



## Pharmacognostic evaluation of *Drymoglossum heterophyllum*-(L)C. Chr.

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### ABSTRACT

*Drymoglossum heterophyllum*-(L)C.Chr. is an epiphytic fern which is commonly known as Dragon Scales is an important medicinal plant belonging to Pteridaceae family. The leaves are used for many medicinal purposes. This study provides taxonomical, pharmacological and physicochemical details helpful in laying down standardization and pharmacopoeial parameters. The diagnostic characters are aseptate trichomes anomocytic stomata, reddish brown sclerenchyma and thick walled cuticle. The physicochemical studies revealed total moisture content(8.65%), total ash value(7.75%), water soluble ash(4.42%), acid insoluble ash value(3.466%), Alcohol soluble extractive(4.157 %) water soluble extractive value(7.85%), Crude fibre content(18.18%) and total chlorophyll content ( 0.449/g ).

**Key words:** *Drymoglossum heterophyllum*-(L)C.Chr., Pharmacognosy, Physicochemical evaluation

### INTRODUCTION

Standardization of a crude drug is essential to set a distinctive identity and quality of a crude drug. Most of the standard parameters are revealed based on the microscopy and physicochemical constants of a plant. Documentation of research work promotes the acceptance of traditional medicines. These standards might initiate the scientists who are keen and sincere to investigate the traditional claims of plant drugs<sup>1</sup>. As the demand of herbal medicine is increasing in both developing and developed countries, extensive research works have been conducted using plants but the therapeutic utility of pteridophytes have not been explored much. The present study was undertaken to scientifically prove the claimed therapeutic utility of a widely seen pteridophyte *Drymoglossum heterophyllum*-(L)C.Chr. The leaves of the plant were traditionally used for treatment of swellings<sup>2</sup>, cuts, wounds and fever<sup>3</sup>. The leaf decoction is used in treatment of small pox & as poultices for headaches. Some tribal society uses leaves of this plant in treatment of superficial skin infections, cough, gonorrhoea etc. Ground leaves are used as styptic for coagulating blood and arresting capillary hemorrhages. Relevance of the present study increases as there is very less scientific research carried out on the various aspects of this plant.

### EXPERIMENTAL SECTION

The plant material was collected from Kuruppunthara, Kottayam, Kerala and taxonomic identification of the sample was confirmed by Dr. Rojimon P Thomas, Department of botany, CMS college, Kottayam. (Voucher specimen no: 277). Fresh leaves were collected and dried at room temperature to remove moisture and size reduced. Pharmacognostical evaluation<sup>4-6</sup> were carried out by taking free hand sections. Photographs were taken using compound binocular microscope having sensor aided digital camera and computer attachments. Powder microscopy and Physicochemical constants<sup>7-13</sup> were carried out from shade dried powder.

## RESULTS AND DISCUSSION

*Drymoglossum heterophyllum*-(L)C.Chr is an epiphytic fern and leaves are sour in taste belongs to Pteridaceae family. Leaves appears as two small round glossy fronds (about 1cm across) without stalks. Oval or round in shape about 1-2cm wide & 1-5cm long with rounded apex and cuneate. The fronds bearing spores (fertile leaves) are long and narrow (3-15cm long) and held on a stalk. Sometimes the tips are branching. The thin stems are covered by scales and there are minute star-shaped hairs on the underside of the frond.

Stem contains cuticle which is the outermost covering of the stem which appears as very thick. There is no well defined epidermis or core present. Cuticle is succeeded with 2-3 layers of closely arranged parenchymatous cells which is devoid of cellular inclusions like starch, calcium oxalate crystals etc. The central portion of the stem is occupied with oval to round parenchyma cells intercepted with vascular bundles. 2-3 layers of sclerenchymatous cells appears red in colour like pericycle in angiosperms which delimits cortex from the vascular tissues. Vascular bundles are round to oval in appearance. The outer layer of the bundle is bordered which bears the live cells. Vascular bundles are not continuous as in angiosperms, they are found as isolated bundles. These isolated vascular bundles inside the cortical region is termed as cortical bundles. Xylem vessels occupies the central portion like holes and is surrounded by very small cells of phloem. Under developed vascular bundles are small in size.

The outermost layer of the leaf is made up of a thick coating like cuticle. There is no well defined epidermis or epidermal outgrowths like trichomes. The anomocytic stomata was observed on the outerlayer occassinally. Incidence of stomata is very less. The next layer near to the outerlayer is not differentiated in to midrib and lamina. The entire inner portion is occupied with loosely arranged oval to rectangular cells.

Powder microscopy of the leaves shows the Aseptate trichomes are present in the powdered leaves. The trichomes are sometimes attached with epidermal cells. The incidence of stomata in the aquatic plants are very less. Anomocytic type of stomata was seen in the powder. Epidermal cells are seen abundantly. Brown coloured pigments are present in the leaf powder.

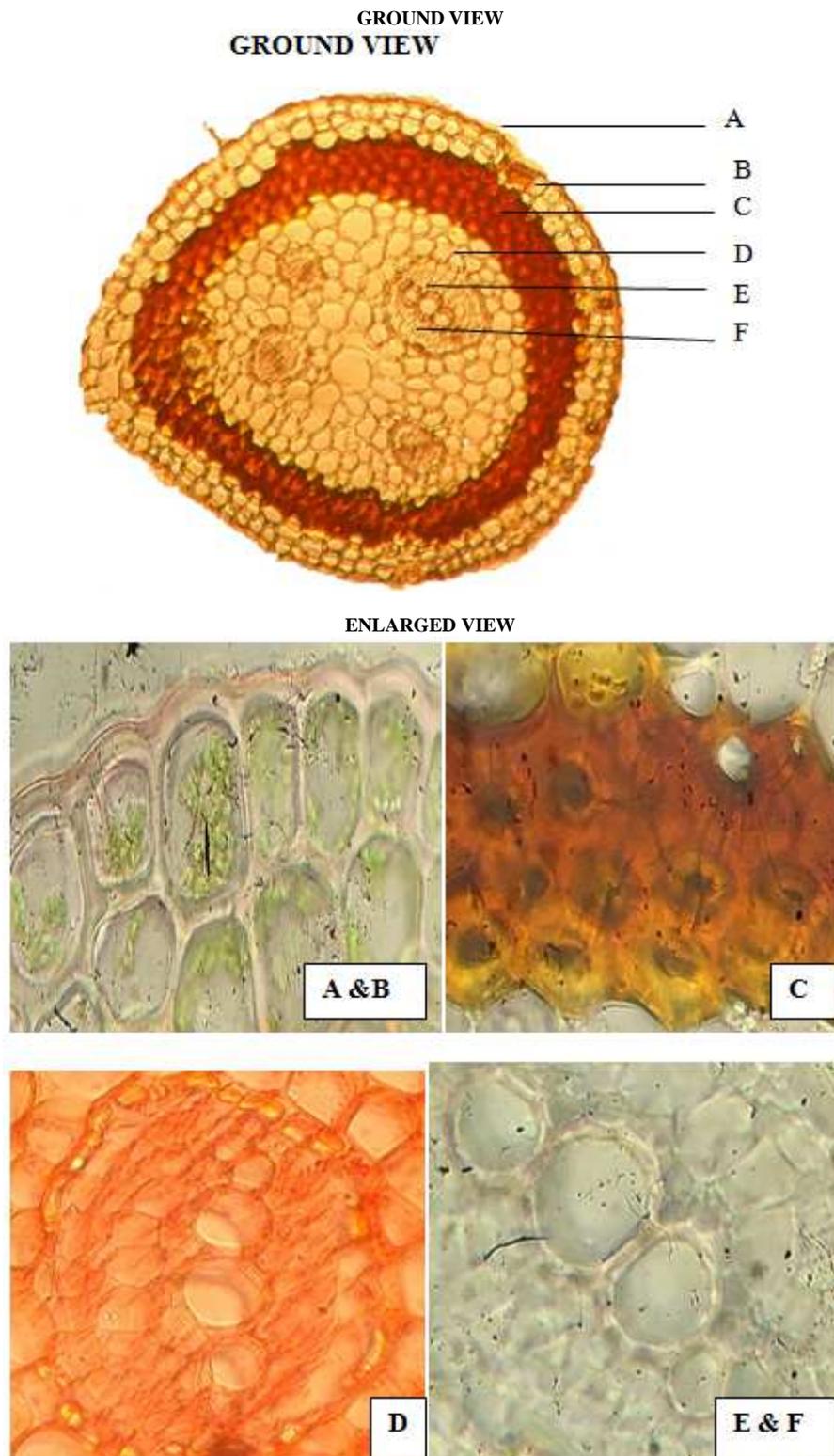
The physicochemical constants of the plant *Drymoglossum heterophyllum*-(L)C.Chr. is as follows. Total ash value, Water soluble ash, Acid insoluble ash value of the shade dried leaf of was found to be 7.75% w/w, 4.42% w/w and 3.466% w/w successively. Ash values within fair limits, signifies the quality and purity of the *Drymoglossum heterophyllum*-(L)C.Chr and also gives idea about the total inorganic content. Alcohol soluble extractive value and Water soluble extractive value of the shade dried leaves was found to be 4.157 % w/w. and 7.85% w/w. Moisture content of the shade dried leaves was found to be 8.65% w/w. Crude fibre content of the shade dried leaves was found to be 18.18% w/w. The chlorophyll content of the leaves was also estimated. The total chlorophyll content was 0.449/g tissue.

**Table:1 Physicochemical Constants**

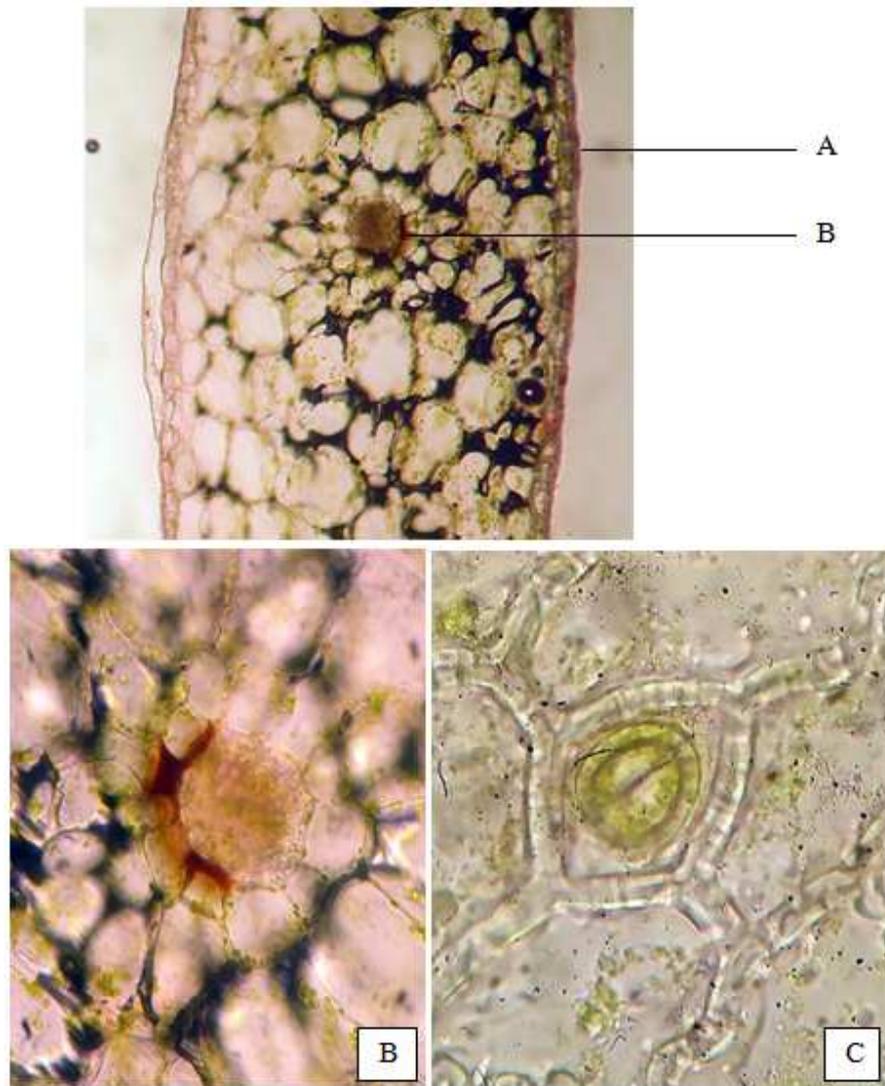
PARAMETERS	% W/W
Total ash	7.756 ± 0.257
Water soluble ash	4.420 ± 0.052
Acid insoluble ash	3.466 ± 0.068
Water soluble extractive value	7.851 ± 0.742
Alcohol soluble extractive value	4.157 ± 0.423
Loss on drying	8.690 ± 0.98
Crude fibre content	18.180 ± 0.43

**Table:2 Chlorophyll Estimation**

Chlorophyll a	0.2489 ± 0.1074mg/g
Chlorophyll b	0.2002 ± 0.1309mg/g
Total chlorophyll	0.4491 ± 0.2381mg/g

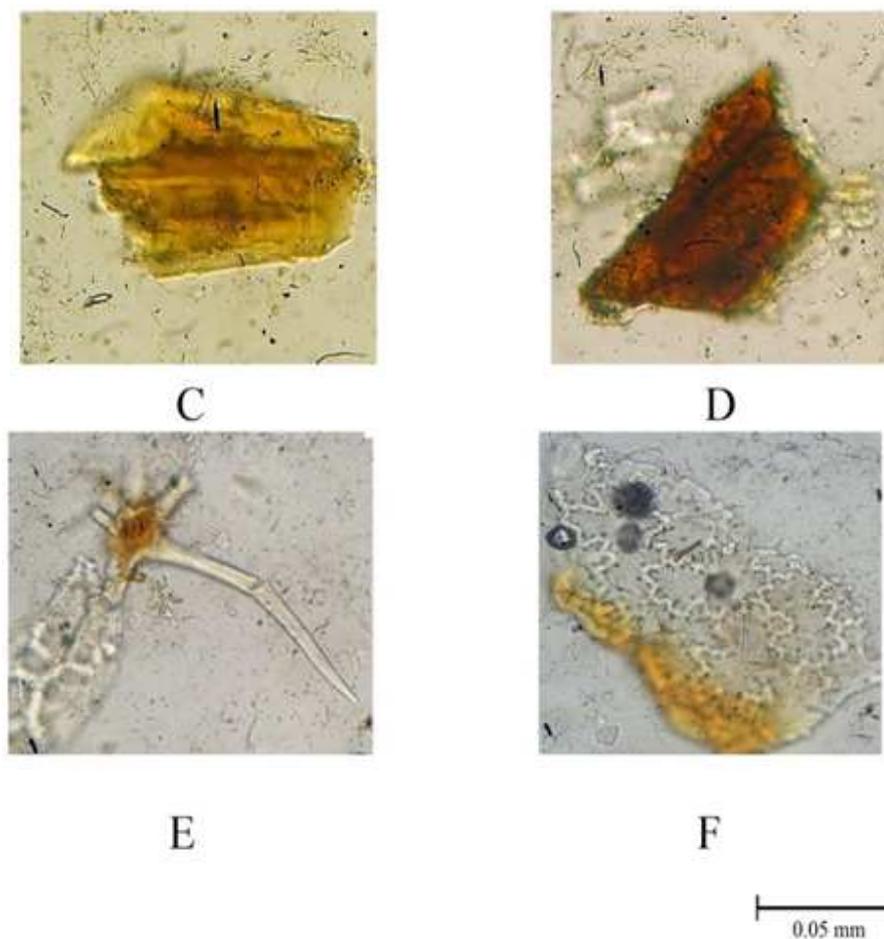


A-cuticle, B-Parenchyma, C-Sclerenchyma, D-Vascular bundle, E-Xylem, F-Phloem  
Fig.1 Stem C.S



A-Cuticle, B-vascular tissue, C- Stomata  
Fig.2 Leaf T.S





A- Aseptate Trichomes, B-Stomata, C & D –Brown coloured pigments, E- Trichomes with epidermal cells, F- Epidermal cells

**Fig.3 Powder Microscopy**

### CONCLUSION

Pharmacognostical evaluation of *Drymoglossum heterophyllum*-(L)C.Chr leaves provide specific pharmacognostical parameters useful in scientific evaluation of the drug. The established standards in this study will help to minimise the adulteration of samples of *Drymoglossum heterophyllum*-(L)C.Chr. and also of great use for researchers, manufacturers and individuals in selection of the authentic plant material for research, drug production or as home remedy. The results of this investigation may be useful in preparation of medical monograph for this plant.

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