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PHYTOCHEMICAL AND PHARMACOGNOSTIC STUDIES OF *TELOSMA AFRICANUM* (N.E.Br) COLVILLE LEAF AND STEM

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ABSTRACT

Telosma africanum (N.E.Br) Colville (Asclepiadaceae) is a slender riverine and deciduous climber used traditionally in the treatment of venereal diseases. Using standard procedures, the pharmacognostic studies, fluorescence analysis and phytochemical screening were carried out. This study revealed the presence of combined Anthraquinone, Saponin, Cardiac glycoside, alkaloids in the leaf and stem. Flavonoid as well as uniseriate trichomes and anisocytic type of stomata were present in the leaf.

INTRODUCTION: *Telosma africanum* (N.E.Br) Colville (Asclepiadaceae) is commonly known as the African *Telosma*. It is a slender climber found in the riverine and deciduous forests mainly Guinea, West Cameroun and dispersed in tropical Africa, as well as from the South to Natal¹.

In the folklore medicine of the Tanganyika, the fresh roots of *T. africanum* is shaken in water and drunk as a vermifuge and for venereal disease¹.

There is however very scanty information on the ethnobotanical uses, pharmacognostic and biological studies of *T. africanum*. This study aims at evaluating the pharmacognostic studies of the leaf, fluorescence analysis as well as the phytochemical screening of the leaf and stem.

MATERIALS AND METHODS: The leaves and stem of *T. africanum* were collected from Onigambari Forest, Ago-Iwoye, Nigeria and authenticated at the Forestry Research Institute of Nigeria (FRIN).

Chemicals and Instruments: Compound microscope, glass and cover slips. All chemicals and reagents used were of analytical grade.

Phytochemical Studies: The Phytochemical screening of the leaf and stem of *T. africanum* was carried out using standard procedures²⁻³.

Pharmacognostical Investigation: Morphological Features: The morphological features of the leaves such as the odour, colour, size, shape and taste were studied⁴.

Microscopy: The sections for microscopy were prepared by free hand section of the leaf which was cleared with chloral hydrate and mounted in glycerine⁵⁻⁶.

Fluorescence analysis: The fluorescence analysis of the powdered leaf and stem of *T. africanum* were carried out using various solvents⁷⁻⁸.

RESULTS AND DISCUSSION: *Telosma africanum* belongs to the family Asclepiadaceae, a family characterised by about 250 genera and 2000 species⁹. In this study, the macroscopy of the leaf showed that the leaves of *T. africanum* are dark green, simple, tasteless, with the lamina about 14.2 long and 22.5cm broad. The shape of the leaf is ovate, acuminate at apex, cordate at base and entire along margin. **Table 1.**

TABLE 1: MACROSCOPIC CHARACTERISTICS OF FRESH *T. AFRICANUM* LEAF

Colour	Green
Odour	Bland
Taste	Bland
Type	Simple
Margin	Entire
Venation	Reticulate
Shape	Ovate
Apex	Acuminate
Base	Cordate
Surface	Cabrid
Texture	Papery

Length: Breadth 14.2cm; 22.5cm

Previous studies have reported that the main type of stomata found in the family asclepiadaceae is the paracytic type with only some species possessing anomocytic or anisocytic types⁹. In this study, the microscopic study revealed that the leaf of *T. africanum* possess the anisocytic (cruciferous) type of stomata characterised by three subsidiary cells with one smaller than the others (**Fig. 1**).

In addition, the leaf possesses uniseriate hairs with pointed apex (Fig. 1) and a dorsiventral structure of the leaf midrib (**Fig. 2**).

The fluorescence analysis is helpful in the characterization of crude drugs¹⁰ and further reveals the presence of active agents in the leaf and stem by their various colour reactions to different chemicals and colour change under the UV at 254 and 366 nm. Though the information, studies on the biological and chemical activities of *T. africanum* is very scanty, the result in this study will further help in identifying the purity, correct identification of the crude drug, the standardisation and control of *T. africanum* (**Tables 2 and 3**).

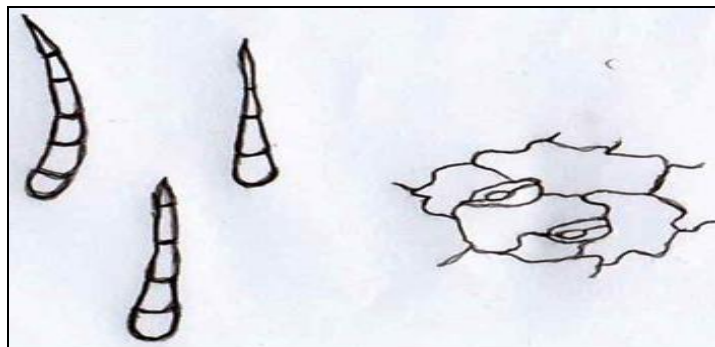


FIGURE 1: UNISERIATE TRICHOMES AND ANISOCYTIC TYPE OF STOMATA FOUND IN *TELOSMA AFRICANUM* LEAF

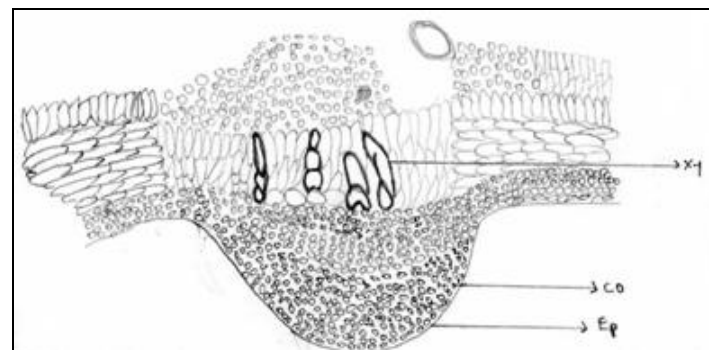


FIGURE 2: TRANSVERSE SECTION OF *TELOSMA AFRICANUM* LEAF
Co – Collenchyma cells; Ep – Epidermal cells; xy - xylem

TABLE 2: FLUORESCENCE ANALYSIS OF *T. AFRICANUM* LEAF POWDER

Treatment	Normal light	UV Light	
		254	366
Dry powder	Green	Green	Green
Powder + 5% NaOH	yellow	Green	Brown
Powder + 5% KOH	Golden yellow	Yellowish Green	Yellow
Powder + 5% FeCl ₃	Greenish brown	Green	Black
Powder + H ₂ SO ₄	Greenish brown	Green	Bottle green
Powder + dil. NH ₃	Greenish yellow	Green	Bottle green
Powder + Conc. HCl	Bottle green	Bottle green	Black
Powder + Conc. HNO ₃	Brown	Yellowish green	Yellow
Powder + 5% HCl	Yellowish brown	Green	Dark brown
Powder + 5% H ₂ SO ₄	Brown	Green	Black
Powder + dil. HNO ₃	Golden brown	Yellowish green	Brown
Powder + Na ₂ CO ₃	Greenish yellow	Green	Black
Powder + AgNO ₃	Green	Greyish green	Ash/grey

TABLE 3: FLUORESCENCE ANALYSIS OF *T. AFRICANUM* STEM POWDER

Treatment	Normal light	UV Light	
		254	366
Dry powder	Light Green	Light brown	Brown
Powder + 5% NaOH	Orange	Yellowish Green	Brown
Powder + 5% KOH	Bright yellow	Yellowish Green	Light brown
Powder + 5% FeCl ₃	Greenish yellow	Green	Brown
Powder + H ₂ SO ₄	Coffee brown	Brown	Dark brown
Powder + dil. NH ₃	Orange	Green	Brown
Powder + Conc. HCl	Orange	Light green	Brown
Powder + Conc. HNO ₃	Bright yellow	Yellowish green	Brown
Powder + 5% HCl	Cream	Light brown	Cream
Powder + 5% H ₂ SO ₄	Yellow	Light Green	Brown
Powder + dil. HNO ₃	Bright yellow	Yellowish green	Yellow

The Phytochemical screening revealed the presence of combined Anthraquinone, Saponin, cardiac glycoside, alkaloids in the leaf and stem of *T. africanum* however, the stem lacked Flavonoid while they both lacked free Anthraquinone (Table 4).

In addition, the phytochemical results will give clues to the possible medicinal potentials and pharmacological properties of *T. africanum*.

TABLE 4: PHYTOCHEMICAL SCREENING OF LEAF AND STEM OF *T. AFRICANUM*

	Anthraquinone		Saponin	Reducing sugar	Cardiac glycoside	Alkaloid	Flavonoid
	Free	Combined					
Leaf	--	++	++	++	++	++	++
Stem	--	++	++	++	++	++	--

REFERENCES:

- Burkill H.M. The useful plants of West tropical Africa. Royal Botanic Gardens, Kew, 1985; 1:319.
- Trease G.E and Evans W.C. Pharmacognosy, 1996; (14th edn). Saunders. London.
- Harborne J.B. Method of extraction and isolation In. Phytochemical Methods, Chapman and Hall, London. 1998; 60-66
- Mukerjee P.K. Morphological Examinations. In: Quality Control of herbal drugs. Business Horizons Pharmaceutical Publishers. 2002; 132-133.
- Wallis T.E. A textbook of Pharmacognosy. 1967; 3rd Edn. J and A Churchill Ltd, London.
- Lala P.K. Lab Manuals of Pharmacognosy. CSI Publishers and Distributors, 1993; Calcutta 5th Edition.
- Solanki J, Dhiman A, Nanda A and Dhankhar A Pharmacognostic and preliminary phytochemical evaluation of the leaves of *Crinum latifolium* L. International Journal of Pharmaceutical Sciences and Research. 2011; 2(21): 3219 – 3223.
- Ansari MM, Ahmad J, Ahmad A and Ansari SH. Pharmacognostic characterization and standardization of *Morus alba* stem bark, Journal of Medicinal and Aromatic Plant Sciences. 2006; 28:31-36.
- Watson L and Dallwitz, M.J: The families of flowering plants: descriptions, illustrations, identification, and information retrieval. Version: 4th March 2011. <http://delta-intkey.com>'.
- Apraj V, Thakur N , Bhagwat A, Mallya R, Sawant L, Pandita N: Pharmacognostic and Phytochemical Evaluation of *Citrus aurantifolia* (Christm) Swingle peel. Pharmacognosy Journal. 2011; (3) 26: 70 – 76.
