

## Study on Morphological, Phytochemical and Physico-chemical Characterization of *Ardisia humilis* Vahl. (Kyet-ma-oke)

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### Abstract

A pharmacognostic study of *Ardisia humilis* Vahl. (Kyet.ma.oke) was collected from Ywar-thar-kone village, Hinthada Township during the flowering and fruiting period. *Ardisia humilis* Vahl. belongs to the family Primulaceae. The morphological characters were studied, classified and identified. *Ardisia humilis* Vahl. was perennial shrubby herbs and wild growing habits. The young leaves and fruits were reddish green in colour. In chemical studies, phytochemical and physico-chemical examination were carried out. In phytochemical study, alkaloids, carbohydrate, glycoside, phenol,  $\alpha$  amino-acid, saponin, flavonoid, steroid, reducing sugar, starch, terpenoid and tannin were found to be present but cyanogenic-glycoside was not detected in powdered leaves of *Ardisia humilis* Vahl. In physico-chemical study, water, methanol, ethanol, pet-ether, acetone and ethyl-acetate, soluble matters were examined. The extractive values of powdered leaves were mostly soluble in ethanol. It was about 21.67% . Least soluble matters content was found in pet ether. It was about 3.34% respectively. Obtained data of species and chemical studies of phytochemical and physico-chemical are comparatively discussed.

**Keywords :** *Ardisia humilis* Vahl. (Kyet-ma-oke), Morphological, Phytochemical and Physico-chemical

### INTRODUCTION

Ayeyarwady region including Hinthada District possess many plant natural resources because of her unique geographical position and favourable climate. Moreover, wild plants and herbs are also flourished in Ayeyarwady region. *Ardisia humilis* Vahl is one of the common widely grown in Myanmar.

The use of herb as medicine is mentioned in china and Japan at 168 BC. Every herb has its own properties which include their specific chemical constituents. The chosen medicinal plant namely as *Ardisia humilis* Vahl. belong to the Family Primulaceae and its habitat is wild growing. *Ardisia humilis* Vahl. is locally known as Kyet-ma-oke, Jet berry in English. (Hundley, H.G and Chit KoKo . 1987).

The plant is credited with stimulant and carminative properties. The plant is used in the treatment of diarrhoea, bruise, dysentery, gout, mental disorder and rheumatism. Roots are used in fever, diarrhoea and rheumatism and it has antibacterial activity.

*Ardisia humilis* Vahl. is a beautiful flowering plant species of genus *Ardisia*. This evergreen shrub can add life to my house and office space with its beautiful green foliage. Its leaves are shiny, leathery and dark green in colour (R.H.M.J Lemmens, 1794).

*Ardisia humilis* Vahl. (kyet-ma-oke) was 1 feet height and small undershrub. The flowering periods was in rainy season. The plants were found as moisture and shady places.

In this research, one of the medicinally important plants was selected namely kyet-ma-oke, *Ardisia humilis* Vahl. The aim and objectives of the study are to know the Myanmar medicinal plant *Ardisia humilis* Vahl. To study the morphological characters to observe the phytochemical constituents of powdered samples and to examine the physicochemical determination of powdered samples.

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## MATERIALS AND METHODS

### Botanical Studies

#### Collections and identification of *Ardisia humilis* Vahl.

The plant specimens studied in this investigation were collected from wild growing, Ywar-thar-kone village in Hinthada District (Figure 1). Collected periods were during flowering and fruiting times in the year from December, 2019 to February, 2020. For morphological studies, the fresh of vegetable and reproductive parts were used. The selected specimens were collected at North Latitude 17° 38' 53" and East Longitude 95° 26' 18 ". The sample were washed with distilled water and shade dried for several days. Precise location of specimens collection was made by using Global Positioning System (G.P.S).

The following reagents were used to examine the section and powdered samples of phytochemical and physico-chemical characterizations.

- (1) Chloral hydrate solution B.P for cleaning reagent.
- (2) Solution of phloroglucinol B.P followed by concentrated hydrochloric acid for testing lignin and vascular bundles
- (3) Iodine solution for testing starch.
- (4) Glycerin for temporary mounts. (Metcalf and Chalk, 1972, Trease and Evans, 2002.)

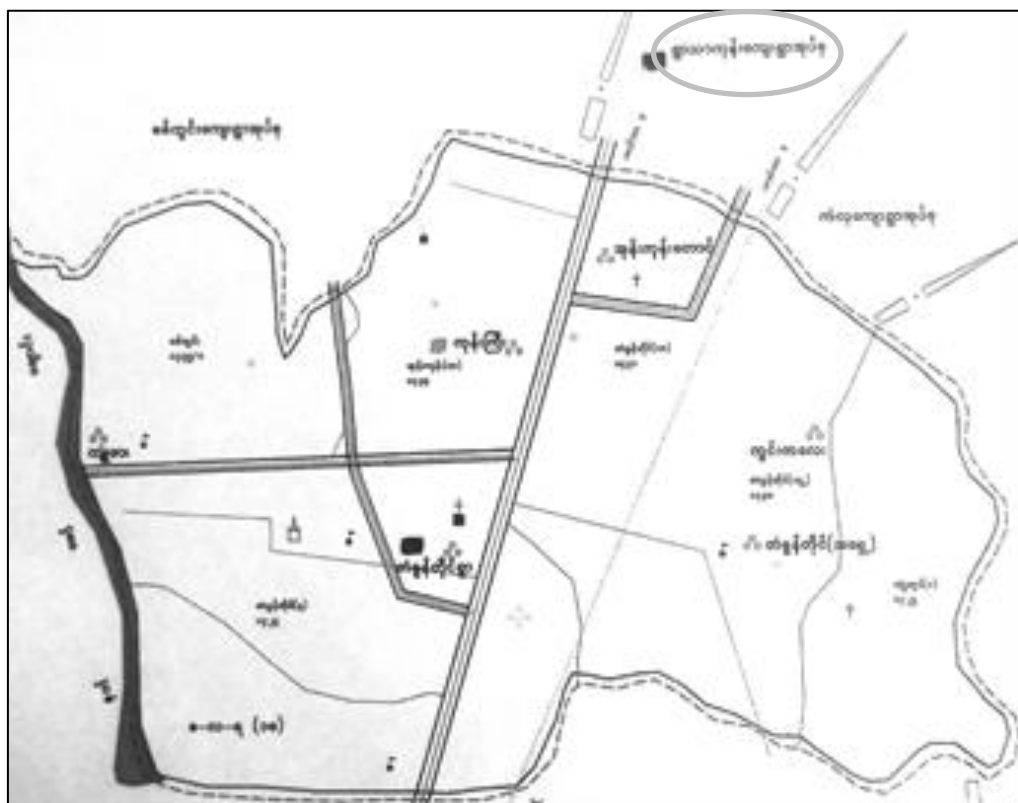


Fig 1. Map of Hinthada Township

## Chemical studies

In chemical studies, preliminary, phytochemical investigation and physicochemical characterization of powdered samples were examined at phytochemical laboratory Department of botany, Hinthada University.

### Preliminary phytochemical investigation of *Ardisia humilis* Vahl.

Preliminary phytochemical examination of powdered leaves was studied. In phytochemical studies, the alkaloids, carbohydrate, glycoside, phenol,  $\alpha$ -amino acid, saponin, flavonoid, steroid, reducing sugar, starch, terpenoid and tannin were found to be present but cyanogenic glycoside was not detected. These results were shown in Table (1) and figures (13 –25).

### Physico-chemical examination of *Ardisia humilis* Vahl. (Kyet-ma-oke)

Determination of moisture content of the powdered sample was determined by oven dry method five grams of powdered sample was weighted accurately in a beaker and dried in an oven at the temperature of 110°C for 45 minutes. After drying the beaker was removed from the oven and cooled in a desiccators at room temperature and weighted. This procedure was repeated until a constant weight was obtained. In this research, moisture content and solubility in different solvents such as water, methanol, ethanol, pet-ether, acetone and ethyl-acetaete were carried out. According to the methods of (British Pharmacopoeia, 1968 and Trease and Evans 1978). This results were shown in (Table. 2) and Figure( 26 - 27).

## RESULTS

### Botanical Studies

Scientific Name	- <i>Ardisia humilis</i> Vahl.
Synonyms	- <i>Ardisia arborescens</i> Wall.
Myanmar Name	- Kyet – ma –oke
English Name	- Low Shoebutton, Jet Berry
Family	- Primulaceae (Myrsinaceae)
Location	- Ywar-thar-gone village, Hinthada District, Ayeyarwady Region
G.P.S	- N – 17° 38' 53" E – 95° 26' 18"

### Morphological characters of *Ardisia humilis* Vahl.

**Perennial shrubby** herbs, erect, 0.3 – 1.2 m height, sub rectangular to subcylindrical shape stem, reddish green at the top, soft woody at the base. **Leaves** simple and alternate, exstipulate, petiole 0.4 – 1.0 cm long, reddish green in young, lamina broad ovate to elliptical 11-15 cm long and 5-7 cm wide, glabrous, serrate margin and acute apex. **Inflorescences** axillary, umbellate, 2.0 – 2.5 cm long, peduncle cylindrical, reddish green. **Flowers** pinkish white, 0.5 – 0.8 cm long, 0.3 – 0.6 cm wide, petiole reddish green, bract minute, actinomorphic, hypogynous. **Sepals** 5, valvate, reddish green, cup shaped, synsepalous, **Petals** 5, valvate, pinkish white, rotate synpetalous. **Stamens** 5 petalostamonus, filament short,

anther ditheous, sagittate shaped. **Carpel** 2, syncarpous, style long, stigma simple, free central placentation, ovary superior. **Fruits** berry, 0.3 – 0.6 cm long, 0.2 – 0.4 cm wide, globose, reddish green. **Seeds** globosis, 0.2 – 0.4 cm long, 0.1 – 0.2 cm wide, dark brown. (Figure 2 – 12)

- |                                |   |
|--------------------------------|---|
| Flowering and fruitings period | - December to June                          |
| Part used                      | - leaf, fruit                               |
| Uses                           | - vegetable, metal disorder, menstrual pain |

**Morphological characters of *Ardisia humilis* Vahl.**



Fig 2. Habit

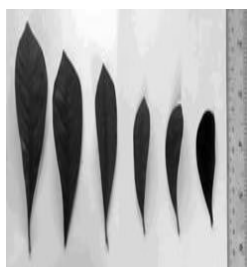


Fig 3. Upper surface leaves

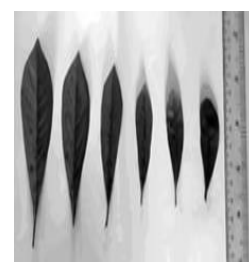


Fig 4. Lower surface leaves



Fig 5. Inflorescence



Fig 6. Flowers



Fig 7. L.S of flower

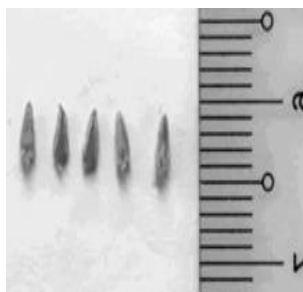


Fig 8. Anthers

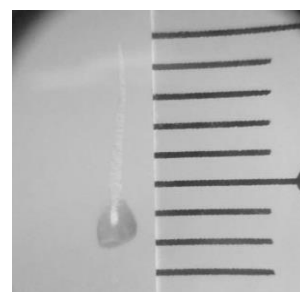


Fig 9. Carpel



Fig 10. T.S Ovary



Fig 11. Fruits



Fig 12. Seeds

### Chemical Studies

#### Preliminary phytochemical investigation of powdered leaves of *Ardisia humilis* Vahl. (Kyet-Ma-Oke)

Table (1). Phytochemical examination of powdered sample on leaves of *Ardisia humilis* Vahl. (Kyet-Ma-Oke)

No.	Type of compound	Extract	Reagent used	Observation	Results
1	Alkaloid	1% HCl	1. Mayer's reagent	Cream ppt.	+
			2. Wagner's reagent	Blue ppt.	
			3. Dragendorff's reagent	Orange red ppt.	
2	Carbohydrate	H <sub>2</sub> O	10% $\alpha$ -naphthol & H <sub>2</sub> SO <sub>4</sub> (Conc.)	Purple ring	+
3	Glycoside	H <sub>2</sub> O	10% Lead acetate solution	White ppt.	+
4	Phenol	H <sub>2</sub> O	5% FeCl <sub>3</sub> solution	Greenish black ppt.	+
5	$\alpha$ -amino acid	H <sub>2</sub> O	Ninhydrin reagent	Light purple color	+
6	Saponin	H <sub>2</sub> O	H <sub>2</sub> O	Persistent foam	+
7	Tannin	H <sub>2</sub> O	1% Gelatin & 10% NaCl solution	Brown ppt.	+
8	Flavonoid	70% EtOH	Mg ribbon & Conc; HCl	Brown colour	+
9	Steroid	chloroform	Acetic anhydrite & Conc; H <sub>2</sub> SO <sub>4</sub>	Bluish green	+
10	Terpenoid	Petroleum ether	Acetic anhydrite & Conc; H <sub>2</sub> SO <sub>4</sub>	Reddish brown	+
11	Reducing sugar	H <sub>2</sub> O	Fehling's solution	Brick red ppt.	+
12	Starch	H <sub>2</sub> O	Iodine solution	Bluish black	+
13	Cyanogenic glycoside	H <sub>2</sub> O	H <sub>2</sub> O, Conc; H <sub>2</sub> SO <sub>4</sub> , sodium picrate paper	No colour change	-

+ present – absent



Fig. 13 Test for alkaloid



Fig.14 Test for carbohydrate



Fig. 15 Test for glycoside

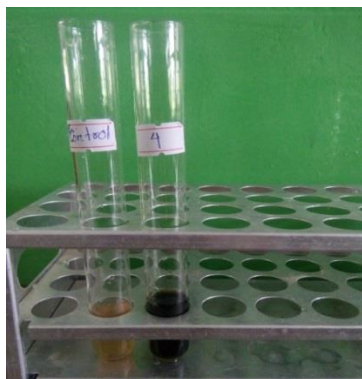


Fig. 16 Test for phenol



Fig. 17 Test for  $\alpha$ -amino acid

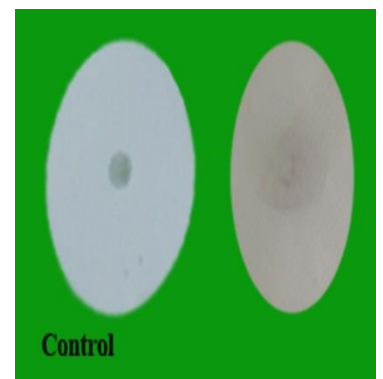


Fig. 18 Test for saponin

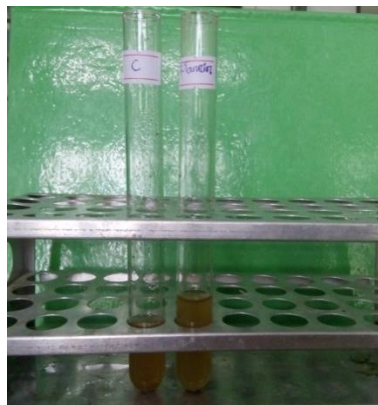


Fig. 19 Test for tannin



Fig. 20 Test for flavonoid

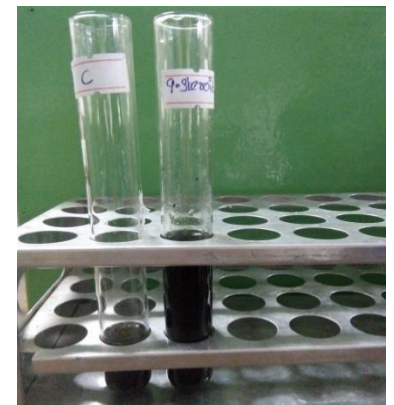


Fig. 21 Test for steroid



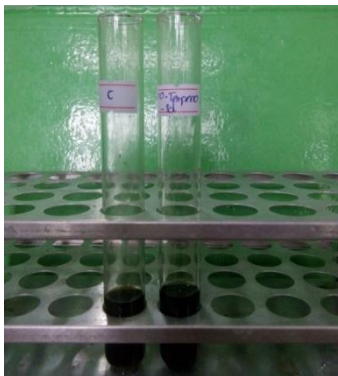


Fig. 22 Test for terpenoid

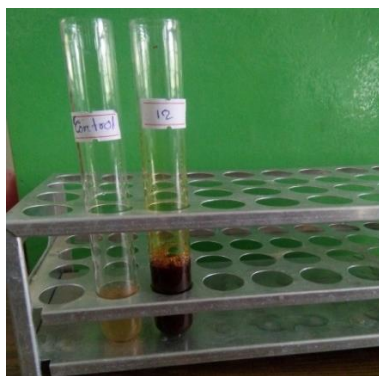


Fig. 23 Test for reducing sugar

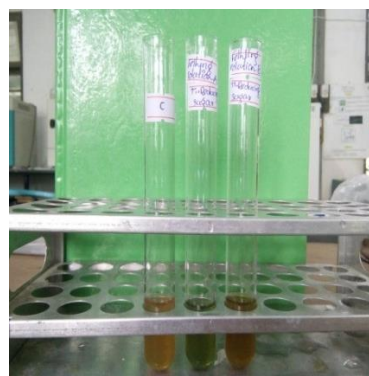


Fig. 24 Test for starch

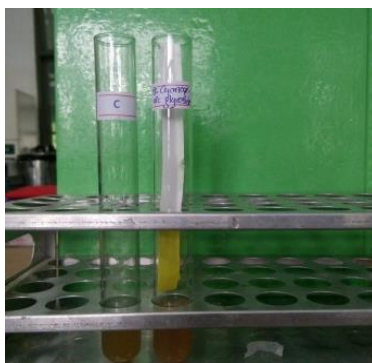


Fig.25 Test for cyanogenic glycoside

## 2.2 Physico-chemical examination of powdered leaves of *Ardisia humilis* Vahl. (Kyet-ma-oke)

Table (2) Physico-chemical examination of powdered sample on leaves of *Ardisia humilis* Vahl. (Kyet-ma-oke)

No.	Physico-chemical characters	Average (% W/W)
1	Moisture	68.08 %
2	Water soluble matter content	10.0 %
3	Methanol soluble matter content	13.4 %
4	Ethanol soluble matter content	21.67 %
5	Pet-ether soluble matter content	3.34 %
6	Acetone soluble matter content	6.67 %
7	Ethyl acetate soluble matter content	8.34 %

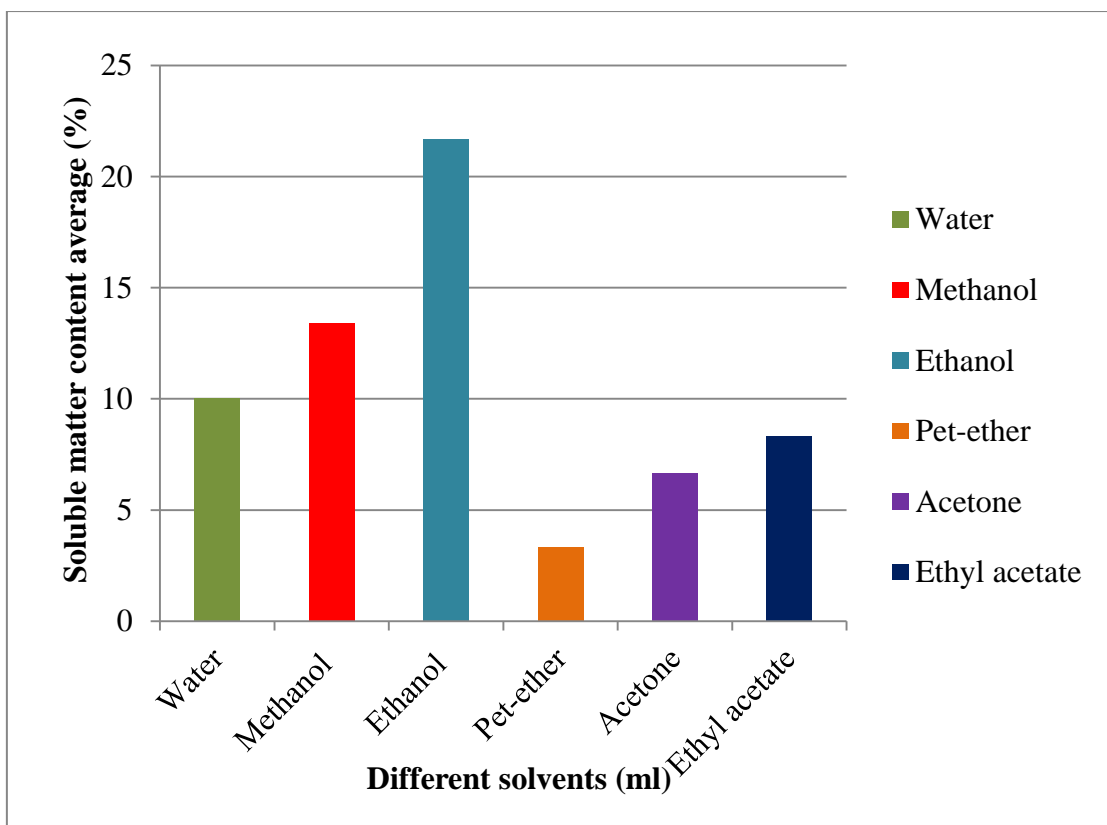


Fig.26 Physico-chemical examination of powdered leaves of *Ardisia humilis* Vahl. (Kyet-Ma-Oke)

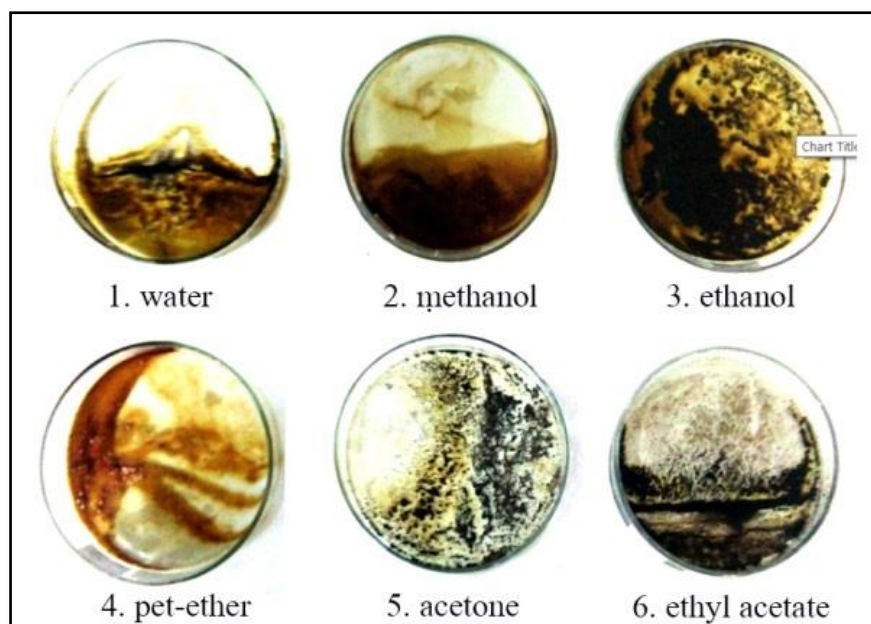


Fig.27 Solubility tests of different solvents in powdered leaves of *Ardisia humilis* Vahl.



## DISCUSSION AND CONCLUSION

The selected specimen, *Ardisia humilis* Vahl., Kyet-ma-oke belong to the family Primulaceae was found to be wild growing. The specimens can be abundantly found in moisture and shadier places of Hinthada Township.

*Ardisia humilis* Vahl., were found as under shrub, and soft wooded stem, leaves were alternate, exstipulate and lamina was elliptic and obovate. The inflorescences was axillary and umbellate. The flower was found as pinkish white and the pedicel and petiole were found as reddish green in colour.

The sepals were 5, synsepalous and cup shaped. The petals were found as pinkish white and rotate. The stamens were 5 and the filament were short. The anthers were dithecous and sagittate. The style was long and the stigma was simple, ovaries were superior and free central placentation. Fruits were berry, globose and dark reddish in colour. The seeds were found as dark brown in colour. These characters were agreed with those mentioned by Backer. 1965, Dassanagake 1980.

The fruits were found as dark reddish, attractive, sweet and acerbity taste. Tender shoots were also found as dark reddish. So, tender shoots and fruits are eaten as vegetable in local people.

In preliminary phytochemical investigation, chemical constituents such as alkaloid, carbohydrate, glycoside, phenol,  $\alpha$ -amino acid, saponin, flavonoid, steroid, terpenoid, reducing sugar and starch were detected in the powdered leaves. However, cyanogenic glycoside was not detected in this study.

In physico-chemical examination, moisture content and various solvents such as water, methanol, ethanol, pet-ether, acetone and ethyl acetate soluble matter contents were investigated. In this study, the most soluble matter was found in ethanol. The second most soluble matter was found in methanol. The least soluble matter was observed in pet-ether.

So, chemical constituents of powdered leaves should be extracted with ethanol for further pharmaceutical research studies.

This basic scientific investigation may be utilized for further Myanmar medicinal plant research work to produce useful and effective drugs for human society.

The presence research is to examine the medicinal plant scientifically and discover a wider application of Myanmar Traditional Medicine.

### Acknowledgement

We wish to express my deep gratitude to Dr Theingi Shwe, Rector of Hinthada University, Dr Yee Yee Than and Dr Cho Kyi Than, Pro-rectors of Hinthada University, for permission me to study and for giving invaluable advice. Our special thanks to Dr. Moe Sandar Shein, Professor, Department of Botany, Hinthada University, for their kind advice, helpful, suggestion and for allowing me to use the library in doing this research work. We much grateful to my devoted parents for their providing moral and financial support throughout the completion of this research.

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