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Pharmacognostic study of *Procris repens*

Saranya S Mohan

M Pharm student, Jamia Salafiya Pharmacy College,

Pulikkal, Malappuram District, Kerala, India.673637

Author correspondence: E mail : saranyasmohan566@gmail.com

ABSTRACT

Objective: To study the microscopy, powder microscopy and macroscopy of a medicinal plant of significant interest, Procris repens (Lour.) B.J. Conn and Hadiah. **Methods:** Various pharmacognostic parameters involved in organoleptic, microscopic and powder microscopic evaluation were carried out. **Results:** microscopy of the leaf shows uniseriate upper and lower epidermis covered with cuticle. Mesophyll layer cannot distinguished to palisade and spongy parenchyma. Chlorophyll is found in this region. Cystoliths and rosette crystals of calcium oxalate are present in leaf lamina. Anisocytic stomata and unicellular trichomes are present. Transverse section of *Procris repens* (stem) shows outer unicellular epidermis covered with cuticle. Epidermis is followed by 2-3 layered collenchymatous hypodermis. Hypodermal cells contain rosette crystals of calcium oxalate. Transverse section of *Procris repens* (Root) shows outer cork region. Cork is followed by cortex which is made up of parenchymatous cells. Rosette crystals of calcium oxalate are present in this region. Powder microscopy shows crystals of calcium oxalate, large number of round to elongated simple starch grains, a fragment of mesophyll cells and stomata. Fragments of vascular elements which shows spiral vessels, bordered pitted vessels and annular vessels are seen. Golden yellow coloured contents, fragments of epidermal cells with unicellular trichome and non-lignified fiber with narrow lumen are also present.**Conclusion:** The present study provides some valuable information with respect to its identification and authentication of *Procris repens*.

Keywords: Procris repens, microscopy, parenchyma cells, collenchyma cells, anisocytic stomata, unicellular trichomes, xylem, macroscopy, powder microscopy, calcium oxalate crystals.

INTRODUCTION

The oldest known medical practice is herbal therapy. Historically, plants have been a prime source of pharmaceuticals, with many

of the ones on the market now originating either directly or indirectly from them. Herbal remedies are mostly used to cure moderate and chronic illnesses, and they have frequently maintained their appeal due to historical and cultural components. *Procris repens* (Lour.) B.J. Conn and Hadiah (synonym: *Pellionia repens*) plant is known as the "Trailing Watermelon Begonia" because of its unique trailing growth habit and its leaves resemble the rinds of watermelon. The trailing nature of the plant makes it an excellent choice for ground cover or hanging baskets. It is a tropical plant that belongs to the family *Urticaceae*. It is native to Southeast Asia. This plant produces small, inconspicuous flowers and *Procris repens* contains a variety of bioactive compounds including alkaloids, flavonoids, phenolic acids, and terpenoids, which contribute to its medicinal properties. Native Distribution is Bhutan, India, Southern China, Indochina, Philippines, Malaysia, Singapore, Indonesia and Preferred Climate Zone : Tropical, Sub-Tropical / Monsoonal. It is a small herbaceous creeper, with prostrate ground-hugging habit, up to 15 cm tall, spreading or trailing up to 60 cm. The stems are slender, wiry, and prostrate, rooting at the nodes. They can reach lengths up to 30 cm. It has alternate, fleshy leaves have toothed or wavy leaf blades that are elliptic to oblong, and sometimes broadly egg-shaped, asymmetrically cordate based. *Procris repens* produces white or pink tiny flowers with a tinge of silver, and arranged in branched clusters. It possesses fibrous root system that aids in nutrient and water absorption. From the aqueous ethanolic extract of whole plants of *Pellionia repens (Procris repens)*, pellioniareside (1), along with lupeol (2), uracil (3), (22E,20S,24R)-5α,8αepidioxyergosta-6,22-dien-3-ß-ol (4), and daucosterol (5) were identified as novel glucoceramides. The relative configurations and structure of pellioniareside were determined to be (2S,3S,4R,6E,8E)-1-O-ß-D-glucopyranosyl-2-[(2R)-2-hydroxytetracosanoylamino]- 1,3,4-octadecanetriol-6,8-diene by analysis of spectral data and by chemical evidence. Pellioniareside, a new sphingolipid, may be the active constituent of *Pellionia repens* to treat icterus, acute and chronic hepatitis and allergic dermatitis. *Procris repens* (Lour.) B.J. Conn and Hadiah (*Urticaceae*) is traditionally used in folk medicine for the treatment of skin injuries, nerve related disorders, gastrointestinal complaints and respiratory conditions. The whole plant of *Procris repens* was used to treat icterus, acute and chronic hepatitis and allergic dermatitis in Chinese medicine. It is used by Malays for poulticing boils, swollen areas, and the abdomen when it is painful. A decoction from the plant is used for rheumatism. Lupeol-one of the chief components of *Pellionia repens* exhibits strong inhibitory effects on osteoclastogenesis.

The current literature survey revealed macroscopy, microscopy and powder microscopy of Procris repens.The main objective of this study is to provide some valuable information with respect to its identification and authentication of *Procris repens*.

MATERIALS AND METHODS

Plant collection

The fresh leaves of *Procris repens* (Lour.) B.J.Conn and Hadiah were collected from

Puthur,Kannur district,Kerala and authenticated by A.K.Pradeep, Dept. of Botany, University of Calicut.A voucher specimen was preserved in the herbarium (CU No. 173930) for further reference.After authentication, the leaves of *Procris repens* (Lour.) B.J.Conn and Hadiah were dried at room temperature until they were free from the moisture and powdered.

Chemicals and instruments

Phloroglucinol, hydrochloric acid, glycerin, iodine solution and all other chemicals used in the study were of analytical grade.

Macroscopic evaluation

The fresh leaves of *Procris repens* were subjected to morphological studies, consists of organoleptic characteristics viz. colour, odour, taste, shape, texture were examined as per standard WHO guidelines.

Microscopical evaluation

A histochemical and microscopical study of the fresh drug and powdered drug was performed according to the method described by Kokate and Khandelwal.

RESULTS

Macroscopic evaluation

ORGANOLEPTIC CHARACTERS	LEAVES	STEM	ROOT
COLOUR	Grey-green to dark green	Green-pink	Brown
ODOUR	Aromatic	No characteristic odour	No characteristic odour
TASTE	Bitter and pungent	Tasteless	Tasteless
SHAPE	Elliptic to oblong	Cylindrical	Fibrous
SIZE	2-8 cm x 1-4 cm	10-15 cm	5-10 cm
TEXTURE	Smooth, glabrous, slightly waxy	Smooth	Stringy

Mi

croscopical evaluation

1.Transverse section of *Procris repens* (leaves)

It shows midrib with an outer single layer of upper epidermis and lower epidermis is dome-shaped, covered with cuticle. The

epidermis is followed by parenchymatous region where the vascular bundle is embedded. The vascular bundle is made up of xylem and phloem elements. Two to three layers of collenchyma cells are present in the lower epidermis. A band of chlorenchymatous cells are also present.

The transverse section of the leaf lamina shows uniseriate upper and lower epidermis covered with cuticle. Mesophyll layer cannot distinguished to palisade and spongy parenchyma. Chlorophyll is found in this region. Cystoliths and rosette crystals of calcium oxalate are present in leaf lamina. Anisocytic stomata and unicellular trichomes are present.

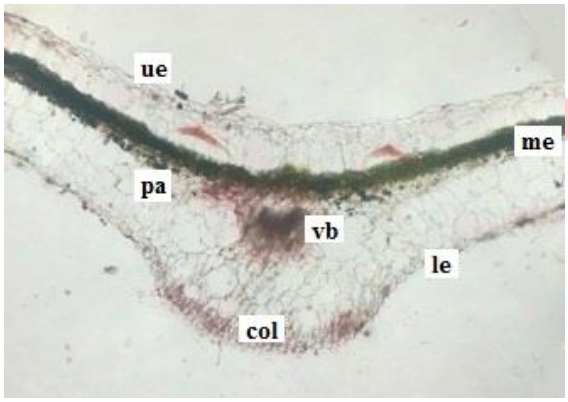

Fig.1: Ground plan of *Procris repens* (leaves): **col.**: collenchyma cells; **le.**:lower epidermis; **me.**: mesophyll cells; **pa.**: parenchyma cells; **ue.**: upper epidermis; **vb.**: vascular bundles.

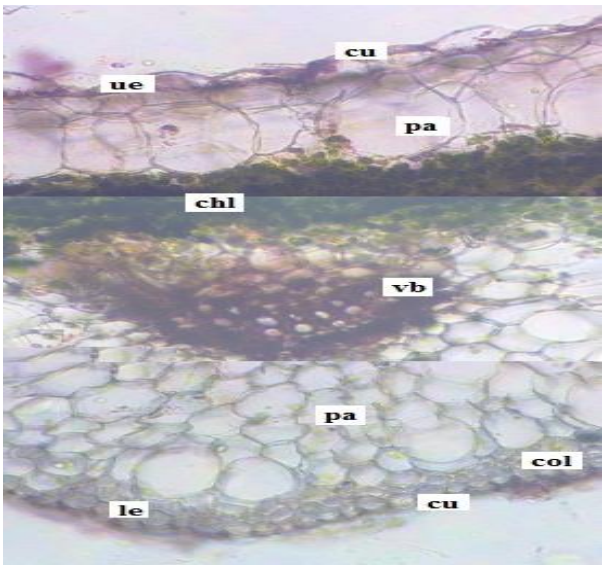

Fig.2: Portion enlarged of mid rib in *Procris repens* (leaves): **chl.**: chlorenchyma; **col.**: collenchyma cells; **cu.**: cuticle; **le.**: lower epidermis; **pa.**: parenchyma cells; **ue.**: upper epidermis; **vb.**: vascular bundles.

2.Transverse section of *Procris repens* (stem)

It shows outer unicellular epidermis covered with cuticle. Epidermis is followed by 2-3 layered collenchymatous hypodermis. Hypodermal cells contain rosette crystals of calcium oxalate. Hypodermis is followed by parenchymatous cortex.Schizogenous cavities are present in this region. Conjoint, collateral and closed vascular bundles are present in the parenchymatous cells and arranged in a circular manner. Vascular bundles are composed of xylem and phloem elements. Parenchymatous pith is present. Simple elongated starch grains are present in the cortex and pith.

Fig.1: Ground plan of *Procris repens* (stem): **e.**: epidermis; **hyp.**: hypodermis; **ct.**: cortex; **pa.**: parenchyma cells; **sy.cav .**: schizogenous cavity; **vb.**: vascular bundles; **pi.**: pith.

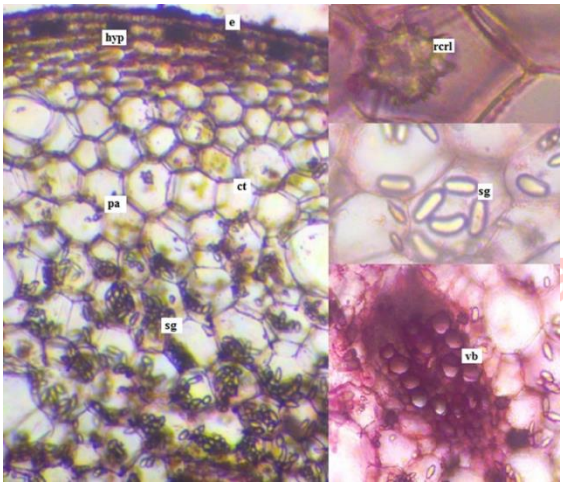

Fig.2: Transverse section of *Procris repens* (stem) a portion enlarged: **e.**: epidermis; **hyp.**: hypodermis; **ct.**: cortex; **pa.**: parenchyma cells; **rcrl .**: rosette crystals of calcium oxalate; **vb.**: vascular bundles; **sg.**: starch grains.

3.Transverse section of *Procris repens* (Root)

It shows outer cork region. Cork is followed by cortex which is made up of parenchymatous cells. Rosette crystals of calcium oxalate are present in this region. Phloem is narrow made up of phloem elements. Xylem is wide region made up of lignified xylem elements like xylem vessels, xylem parenchyma and xylem fibers.Pith is absent.

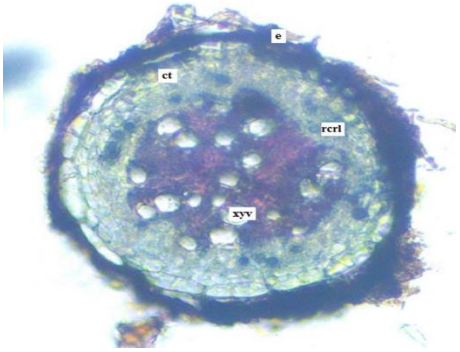

Fig.1: Ground plan of *Procris repens* (Root): **ck.**: cork; **ct.**: cortex; **rcrl.**: rosette crystals of calcium oxalate; **xyv .**: xylem vessel.

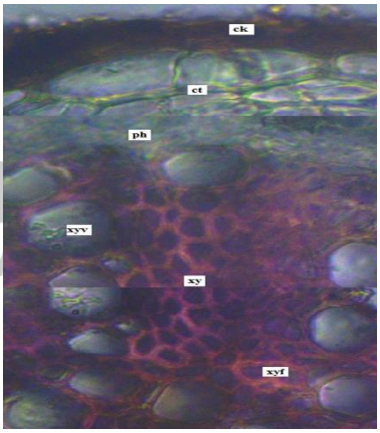

Fig.2: Transverse section of *Procris repens* (Root) a portion enlarged: **ck.**: cork; **ct.**: cortex; **ph.**: phloem; **xy .**: xylem; **xyv .**: xylem vessel; **xyf .**: xylem fiber.

Powder Microscopy

Powder microscopy of *Procris repens* shows crystals of calcium oxalate, large number of round to elongated simple starch grains, a fragment of mesophyll cells and stomata. Fragments of vascular elements which shows spiral vessels, bordered pitted vessels and annular vessels are seen. Golden yellow coloured contents,

fragments of epidermal cells with unicellular trichome and non-lignified fiber with narrow lumen are also present.

Fig. 1: Powder microscopy; **A.**:crystal of calcium oxalate; **B.**: fragment of mesophyll cells; **C.**: stomata; **D.**: spiral vessel; **E.**: parenchyma cells; **F.**: starch grains; **G.**: coloured content; **H.**: fragment of epidermal cells with trichome; **I.**: non-lignified fiber; **J.**: vascular element with bordered pitted vessels and annular vessels.

DISCUSSION

These studies were aimed at ensuring macroscopy, microscopy and powder microscopy of *Procris repens* under investigation. Morphological evaluation is helpful in the authentication of *Procris repens* by evaluating the external appearance i.e. colour, shape, texture, size, odour and taste. All these parameters were recorded for leaf, stem and root of the plant *Procris repens*. Unicellular trichomes, parenchymatous cortex, rosette crystals of calcium oxalate are the differential characters. These were helpful in primary identification of *Procris repens*. Microscopical techniques provide detailed information about *Procris repens*. Identifying the powder characteristics of *Procris repens* is useful in authentication and identification of the adulterants.

In conclusion the present work was undertaken to lay down the macroscopical,

microscopical and powder microscopical parameters. And it reveals the pharmacognostical characters of Procris repens.

CONCLUSION

From the present study, it is revealed that the microscopy of the leaf shows uniseriate upper and lower epidermis covered with cuticle. Mesophyll layer cannot distinguished to palisade and spongy parenchyma. Chlorophyll is found in this region. Cystoliths and rosette crystals of calcium oxalate are present in leaf lamina. Anisocytic stomata and unicellular trichomes are present. Transverse section of *Procris repens* (stem) shows outer unicellular epidermis covered with cuticle. Epidermis is followed by 2-3 layered collenchymatous hypodermis. Hypodermal cells contain rosette crystals of calcium oxalate. Transverse section of *Procris repens* (Root) shows outer cork region. Cork is followed by cortex which is made up of parenchymatous cells. Rosette crystals of calcium oxalate are present in this region. Powder microscopy of *Procris repens* shows crystals of calcium oxalate, large number of round to elongated simple starch grains, a fragment of mesophyll cells and stomata. Fragments of vascular elements which shows spiral vessels, bordered pitted vessels and annular vessels are seen. Golden yellow coloured contents, fragments of epidermal cells with unicellular trichome and non-lignified fiber with narrow lumen are also present.

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CONFLICT OF INTEREST

Nil

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SARANYA S MOHAN

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