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INVESTIGATION ON MORPHOLOGY, ANATOMY OF LEAVES AND PRELIMINARY PHYTOCHEMICAL TEST ON *ERIOLOBUS INDICA* SCHN.

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ABSTRACT

Eriolobus indica Schn. belongs to the Family Rosaceae in the order Rosales. It has high medicinal value for demulcent, cardiac tonic, expectorant, astringent, dysentery, snake and insect bites. That plant is commonly known as pin-sein-thee in Myanmar. The plants were collected from Kalaw Township, Southern Shan State. The description of this plant was given according to literature. The anatomical characters of leaves were also made and presented in this paper with photographic records. The fresh specimens were cut by free hand sections and examined under microscope. The preliminary phytochemical test showed the presence of alkaloids, carbohydrates, glycosides, phenolic compounds, saponins, tannins, terpenoids, steroids, starch, reducing sugar and the absence of α-amino acid.

INTRODUCTION

Eriolobus indica Schn. belongs to the family Rosaceae. It is known as crab apple. It is mostly occurred in hilly regions. In Myanmar, the plant is widely distributed in Shan, Kachin State and Mandalay Region, commonly known as Makawk, Taung-gwe, Myet-chin-nu and Pin-sein-thee.

Lawrance (1964) states that the Rosaceae has about 115 genera and 3200 species distributed over most of the earth and abundant in Eastern Asia North America, and Europe. There are about 3200 species widely distributed around the world. Flowering and fruiting period is from January to December.

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The morphology and taxonomy of the vegetative and reproductive parts, anatomy of the leaves and preliminary phytochemical investigation of the fruits of *Eriolobus indica* Schn. were carried out in this paper. The anatomical studies on the leaves of *Eriolobus indica* Schn. of Metcalfe and Chalk (1972) showed that the leaf hairs were generally unicellular in the form of simple trichome, or occasionally united to form tufts. Calcium oxalate was usually secreted in the form of solitary or clustered crystal in the leaves .

Eriolobus indica Schn. were used as traditional medicine such as demulcent, cardiac tonic, diuretic, expectorant, astringent, dysentery, pile, snake and insect bites. Photographic records for morphological and anatomical characteristic of this species and preliminary phytochemical tests has been presented in this paper.

MATETRALS AND METHODS

Botanical Study

The plants samples of *Eriolobus indica* Schn. were collected from Kalaw Townships, Southern Shan State in May 2016. Immediately after collection some of the specimens were pressed, dried and preserved for study and storage.

After collection, the leaves were mounted between blotting papers and news paper sheets, pressed subjected and sun-dried. When the specimens were dried, they were mounted onto herbarium sheets.

The fresh specimens of vegetative and reproductive parts have been used for identification. The morphological study of the plants was undertaken with the help of available literature Manandhar (1974) and Hundley and Chit Ko Ko (1987).

Anatomical Study

The anatomical studies of the leaves were also examined by free hand sections according to the methods given by Trease and Evans (2002) and identification of the leaves anatomy studied by the literature of Metcalfe and Chalk (1972). For cleaning, section cutting of the specimens were warmed in chloral hydrate solution. The anatomical study of the leaves were examined by maceration by boiling with 10% nitric acid and small amount of glacial acetic acid. Photographic plates were prepared from the free hand sections and macerated materials of the leaves were also presented.

Preliminary Phytochemical Test

Preliminary phytochemical examination of the fruits of *Eriolobus indica* Schn. (Pin-sein-thee) has been conducted with the test reagent in Botany Department of Dagon University according to the methods described in British Pharmacopoeia (1965) and these stated by Harbone (1973), Marini-Bettelo (1981), Trease & Evans (2002).

About 5 g of the fruits powdered of Pin-sein-thee was extracted by using 100 ml of water, ethanol and pet-ether (60°-80°C). These extracts were screened to know the presence or absence of alkaloids, carbohydrates, glycosides, phenolic compounds, saponins, tannins, terpenoids, steroids, starch, α-amino acid and reducing sugar. The result are shown in Table 1 and Figure 4.

RESULTS

Morphological Characters of *Eriolobus indica* Schn.

Scientific Name - *Eriolobus indica* Schn.
Syn - *Docynia indica* Dene.
- *D. graffithiana* Dene.
- *Pyrus indica* Wall.
- *Cydonic indica* Spach.

Myanmar Name - Pin-sein-thee, Ma Kawt, Taung-gwe, Myet-chin-nu
English Name - Crap apple
Family - Rosaceae
Flowering period - January to March
Fruiting periods - March to November

The plants is perennial ever green tree, commonly 30-50ft tall. Leaves simple, alternate. Petiolate, light green, mostly lanceolate, up to 5.5-9.5 cm long, 1.5- 4.5 cm wide, tomentose, the base obtuse, the margin entire, the tips acute, the lateral veins 6-12 pairs. Inflorescence, axillary, 1-3 flowers cyme, flower pale green or white, bracteates, bracteolate, pedicellate, bisporangiate, hypanthium narrowly campanulate, epigynous. Calyx 5, aposepalous, valvate, about 0.45 ×0.2 cm in diameter, green, valvate, persistent, superior. Corolla 5, apopetalous, petaloid (Pale green to white), superior, tomentose. Stamen α (20-30), monadelphous, filament unequal, basifixed, entrorse, anther dithecous, longitudinal dehiscence. Carpel 3-5, syncarpous, 3-5 locular, axile placentation, 1-3 ovule in each locule, style short, stigma capitates, ovary globose terete, inferior . Fruit globose, yellowish green with orange spot, hard, calyx persistent. Seed black, glabrous.

Figure 1. Morphological Characters of *Eriolobus indica* Schn.

Plants in natural Habit

Ventral view

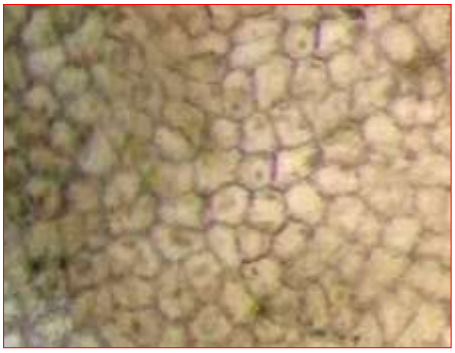
Flower

T.S of young fruit

Fruits

Figure 2. Anatomical Characters of *Eriolobus indica* Schn.

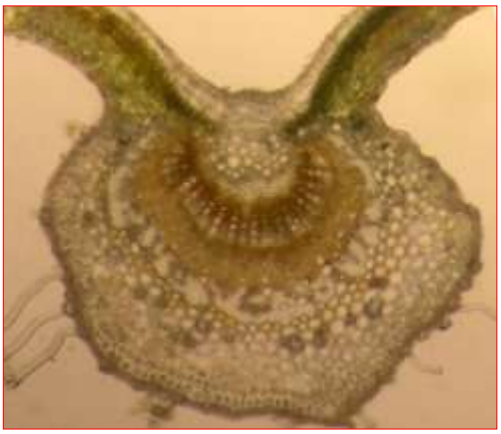
Lamina



Surface view of upper epidermis

Surface view of lower epidermis

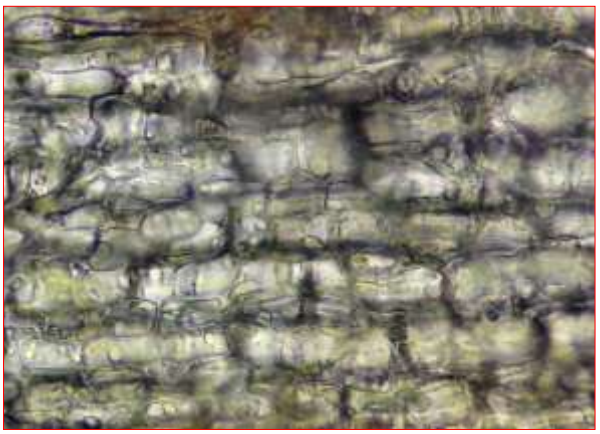
T.S of lamina showing palisade and spongy mesophyll



T.S of midrib showing cortical region and vascular bundle

Midrib

T.S of petiole showing epidermis, cortical region and vascular bundle



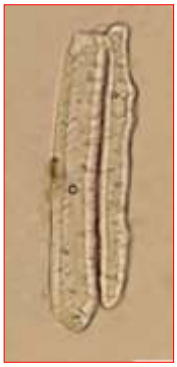
Surface view of petiole

Figure 3. Tracheary Elements of macerated Leaves of *Eriolobus indica* Schn.

Vessel

Spiral

Reticulate



Pitted

Annular

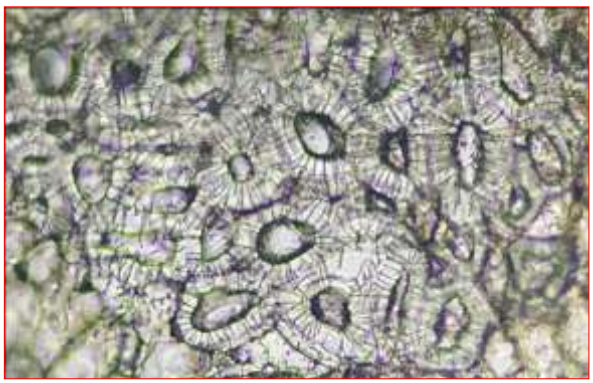
Tracheid

Spiral

Annular

Fibre tracheid

Fibre



Sclereids

A – Carbohydrate

B -Glycosides

C. Saponin

D- Tannin

E –Starch

F – α-Amino acid

G- Reducing sugar

H- Alkaloid (Mayer's reagent)

I - Alkaloid (Dragendroff's reagent)

J - Alkaloid (Wagner's reagent)

K –Steroids

L - Terpenoids

Figure 4. Preliminary phytochemical examination of *Eriolobus indica* Schn.

Preliminary phytochemical examination of *Eriolobus indica* Schn.

Phytochemical investigation of the fruit of *Eriolobus indica* Schn. (pin-sein-thee) extracts showed that the presence of alkaloids, carbohydrates, glycosides, phenolic compounds, saponins, tannins, terpenoids, steroids, starch, and reducing sugar and absence of α-amino acid. The result were shown in table (1).

Table 1. Preliminary phytochemical test of *Eriolobus indica* Schn. fruits by test tube method

No.	Constituents	Extract	Reagent used	Observation	Remark
1.	Carbohydrates	H_2O	10 % α-napthol, Conc: H_2SO_4	red ring	+
2.	Glycosides	H_2O	10 % lead acetate	white ppt.	+
3.	Saponins	H_2O	Distilled water	frothing	+
4.	Tannins	H_2O	1 % $FeCl_3$	brownish green ppt.	+
5.	Starch	H_2O	Iodine solution	bluish change	+
6.	α-amino acids	H_2O	Ninhydrin reagent	violet colour	-
7.	Reducing sugar	H_2O	Benedict's solution	yellow or red ppt.	+
8.	Alkaloids	1% Con:HCl	1.Mayer's reagent 2.Dragendroff's reagent 3.Wagner's reagent	white ppt yellow or red ppt colour change	- + +
9.	Steroids	Pet-ether	Acetic anhydride Conc: H_2SO_4	pink colour	+
10.	Terpenoids	$CHCl_3$	Acetic anhydride Conc: H_2SO_4	pink colour	+

(-) = absent (+) = present ppt = precipitate

DISCUSSION AND CONCLUSION

In this paper, morphological and taxonomical characters of the plant *Eriolobus indica* Schn. are described. In this paper, the plant is perennial ever green tree, leave alternate, simple, petiolate; Flower bisexual, actinomorphic, complete, regular, penta-merous, epigynous. Calyx 5, aposepalous, green, persistent, superior. Corolla 5,pale green to white, caducous, superior. Stamens numerous, extrorse. Gynoecium 3-5 carpellary, syncarpous, axile placentation, style short, stigma capitate. Fruit globose, seed black, glabrous. These characters are in accordance with the description given by Manandhar (1974) and Kubitzki (2004).

In histological studies, the trichomes are abundant in lower surface of the leaves, anomocytic stomata are more abundant on lower epidermis. Vascular bundles are arranged in cresent shape in the midrib. In the petiole, vascular bundles are also arranged in cresent shape. These bundles are collateral and closed types. These are agreed with those of Esau (1953) and Metcalfe and Chalk (1969).

According to the phytochemical investigation of the fruits of *Eriolobus indica* Schn. , these fruits contained alkaloids, glycosides, saponin, tannin, terpenoids, steroids carbohydrate, a little sugar and starch. The determination of nutrients values of this plant showed that protein, fat and carbohydrates were present. Carbohydrates provided the body as the fuel which are needed for physical activity and for proper organ function. Proteins are used mainly for growth, repair and development during childhood, adolescence and pregnancy. Proteins are expensive sources of energy, whereas carbohydrates and fats are the more economical energy in food. The deficiency of proteins can cause the anemia disease. Fat played a vital role to maintain the healthy skin and hair, body temperature and promoting healthy cell function.

These data provides very useful information for phytochemical characterization of the fruits of *Eriolobus indica* Schn. and for testing the health benefits of fresh fruit. Medicinal value of *Eriolobus indica* Schn. used in traditional medicine such as demulcent, cardiac tonic, expectorant, astringent, dysentery, pile, snake and insect bites and rich in antioxidant properties Manandhar (1974).

It is intended that the result of the present will contribute the information towards a better understanding of morphology and anatomy of genus *Eriolobus indica* Schn. in Myanmar and to know the chemical constituents and medicinal properties of the species in this paper.

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