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2014;04(07):619-622.

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Pharmacognostic Studies Of The Leaves And Root Of The Plant, *Tephrosia Vogelii* Hook F(Fabaceae)

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**Article citation:**

**ABSTRACT**
The leaves and root bark of *Tephrosia vogelii* Hook (Fabaceae) is also known as fish poison. The macroscopical examination of the whole leaf revealed the following; the colour is green, venation is pinnate, margin entire, apex is Lanceolate, surface is hairy and texture papery. The microscopy of the leaf powder showed numerous unicellular covering trichomes with large lumen and long slits with tapering edges and broad base, abundant single fibres with two tapering edges and somewhat twist lumen. Fragment of the lamina in transverse view revealed the leaf as a dorsal ventral leaf, composed of double palisade. The upper epidermis is bigger and thicker than the lower epidermis with a parenchyma wall, spongy mesophyll, and spiral vessels. The histology of root powder revealed the presence of Cork cells, Calcium oxalate, Fibre, Parenchymatous wall, and simple Starch grains. The phytochemical test showed the presence of carbohydrates, steroids, alkaloids, Saponins, tannins, flavonoids and cardiac glycosides. Chemo-microscopical test revealed the presence of lignin, tannin, starch grains, calcium oxalate, proteins and oil glands in the leaves. The ethanol extractive value of the leaf is 2.8% while its water extractive value is 1.76%, meaning the leaf is more soluble in ethanol than water.

**KEYWORDS:** *Tephrosia vogelii*; Phytochemistry; Chemomicroscopy; Pharmacognostic study.

**Source of support:** None

**Competing interest / Conflict of interest**
The author(s) have no competing interests for financial support, publication of this research, patents and royalties through this collaborative research. All authors were equally involved in discussed research work. There is no financial conflict with the subject matter discussed in the manuscript.

Disclosure forms provided by the authors are available with the full text of this article at jpbms.info

**INTRODUCTION**
Medicinal plants are the most ancient source of drugs for curing human and animal diseases. Their biological actions recognized led to their cultivation in antiquity. Almost one quarter of all medicines are derived from 250,000 flowering plants on the earth surface though some of the secondary metabolites it contains may be toxic to lower beings or to man or...
both. Their use in the crude or refined form enhances the effort aimed at integrating herbal
with orthodox1.
Tephrosia vogelii is a soft woody branching herb or
small tree with dense foliage, 0.5-4m. Stems and
branches tomentose with long and short white or
rusty-brown hairs. Leaves are arranged spirally,
imparipinnate. Flower is about 18-26mm long,
fragrant when fresh and usually violet-purple or
blue. Pod is linear, slightly turgid with brown or
green woolly seeds which are ellipsoidal to reniform.
It is found in widely varying habitats including
savannah-like vegetation, grassland, forest
margins and shrub land, wasteland and fallow
fields. It grows much better than Leucaena
leucocephala in acid soils, forming root nodules
and fixing atmospheric nitrogen while on poor
soils; it grows more slowly and is prone to
diseases.

Apart from its wide spread use as a fish poison, so
many ethnomedicinal uses have been advocated. It
is cultivated to serve as a medicament. The ground
leaves and stem bark mixed with vegetable oil is
used as part of medicament for bone setting, pieces
of the stem are used to hold the broken limbs in
position2. Roots boiled in water when warm can be
used to treat feet with localised fungal infections
by immersing for some minutes3.
In East Africa the leaf is used as an abortifacient 4,
5. Hot water extract of the bark, leaf and unripe
fruit has been used to induce abortion in pregnant
women in Gabon4. In Cameroon hot water extract
of the leaf is drunk to induce menses6. The leaf
macerate is purgative and emetic8. The crude
methanolic extract of the leaves has shown
to induce contraction of isolated rabbit jejunum9
and guinea pig ileum10 in a concentration
dependent manner and this supports its use as a
purgative. Pulped leaves and leaf sap obtained
from the plant are used for ear ache in Tanzania
and the root scrapings are applied to aching

In Angola the plant Tephrosia vogelii is used as a
piscicide, anthelminthic, insecticide as well as for
treating tuberculosis12 and as a bactericide13. Its
anthelminthic property is dose dependent12. The
roots are used to treat typhoid fever14. The plant
has been known to have toxic and repellent effects
against certain insect pests of stored grains15-19
supporting its widespread use by local farmers as a
grain protectant. The plant can also be used as a
rat poison by compounding with groundnut.

In Nigeria it is used as a seed dresser
(insecticide/repellent) for cereals and legumes20. It
is applied directly to treat head lice, fleas, scabies
and other ectoparasites20,21 fresh water snails have
been found to be susceptible to extracts of crushed
unboiled root which can be employed in combating
schistosomosis8.

MATERIALS AND METHODS
The plant, Tephrosia vogelii was manually collected
from Vom, Plateau State (North-Central Nigeria) on
the 24th March, 2011 and was identified in Federal
College of Forestry, Jos Plateau state.
The morphological features of the leaves of
Tephrosia vogelii were macroscopically examined.
The powdered samples and the different
histological/anatomical sections of the fresh leaf
were treated and observed differently on
microscope slides to ascertain the presence or
absence of some chemical substances like starch,
oils, proteins, tannins, lignin and calcium oxalate
using appropriate chemical reagents and WHO
specifications22. The root powder was similarly
treated for its histological features and chemo-
microscopy with the right chemical reagents. The
water and alcohol soluble extractive values were
also determined using the official methods of
British Pharmacopoeia23 and African
Pharmacopoeia24.
The ethanolic extract of the leaves and the root
were separately subjected to preliminary
phytochemical screening using the standard
techniques25-28 to ascertain the presence or
absence of plant metabolites such as alkaloids,
cardiac glycosides, tannins, anthraquinones,
steroids carbohydrates, flavonoids and saponins.

RESULTS AND DISCUSSION
Table 1. Showing the extractive values.

<table>
<thead>
<tr>
<th>Extractive value</th>
<th>Leaf</th>
<th>Root</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>1.76%</td>
<td>1.68%</td>
</tr>
<tr>
<td>Alcohol</td>
<td>2.80%</td>
<td>2.27%</td>
</tr>
</tbody>
</table>

Table 2. Showing the various phytochemical constituents of
both the crude and the ethanolic extract of the leaf and
root of Tephrosia vogelii.

<table>
<thead>
<tr>
<th>Tests/Constituents</th>
<th>Crude</th>
<th>Ethanolic Extract</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LEAF</td>
<td>ROOT</td>
</tr>
<tr>
<td>ALKALOIDS</td>
<td>+</td>
<td>+++</td>
</tr>
</tbody>
</table>

- ALKALOIDS: + indicates presence, ++ indicates stronger presence, +++++ indicates very strong presence.
From the macroscopic examination of the whole leaf of *Tephrosia vogelii*, the following were observed; the colour is green, venation is pinnate, margin entire, apex is Lanceolate, surface is hairy and texture papery.

The microscopical examination of the leaf powder revealed the presence of numerous trichomes which are of the covering unicellular trichomes with large lumen, long slits with tapering edges and broad base. Abundant fibres which occur usually as a single fibre with two tapering edges and somewhat twist lumen are present. Fragment of the lamina in transverse view showed that the leaf is dorsal ventral, composed of double palisade. However, the surface view of the lamina fragment showed that the epidermis is composed of cells with straight walls, and fairly numerous anisocytic stomata. The upper epidermis was also seen to be bigger and thicker than the lower epidermis. The leaf has a thick cuticle and with a spongy mesophyll and some group of conducting vessels like the spiral vessels. Calcium oxalate crystals mainly in the form of prisms were found scattered. They are not very abundant but are of various shapes and mostly of medium size. Starch grains were present as occasionally round granules which were found scattered. Few showed eccentric dot hilum with no visible striations. Parenchymatous wall was seen as occasional fragment of thick walled parenchyma of the midrib and larger palisades of the upper epidermis which are composed of longitudinally elongated cells.

The chemo-microscopy of the leaves indicated the presence of lignin, and tannins were found on the fibres and trichomes, Starch grains were found scattered as simple granules. Oils were present as round oil glands and prisms of Calcium oxalate was found on fibres. Proteins were found to be present on leaves but absent in the root.

The alcohol extractive value (2.80%) is more than water extractive value (1.76%) signifying that the leaf is more extractible in the former than later. The soluble extractive value determination aids in the detection of exhausted drugs and identification of authentic drugs. The values are also useful for the determination of the amount of adulterants which yields matter to solvents which has little or no effect upon the drug itself.\(^2\,^3\)

The phytochemical results showed that it contains same constituents (alkaloids, saponins, tannins, flavonoids, steroids, carbohydrate and cardiac glycosides) though of higher yields in the extract particularly ethanolic extract than the crude. The presence of tannins and alkaloids may suggest its traditional use as localized fungal infection\(^3\), fish poison, and insecticide. The alkaloids may also suggest its traditional use as emesis while the purgative property may due to the presence of cardiac glycosides\(^6\). The traditional treatment of aching teeth could be due to the presence of flavonoids, and alkaloids. The presence of saponins and alkaloids in both the root and leaves may justify its ethno medicinal used as an abortifacient\(^4\,^5\).

In conclusion, the pharmacognostic studies of the leaves of *Tephrosia vogelii* could serve as a useful monograph in the identification of the crude drug

**REFERENCES**


