

## Short Communication

# Pharmacognostic evaluation of the leaves of *Dissotis rotundifolia* Triana (*Melastomataceae*)

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*Dissotis rotundifolia* Triana (*Melastomataceae*), a native of tropical West Africa is known to have many uses in ethnomedicine. Establishment of pharmacognostic profile of the leaves will assist in standardization which can guarantee quality, purity and identification of samples. Evaluation of fresh, powdered and anatomical sections of the leaves was carried out to determine the macromorphological, micromorphological, chemomicroscopic, numerical and phytochemical profiles. Macroscopically, the leaf was linear in shape, with a glabrous texture, a short petiole, margin entire, apex and leaf base acute with pinnate venation. Microscopically, stomata was anomocytic, epidermal cells were straight and polygonal with uniseriate and multiseriate covering trichomes. Chemomicroscopic characters present included lignin, starch, mucilage and calcium oxalate crystals while phytochemical evaluation revealed the presence of alkaloids, cardiac glycosides and saponins. The investigations also included the moisture content, ash values as well as palisade ratio, stomata index, vein – islet and veinlet termination numbers. These findings should be suitable for inclusion in the proposed Pharmacopoeia of Nigerian medicinal plants.

**Key words:** *Dissotis rotundifolia*, pharmacognostic evaluation, pharmacopoeia.

## INTRODUCTION

The genus *Dissotis* comprises of 140 species native to Africa (Loigier, 1994). *Dissotis rotundifolia* Triana, a native of tropical West Africa belongs to the Melastomataceae family (Wagner et al., 1990) and common names include Pink lady (English), Ebafo (Bini), and Awede (Yoruba). It is a versatile perennial slender creeping herb with prostrate or ascending stems up to 40 cm high, rooting at the nodes and producing from seeds and stolons. Traditionally, in various parts of tropical Africa, it has various uses. In Nigeria, the plant is used mainly for the treatment of rheumatism and painful swellings, and the leaves decoction is used to relieve stomach ache, diarrhoea, dysentery, cough, stop abortion, conjunctivitis, circulatory problems and venereal diseases. It is used in East Africa for the treatment of bilharzias (Kokwaro, 1976), and in Cameroun, the leaves are used for dysentery (Noumi and Yomi, 2001).

There is no doubt that Africa is blessed with abundant

plants whose medicinal potentials are yet to be tapped. Apart from a sketchy description of the plant, no further work has been reported on its diagnostic features. This paper reports on the macro/micro and chemomicroscopic characters of *D. rotundifolia* leaves, its specific physical and chemical standards and provides monographs which can be used as quality parameters in the Nigerian pharmacopoeia.

## MATERIALS AND METHODS

Fresh leaves of *D. rotundifolia* Triana were collected in Ugbowo area of Benin City, Nigeria. Identification and confirmation were done by Usang Felix of Forest Research Institute of Nigeria, Ibadan, Nigeria where voucher specimens were deposited with the number FIH 107156.

### Macroscopy

The following macroscopic characters for the fresh leaves were noted: size and shape, colour, surfaces, venation, presence or absence of petiole, the apex, margin, base, lamina, texture, odour and taste (Evans, 1996; Wallis, 1985).

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Figure 1. *Dissotis rotundifolia* Triana.

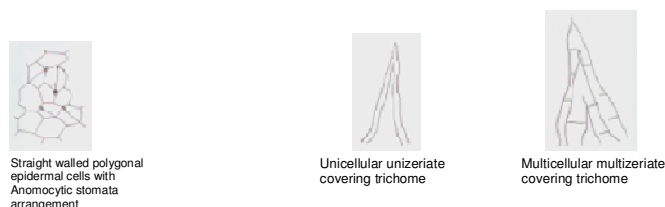


Figure 2. Diagnostic epidermal characters of *Dissotis rotundifolia*.

### Microscopy

The outer epidermal membranous layer (in fragments) were cleared in chloral hydrate, mounted with glycerin and observed under a compound microscope. The presence/absence of the following were observed: epidermal cells, stomata (type and distribution) and epidermal hairs (types of trichomes and distribution). The transverse sections of the fresh leaves through the lamina and the midrib as well as a small quantity of the powdered leaves were also cleared, mounted and observed (African Pharmacopoeia, 1986).

### Chemomicroscopic examination

Examination of the powder for starch grains, lignin, mucilage, calcium oxalate crystals, cutin and suberin were carried out using standard techniques (Evans, 1996).

### Phytochemical investigation

Chemical tests were employed in the preliminary phytochemical screening for various secondary metabolites such as tannins, cardiac glycosides, alkaloids, saponins, anthracene derivatives and cyanogenetic glycosides (Evans, 1996; Brain and Turner, 1975; Ciulei, 1981; Harborne, 1992).

### Quantitative investigation

Quantitative leaf microscopy to determine palisade ratio, stomata number, stomata index, vein – islet number and veinlet termination

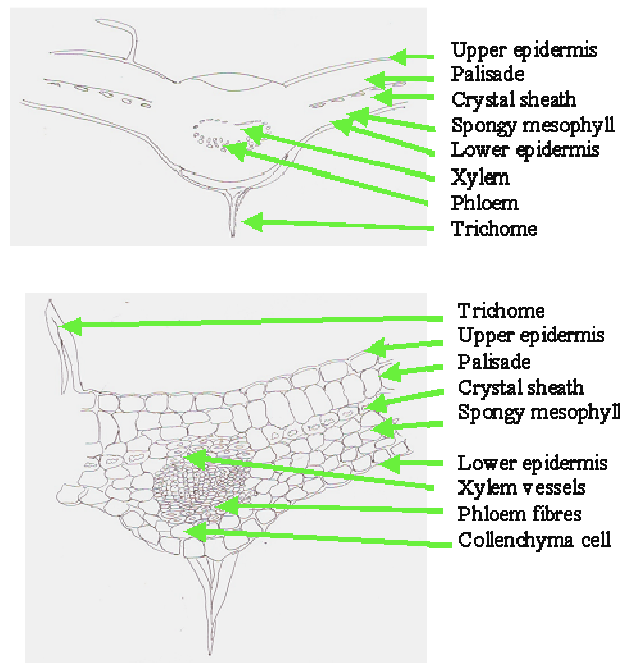


Figure 3. Transverse section of *D. rotundifolia* through the midrib and lamina under low and high power magnifications.

number were carried out on epidermal strips. Other parameters determined for the powdered leaves were moisture content, total ash, acid – insoluble ash, water – soluble ash, alcohol (90% ethanol) and water-soluble extractive values (British Pharmacopoeia, 1980).

## RESULTS AND DISCUSSION

Macroscopic investigations showed simple leaves which were whorled, with hairs on both dark green surfaces (Figure 1). The truncated base of the leaves has stipules, with a short petiole, ovate shape, apex obtuse and a venation that is reticulate. The average leaf size is 3.0 cm  $\pm$  0.10 (length) and 2.5 cm  $\pm$  0.05 (breadth). It is odourless and has a characteristic salty after-taste.

The micromorphological features of the epidermal strips, anatomical sections and powdered samples were also evaluated (Figure 2). Anticlinal walls are straight and polygonal and there were three or four epidermal cells which are not different from each other surrounding the stomata (Anomocytic arrangement). Uniseriate and multiseriate covering trichomes are present on the lower surfaces and are similar to those of the upper surface. Transverse section of the leaf across the mid – rib (Figure 3) shows an upper epidermis consisting of straight (5 – 6 sided) polygonal cells and a lower epidermis of smaller cells. It has a dorsiventral leaf arrangement (bifacial surface). The mid-rib bundle is surrounded by a zone of collenchyma on both surfaces. The phloem vessels embed the proto- and meta-xylem vessels.

**Table 1.** Numerical data of *Dissotis rotundifolia*.

Parameter	Mean $\pm$ SD (% w/w)
Moisture content	13.37 $\pm$ 0.16
Total ash	8.52 $\pm$ 0.18
Acid-insoluble ash	1.60 $\pm$ 0.18
Water-soluble ash	1.73 $\pm$ 0.07
Alcohol-soluble extractive	0.70 $\pm$ 0.02
Water-soluble extractive	1.57 $\pm$ 0.02

**Table 2.** Quantitative leaf microscopy of *Dissotis rotundifolia*.

Parameter	Range	Mean $\pm$ SD
Palisade ratio	5.50 – 7.75	6.25 $\pm$ 0.61
Stomata number: Upper surface	8.00 – 11.00	9.30 $\pm$ 0.21
Stomata number : Lower surface	6.00 – 9.00	7.40 $\pm$ 0.25
Stomata index: Upper surface	23.53 – 26.83	24.93 $\pm$ 0.19
Stomata index: Lower surface	20.00 – 23.68	21.67 $\pm$ 0.24
Vein islet number	1.25 – 2.25	1.55 $\pm$ 0.18
Veinlet termination number	1.25 – 1.50	1.45 $\pm$ 0.05

Chemomicroscopic studies of the leaves revealed the presence of lignin, starch, mucilage and calcium oxalate crystals. Phytochemical evaluation revealed the presence of alkaloids, cardiac glycosides and saponins. These secondary plant metabolites are known to possess various pharmacological effects and may be responsible for the various actions of *D. rotundifolia*. The numerical and quantitative values are presented in Tables 1 and 2.

*D. rotundifolia* is currently being used in the treatment of various disease conditions without standardization or concerns as to its level of quality. Standardization is an integral part of establishing the correct identity of a crude drug. Before any crude drug can be included in an herbal pharmacopoeia, some pharmacognostic and herbal parameters must be established.

*D. rotundifolia* is a plant which is known to have some ethno pharmacological activities and is being well researched on. The results of these investigations could, therefore, serve as a basis for proper identification, collection and investigation of the plant. These parameters which are being reported for the first time could also be useful in the preparation of the herbal section of the proposed Nigerian Pharmacopoeia.

## REFERENCES

- African Pharmacopoeia. (1986). General methods for Analysis. OAU / STRC Scientific Publications, Lagos, 2(2): 01 – 5, 137 – 149, 223 – 237.
- Brain KR, Turner TD (1975). Practical evaluation of phytopharmaceuticals. Wright – Sciencetchnica, Bristol. 1<sup>st</sup> Ed. 144.
- British Pharmacopoeia (1980). Appendix XI. Her Majesty's Stationery Office, London. A108, 11: A113.
- Ciulei I (1981). Methodology for analysis of vegetable drugs. United Nations Industrial Development Organisation. Romania, pp.17-25.
- Evans WC (1996). Trease and Evans Pharmacognosy. WB Saunders Ltd. London. 14<sup>th</sup> Ed. 119-159.
- Harborne JB (1992). Phytochemical methods. A guide to modern technique of plant analysis. Chapman and Hill, London, p. 279.
- Kokwaro JC (1976). Medicinal plants of East Africa. General Printers, Nairobi, p. 198.
- Loigier HA (1994). Spermatophyta. Descriptive flora of Puerto Rico and Adjacent islands, pp. 1-3.
- Noumi E, Yomi A (2001). Medicinal plants used in intestinal diseases in Mbalmayo Region, Fitoterapia, pp. 246-254.
- Wagner WL, Herbst DR, Sohmer SH (1990). Manual of flowering plants of Hawaii. University of Hawaii Press, Bishop Museum, Honolulu, p. 210.
- Wallis TE (1985). Textbook of Pharmacognosy. CBS Publishers, Delhi, India, pp. 572-575.