Pharmacognostic Studies on the Leaves of *Dyschoriste Perrottetii* Nees

*Odo, U. E., Ezugwu, C. O. and Ezejiofor, M.*

Department of Pharmacognosy and Environmental Medicine, Faculty of Pharmaceutical Sciences, University of Nigeria, Nsukka.

**A B S T R A C T**

To ensure reproducible quality of herbal products, proper control of starting material is important. The first step towards ensuring quality of starting material is authentication. Thus, in recent years there has been a rapid increase in the standardization of selected medicinal plants of potential therapeutic significance. Despite the modern techniques, identification of plant drugs by pharmacognostic studies is more reliable. *Dyschoriste perrottetii* Nees (Family-Acanthaceae) is an important medicinal plant used in various ways in the treatment of microbial infections, fever, measles and pains. Macroscopic, microscopic and chemo-microscopic studies of powdered and anatomical sections of the leaf were carried out using standard methods. This is necessary, for the purpose of identification and monograph preparation. The result shows diacytic stomata on the lower and upper surface, surrounded by wavy walled epidermal cells, unicellular covering trichomes, calcium oxalate crystal, which are mostly single and prismatic, lignified fibres and a characteristic collenchyma cells below the epidermis. Chemo-microscopic examination revealed the presence of starch, tannin, mucilage and cellulose. Quantitative evaluation of the powdered leaves gave moisture content of 7.5 %, total ash 12.5 %, water soluble ash 5.3 %, acid insoluble ash of 4.0 %, and alcohol extractive and water soluble extractive of 31.2 and 21.08 % respectively. These findings are of importance in the establishing diagnostic indices for the identification, 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 Hausas and Fulani communities, it is commonly known as *fidda hakukuwa* the plant is used in traditional medicine for easy labour and in treatment of yellow fever and measles and the seeds used for the removal of foreign material in the eyes.[3] Members of the Acanthaceae are of used for the relief of pain during child birth.[4] Pharmacological and biological study of the family shows that some members exert anticholinesterase 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 tannin.[9] 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 and inclusion in the pharmacopoeia.

**MATERIAL AND METHODS**

**Plant collection and identification**

The plant was collected in February 2009 from Nsukka, Enugu State, Nigeria. It was identified and authenticated by Mr. A. Ozioko, a taxonomist of the Bio-resources and Development Conservation Programme Centre (BDCP) Nsukka and a Voucher Specimen (UN/PCOG/09/392) deposited in the Herbarium of Department of Pharmacognosy and Environmental Medicine, University of Nigeria, Nsukka.

**Macroscopical Examination**

The macroscopical features of the leaves were studied using both the fresh and dried plant collected as described by Evans.[7]
**Microscopical Examination**

The powdered and transverse section of the leaf was employed for this study; to carry out quantitative and qualitative studies using the method employed.\(^9\) Chemo-microscopical examination was carried out to detect the presence or absence of various chemical compounds such as starch, cellulose, tannins, and lignin, fat and oil, mucilage and calcium oxalate crystals.

**Phytochemical studies**

The preliminary phytochemical screening of the leaf powder was performed following standard qualitative chemical tests\(^7,8\) in order to detect the presence or absence of major secondary plant metabolites of pharmacognostic importance which include; alkaloids, tannins, flavonoids, saponins, glycosides, proteins, fats and oils, steroids and carbohydrates.

**Quantitative microscopy**

The moisture content of the powdered leaves was determined by loss on drying method.\(^8\) The ash value, acid insoluble ash and water—soluble ash was determined as determined as described.\(^9\) The water and alcohol extractive value were obtained using the method outline.\(^9\)

**RESULTS**

**Macroscopical examination**

The leaves are simple, opposite. The shape is lanceolate with 2.5-5.0 cm wide and 6-12 cm long. The base of the leaf is decurrent. The leaves are glabrous dark green in with apex sub acute, the margin shallowly wavy, reticulate venation, smooth and soft texture and petiole about 1.0-2.2 cm. It has characteristic, agreeable odour and slightly bitter.

**Microscopical Examination**

The microscopical features of the fresh and leaves powder were described as follows; diacytic stomata numerous on lower epidermis and moderate on upper epidermis, unicellular covering trichome 4-12 µm in size, phloem...
fibers moderate, 100-200 µm long with tapering apex, spiral xylem vessels, prisms of calcium oxalate 25-30 µm in size. The transverse section of the lamina through the midrib (Figure 2) revealed that the is dorsoventral with epidermis covered externally by a wavy cuticle, mesophyll, diacytic stomata and a characteristic collenchyma cells below the epidermis.

**Phytochemical studies**
Phytochemical screening of the leaf powder revealed the presence of alkaloids, flavonoids, tannins, glycosides, saponins and sterols.

**Chemo-microscopical examination**
This revealed the presence of chemical constituents in the cell wall and cell of *Dyschoriste perrottetii* (Table 1).

**Quantitative leaf microscopy**
The results of quantitative microscopy and pharmacognostic standards were presented in Table 2.

### Physicochemical standards
The water extractive and alcohol extractive, total ash, acid insoluble ash, water soluble ash and moisture content were shown in Table 3.

### 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 parenchymatous cells containing prismatic calcium oxalate crystals conformed with major characteristic features of the family Acanthaceae. The chemo-microscopical result indicated the presence of mucilage and tannins. Phytochemical screening reveals the presence of alkaloids, flavonoids, tannins, glycoside, saponins and sterols. The commonly encountered alkaloid in the Acanthaceae family is the trophan alkaloids, quinazoline found to have

---

**Table 1: Results of chemomicroscopy of the leaf of *Dyschoriste perrottetii* Nees**

<table>
<thead>
<tr>
<th>Test Reagent</th>
<th>Observation</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlo-zinc-iodide</td>
<td>Blue to black colour observed on epidermal cells</td>
<td>Cellulose (+)</td>
</tr>
<tr>
<td>Ferric chloride solution</td>
<td>Greenish leaves in some parenchyma cells</td>
<td>Tannins (+)</td>
</tr>
<tr>
<td>N 50 – iodine</td>
<td>Blue-black colouration observed on some few grains in parenchyma cells. In transverse section and in powdered leaves.</td>
<td>Starch (+)</td>
</tr>
<tr>
<td>Phloroglucinol and conc. HCL</td>
<td>No. red colouration observed in the xylem vessels</td>
<td>Lignin (−)</td>
</tr>
<tr>
<td>Ruthenium red</td>
<td>Red colouration observed</td>
<td>Mucilage (+)</td>
</tr>
<tr>
<td>80 % H₂SO₄</td>
<td>Crystals of calcium oxalate dissolved</td>
<td>Calcium oxalate crystals (+)</td>
</tr>
</tbody>
</table>
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.

ACKNOWLEDGEMENT

The authors thank Department of Pharmacognosy and Environmental Medicine and Department of Botany, University of Nigeria, Nsukka for providing the facilities for the research.

REFERENCES