

Pharmacognostic studies on the leaves of *Dyschoriste perrottetii* Nees (Family: Acanthaceae)

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The macroscopical, microscopical and chemo-microscopical studies have been carried out on the whole leaves, anatomical sections and powdered samples of *Dyschoriste perrottetii* Nees. Diacytic stomata on lower and upper surfaces, surrounded by wavy epidermal cells were observed, unicellular covering trichomes with cystoliths. Calcium oxalate crystals, which are mostly single and prismatic, were also present. Chemo-microscopical examination revealed the presence of starch, tannin, mucilages and cellulose. Quantitative evaluation of the powdered leaves gave moisture content of 7.5 %, total ash 17.5 % acid insoluble ash of 4.0 %, alcohol extractive of 13.2% and water extractive of 31.2 % The mean quantitative microscopy values for the fresh leaves determined such as Palisade ratio, 8.4 ± 1.2 Stomatal number; Upper epidermis, 36 ± 5.0 Lower epidermis, 100 ± 6.0 Stomatal index; Upper epidermis, 19.9 ± 2.5 Lower epidermis, 37.1 ± 3.5 Vein islet 15.0 ± 3.1 , vein termination, 13 ± 1.2 . The result could be used for identification and preparation of monograph on the plant.

Key words: *Dyschoriste perrottetii*, macroscopy, microscopy, pharmacognostic evaluation.

INTRODUCTION

The plant *Dyschoriste perrottetii* Nees (family Acanthaceae) is a shrub of about half a meter high, with branches and square woody stem rooting at lower nodes [1]. It is widely distributed in the tropics frequently in temperate and completely absent in artistic region [2].

In Nigeria among the Hausa and Fulani communities it is commonly known as *fidda hakukuwa* [3]. The plant is used in traditional medicine for easing labour and in treatment of yellow fever and measles. The seeds are used for the removal of spicles of chaft of glass or any foreign material in the eyes [3]. Member of Acanthaceae family are of used for the relief of pain during child-birth [4]. Pharmacological and Biological Studies of the family showed that some members exert anticholinestrage activity, histamine antagonist, cardiac depressants antimicrobial and antifungal effects [5]. Recently some were found to exhibit antitumour activity [6]. Preliminary phytochemical screening on the herb revealed the presence of phenolic compounds, alkaloids, steroids, saponins and tannins. It was deemed of interest to investigate this plant pharmacognostically such as macroscopical, microscopical and other diagnostic

character of the leaves of *Dyschoriste perrottetii* Nees, with a view of preparing monograph for its proper identification.

MATERIALS AND METHODS

Plant Collection and Identification: The plant was collected in February and September 1998 from Samaru – Zaria, it was identified on the field using keys and description in the official books [1,7]. The sample was authenticated by comparing with a voucher specimen (No. 1186) deposited in the herbarium of Department of Biological Sciences, Ahmadu Bello University, Zaria, Nigeria.

Macroscopical Examinations: The macroscopical features of the leaves were described using the terms outlined [8].

Microscopical Examination: The powdered and transverse sections of the leaf were employed for this study; to carry out quantitative and qualitative studies, using the methods employed [8]. Chemo-microscopical examination was carried out to detect the presence or absence of various chemical compounds such as starch, cellulose, tannins, lignin, fats and oils, mucilage and calcium oxalate crystals.

Phytochemical Studies: Dried materials of *Dyschoriste perrottetii* Nees and crude ethanolic extract were used and extraction process of the alkaloids, flavonoids and steroids were as described [8,9].

Quantitative Microscopy: The moisture content of the powdered leaves was determined by loss on drying method [9]. The ash value, acid insoluble ash and water-soluble ash were determined as described [10]. The water and alcohol extractive values were obtained using the method outlined [9].

RESULTS

Macroscopical Examination: The macroscopical features of the leaves *Dyschoriste perrottetii* Nees (Fig. 1) were as follows:

Leaves arrangement: Opposite decussate

Type: Simple

Petiole: Present (1.0 – 2.2cm)

Shape: Lanceolate

Apex: Sub-acute

Margin: Repand (shallowly-wavy)

Venation: Reticulate

Base: Decurrente

Surface: Glabrous

Texture: Smooth and Soft

Sensory Characters:

Colour: Dark green

Odour: Characteristics agreeable odour

Taste: Slightly bitter

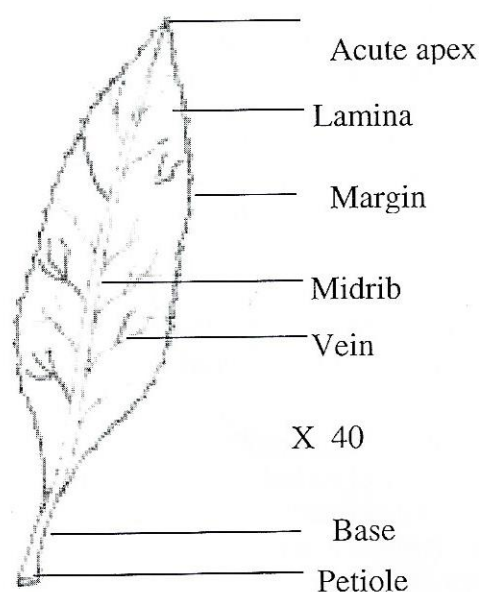
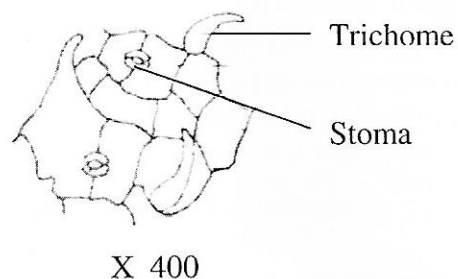
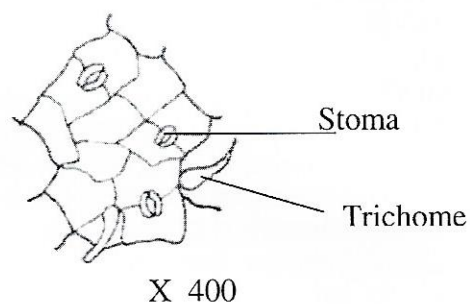


Fig 1: Macroscopical Features of the Leaf of *Dyshoriste Perrottetii* Nees



(a) Upper epidermis



(b) Lower epidermis

Fig. 2: Surface view showing the upper and the lower epidermis of the leaf of *Dyshoriste perrottetii* Nees.

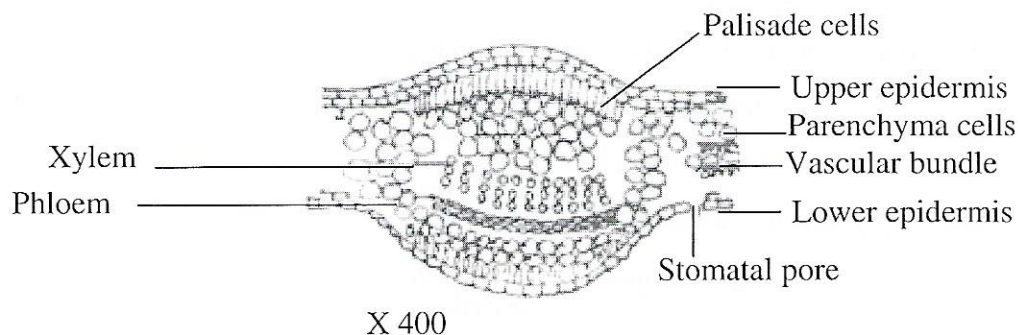


Fig 3: Transverse Section Showing the Midrib of the Leaf of *Dyschoriste perrottetii* Nees.

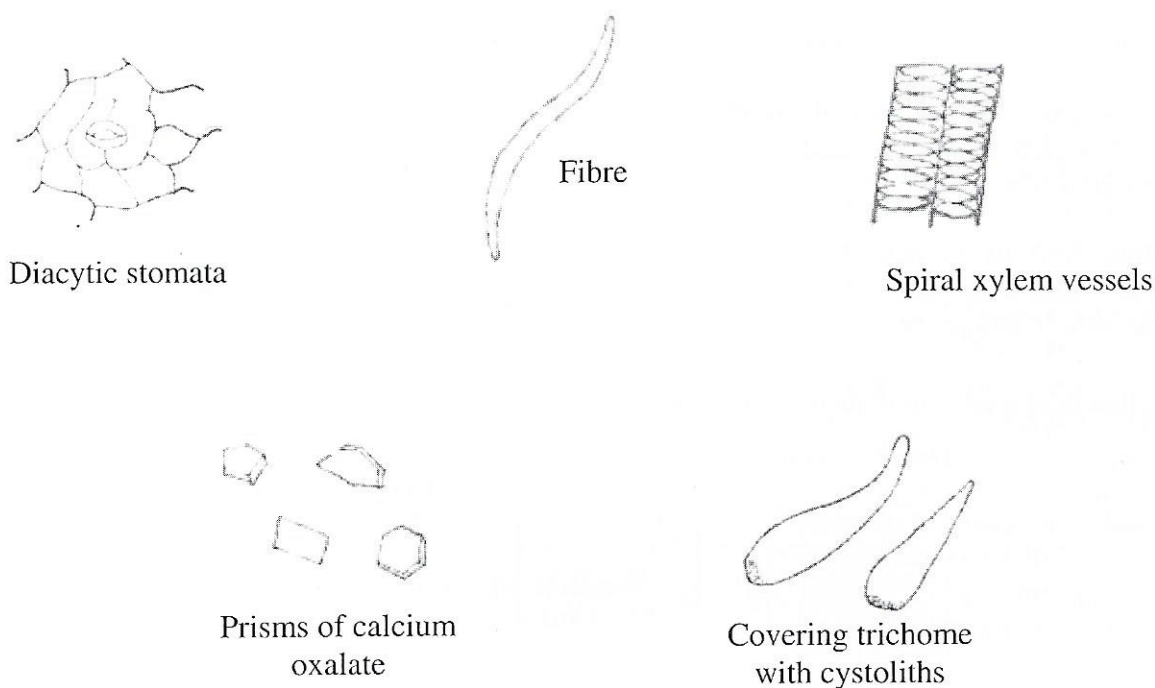


Fig. 4: Microscopical features of the powdered leaf of *Dyschoriste perrottetii* Nees. X 400

Microscopical Examination: The microscopical features of the fresh and powdered leaves were described as follows:

Stomata: Diacytic, numerous on lower epidermis and moderate on upper epidermis, (Fig. 2)

Trichomes: Unicellular covering 4 – 12 μ m in size, with aggregate of cytolith in its base.

Phloem fibers: Moderate, 100 - 200 μ m long with tapering apex.

Xylem vessels: Few, spiral type.

Starch grain: Few, simple spherical in shape, 12.5 - 20 μ m in size.

Calcium oxalate: Moderate, prismatic, 25 - 30 μ m in size.

Oil globe: Few, simple, oval in shape, 12.5 - 30 μ m.

The transverse section of the lamina through the midrib (Fig. 3) revealed the position of the tissues found in the leaf of *Dyschoriste perrottetii* Nees; the leaf is dorsoventral with the mesophyll containing calcium oxalate crystals. Microscopical features of the powdered samples were also determined (Fig. 4). The prismatic calcium oxalate crystals, the spiral xylem vessels and the unicellular/uniseriate covering

trichomes with aggregate of cystolith in their base are worthy to note.

Chemo- microscopical Examination: This revealed the presence of chemical constituents in the cell wall and cell of *Dyschoriste perrottetii* Nees; (Table 1)

Table 1: Results of chemo-microscopy of the leaf of *Dyschoriste perrottetii*

Test Reagent	Observation	Inference
Chlo-Zinc-iodine	Blue to black colour observed on epidermal cells	Cellulose (+)
Ferric chloride solution	Greenish leaves colour in some parenchyma clls	Tannins (+)
N50 – Iodine	Blue-black colouration observed on some few grains in parenchyma cells. In transverse section and in powdered leaves.	Starch (+)
Phloroglucinol and conc. HCl	No red colouration observed in the xylem vessels	Lignin (-)
Ruthenium red	Red colouration observed	Mucilage (+)
80% H ₂ SO ₄	Crystals of calcium oxalate dissolved	Cal.Ox. Crystal. (+)

Key: (+) = present, (-) = absent

Quantitative leaf microscopy: The results of quantitative microscopy and pharmacognostic standards were presented in tables 2 and 3.

Table 2: Results of quantitative microscopy of the leaf of *D. perrottetii*

Determination	Values	
	Range	Mean
Palisade ratio	8.2 – 8.5	8.4
Stomatal number		
Upper epidermis	34 – 38	36
Lower epidermis	94 – 106	100
Stomatal index		
Upper epidermis	19.4 – 20.1	19.9
Lower epidermis	37.0 – 37.2	37.1
Vein islet	14 – 16	15.0
Vein termination	11 – 15	13.0

• mean values of 10 determination

Table3: Results of pharmacognostic standards of the leaf of *D. perrottetii*

Determination	Values%
Moisture content	7.5
Ash value	17.5
Acid-insolubel ash	4.0
Alcohol extractive	13.2
Water extractive	31.2

DISCUSSION

The macroscopical features of the plant can be used, as its diagnostic parameters. The microscopical features such as the presence of Diacytic stomata on both epidermal surfaces,

aggregate of calcium carbonate (cystolith), the parenchyma cells containing prismatic calcium oxalate crystals conformed to major characteristics features of the family Acanthaceae [11]. The chemo-microscopical result indicated the presence of mucilage and tannins. Phytochemical screening reveal the presence of alkaloids, flavonoids, and

sterols Table 4., the commonly encountered alkaloids in the Acanthaceae family are Tropane, alkaloids, quinazoline [12] the later group are found

to have utrotonic activity [12] this may be responsible for the use of the plant in easing labour.

Table4: Results of phytochemical screening of the crude ethanolic extract of *D. Perrottetii* Nees

Chemical Constituents	Results
Tannins	+
Anthraquinones	-
Sterols	+
Flavonoids	+
Alkaloids	+

Key: (+) = present, (-) = absent

The Pharmacognostic standards such as moisture content (7.5%w/v) of the leaf, is low, which showed that there is less chance for microbial degradation of the drug during storage.

CONCLUSION

The results presented in this study could serve as diagnostic parameters for proper identification as well as preparation of a monograph on *Dyschoriste perrottetii* Nees;

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