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Research Article

Pharmacognostical Investigation of *Erythropalum scandens* BL., Bijdr (Erythropalaceae) – An Ethnomedicinal Plant

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ABSTRACT
Erythropalum scandens Bl., Bijdr (Erythropalaceae) commonly known as "Vaathavallikodi" in *Kanikkar tribals* of KMTR, Western Ghats, Tamil Nadu. Tender shoots and leaf of this plant treat rheumatic complaint by the *Kanikkar tribals*. The present investigation deals with the pharmacognostic studies of the leaf and stem of the above said plant. Pharmcognostic studies include microscopic, physico-chemical constant, fluorescent analysis and preliminary phytochemical evaluations. These findings should be suitable for inclusion in the proposal pharmacopoeia of Indian medicinal plants.

Key words: *Erthropalum scandens*, Pharmacognostic evaluation, pharmacopoeia.

INTRODUCTION

Plants have traditionally served as man's novel weapons against different ailments[1]. Besides the modern medicinal practices existing today, about 65% of the Indian population depends on the traditional medical systems for their primary healthcare. Regions with rich biodiversity, with its traditional ethnic people, are the biggest source for the plant resources and its hidden knowledge[2]. The traditional knowledge of medicinal plants has been recorded in numerous literatures[3-5].

Erythropalum scandens Bl., Bijdr (Erythropalaceae) also known as "Vaathavallikodi" in *Kanikkar tribals* of KMTR, Western Ghats, Tamil Nadu. The chopped tender shoots are boiled with water, bath is taken with warm water until relieve from the rheumatic complaints. Fresh leaf paste mixed with one teaspoon of honey is given orally twice a day for treating rheumatism by the *Kanikkar tribals*[6].The ethanol extract of *E. scandens* leaf was evaluated for their antiinflammatory activity in rat using a carrageenan induced paw edema[7].

The literature survey revealed that the systemic evaluation including pharmacognostical study of this plant is still lacking. No scientific parameters are available to identify the true plant material and to ensure its quality. There is a need for documentation of research work carried out on traditional medicines. With this backdrop, it becomes extremely important to make an effort towards standardization of the material to be used as medicine. The process of standardization can be achieved by stepwise pharmacognostic studies.

The present study focuses on the macroscopic and microscopic features of the leaf of *Erythropalum scandens*. The study provides certain specific anatomical features of *Erythropalum scandens. Erythropalum scandens*, though monogeneric taxon with only one species, simulates many other co-existing lians, especially Menispermaceae. The present investigation highlights the microscopic features of *E. scandens* which would aid for botanical diagnosis of the plant as compared to other lians. The study also discusses the systematic position of *Erythropalum* and throws light to resolve the taxonomic controversy. The pharmacochemical characterization such as physicochemical constant, fluorescence analysis and qualitative evaluation were investigated. The preliminary phytochemical analyses are supplementary to botanical parameters for diagnostic purpose.

MATERIALS AND METHODS

The plant materials were collected from the well grown plant found in the natural forest of Kalakad-Mundanthurai Tiger Reserve Forest, Western Ghats, Tirunelveli, Tamil Nadu, India. Identification and confirmation were done by Botanical Survey of India, Southern Circle, Coimbatore, Tamil Nadu, India. Voucher specimens were deposited in the Ethnopharmacology unit, Botany Research Laboratory. V.O. Chidambaram College, Tuticorin, Tamil Nadu.

Macroscopical studies: The macroscopic characters like surface, shape, size, venation, phyllotaxy, length of the petiole, length of the leaf etc were noted.

Anatomical Studies: For anatomical studies, the required samples of leaf and stem were cut and removed from the plant and immediately fixed in FAA (formalin- 5 ml + acetic acid- 5 ml + 70% Ethyl alcohol- 90 ml). The

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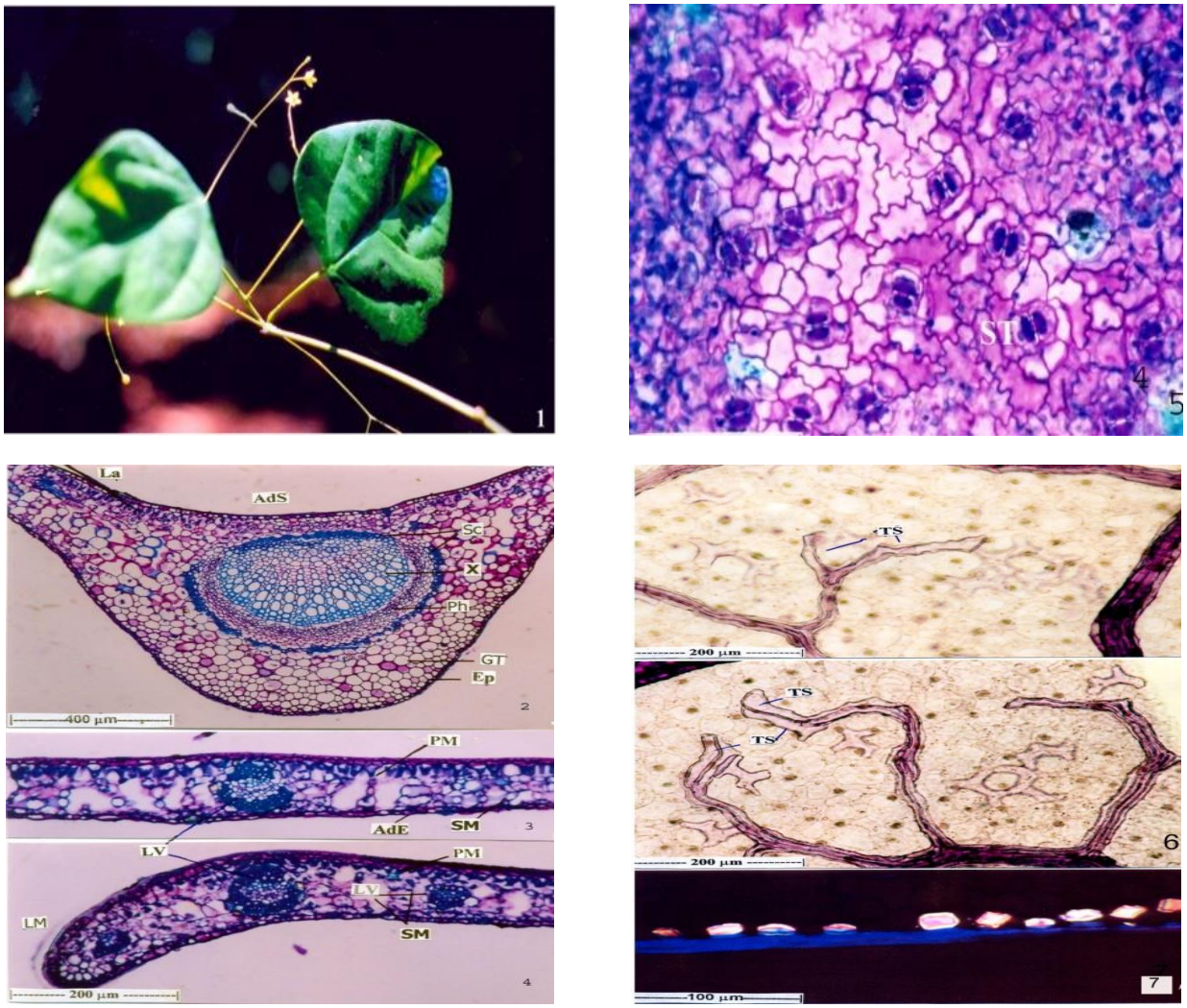
Plate-I



1. A flowering twig.
2 .T. S of leaf through midrib with lamina.
3. T.S. of lamina through lateral vein.
4. T.S. of leaf margin.
5. Abaxial epidermis with stomata.
6. Terminal sclereids found at the tip of vein termination.
7. Prismatic crystals along the veins under polarized light microscope.
(AbE - Abaxial epidermis; AdE - Adaxial epidermis; AdS - Adaxial side; AbS - Abaxial side; LM - Leaf margin; La - Lamina; LV- Lateral vein; Ph - Phloem; PM - Palisade mesophyll; SM- Spongy mesophyll; St - Stomata; X - Xylem; AdH - Adaxial hump; Ep - Epidermis; GT - Ground tissue; Iph - Inner phloem; Oph - Outer phloem; Sc - Secretory cavity; TS – Terminal sclereids Vt- Vein termination)

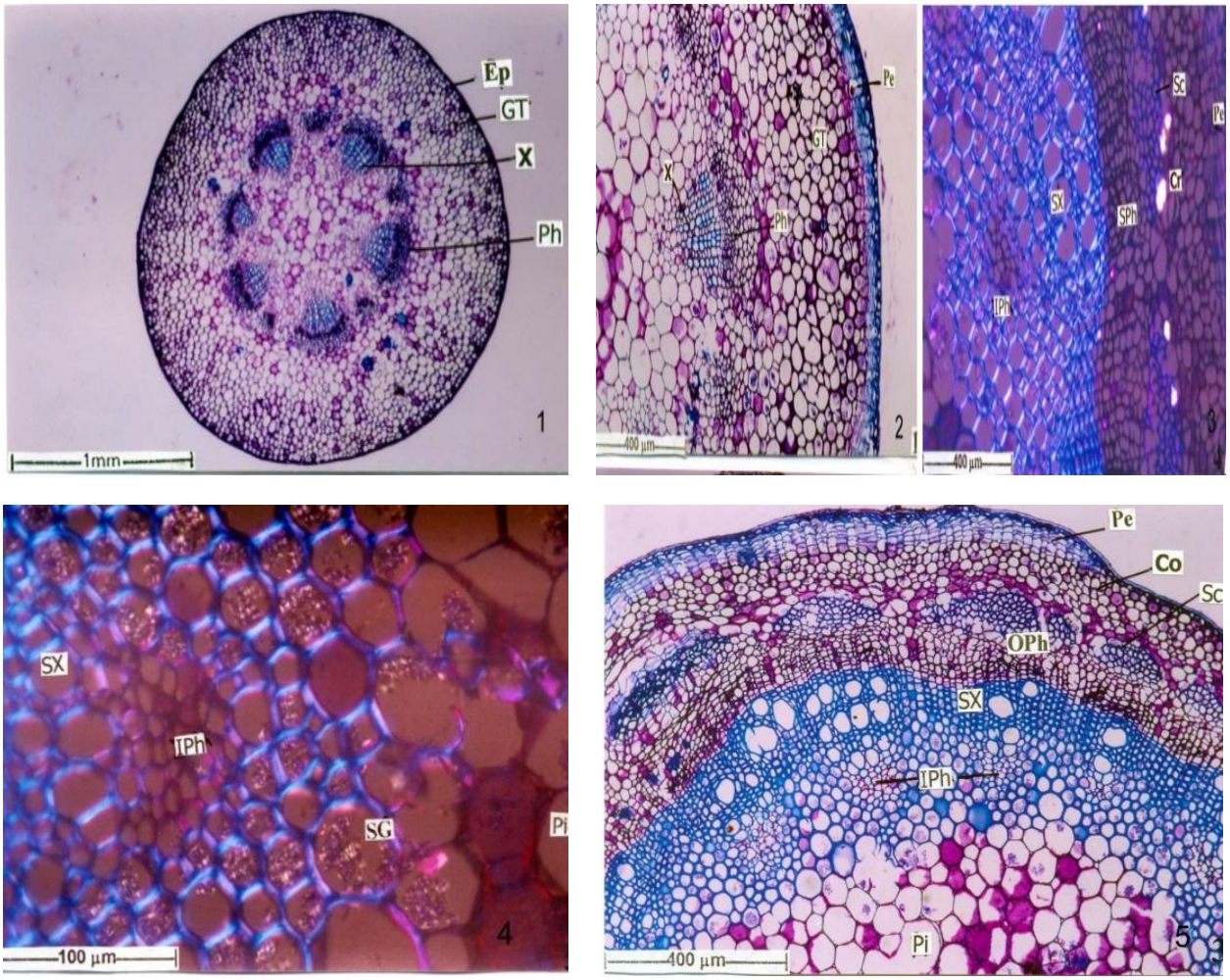
specimens were left in the preservative for two days; then the materials were washed in water and processed further.

Standard microtome techniques were followed for anatomical investigation[8]. Transverse sections of the

Table 1: Ash values and extractive values of the powdered leaves of *Erythropalum scandens*

Ash values		
S. No.	Type of Ash	% of Ash
1	Total ash value of powder	6.73 ± 0.03
2	Water soluble ash	1.82 ± 0.01
3	Alkalinity of water soluble ash	2.27 ± 0.02
4	Acid insoluble ash	1.48 ± 0.01
Extractive values		
S. No.	Nature of the extract	Extractive value (%)
1	Alcohol (Ethanol)	4.75 ± 0.02
2	Water (Aqueous)	6.62 ± 0.01

Plate-II



1. T.S. of petiole – proximal region.
2. T.S. of young stem – a portion enlarged.
3. T.S. of thick stem – portion enlarged.
4. T.S. of stem showing crystals in the cortical region.
5. Starch grains in the pith cells.
(Ep – Epidermis ;VC – Vascular cylinder;Co –Cortex; Oph – Outer phloem; Pe – Periderm; Ph – Phloem; Sp – Sclerenchymatous pith; X – Xylem; GT – Ground tissue; IPh – Inner phloem; SPh – Secondary phloem; SX –Secondary xylem; SC – Sclerenchymatous cap; Cr – Crystals; IPh – Inner phloem; Pe – Periderm; Pi – Pith; SG – Starch grain; SPh – Secondary phloem; SX – Secondary xylem)

materials were made. The microtome sections were stained with 0.25% aqueous Toluidine blue (Metachromatic stain) adjusted to pH 4.7[9]. Photomicrographs were taken with NIKON trinocular photo micrographic unit.

Physicochemical and fluorescence analysis: These studies were carried out as per the standard procedures[10]. In the present study, the powered leaf was treated with various chemical reagents like aqueous 1N sodium hydroxide, alcoholic 1N sodium hydroxide, 1N hydrochloric acid, 50% sulphuric acid, concentrated nitric acid, picric acid, acetic acid, ferric chloride and concentrated HNO3+NH3 These extracts were subjected to fluorescence analysis in day light and UV light(254nm and366nm). Various ash types and extractive values were determined by following standard methods[11].

Preliminary phytochemical analysis: Shade dried and powdered leaf samples were successively extracted with Hexane, Chloroform, Ethanol and Water. The extracts were filtered and concentrated using vacuum distillation. The different extracts were subjected to qualitative tests for the identification of various phytochemical constituents as per the standard procedure[10,12].

RESULTS

Macroscopic features: The plant is a climbing shrub, glabrous, 5 - 10m tall with axillary tendrils. Leaves simple, alternate, entire, 3-ribbed, subpeltate, petiole 3–10cm long, with axillary tendril, leaf blade ovate, oblong-ovate 8 - 20 x 4 - 15 cm, papery to leathery, base obtuse, truncate, or cordate and usually peltate, apex acuminate; basal veins 3

abaxially prominent, adaxially impressed. Flowers are in axillary cymes, peduncle 4 - 10 cm. Pedicel filiform, 2 - 5mm. Pentamerous; petals and sepals valvate, calyx cupular, 5-dentate. Petals white, 1.5 - 2mm. Stamens- five alternating with five staminodes with tuft of hairs on either side. Ovary- half interior, one celled with 1-3 pendulous ovules. Disc is elevated. Fruit is a drupe. Oblong to obovoid, yellow, 1.5 - 2.5 × 0.8 –1.2 cm in size; crowned by persistent calyx; dehisced segments eventually recurving to display bright red inner surface. Seeds are pendulous, indigo blue, broadly ellipsoid.

Microscopic features

Leaf (Plate-I)

Midrib: The leaf is dorsiventral, mesomorphic with even and smooth surfaces. The midrib is cradle shaped in transectional view with adaxial concavity and abaxial hemispherical body (Plate-I, 2). It measures 600 µm along the median vertical axis and 800 µm in horizontal axis. The epidermis of the midrib is thin comprising of small, thick walled squarish cells. The ground tissue in the abaxial part of the midrib has about 10 layers of compact, thin walled angular parenchyma cells. The narrow bridge beneath the adaxial epidermis comprises of five or six layers of small chlorenchymatous cells.

The vascular strand is single, large and occupies the entire central portion of the midrib (Plate-I, 2). It is planoconvex in sectional view, the adaxial side being more or less flat and abaxial side being semicircular. It is 350 × 500 µm in vertical and horizontal planes. The xylem elements occur in close, long, radial rows; the elements are thick walled, angular and wide. Phloem zone is broad, dense and continuous all along the lower part of xylem band (Plate-I, 2). The entire vascular strand is ensheathed by a thin cylinder of sclerenchyma elements.

Lamina: The lamina is more or less uniform in thickness; the lateral veins do not project beyond the upper and lower sides; their vascular strands are quite prominent, extending from upper to lower epidermis (Plate-I, 3). The adaxial and abaxial epidermal layers are thin and consist of small thick walled cells. The mesophyll tissue is unique to have a very narrow layer of palisade cells; the cells are conical with wider end attached to the adaxial epidermis. The palisade zone is 20 µm in height. The spongy mesophyll is quite wider comprising of four or five layers of cells forming vertical filaments and wide air-chambers (Plate-I, 4). In surface view, the spongy parenchyma cells are deeply lobed and amoeboid in appearance.

Epidermal morphology (Plate-I): The adaxial epidermis is apostomatic (lacking stomata). The cells are amoeboid in outline due to undulate anticlinal walls. The walls are thin. The abaxial epidermis is stomatiferous. The stomata are anomocytic lacking distinct subsidary cells. The guard cells are circular with elliptical stomatal pores. The abaxial epidermal cells are also lobed and amoeboid due to undulate anticlinal walls (Plate-I, 5)

Venation pattern of the leaf (Plate-I): The secondary and tertiary veins are prominent forming distinct vein-islets. The islets vary in shape and size. They are rectangular to polygonal. The islets have distinct vein terminations. The wider islets mostly have more than one vein terminations, while the smaller ones have single terminations. The terminations are mostly forked repeatedly forming dendroid configurations, occupying the entire area of the vein islets.

The vein terminations are unique in having terminal sclereids. The sclereids are long, narrow, simple or lobed; they are thin walled with wide lumen. Minute, circular simple pits may be seen in some of the sclereids. The sclereids are also seen running along the veins, closely attached with them (Plate-I, 6).

Crystals: Calcium oxalate crystals are abundant in the leaf. Minute clustered crystals or druses are seen diffusely distributed in the mesophyll tissue (Plate-I, 6). Apart from the druses, prismatic crystals are also abundant in the leaf. They are seen ensheathing the veins all around. The crystals are rhomboidal, pyramidal, double pyramidal and squarish (Plate-I, 7).

Petiole (Plate-II): Structure of the petiole was studied along the distal as well as proximal regions (Plate-II, 1). The distal part of the petiole has the lamina forming the lateral wings; the petiole is broadly semicircular measuring 1.5 mm in vertical plane and 1.6 mm horizontally. The epidermis is thin and less conspicuous. The ground tissue is parenchymatous, homogeneous with small compact cells. The vascular system consists of five discrete vascular strands forming a circle; each strand is collateral and triangular in shape. The proximal part of the petioles is circular with smooth outline. The epidermis is narrow with small cells. The ground tissue is parenchymatous, the cells being small and compact. Sporadically, there are solitary sclereids located in the ground tissue. The vascular strands have 5-7 parallel rows of xylem elements, which are circular and thick-walled. Phloem is in thick sheath, external to the xylem.

Young stem (Plate-II): The young stem in its primary state of growth is circular in outline and measures 2 mm thick. It has intact epidermis comprising of small, thick walled cells. Fairly thick periderm is formed beneath the epidermis at discontinuous places (Plate-II, 2). The cortex is 350 µm wide and consists of about ten layers of thick walled, angular cells; a few layers of the outer cortex are collenchymatous and rest of the inner layers is parenchymatous. The stele consists of several discrete; wedge shaped collateral vascular bundles of different sizes. The xylem elements are narrow, thick walled and occur in parallel rows. Phloem is in small strands and is subtended by a thick mass of small celled parenchyma cells. The pith is wide and parenchymatous.

Old stem: Measuring 2.5 mm was studied. It shows beginning of secondary growth. The periderm is formed in broad discontinuous bands. The epidermis is intact all around the stems. The periderm is 50 µm; it comprises of densely packed, tubular phellem cells; phelloderm is not evident. The cortex is narrow measuring 70 µm - 100µm in radial widths. It consists of small circular compact parenchyma cells. The vascular cylinder is hollow comprising of thick secondary xylem and fairly wide and continuous secondary phloem zone. On the outer part of the phloem are seen thick, semicircular masses of

Table 2: Fluorescence analysis of the powdered leaves of *Erythropalum scandens*

Experiments	Visible/Day light	UV Light 254nm	365nm
Drug powder as such	Pale Green	Yellowish green	Pale Brown
Powder + 1N NaOH (aqueous)	Brown	Dark brown	Dark brown
Powder + 1N NaOH (alcohol)	Green	Fluorescent colour	Pale yellow
Powder + 1N HCL	Pale green	Green	Green
Powder + 50% H_2So_4	Green	Fluorescent green	Fluorescent green
Drug powder + Nitric acid	Reddish orange	Yellowish green	Pale green
Drug Powder + Picric acid	Yellowish green	Fluorescent green	Green
Drug Powder + Acetic acid	Yellowish green	Fluorescent green	Fluorescent green
Drug Powder + Ferric chloride	Reddish brown	Green	Pale green
Drug Powder + HNO_3 + NH_3	Reddish orange	Yellowish green	Pale green

sclerenchyma cells (Plate-II, 3). Secondary xylem consists of short radial rows of vessels which are thin walled, narrow and angular. They are 20-40 µm wide xylem fibers are thick walled, lignified and form a dense ground tissue of the secondary xylem. Xylem rays are not well defined.

Secondary phloem has compact radial files of sieve elements, parenchyma cells and phloem rays (Plate-II, 3). Along the inner boundary of the xylem cylinder, there are small clusters of phloem, abutting the xylem elements. These phloem strands are inner phloem or medullary phloem (Plate-II, 3). The pith is wide, and parenchymatous; the cells are polygonal, thin walled and compact. A group of central core of pith cells has been differentiated into sclereids.

Calcium oxalate crystals of prismatic type are sparsely seen in the parenchyma cells adjoining the sclerenchya caps of the phloem (Plate-II, 4). Starch grains are abundant in the xylem fibers (Plate-II, 5). The starch grains are compound type; they are polyhedral and occur in masses inside each cell of the fibers.

Powder analysis of the drug: The results of the ash and extractive values of *E. scandens* leaf drug powder are depicted in Table 1. The total ash content of the powdered leaf is 6.73% and the extractive value in water is more than in ethanol.

Fluorescent analysis: The result of fluorescent analysis of leaf powder of *E. scandens* are shown in Table 2. The leaf powder shows the characteristic fluorescence colour, when treated with 1N alcoholic Na OH, 50% sulphuric acid, picric acid and acetic acid under short UV light treated.

Preliminary phytochemical screening: The result of preliminary phytochemical screening of leaf extracts of *E. scandens* are presented in Table 3. The ethanol extracts of the leaf powder shows the presence of alkaloid, terpenoid, steroid, carbohydrate, glycoside and starch.

DISCUSSION

E. scandens is the only species (unispecific genus) and has been subjected to taxonomic controversy. The primary aim of the present study of the taxon is more towards the pharmacognostic parameters; fairly detailed account of anatomical features has been explored in the present study, which is lacking in the literature[14]. The result of the study prompted us to throw some light on the systematic position of *Erythropalum* in addition to the pharmacognostic evaluation of the plant.

The external profile of E. scandens simulates very much the members of Menispermaceae in lianous / scandent habit, peltate leaves with palmate venation. In the absence of reproductive parts, the field botanists are likely to identify it as Menispermacean taxon. However, the anatomical features are highly specific for *E. scandens* and most of the characters are not shared by Menispermaceae.

Among different attributes of leaf anatomy, the midrib seems to be of more specific and reliable for diagnostic purpose. In cross sectional view the midrib may exhibit various patterns of outline profile. Their dimensional values are added to their structural features. In *E. scandens*, the midrib is cradle shaped with a single large semicircular vascular bundle which is ensheathed by a thin sclerenchyma layer. The ground tissue of the midrib is homogenous and parenchymatous. The lamina is dorsiventral with narrow single layer of conical palisade cells and wide zone of lobed spongy parenchyma cells. The vascular strands of the lateral veins are prominent, but do not project above the level of the lamina. They are also surrounded by thick sclerenchymatous sheath. As far as the identification fragmentary leaves, the foresaid features suffice.

Vein islet and vein termination have been believed by the pharmacognosists to be specific at species level and are widely studied and employed for segregating different species of herbal drugs[14]. However, Metcalfe[15] thinks that whilst vein-islet numbers may often suffice for the identification of commercial samples of crude drugs, it is questionable whether they are sufficiently precise for the identification of species in general taxonomic studies. In *E. scandens*, the vein islets, though variable in size and shape, are distinct; the vein terminations are dendroid and profusely branched. This observation seems to be of use in the diagnosis of *E. scandens* from other co-existing lians.

Some of the surface view characters of the lamina have been found to be specific. The anticlinal walls of the epidermal cells vary so much to the extent of straight,

curved or undulating, that the use of the surface view appearance of cells in diagnostic processes is severely limited[15]. For example, the shape of the epidermal cells is fixed within a species, though it is reliable for a whole family, it serves as a confirmatory identification characters. Straight or wavy anticlinal walls of the epidermal cells are also characters of worth consideration. In *E. scandens*, the epidermal cells of both upper and lower sides are amoeboid in shape due to undulate anticlinal walls.

Classification of petiolar vasculature as seen in cross sectional view along different levels of the petiole has been done extensively by Howard[16]. The study has shown explicitly that petiolar anatomy is of much reliable source of information for taxonomic as well as diagnostic studies. As per the classification of petiolar anatomy proposed by Howard (1979)[16], the petiole of *E. scandens* comes under ninth category where there is a ring of discrete vascular strands with more or less equal parenchymatous gaps.

Young stem of dicotyledonous plant do not show much variation in their anatomy. Their structure is built up on a common pattern. However, some variation may be observed in minor details. In *E. scandens*, the periderm is discontinuous in origin and occurs at isolated loci in the stem. The vascular cylinder consists of thick segments of xylem and phloem forming more or less closed cylinder. As the stem grows in thickness, the xylem cylinder becomes deeply lobed along several places. The vessels appear as wide tubes to the naked eye on the cut surface. These features are common to most of scandent / lianous plants. Apart from these features, *E. scandens* shows some specific features such as medullary phloem and sclerotic pith.

The xylem elements of the stem include fibres, tracheids and vessels. The fibres have well developed slit-like lateral wall pits arranged in a single vertical row. The tracheids are quite frequent and have two vertical rows of elliptical pits. Both narrow and wide cylindrical vessels with simple, oblique or horizontal perforations plates are seen on their end walls.

Systematic position of *Erythropalum scandens*

Metcalfe and Chalk[13] have provided the general anatomical feature of olacaceae under which *Erythropalum* is included by many taxonomists. The characters are include

- Presence of silicified cells in the leaf.
- Schizogenous secretary cavities with resinous contents in the leaf and stem.
- Laticiferous tubes which are anastomosing and non septate
- Spicular cells in the Mesophyll
- Vessel elements with scalariform perforation plates.

In the observations of the present study of *E. scandens* none of these aforesaid features were evident. These observations tempted us to conclude that *Erythropalum* may deserve an independent status under the family Erythropalaceae Planchon ex Miq. as conceived by the modern systematic botanists[17,18]. It seems that its affinities are obscure. However, some of the floral characters of this taxon are in common with Icacinaceae, Olacaceae and Celastraceae.

Salient anatomical features of *Erythropalum scandens*

- Leaf dorsiventral, smooth surfaced and hypostomatic. Palisade zone narrow and spongy mesophyll with vertical partition filaments of spherical cells.
- Midribs cradle shaped in sectional view with adaxial concavity; ground tissue parenchymatous; vascular strand single, semicircular with radial rows of xylem, abaxial band of phloem and thick sheath of fibres.
- Vascular bundles of the lateral veins prominent with sclerenchyma bundle caps.
- Vein islets wide and distinct with usually dendroid vein terminations and prominent terminal sclereids.
- Calcium oxalate druses abundant in the mesophyll tissue; prismatic crystals common in the stem cortex, vein sheath; starch grains abundant in the pith tissue of the stem.
- Petiole is circular in cross sectional view at the proximal part with a circle of discrete collateral vascular strands.
- Young stem has heterogeneous cortex, stelar part with discrete vascular bundles; old stem has initial stage of secondary growth and discontinuous superficial initial periderm; vascular cylinder is thick and hollow with outer and inner phloem, small masses of fibres attached to the outer phloem and sclerotic central core of pith.
- Starch grains, mostly compound type, are abundant in the xylem fibres.
- Powder/maceration of the stem shows narrow fibres, tracheids, narrow and wide cylindrical vessel elements with simple perforation plate.

Physicochemical Constants

Ash values: The physical constant evaluation of the drug is an important parameter in detecting adulteration or improper handling of drugs[19]. Equally important in the evaluation of crude drugs, is the ash value and acid-insoluble ash value determination. The total ash is particularly important in the evaluation of purity of drugs, i.e., the presence or absence of foreign organic matter such as metallic salts and/or silica[20].

The ash values of *E. scandens* leaves are 6.73%. These ash values are indicative of the impurities present in the drug. Since the ash values are constant for a given drug, these values are also one of the diagnostic parameters of the drug. Samples have more water soluble ash than acid insoluble ash. The ash values are generally index of the purity as well as identity of the drug.

Fluorescent analysis: Many phytocompounds fluoresce when suitably illuminated. The fluorescence colour is specific for each compound. A non fluorescent compound may fluoresce if mixed with impurities that are fluorescent. The fluorescent method is adequately sensitive and enables the precise and accurate determination of the analyte over a satisfactory concentration range without several time consuming dilution steps prior to analysis of pharmaceutical samples[21]. The powdered leaf of *E. scandens* emitted pale green under day light and yellowish green and pale brown under short and long UV radiation respectively.

Table 3: Preliminary phytochemical screening of *Erythropalum scandens* leaf extract.

No.	Test	Reagent	Observation	Hexane	Chloroform	Ethanol	Water
1	Alkaloid	Dragendorff's reagent	Orange ppt.	-	-	+	+
		Mayer's Test	White ppt.	-	+	+	+
		Hager's Test	Yellow	-	+	+	+
2	Terpenoids	Noller's Test	Pink	+	+	+	-
3	Steroid	Liebermann-Burchard's Test	Bluish green	-	+	+	-
		Salkowski Test	Red, green	-	+	+	+
4	Coumarin	10% NaOH	Yellow	+	+	-	+
5	Tannin	1% Lead acetate	White ppt.	-	+	-	+
6	Saponin	Water	Foam like froth	-	+	-	+
7	Flavonoids	Shinada's	Reddish pink	-	-	-	-
		Zn-Hcl	Magenta	-	-	-	-
		$Fecl_3$	Blackish red	-	-	-	+
8	Quinones	H_2So_4	Red	-	-	-	-
	Anthraquinones	Borntrager's	Pinkish Red	-	-	-	-
9	Phenol	$Fecl_3$	Intense colour	-	-	-	+
10	Protein	Biuret	Violet	-	-	-	+
		Xanthoprotein	Orange	+	+	+	+
		Lead acetate	White ppt.	-	+	-	+
		Millions	White ppt.	+	+	+	+
11	Carbohydrate	Fehling's sol.	Brick red	+	+	+	+
		Molisch	Purple	-	-	-	+
12	Glycosides	Anthrone + H_2So_4	Purple colour	-	-	+	-
13	Gum	Water	No thickening	-	-	-	-
14	Starch	I_2KI_2	Red	+	+	+	+
15	Fixed oil	Press between filter paper	No oil stain	-	-	-	-

Preliminary phytochemical analysis: Presence or absence of certain important compounds in an extract is determined by colour reactions of the compounds with specific chemicals which act as dyes. This procedure is a simple preliminary pre-requisite before going for detailed phytochemical investigation. Various tests have been conducted qualitatively to find out the presence or absence of bioactive compounds. Different chemical compounds such as alkaloid, terpenoid, coumarin, tannin, saponin, flavonoid, quinine, anthraquinone, phenol and glycosides were detected in *E. scandens* leaf extracts which could make the plant useful for treating different ailments as having a potential of providing useful drugs of human use. This is because the pharmacological activity of any plant is usually traced to a particular compound.

Therapeutically terpenoids exert wide spectrum of activities such as antiseptic, stimulant, diuretic, anthelmintic, analgesic and counter-irritant[22]. Many tannin containing drugs are used in medicine as astringent. They are used in the treatment of burns as they precipitate the proteins of exposed tissues to form a protective covering[23]. They are also medically used as healing agents in inflammation, leucorrhoea, gonorrhoea, burns, piles and antidote[24].

Saponins, a group of natural products occur in the leaf extracts of *Erythropalum scandens*. In plants, the presence of steroidal saponins like, cardiac glycosides appear to be confined to many families and these saponins have great pharmaceutical importance because of their relationship to compounds such as the sex hormones, cortisones, diuretic steroids, vitamin D etc.,[25]. From plant sapogenins a synthetic steroid is prepared and to treat a wide variety of diseases such as rheumatoid arthritis, collagen disorders, allergic and asthmatic conditions[14].

To understand the nature of the fluorescence emission from these crude preparations under different conditions, the preliminary phytochemical analysis of these crude preparations was compared. The comparative analysis clearly showed a correlation between a compound present in it and their fluorescent behaviour under different conditions. The major bioactive compounds present in these crude preparations are the coumarins, flavones, tannins, alkaloids and saponins. Coumarin especially hydroxyl amino acid derivatives like o-coumaric acid appears yellowish green in alkaline condition under short UV radiation. Flavones which are light yellow in aqueous condition under UV light turns to bright yellow under alkaline conditions. Similarly the phytosterols when treated with 50% H2SO4 show green fluorescence under UV light. Terpenoids especially sapogenins exhibit yellow green fluorescence under short UV light[26]. Quinine, aconitin, berberin and emetin show specific colour of

fluorescence (Aconitin - light blue; berberin - light yellow; emetin - orange). Fixed oils and fats fluoresce least, waxes more strongly and mineral salts most of all[27]. Haydon[28] studied the photophysical characters of coumarins. Hydroxy methyl coumarin fluoresced in the 420 - 440nm when observed in different solvents with increasing polarity[29]. The fluorescence analysis of the crude drugs of *E. scandens* exhibited clear fluorescence behaviour at different radiations which can be taken as standard fluorescence pattern.

Since the plant *E. scandens* are useful in traditional medicine for the treatment of rheumatism, it is important to standardize for use as a drug. The pharmacognostic constants for the leaves of this plant, the diagnostic microscopic features and the numerical standards reported in this work could be useful for the compilation of suitable monograph for proper identification.

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