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Pharmacognostic and preliminary phytochemical screening of leaves of *Tecomaria capensis*

***Elamaran Tamiljothi[1], V.Ravichandiran[1], N.Chandrasekhar[2],V. Suba [3].**

[1]*Department of Pharmacology, School of Pharmacy, Vels University, Pallavaram, Chennai. TN*
[2]*Department of Pharmacology, Vignan Pharmacy College, Vadlamudi, Guntur. A.P.*
[3]*Department of Pharmacology, National Institute of Siddha, Thambaram, Chennai, T.N*

ABSTRACT

Tecomaria Capensis belonging to thefamily Bignoniaceae is an evergreen climber with leaves which are opposite , slightly serrated, green to dark green, pinnate with 5to 9 oblong leaflets . The flowers are trumpet shaped with colour ranging from orange to orange-red to apricot.The present study aimed to explore the pharmacognostic and phytochemical screening of leaves of Tecomaria capensis. In the microscopic studies, the leaves showed the presence of trichomes, collenchyma, vascular bundles, spongy parenchyma, palisade cells and Anomocytic stomata. Phytochemical evaluation revealed the presence of alkaloids flavinoids, glycosides, proteins and steroids. Establishment of pharmacognostic profile of the leaves will assist in standardization for quality, purity and sample identification. The results of the study could be useful in setting some diagnostic indices for the identification and preparation of a monograph of the plant.

Keywords: *Tecomaria Capensis* , transverse section, powder microscopy, Anamocytic stomata.

INTRODUCTION

After decades of serious obsession with the modern medicinal system, people have started looking at the ancient healing systems like Ayurveda, Siddha and Unani. This is because of the adverse effects associated with synthetic drugs[1] **.** Tecomaria capensis (Bignonaceae) is also known as Cape-honey suckle [2] is a climber common to the tropical zone. It is grown as an ornamental plant in gardens .Traditionally the leaves were used to treat pneumonia, enteritis, diarrhea and tonic[3].It was reported to contain analgesic[3],Antimicrobial[2], anti fungal and Antipyretic[2] ,antioxidant activity[4]. Hence the study paves the pharmacognostical relevance to identify the species for quality to maintain standards before it intended for production or consumption.The objective of investigations was to ease the identification of the species both in whole and powdered form. The presence of valuable phytoconstituents such as flavinoids, glycosides and steroidal compounds also demand furtherphytochemical studies of the species.[5]

MATERIALS AND METHODS

Collection of specimen

The leaves of *Tecomaria capensis* (Thunb.) Spach was collected from Guntur district, A.P, was authenticated by the plant taxonomist Dr. S.M.Khasim, Dept. of Botany and microbiology, Acharya Nagarjuna University, Guntur. A.P. and voucher specimen was deposited. After authentication, fresh plant material was collected in bulk, washed under running tap water to remove adhering material, dried under shade and pulverized in a mechanical grinder. The coarse powder was passed through sieve no. 60#. Care was taken to select healthy plants and for normal organs. The required samples of different organs were cut and removed from the plant and fixed in FAA (Formalin-5ml+Acetic acid-5ml+70%ethyl alcohol -90ml) After 24 hours of fixing the specimen were dehydrated with graded series of tertiary-butyl alcohol [6] . Infiltration of the specimens was carried by gradual addition of paraffin wax (melting point 58-69^{0}C) until TBA solution attained super saturation. The specimens were cast into paraffin blocks.

Procedure for Staining

The paraffin embedded specimens were section with the help of rotary microtome.The thickness of the section was 10-12 micrometers.Dewaxing of the section was by customary procedure.The section were stained with toluidine blue as per the method published by O'Brien,et.al.,1964 . Since toluidine blue is a polychromatic stain the staining results were remarkably good and some cytotochemical reactions were also obtained. They rendered pink colour to the cellulose walls,blue to the lignified cells,dark green to suberin,violet to the mucilage,blue to the protein bodies etc. wherever necessary sections were also stained with saffranin and fast green and iodine(for starch).For studying the stomatal morphology ,venation pattern and trichome distribution,paradermal(sections taken parallel to the surface of leaf)as well as clearing of leaf with 5%sodium hydroxide or epidermal peeling by partial maceration employing Jeffery's maceration fluid were prepared .Glycerin mounted temporary preparation were made for macerated/cleared materials.

Photomicrographs

Microscopic description of tissue or supplemented with micrographs were necessary photographs of different magnifications were taken with Nikon Labphot 2 microscopic unit . For normal observations bright field was used for the study of crystals,starch grains and lignified cells, polarised light was employed . Since these structures have birefringent property, underpolarised light they appear bright against dark backgrounds. Magnification of the figures are indicated by the scale bars[6].

Study of macroscopy

By visual method the organoleptic characterestics of leaf was found.

Preliminary phytochemical screening

The obtained various extracts from successive extraction process were used for knowing various phytochemical substances by using standard test procedure.

RESULTS AND DISCUSSION

Macroscopical characteristics

Leaf; isobilateral, Shape ;ovate , Size :length -6 - 7.5 cm;width - 2.5 – 3.5 cm,Texture; glabrous,Apex; acute , Margin ; serrated ,Base ; Decurrent, Petiole ; expetiolate , Surface; glossy , Colour :outer - dark green, Inner ; light green,Venation; pinnate , Taste - Odour ; characteristic .

Microscopy

Transverse section of leaves of *Techoma Capensis*

Type:-

Isobilateral, convex type of leaf

Upper epidermis:-

It is of single layer non-lignified rectangular shape of cells arranged transversally

Lower epidermis:-

It is of single layer non-lignified rectangular shape of cells arranged transversally

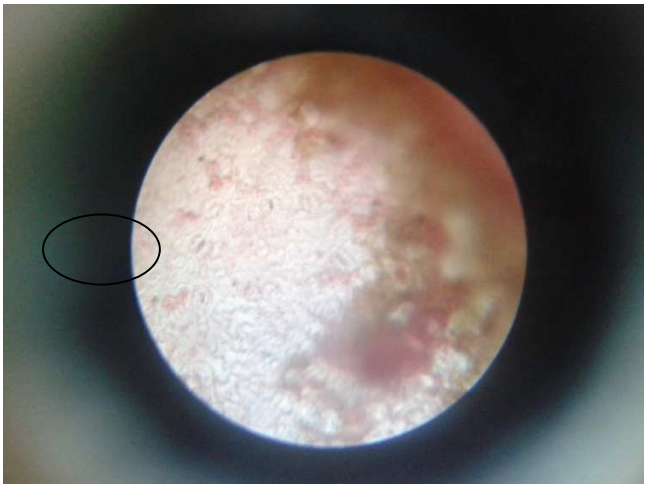

Figure1: Anamocytic stomata

Trichome:-

Both covering as well as glandular trichomes are present .covering trichomes are present just above the epidermal layer .Glandular trichomes are present in more number in the midrib portion

Stomata:-

Anamocytic stomata

Palisade cells:-

Below the upper epidermis and above lower epidermis palisade cells are longitudinally compactly arranged and they are terminated up to the lamina portion or mesophyll portion.

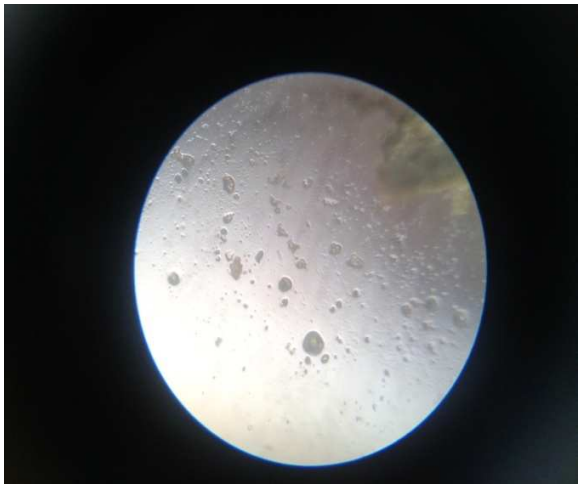

Figure 2: Clusters of calcium oxalate crystals

Figure 3: Phloem vessels

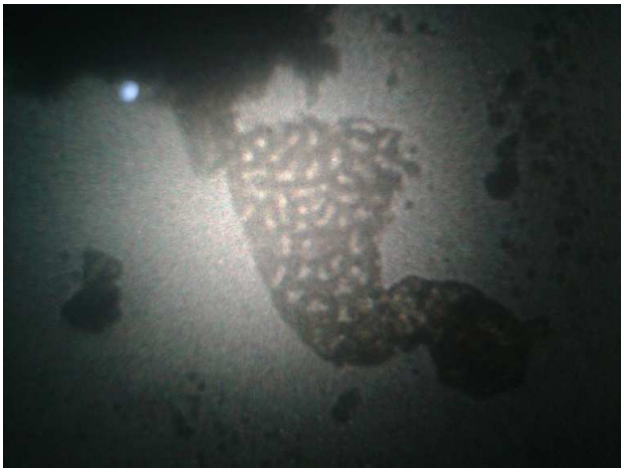

Figure 4: Spongy parenchyma cells

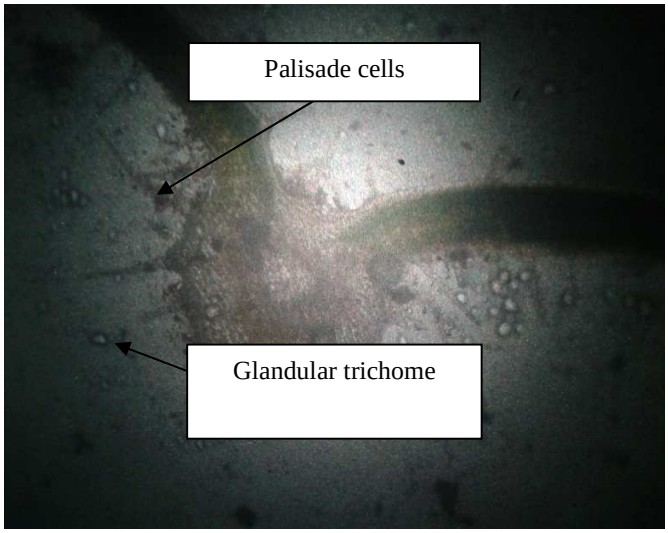

Figure : 5 T.S of Tecomaria capensis

Figure 6: Leaves of Tecomaria capensis

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Spongy parenchyma:-

Polygonal, loosely arranged cells with intracellular spaces and non lignified

Vascular Bundles :-

Isobilateral vascular bundles seen in central portion of midrib. It contains xylem (lignified) phloem and surrounded with phloem parenchyma. Below the upper epidermis and above the lower epidermis encircled with chollenchyma

Chollenchyma:-

Contains thick walled non-lignified polygonal shape of cells.

POWDER MICROSCOPY

Trichomes:-

Multicellular, non lignified slightly curved with central lumen

Xylem vessels:-

Lignified, narrow, sieve tube like bundles of vessels

Epidermal cells:-

non-lignified rectangular shape of cells arranged transversally

Calcium Oxalate Crystals:-

Mesophyll region contains calciumoxalate crystals. Isolate or cluster of prism of calciumoxalate crystals.

Tests for phytoconstituents	Pet. ether	n-hexane	Chloroform	Ethylacetate	Ethanol	Water
Alkaloids	--	--	--	--	--	--
Flavinoids	--	--	++	++	++	++
Cardiac Glycosides	++	++	++	++	++	--
Saponin Glycosides	++	++	++	++	--	--
Coumarin Glycosides	--	--	--	++	++	--
Tannins	--	--	--	--	++	--
Steroids and terpinoids	--	++	++	++	++	--
Carbohydrates	--	--	--	++	--	--
Protein	--	--	--	++	++	--
Inulin	--	--	--	--	++	++
Volatile oil	++	++	++	++	++	--
Waxes	--	--	--	--	--	- -
Mucilage	--	--	--	--	++	++

CONCLUSION

In this study various parameters were evaluated to explore the anatomical features of the leaf of Tecomaria capensis which could be useful in identifying the species in routine quality control process.

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