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PHARMACOGNOSTICAL AND PHYTOCHEMICAL ESSAY OF '*Ellertonia rheedii* Wight'

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ABSTRACT

The civilization of ancient era has proven that, wide variety of the plants can be utilized for treating diseases. Many written evidences are available and regarding the usage indigenous medicine being passed on from generation to generation. *Ellertonia rheedii* Wight was an indigenous plant belonging to Apocynaceae family found in Western Ghats of Coorg, Shimoga, Chikamagalore, Dakshina Kannada. The paste of fresh leaves of this plant is used externally in varicose vein by folklore practitioners in and around Dakshina Kannada District of Karnataka State. In local language it is called "*Nara balli"* which means a climber used for the disease of vein. The identity of Ellertonia rheedii Wight is yet explored in Ayurvedic literature. Hence a detailed pharmacognostic and phytochemical study of *Ellertonia rheedii* Wight was undertaken.

Keywords: *Ellertonia rheedii* Wight, Folklore, pharmacognostic study, phytochemical study

INTRODUCTION

The folk medicine or tribal medicine has given rich contribution to the development of Materia Medica of Ayurveda. *Ellertonia rheedii* Wight was an indigenous plant belonging to Apocynaceae family, found in Western Ghats, from South Karnataka to Travancore, up to an altitude of 3000 ft[1]. It is a climbing shrub, branches reddish white-lenticellate. Branches are twining terate leaves up to 8x3 cm[2]. "Nara balli" which means a woody climber used for the disease of vein and the name itself indicates its long term use among the folk and efficacy of the drug[3]. Locally leaves of this species are used in making salad and as spice.

Botanical synonyms[4] *Ellertonia rheedii* Wight, *Echites caryophyllata*is a synonym of *Kamettiacaryophyllata (*Roxb*.)* Nicolson & Suresh in 1848.

Vernacular names

Kannada- Naraballi, Narasoodi balli., Malayalam- Naramarathiru.

Taxonomical classification

Kingdom- Plantae, Sub kingdom-Tracheophyta, Superdivision- Spermatophyta- Seed plants, Division-

Magnoliophyta- Flowering plants, Class- Magnoliopsida- Dicotyledons, Order - Gentianales, Family- Apocynaceae, Genus- *Ellertonia*, Species – *Rheedii* Wight.

Distribution and Habitat[5] Western ghats, evergreen forest from Travancore and Tinnevelly, up to 3000ft.This species are rare and apparently endemic to Western Ghats.

Family character[6,7] Erect or climbing shrubs, trees, rarely herbs, usually with milky latex. Leaves opposite or whorled, rarely alternate, simple, entire, usually estipulate. Flowers regular, bisexual, hypogynous, in terminal or axillary cymes, often large and showy. Calyx- lobes 5, imbricate, often glandular within. Corola gamopetalus, usually salver shaped or funnel shaped, the tube often appendaged within; lobes 5, often twisted in bud. Stamens 5, inserted in the corolla-tube or on its mouth; filaments usually short; anthers linear- oblong or sagittate, introrse, sometimes spurred at the base, free or connivent and adherent to the stigma. Disc was annular, cup shaped, lobed or 0. Ovary superior, one celled with two parietal placentas or 2 celled with axile placentas, or of two distinct or partially connate carpels; ovules in each cell two or many, rarely solitary; style simple or divided at the base; stigma variable in form and usually ending in an entire or bifid apiculus. Fruit is two follicles or a berry or drupaceous. Seeds naked, comose or winged, occasionally arillate; endosperm fleshy or hard.

Morphology of *Ellertonia rheedii* Wight

Stem: Reddish, branches are twining., Leaves: 7.5-10x3-4 cm, 3-4 nearly world, ovate or elliptic, apex acute or shortly accumulate, base acute or slightly rounded., Stem-Reddish white-lenticellate., Flower: Trichotomously branched axillary and terminal cymes, follicle up to 5cm long, Calyx: 5 lobed., Corolla: tube slender inflated at the middle reddish in bud, lobes 5, linear., Seeds: winged below, rounded above in all nearly 1 in long 2 in broad in the middle., Pod: Dry pod that splits open at maturity.

OBJECTIVES OF THE STUDY

1. Pharmacognostical analysis on *Ellertonia rheedii* Wight leaf by: Macroscopic studies. Microscopic studies.
2. Physico chemical study of *Ellertonia rheedii* Wight Leaf
3. Phytochemical study of *Ellertonia rheedii* Wight Leaf

Systemic extraction of drug using different apparatus and different solvents. Extracts are subjected to chemical analysis using various reagents to know the presence of active principles. Chromatographic methods. Pharmacological study on *Ellertonia rheedii* Wight leaf by: *Rasanirdharana*, Determination of Taste-threshold

MATERIALS AND METHODS

A. Pharmacognostical study:

Collection of Sample: The Botanically identified samples of *Ellertonia rheedii Wight.* Leaffrom Mangalore District, Moodbidri.

Place of work: Pharmacognostical study was carried out at Centre of Medicinal Plant s & Research Centre, Kottakkal, Malappuram District, Kerala.

Phytochemical study was carried out in P G Department of *Dravyaguna Vijnana,*

Alva's Ayurveda Medical College, Moodbidri.

1. Macroscopy of *Ellertonia rheedii* Wight. Leaf.

Procedure: The external features of the test samples – *Ellertonia rheedii Wight.* Leaf was documented using Canon IXUS digital camera.

2. Microscopy of *Ellertonia rheedii* Wight. Leaf.

Procedure: Transverse sections were photographed using Zeiss AXIO trinocular microscope attached with Zeiss Axio Cam camera under bright field light. Magnifications of the figures are indicated by the scale-bars.

3. Powder Microscopy of *Ellertonia rheedii Wight.* Leaf

Procedure: Fine powder was mounded in glycerine as well as with phloroglucinol and con. HCl. Gently heat the mixture and observed under microscope.

B. Physicochemical study

Physical Standards: Subjected to various analyses, such as determination of Moisture content[8], determination of the total ash[9], determination of acid insoluble ash[10], determination of water soluble ash[11], determination of pH value[12], water soluble extractive value[13], ethyl alcohol soluble extractive value[14], methanol soluble extractive value[15], chloroform solu-

ble extractive value[16], acetone soluble extractive value[17], petroleum ether soluble extractive value[18].The extractive value in various solvents and ash value are important in identification and standardization of single drugs.

C. Phytochemical Study[19]

Preliminary phytochemical study of Proteins, Carbohydrates, Tannins, Saponins, Flavonoids, Steroids, Alkaloids, Triterpenoides, Starch, Resins, Phenolics, Elagic acidwas carried out.

Ash Analysis[20] The air-dried powdered drug was taken in a crucible and heated in an electric Bunsen burner to make the ash. Then it was diluted with distilled water, boiled and filtered and test for Carbonates, Fluorides, Chlorides, Sulphates, Chromate, Phosphate, Potassium, Sodium, Aluminium, Calcium was carried out.

D. Chromatographic studies

1. Thin Layer Chromatography[21]: Thin layer chromatography is a technique in which a solute undergoes distribution between two phases, a stationary phase acting through adsorption and a mobile phase in the form of a liquid. A visual comparison of the size and intensity of the spots usually serves for semi-quantitative estimation.

Visualization: Observe the plate under UV light at 254 nm and 366 nm record the R_f value and colour of the resolved bands

Toluene: Ethyl acetate: Formic acid (7: 3: 0.1) Developing reagent used was Phenol reagent (FCR)

2 HPTLC Fingerprint Profile: After development the air dried plate scanned at 254 nm 366 nm, and 550 nm after derivetizing with anisaldehyde sulphuric acid reagent in CAMAG TLC SCANNER 3 with win CATS software.

E. Pharmacological studies

1. Rasa Nirdharana

1. Botanically identified *Ellertonia rheedii* Wightwas collected and Rasa Nirdharana by *Rasonipata* Method[22].

2. Determination of Taste Threshold[23] to differentiate *Pradhana Rasa* and *Anuras*a the drugs for which taste is to be established are given along with another equally potent drug. The *Rasa* present in the mixture are identified with the help of "taste threshold" Method.

RESULT

A. Pharmacognostical studies

Macroscopic features of *Ellertonia rheedii* Wight Leaf: Leaves was opposite or in whorls of 3, up to 8x3 cm, ovate to elleptic-acuminate, glabrous; petiol up to 1.2 cm (Fig.1)

Microscopy of *Ellertonia eheedii Wight* Leaf (Fig.2)

TS of petiole-TS of petiole is somewhat wavy in outline, the upper layer is epidermis, after epidermis some pigment cells can be seen. It is followed by multilayered cortex consists of both parenchyma and collenchymas cells, Xylem is endarch, vascular bundles conjoint and collateral.

TS of leaf-Single layered epidermis on both upper and lower side, pigment cells are also seen in leaf mid rib. Epidermis is followed by palisade parenchyma which is compactly arranged followed by loosely arranged spongy parenchyma. In mid rib lower epidermis is followed by collencymatous cells, vascular bundles are same as that of petiole

Powder Microscopy of Leaf *Ellertonia rheedii* Wight. Powder microscopy of the leaves of *Ellertonia rheedii* Wight shows lower epidermis (Fig.3) surface with stomata, epidermal fragments with pigment cell and mesophyll cells of lamina in sectional view fragments of upper epidermal cells in surface view, Upper epidermal cells (Fig.4) with underlying palisade cell.

B. Physico chemical studies

1. Determination of moisture content: Percentage of moisture content of the drug *Ellertonia rheedii* Wight.4%(Table no. 1)
2. Determination of the total ash: Percentage of total ash of the drug *Ellertonia rheedii* Wight – 6.2 % (Table no. 2)
3. Determination of Acid insoluble ash: Percentage of Acid insoluble Ash of the drug *Ellertonia rheedii* Wight – 5.34% (Table no. 3)
4. Determination of water soluble ash: Percentage of Water soluble Ash of the drug *Ellertonia rheedii* Wight.– 3.36% (Table no. 4)
5. Determination of pH value : pH value of.*-6.93*
6. Determination of Extractive values (Table no. 5)

C. Phytochemistry: The results of the different phytochemical components present in *Ellertonia rheedii* Wight. (Table no. 6) Ash analysis (Table no. 7), Thin Layer Chromatography- (Fig.5), HPTLC Densitometric scan of at UV 254nm (Table 8), HPTLC Densitometric scan of at UV 366nm (Table 9), HPTLC Densitometric scan of at UV 550nm (Table 10)

Pharmacological study

Rasanirdharana by *Rasanirdharana Ellertonia rheedii* Wight Leaf – On observation out of 30 volunteers recorded *Kashaya, Tikta as Pradhanarasa with Madhura Anurasa*.

Determination of taste-threshold, *Ellertonia rheedii* Wight Leaf – 352ml

DISCUSSION

1814 Roxberg the identity published as *Kamettia caryophyllata. Ellertonia rheedii* Wight and *Echites caryophyllata* are the synonyms accepted in 1848. *Ellertonia rheedii* Wight was an indigenous plant belonging to Apocynaceae family, found in Western Ghats, from South Karnataka to Travancore, up to an altitude of 3000 ft. The identity of *Ellertonia rheedii* Wight is not yet explored in Ayurvedic literature. In local Kannada language it is called "Nara balli" which means a woody climber used for the disease of vein in and around Edapadavu, Mijar of Moodbidri. Locally leaves of this species are used in making salad and used as spice.

Pharmacognostical study: Leaves were opposite or in whorls of 3, up to 8x3 cm, ovate to elleptic-acuminate, glabrous; petiol up to 1.2 cm, TS of petiole is somewhat wavy in outline.The upper layer is epidermis, after epidermis some pigment cells can be seen. It is followed by multilayered cortex consists of both parenchyma and collenchymas cells. Xylem is endarch, vascular bundles conjoint and collateral. Ts of leaf show single layered epidermis on both upper and lower side. Pigment cells are also seen in leaf mid rib. Epidermis is followed by palisade parenchyma which is compactly arranged. It is followed by loosely arranged spongy parenchyma. In mid rib lower epidermis is followed by collencymatous cells. Vascular bundles are same as that of petiole. The detailed powder microscopy of the leaves shows fragments of upper epidermal cells in surface view. Upper epidermal cells with underlying palisade cell, lower epidermis surface with stomata, epidermal fragments with pigment cell and mesophyll cells of lamina in sectional view.

Phytochemical study: The Preliminary phytochemical study of *Ellertonia rheedii* Wight Leaves shows the presence of Proteins, Steroids, Tannins, Phenolics. Ash analysis of *Ellertonia rheedii* weight showed the presence of Fluorides, Chlorides, Sulphates, and Phosphates. HPTLC and TLC documentation of drug had been carried out. In HPTLC documentation at 254 nm 5 peaks, at 366 nm 4 and 550 nm 4 peaks were obtained respectively which shows the presence number of phyto components in the leaf of *Ellertonia rheedi* Wigh.

Pharmacological study: The study reveals that the leaf of the plant *Ellertonia rheedii* Wight having *Kashay,Thiktha* as *Pradhana rasa* and *Madhura as Anurasa*.

CONCLUSION

Ellertonia rheedii Wight is a drug well known for its folklore importance and have been noticed widely for its traditional usage. Hence it deserves an important place in bio-diversity. The Preliminary phytochemical study of *Ellertonia rheedii* Wight leaves shows the presence of Proteins, Steroids, Tannins, Phenolics. The Pharmacological study reveals that the leaf of the plant *Ellertonia rheedii* Wight having *Kashaya, Tikta* as *Pradhanarasa* and *Madhura as Anurasa*. Ash analysis showed the presence of Ash analysis of *Ellertonia rheedii* Wight showed the presence of Fluorides, Chlorides, Sulphates, and Phosphates.

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FIGURES

Fig.1. Macroscopic features of

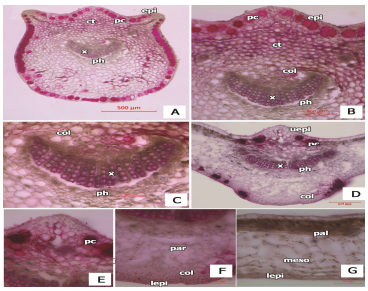


Fig.2 *Ellertonia rheedii* WightLeaf

Fig. 2 Microscopy of *Ellertonia rheedii* Wight Leaves. A - C, TS of Petiole; D - F, TS of Mid rib portion; G, TS of Lamina Portion. col, collenchyma; ct, cortex; cu, cuticle; epi, epidermis; lepi, lower epidermis; meso, mesophyll cells; pal, palisade; par, parenchyma; pc, pigment cells; ph, phloem; uepi, upper epidermis.

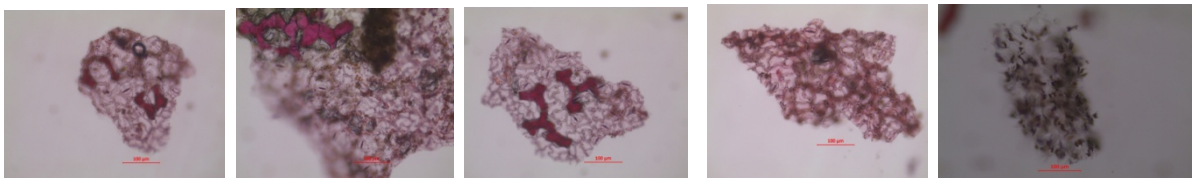


Fig.3. Lower epidermis

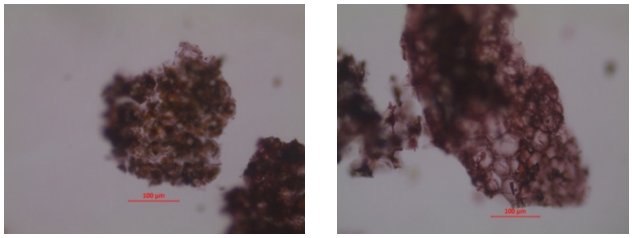
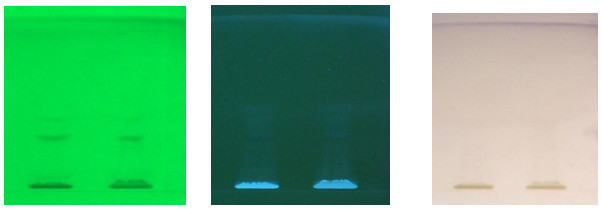


Fig.4. Upper epidermal cells



254 nm 366 nm 550 nm

Fig.5. Thin Layer Chromatography

TABLES

Table 1 Moisture content of the drugs:

Name of Drug	Wt. of the Drug	Loss of Wt. after drying	Moisture content
Ellertonia rheedii Wight.	5 gm	0.2gm	4%

Table 2 Total ash of the drugs:

Name of Drug	Weight of Drug	Weight of Ash	% of Ash
Ellertonia rheedii Wight.	5 gm	0.31	6.2 %

Table 3 Acid insoluble ash of the drugs:

Name of Drug	*Weight of Drug*	Weight of acid insoluble Ash	Acid insoluble Ash *(%w/w)*
Ellertonia rheedii Wight.	5 gm	0.267gm	5.34 %

Table 4: Water soluble ash of the drugs:

Name of Drug	*Weight of Drug*	*Wt. of water soluble Ash*	*Water soluble ash (% w/w)*
Ellertonia rheedii Wight.	5 gm	0.168 gm	3.36%

Table 5: Percentage of extractive values of drugs in different solvents:

The Extractive Values In Different Solvents	Percentage of Extract of *Ellertonia rheedii* weight
Water	5.28 %
Ethanol	2.44%
Methanol	17.18%
Chloroform	3.56%
Petroleum Ether	1.5%
Acetone	3.48%

Table 6: Phytochemical components present in various extracts:

Components	*Ellertonia rheedii* wight
Proteins	Present
Carbohydrates	Absent

Tannins	Present
Saponins	Absent
Flavonoids	Absent
Steroids	Present
Alkaloids	Absent
Triterpenoides	Absent
Starch	Absent
Resins	Absent
Elagic acid	Absent
Phenolics	Present

Table 7 Results of Ash analysis:

Results of Ash analysis components	*Ellertonia rheedii* wight
Carbonates	Absent
Fluorides	Present
Chlorides	Present
Sulphates	Present
Chromates	Absent
Phosphates	Present
Potassium	Absent
Sodium	Absent
Aluminium	Absent
Calcium	Absent

Table 8: RF table 254nm

Track	Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %	Assigned substance
1	1	0.01 Rf	0.6 AU	0.02 Rf	53.4 AU	16.97 %	0.03 Rf	0.0 AU	360.8 AU	4.61 %	unknown *
1	2	0.04 Rf	0.2 AU	0.06 Rf	32.5 AU	10.32 %	0.09 Rf	0.0 AU	735.6 AU	9.40 %	unknown *
1	3	0.24 Rf	17.0 AU	0.29 Rf	147.3 AU	46.81 %	0.32 Rf	8.6 AU	4381.8 AU	55.98 %	unknown *
1	4	0.38 Rf	13.3 AU	0.40 Rf	62.7 AU	19.93 %	0.43 Rf	17.9 AU	1584.8 AU	20.25 %	unknown *
1	5	0.89 Rf	11.4 AU	0.92 Rf	18.8 AU	5.97 %	0.95 Rf	3.7 AU	764.1 AU	9.76 %	unknown *
2	1	0.01 Rf	0.4 AU	0.03 Rf	79.5 AU	27.71 %	0.05 Rf	0.0 AU	946.8 AU	13.28 %	unknown *
2	2	0.23 Rf	20.1 AU	0.29 Rf	131.9 AU	45.99 %	0.33 Rf	3.1 AU	3974.8 AU	55.74 %	unknown *
2	3	0.37 Rf	4.6 AU	0.40 Rf	51.2 AU	17.84 %	0.44 Rf	15.2 AU	1583.0 AU	22.20 %	unknown *
2	4	0.54 Rf	8.3 AU	0.55 Rf	13.3 AU	4.62 %	0.58 Rf	4.1 AU	322.2 AU	4.52 %	unknown *
2	5	0.89 Rf	1.9 AU	0.92 Rf	11.0 AU	3.84 %	0.95 Rf	0.2 AU	303.7 AU	4.26 %	unknown *

Table 9: Rf table 366nm

Track	Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %	Assigned substance
1	1	0.01 Rf	0.3 AU	0.02 Rf	46.5 AU	33.02 %	0.04 Rf	1.3 AU	314.1 AU	9.84 %	unknown *
1	2	0.20 Rf	6.0 AU	0.25 Rf	17.7 AU	12.56 %	0.25 Rf	16.4 AU	523.6 AU	16.41 %	unknown *
1	3	0.26 Rf	17.6 AU	0.29 Rf	46.4 AU	33.00 %	0.32 Rf	14.0 AU	1649.3 AU	51.69 %	unknown *
1	4	0.38 Rf	11.9 AU	0.40 Rf	30.1 AU	21.42 %	0.43 Rf	0.3 AU	703.4 AU	22.05 %	unknown *
2	1	0.01 Rf	1.7 AU	0.03 Rf	87.4 AU	49.49 %	0.04 Rf	1.2 AU	1005.3 AU	21.76 %	unknown *
2	2	0.21 Rf	15.5 AU	0.29 Rf	48.6 AU	27.50 %	0.32 Rf	14.4 AU	2623.5 AU	56.78 %	unknown *
2	3	0.38 Rf	14.6 AU	0.40 Rf	28.3 AU	16.03 %	0.43 Rf	6.9 AU	832.7 AU	18.02 %	unknown *
2	4	0.97 Rf	0.4 AU	0.99 Rf	12.3 AU	6.98 %	1.00 Rf	4.3 AU	159.0 AU	3.44 %	unknown *

Table 10: Rf table 580nm

Track	Peak	Start Position	Start Height	Max Position	Max Height	Max %	End Position	End Height	Area	Area %	Assigned substance
1	1	0.02 Rf	2.0 AU	0.02 Rf	13.0 AU	18.78 %	0.04 Rf	0.0 AU	85.3 AU	3.48 %	unknown *
1	2	0.36 Rf	17.5 AU	0.40 Rf	38.7 AU	56.04 %	0.44 Rf	16.7 AU	1866.6 AU	76.24 %	unknown *
1	3	0.63 Rf	14.1 AU	0.64 Rf	17.4 AU	25.18 %	0.69 Rf	4.8 AU	496.3 AU	20.27 %	unknown *
2	1	0.01 Rf	1.1 AU	0.03 Rf	22.1 AU	20.40 %	0.04 Rf	0.1 AU	303.5 AU	8.26 %	unknown *
2	2	0.22 Rf	8.7 AU	0.23 Rf	18.6 AU	17.15 %	0.26 Rf	9.4 AU	449.2 AU	12.23 %	unknown *
2	3	0.31 Rf	9.8 AU	0.32 Rf	21.9 AU	20.24 %	0.34 Rf	19.1 AU	449.8 AU	12.25 %	unknown *
2	4	0.36 Rf	33.0 AU	0.40 Rf	45.8 AU	42.22 %	0.46 Rf	16.0 AU	2470.4 AU	67.26 %	unknown *

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