extract and the following chemical constituents were identified.

**Table 4: phytochemical test on *Ayapana triplinervis* (Vahl) leaf extract.**

| Test                       | Petroleum ether | benzene | Chloroform | Acetone | Ethanol | Water |
|----------------------------|-----------------|---------|------------|---------|---------|-------|
| <b>Alkaloids</b>           | -               | -       | -          | +       | +       | -     |
| <b>Carbohydrates</b>       | -               | -       | -          | -       | -       | +     |
| <b>Phytosterols</b>        | +               | +       | -          | -       | -       | -     |
| <b>Fixed oils and Fats</b> | +               | +       | -          | -       | -       | -     |
| <b>Saponins</b>            | -               | -       | -          | -       | -       | -     |
| <b>Phenolic compound</b>   | -               | -       | -          | +       | +       | +     |
| <b>Protein</b>             | -               | -       | -          | -       | -       | +     |
| <b>Mucilage</b>            | -               | -       | -          | -       | -       | +     |
| <b>Flavonoids</b>          | -               | -       | -          | -       | +       | +     |

In the following observation the petroleum ether and benzene extract shows the presence of phytosterols, fixed oils and fats. Acetone extract shows the presence of alkaloids and polyphenolic compounds. In the ethanol extract contains alkaloids, phenolic compounds, and flavonoids. Carbohydrate and mucilage are present in water extract and along with that phenolic compounds, protein and flavonoids are present. Chloroform extract shows no active constituents.

### 4. CONCLUSION

The study includes the pharmacognostical and phytochemical characters of the leaves of the plant *Ayapana triplinervis* (Vahl). The transverse section of the leaves was taken and examined. By powder microscopy various characters were identified. The physicochemical evaluation was carried out to determine the quality and purity. After the analysis of colour, consistency and percentage extractive value, qualitative chemical test was carried out to identify various phytochemical constituents present in each extract.

### 5. ACKNOWLEDGEMENT

All authors have no conflict of interest. This research did not receive any specific grant from any funding agency.

### REFERENCE

1. Matos Lopes TR, de Oliveira FR, Malheiros FF, de Andrade MA, Monteiro MC, Baetas Gonçalves AC. Antimicrobial bioassay-guided fractionation of a methanol extract of *Eupatorium triplinerve*. *Pharmaceutical Biology*, 2015 Jun 3; 53(6): 897-903.
2. Elya B, Noviani A. Determination of the antioxidant activity of prasman leaf extracts (*Ayapana Triplinervis* [VAHL]) and the total flavonoid and phenol contents of the most active extracts. *International Journal of Applied Pharmaceutics*, 2020 Mar; 12(Special Issue 1): 107-11.
3. Melo AS, Monteiro MC, da Silva JB, de Oliveira FR, Vieira JL, de Andrade MA, Baetas AC, Sakai JT, Ferreira FA, da Cunha Sousa PJ, Maia CD. Antinociceptive, neurobehavioral and antioxidant effects of *Eupatorium triplinerve* Vahl on rats. *Journal of ethnopharmacology*, 2013 May 20; 147(2): 293-301.

4. Aziz N, Wal P, Wal A, Saxena MS. Evaluation of a Polyherbal Powder for Treatment of Diabetes Mellitus. *Indian Journal of Pharmaceutical Sciences*, 2019 Dec 31; 81(6): 1070-7.
5. Patil AG, Koli SP, Patil DA, Phatak AV. Evaluation of extraction techniques with various solvents to determine extraction efficiency of selected medicinal plants. *International Journal of Pharmaceutical Sciences and Research*, 2012 Aug 1; 3(8): 2607.
6. Sharma T, Pandey B, Shrestha BK, Koju GM, Thusa R, Karki N. Phytochemical screening of medicinal plants and study of the effect of phytoconstituents in seed germination. *Tribhuvan University Journal*, 2020 Dec 31; 35(2): 1-1.