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ETHANOBOTANICAL AND PHARMACOGNOSTICAL STUDY OF *GIVOTIA MOLUCCANA* BARK

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ABSTRACT

The importance of herbal medicine practices is indicated by the fact that about 80 % of the developing world's population depends on traditional medicine for their primary healthcare. The scientific evaluation of safety and efficacy of herbal products and medicinal preparation is thus of vital importance from both medicinal and economic perspectives. Consideration of the growing importance of herbal medicine and other herbal preparations, concerns about the safety and claimed efficacy of many herbal products, and lack of proper scientific evaluation resulted in IUPAC supporting the current work with the objective of preparing protocols on tribal claims, its standardization, and documentation of herbal medicine is carried out. Further details of these study includes preparation of extract by successive extraction by maceration for detailed analysis. Macroscopic, microscopic and Fluorescence analysis was carried out using powder leaves and extract. Different physicochemical parameters such as percentage yield, extractive value, chemical evaluation were carried out as per WHO recommended physicochemical determinations with authentic phytochemical procedure's.

KEYWORDS : *Givotia moluccana, physicochemical, phytochemical, extraction, extractive values, hydro alcohol.*

INTRODUCTION

“Health for all” is a dream and a goal which humanity at large shares and strives for. Unfortunately, it has now been proven without doubt that modern pharmaceuticals are and will remain out of reach for a large proportion of the human population for the foreseeable future. This has created an appreciation and a need for the use of other sources of human knowledge to provide

common health benefits. Alternative and traditional medicines, largely herbal in nature, are now regarded as important but underutilized tools against disease. The World Health Organization (WHO) recognized this fact in the early 1970s and encouraged governments to effectively utilize local knowledge of herbal medicines for disease prevention and health promotion. Herbal medicines, however, suffer from a range of

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shortcomings. These include insufficient and unacceptable evidences of safety, efficacy, standardization, and inconsistent production practices¹.

The *Givotia moluccana* vernacular names are telugu-Tella poliki, yell dabba and English-White catamaran tree. They are common in dry deciduous belt, in the slopes of forest, tirumala, talakona, dhumukuralla, SVU Botanical garden in Tirupathi. Leave are alternate haracterous, broadly ovate or orbicular, coarsely dentate, acuminate, glabrous above yellowish tomentose below 5-nerved. Flowers are pale yellow, in axillary or subterminal recemes or paniculate cymes. Perianth lobes 10, biseriata, imbricate, stamens 8-20, exerted. Ovary are 2-3 locular, Ovules 2-3 per locule, pendulous; styles 2, fixed from base. Drupes ellipsoid, epicarp fulvous, tomentose; seeds globose, testa horny. Flowers and fruits are seen during the month of April to August. The plant parts are used as Bark-Rhumantism, Fruit- skin diseases, Seed-Dandruff and psoriasis, Stem-Stem, bark and leaves paste is applied as bandage during deep cuts, Leaves and Root also possess medicinal activity^{2,3,4}.

It is of great interest to carry out the screening of these plants in order to validate their use in folk medicine and to reveal the active principle by preliminary study of their constituents. Systematic screening of the plants may result in the discovery of novel active compounds. In this study, Hydro alcoholic extract of *Givotia moluccana* (bark) and folklore medicine of India which had been described in herbal books were screened and to our knowledge, there is still no report of any studies.

Therefore, taking into consideration the problem of unavailability the screening of pharmacognostical evaluation is been carried out in developing of newer drugs even when the biologically active compounds are unknown.

MATERIALS AND METHODS

A. Procurement of plant material

The bark of *Givotia moluccana*.linn were collected from S.V.University and authenticated by Mr.K.Madhava Chetty,M.Sc, M.Ed, M.Phil, Ph D, PG DPD, Assistant Professor, Dept of Botany, Available online on www.ijprd.com

S.V.University Tirupathi, Andhra Pradesh, India. A voucher specimen (PCOP/Ph'cog/07/2012/78) was deposited at Padmavathi College of Pharmacy for future reference. The collected barks were separated, shade dried, peeled and cut into small pieces and stored in a closed container for further studies.

B. Preparation of Plant Extracts

The dried bark of 500 mg were taken in 1 liter round bottom flask and extracted with 50% ethanol (hydroalcohol) by hot decoction method (maceration) for 4hrs. The extract was cooled at room temperature and evaporated to dryness under reduced pressure in a rotary evaporator^{3,4}.

C. Determination of Percentage yield

The percentage yield, extractive value and loss on drying with various reagents were determined as per the standard procedure. Preliminary quantative phytochemical test were performed for extract using specific reagents through standard procedure^{3,4}.

D. Phytochemical studies

Preliminary phytochemical studies of the bark extract was conducted as per the standard procedure^{3,4,5,6,7}.

PHARMACOGNOSTIC EVALUATION

A. Organoleptic Evaluation

In organoleptic evaluation, various sensory parameters of the plant material, such as size, shape, color, odour, and taste of the bark were recorded. It includes conclusions drawn from studies resulted due to impressions on organs of senses^{3,4,5,6,7,8}.

B. Microscopical Investigation

The qualitative features of *Givotia moluccana* bark were determined using the methods of Evans and for quantitative study anatomical sections, and the microscopy & chemo-microscopy of powdered samples were carried out according to methods outlined by Brain and turner and Evans^{3,4,5,6,7,8}.

C. Powder Analysis

To a little quantity of powder taken onto a microscopic slide, 1–2 drops of 0.1% phloroglucinol solution and a drop of concentrated hydrochloric acid were added, mounted in glycerol, covered with a cover slip and observed under microscope with 10

× 10 magnification. The characteristic features of the powder viz., xylem fibers, calcium oxalate crystals, starch grains, stone cells etc. were recorded using standard techniques. Fibers and stone cells appear pink in color. Presence of starch grains was detected by the formation of blue color on addition of 2–3 drops of 0.01M iodine solution^{3,4,5,6,7,8}.

D. Determination of Alcohol Soluble Extractive Value

Accurately weighed powder (5 g) of bark was taken and macerated with 100 ml of 95% alcohol for 24 h. The contents were frequently shaken during the first 6 h and allowed to remain for 18 h. After 24 h, the extract was filtered and 25 ml of the filtrate was evaporated. The extract was dried at 105°C to a constant weight^{3,4,5,6,7}.

E. Determination of Water Soluble Extractive Value

Water soluble extractive value was determined using the procedure described for alcohol soluble extractive, except that chloroform water was used for maceration^{3,4,5,6,7}.

F. Determination of Ether Soluble Extractive Value

Water soluble extractive value was determined using the procedure described for alcohol soluble extractive, except that ether was used for maceration^{3,4,5,6,7}.

PRELIMINARY PHYTOCHEMICAL SCREENING

The extract were used for preliminary phytochemical screening with chemical tests viz., Molisch's, Fehling's, Benedict's and Barfoed's tests for carbohydrates; Biuret and Millon's tests for proteins; Ninhydrin's test for amino acids; Salkowski and Liebermann-Burchard's reactions for steroids; Borntrager's test for anthraquinone glycosides; foam test for saponin glycosides; Shinoda and alkaline tests for flavonoid glycosides, Dragendorff's, Mayer's, Hager's and Wagner's tests for alkaloids; and ferric chloride, lead acetate, potassium dichromate, dilute iodine tests for tannins and phenolics^{3,4,5,6,7,8}.

A. Fluorescence characters of the plant powder

Fluorescence characters of the plant powder and extract under ordinary light and UV light (UV 366 nm) were determined wherein the powdered bark

sample and extract showed the visibility of varying colors which are as tabulated in table no. 3. The preliminary phyto-profiling for the bark extract of *Givotia moluccana* was carried out wherein the consistency was found^{9,10,11}.

B. Fluorescence characteristics

When physical and chemical parameters are inadequate as it often happens with the powdered drugs, the plant material may be identified from their adulterants on basis of fluorescence study^{9,10,11}.

C. Behaviour of bark powder with different chemical reagents

Behaviour of *Givotia moluccana* bark with different chemical reagents was performed to detect the occurrence of phytoconstituents along with colour changes under ordinary daylight by standard method^{9,10,11}.

RESULT AND DISCUSSIONS

Pharmacognostic Evaluation

Percentage yield

The percentage yield obtained by soxhlet extraction is 2.3g.

Organoleptic characters

In organoleptic evaluation, appropriate parameters like taste, odor, size, shape and color of the bark were studied. Plant parts- bark.

- Colour – dark brown.
- Odour – odourless.
- Taste – Bitter.
- Shape – Flat, channeled pieces.
- Texture – Outer surface hard due to presence of cracks.

Microscopical Characteristics

Powder Analysis – Bark

- Cork: Cork in surface view.
- Starch grains: Rounded or angular, simple or 2-5 compound (radiate split).
- Xylem: Xylem vessels with annular thickening.
- These are numerous either entire or in fragments, spindle shaped, thick walled, strongly lignified, porous walls having simple pores.

- Stone cells: These are U-shaped, lignified structures with one side thin and large lumina.
- Cork cells: Composed of polygonal cells with orange-brown.
- Oil globules.
- Fibers.
- Parenchyma.

Physical Evaluation

Percentages of the extractive values were calculated with reference to air-dried drug are given in table 1.

Table 1. Percentage yield of extractive values

Extractive value	Bark
Water soluble extractive	0.009 % w/w
Alcohol soluble extractives	1.0436 % w/w
Ether soluble extractives	2.0345 % w/w

Preliminary Phytochemical Screening:

Freshly prepared bark extract were tested for the presence of phytoconstituents using reported methods mentioned in the standard methods and results are given in table 2.

The different qualitative chemical tests were performed for establishing the chemical profile of the extracts. In the present investigation the extract of bark was analyzed for the presence of alkaloids, carbohydrates, glycosides, proteins, aminoacids, sterols, phenolic compounds, tannins and flavanoids using standard procedures. The hydroalcoholic extract of *Givotia moluccana* showed the presence of alkaloids, carbohydrates, proteins and amino acids, flavonoids and tannins. The results pertaining to this investigation were presented in table 2.

Table 2 Data showing the presence of phytoconstituents present in various extracts of *Givotia moluccana*.

Name of the tests	REAGENTS	OBSERVATION
		BARK
Alkaloids	Drug + Dragondroffs reagent Mayer's reagent Hager's reagent Wagner's test	- Reddish brown - Orange + Reddish brown +
Glycosides	Anthrone + H ₂ SO ₄ + Heat Coumarine Glycosides	Black – -
Carbohydrates	Drug + Molish's reagent+ conc.H ₂ SO ₄ Fehling's solution A&B Benedict's test	Purple color ring + Brick red + Brick red +
Phytosterols /triterpenoids	Liebermann Test Salkowski Test Noller's test	Reddish orange - - -
ProteinsProteins & Amino acids	Biuret test Xanthoprotein test Millon's reagent test Lead acetate test Ninhydrin test	Bluish black - Orange + Brown - White ppt + Reddish orange -
Saponins (Foam test)	Drug + water + shaking	Formation of honey comb like froth -
Flavonoids	Shinodaw's Test n-HCl acid reduction Test Alkaline reagent test Lead acetate test	- - - White ppt +
Fixed oils & Fats	Spot test	Stains appear after drying +
Gums/Mucilage	Drug + water	No thickening of the Substance -

Volatile oil		-
Phenolics /Tannins	Drug + FeCl ₃ lead acetate + water Vanillin hydrochloride acid test Gelatin test	Dark green + White ppt + - -

+ve- Presence, -ve- Absence.

Fluorescence Analysis of Extract

The bark extract are examined in daylight and UV to detect the fluorescent compounds by the reported method. The observations are given in below,

Bark extract - Under ordinary light – Dark green and under UV light (366 nm) – Dark black.

The treatment of powdered drugs with different chemical reagents reveals the presence of different

chemical constituents present in the powdered drugs. Fluorescence analysis reveals the presence of chemical constituents with fluorescence character in UV light and color change observed in the visible light. The observations are given in table 3, 4 and the histochemical colour reaction is given in the table 5.

Table 3. Data showing Fluorescence analysis of air dried drug with different chemicals

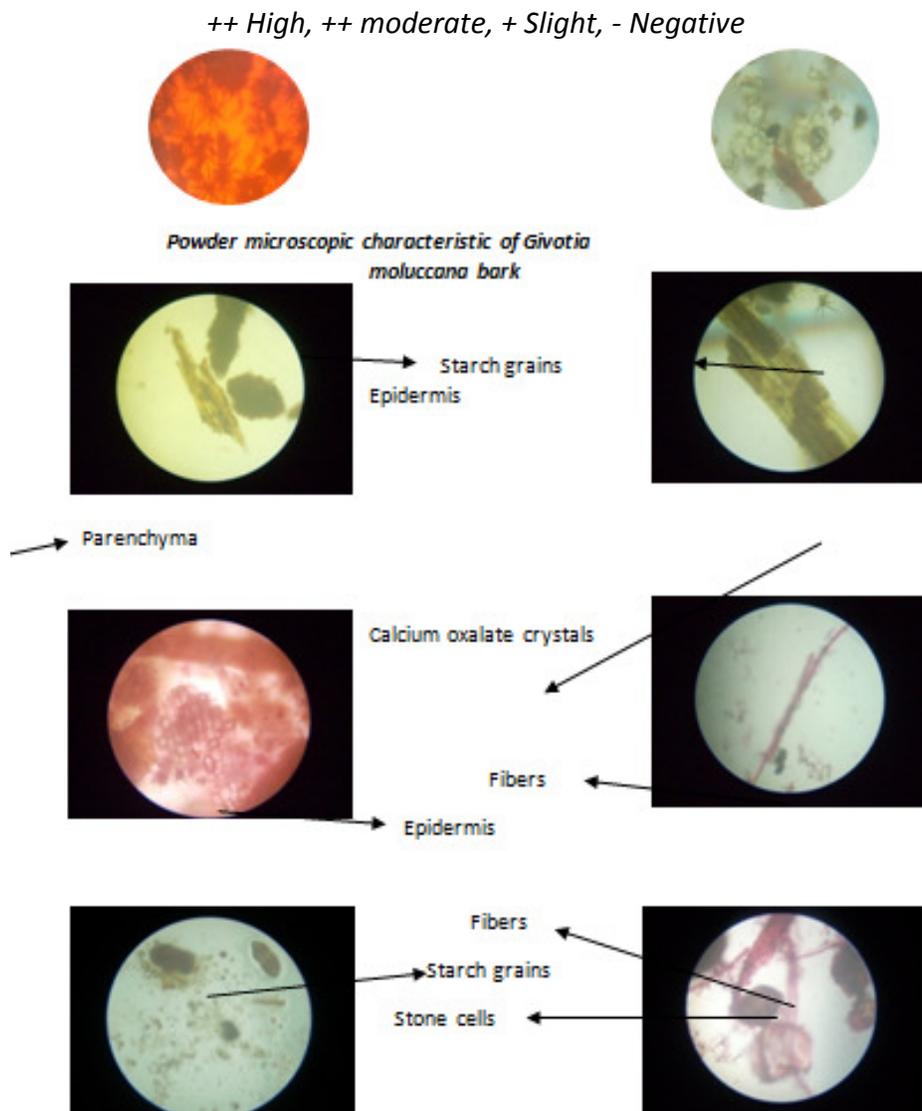
Particulates of the treatments	Bark	
	Under ordinary light	Under ordinary light
Powder as such	Brown	Pale yellow
Powder + Acetic acid	Dark orange	Green
Powder + 5% FeCl ₃	Sun set orange	Pale green
Powder + Iodine	Reddish brown	Slight black
Powder + Ammonia	Pale Pink	Light green
Powder + 1N HCL	Pale brown	Dark Black
Powder + H ₂ SO ₄ (1:1)	Black	Pale yellow
Powder + HNO ₃ (1:1)	Orange	Pale brown
Powder + water	Light brown	Greenish black
Powder +1N NaOH (water)	Brown	Greenish black
Powder + methanol	Reddish brown	Pale yellow

Table 4. Data showing Reagent characteristic of bark powder and extract.

Reagents	Bark		Solubility
	Powder (Day light)	Extract(UV)	Powder
Petroleum	Colorless	Colorless	Insoluble
Benzene	Colorless	Colorless	Insoluble
Acetone	Reddish	Dark Green	Completely insoluble
Ethanol	Brown	Brown	Soluble
Water	Dark brown	Brownish black	Completely soluble

Table 5. Histochemical color reactions of *Givotia moluccana*.

Reagents	Constituent	Color	Histological zone	Degree of intensity
Phloroglucinol + HCl	Lignin	Pink	Xylem, Phloem fibers	+++
Weak Iodine solution	Starch	Blue	Starch grains	+++
Caustic alkali + HCl	Ca. Oxalate	--	Ca. Oxalate crystals	++
5% Aq. KOH	Anthraquinone glycosides	--	--	--
Dragendorffs reagent	Alkaloids	--	--	--
SbCl ₃	Steroids/Terpenoids	--	--	--
Ruthenium Red	--	--	--	--



CONCLUSION

The present study on preliminary phytochemical, physicochemical evaluation of *Givotia moluccana* bark could be used as the diagnostic tool for the standardization of medicinal plants for its bibliographic traditional support. WHO parameters as per WHO guidelines discussed here, can be considered as the identifying parameters to substantiate and authenticate the drug.

The pharmacognostic parameters, which are being reported for the first time, could be useful in the identification and standardization of a crude drug. The data produced in the present investigation is also helpful in the preparation of the crude drug's monograph and inclusion in various pharmacopoeias.

The present study on physicochemical characteristics and preliminary phytochemical screening of provide useful information which may help in authenticating the genuine plant along with nature of phytoconstituents present in it.

The *Givotia moluccana* may be considered a rich source of natural antioxidants, which justifies its use in folk medicine. Furthermore, evaluation of in vitro antioxidant activity of these extract has also provided interesting results that might be beneficial for the pharmacological use of this plant in clinical trials.

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REFERENCES

1. Mosihuzzaman M and Iqbal Choudhary M. Protocols on safety, efficacy, standardization, and documentation of herbal medicine. International union of pure and applied chemistry.2008;80(10):2195–2230.
2. Baskar ananda raj V, Murugamani V, Mounika P, Madhuri B. Preliminary Phytochemical Investigation of *Givotia Moluccana* Stem. International Journal of Research in Pharmaceutical and Biomedical Sciences.2011;2(3):1307- 1313.
3. Baskar ananda raj V, Murugamani V, Anusha CH, Indraja N. Preliminary Pharmacognostical Evaluation of *Givotia Moluccana* Leaves. International Journal of Pharmacognosy and Phytochemical Research. 2012;4(2):74-78.
4. Madhava chetty K, Sivaji K, Tulasi rao K. Flowering plants of Chittoor district, A.P. India, 3rd ed;2008;1:185, 317.
5. Mukherjee PK. Quality control of Herbal drugs. Business Horizons, New Delhi. 200222, 187-191.
6. Raman N. Phytochemical techniques.1st ed, New India publications, New Delhi, 2006, 19-25.
7. Kokate CK, Purohgit AP, Gokhale SB. Methods of crude drug evaluation Pharmacognosy, Nirali Prakashan, Pune, 10.1995; 88-99.
8. Kokate CK. Practical Pharmacognosy, Vallabh Prakashan, Pune, 2002;107–129.
9. Khandelwal KR. Practical Phamacognosy Techniques and experiments. Nirali Prakashan, Pune, 2005;38–161.
10. Sravan Kumar B, Narendar Prasad D, Rao KNV, David banji, Saidulu A. Pharmacognostic and phytochemical investigation of *Erythrina indica*. Lam. Root. *IJPI's Journal of Pharmacognosy and Herbal Formulations*.2010; 1(1): 1-9.
11. Devi P, Meera R, Merlin NJ, Dinesh Babu D. Study of Analgesic, Antipyretic and Diuretic Activities of various extracts of *Diospyros melonoxylon*. *International Journal of PharmTech Research*. 2010; 2(3): 2038-2043.
12. Devi P, Meera R, Muthumani P, Kameswari B, Badmanaban R. Phyto-Physico chemical evaluation and Antioxidant activities of leaves of *Naphellium lappaceum*. *J. Pharm. Sci. & Res*. 2009;1(3):117-122.
13. Quality Standards of Medicinal Plants, III, (ICMR),1st ed.New Delhi. 187-225,366,957.
14. Trease GE, Evans WC. A Text Book of Pharnacognognosy. ELSB Baillere Tindal: Oxford; 1987.
