Anthelmintic activity of *Tephrosia calophylla*

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ABSTRACT

Objective: Nature has provided a completely store house of remedies to cure all ailments of mankind. A large number of populations have to rely upon traditional medicines, which are mainly derived from plant source. Methods: In this connection a critical analysis was done on *Tephrosia* genus by thorough literature survey from this *Tephrosia calophylla* plant was selected for the present study. The various species of *Tephrosia* is ascribed to have many medicinal and therapeutic uses for the treatment of various ailments.

Results: The present study aims to investigate its qualitative phytochemical analysis and anthelmintic activity of roots of *Tephrosia calophylla*. Ethanolic extracts of *Tephrosia calophylla* roots were subjected for the preliminary phyto chemical analysis and found the presence of alkaloids, glycosides, saponins, flavonoids, carbohydrates compounds and ethanol extract contains flavanoids. The above said activity shown by the *Tephrosia calophylla* roots may be due to the presence of secondary metabolites like flavanoids.

Conclusion: Anthelmintic activity was performed by using the ethanol extracts of *Tephrosia calophylla* roots at various concentration. *Tephrosia calophylla* roots shown potent activity when compared to control and equipotent activity when compared to standard Albendazole.

KEYWORDS: Medicinal plant, *Tephrosia calophylla*, worms, Anthelmintics

1. INTRODUCTION

1.1. Introduction of Herbals

Medicinal plants had been in use since 5000 B.C. Oldest known herbal is Pen-t’sao written by emperor Shen-Nung around 3000 B.C. It contains 365 drugs, one for each day of the year. Indians worked meticulously to examine and classify the herbs. Charaka made 50 groups of 10 herbs, each of which would suffice an ordinary physician’s need[1]. Similarly, Susruta arranged 760 herbs in 7 distinct sets based on to some of their common properties. Charaka says, “There is no substance in the world that has no medicinal value, provided you know how to use it”[2].

There are many thousands of medicinal plants in use throughout the world, with a tremendous range of action and degree of potency. Most have specific action on particular body systems and are known to be suitable for treating certain type of diseases. The human body is much better suited to treatment with herbal remedies than with the isolated chemical medicines. Herbal medicines not only provide nutrients, but when need they also strengthen and support the action of the digestive system, speeding up to the rate of processing food and improving the absorption of nutrients. Once taken in by the body, nutrients and medicines are carried to the body’s estimated three trillion cells. The circulatory system has remarkable ability to adopt to an endlessly shifting pattern of demand[3].

1.2. Therapeutic uses of Herbs

A plant’s leaves, flowers, stems, berries, seeds, fruit, bark, roots, or any other part may be used for medicinal purposes. Most herbal remedies are used to treat minor health problems, such as nausea, colds, cough, flu, headache, and pains, stomach and intestinal disorders, menstrual cramps, insomnia, skin disorders, and dandruff. Some herbalists have reported success in treating certain chronic conditions, including peptic ulcer, inflammation of colon, rheumatoid arthritis, high blood pressure, and respiratory problems. Some use herbal remedies for illnesses usually treated only with prescription drugs, such as heart failure.
Tephrosia calophylla

**Botanical Name:** Tephrosia calophylla PERS

1.3. Taxonomic classification:
- **Kingdom:** Plantae
- **Division:** Magnoliophyta
- **Class:** Dicotyledons
- **Sub class:** Polypetaceae
- **Sense:** Polypetaceae
- **Order:** Rosales
- **Family:** Fabaceae
- **Genus:** Tephrosia
- **Species:** calophylla

**Common names:** Adavivempalli, Dumpavempalli, Gaddavempalli, kommuvempalli.

1.4. Geographical Distribution:
Tephrosia is a large tropical and subtropical genus belongs to the family Fabaceae or Leguminosae. Morphologically Tephrosia plants are perennial woody shrubs, the genus Tephrosia possess more than 300 species, of which 35 occur in India, and others are abundant in the equatorial Africa, South Africa and South America regions[4].

Tephrosia calophylla is a perennial under shrub found widely in Andhra Pradesh, south India. It is mainly available in localities of hill slopes, rare in shady locations. It is found widely in Talakona forest of Andhra Pradesh[6].

1.5. Chemical constituents
The genus Tephrosia contains a wide variety of flavanoids and iso-flavanoids. Earlier investigations on Tephrosia calophylla have revealed the isolation of 23 different compounds of which 18 were known and 5 are new.

A new coumestan derivative Tephalostan from the whole plant together with two known flavanoids, 7-O-methylglabranin and kaempferol 3-o-β-D-glucopyranoside were isolated and characterized[6]. The structure of Tephalostan was elucidated as 5′-(R)-8,9-methylene dioxy-5′-isopropenyl-4′,5-dihydroforano-[2′,3′;2,3] Coumestan by extensive one and two-dimensional (1D and 2D)-NMR techniques including ¹H-¹H correlation spectroscopy (COSY), Hetero nuclear single quantum coherence (HSQC), Hetero nuclear multiple bond connectivity (HMBC) and Nuclear Over Hauser enhancement spectroscopy (NOESY) experiments.

1.6. Uses
Many species in the Tephrosia genus have been used as insecticidal, pesticidal agents and as poison particularly to fish in connection with the high concentration of rotenone. The plants are also used traditionally in folk medicine. According to Ayurveda, the plant is useful as an anti-helminthic, anti-pyretic and as well as an alexteric drug. It is also active against leprosy, ulcers, and used as alternative cures for diseases of the liver, spleen, heart and blood. According to the Unani system of medicine, the root is diuretic, allays thirst, enriches blood, cures diarrhea, it is also useful in bronchitis, inflammations, boils and pimples. Leaves are tonic to intestines, and a promising appetizer. The seeds can be used as substitute for coffee[6].

2. MATERIALS AND METHODS

2.1. Plant materials
The plant materials such as roots of Tephrosia calophylla were freshly collected from Talakona forest and nearby villages of Andhrapradesh state. The plants materials was identified and authentified by Dr.Madhava Chetty department of botany Sree Venkateswara University, Tirupati. A voucher specimen (DG-983) of Tephrosia calophylla has been deposited in the Herbarium of the department of botany for the further reference.

All the solvents and reagents used in the present work are of analytical grade. Required chemicals were procured from qualigens chemicals pvt.Ltd. All the glass ware used in the study was made by Borosil and equipments were electric water bath, rotavapor Buchi R-114, digital balance, bottle, dessicator, 40mesh sieve, mixture grinder, hot air oven, conical flask, petridishes.
2.2. Preparation of Plant Extract
The freshly collected plant materials were washed, shadow dried and then dried in hot air oven at a temperature not more than 50°C. The dried material was coarsely powdered materials (500g) were then packed in soxhlet apparatus and extracted with ethanol. Finally extract was concentrated in rotary evaporator at a temperature not more than 50°C and then, dried under vacuum dessicator. The dried extract was used for further experiments. In the current research we have used the ethanolic extract of *Terphrosia calophylla*.

2.3. Preliminary Phytochemical Screening
Preliminary phytochemical screening was done using the specified protocols for the qualitative analysis of Alkaloids, carbohydrates, fixed oils, flavonoids, glycosides, phytosterol/terpenes, saponins, and tannins/phenols. The screening tests as follows,

Table 1. Phytochemical Screening of *Terphrosia calophylla*

<table>
<thead>
<tr>
<th>S.No</th>
<th>Plant constituents</th>
<th>Ethanolic extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alkaloids</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>Carbohydrates</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Glycosides</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>Saponins</td>
<td>+</td>
</tr>
<tr>
<td>5</td>
<td>Flavonoids</td>
<td>+</td>
</tr>
<tr>
<td>6</td>
<td>Steroids</td>
<td>_</td>
</tr>
<tr>
<td>7</td>
<td>Proteins</td>
<td>+</td>
</tr>
<tr>
<td>8</td>
<td>Fats and Fixed oils</td>
<td>_</td>
</tr>
<tr>
<td>9</td>
<td>Volatile oils</td>
<td>+</td>
</tr>
</tbody>
</table>

+: Indicates the presence of phytochemical constituents. 
-: Indicates the Absence of phytochemical constituents

2.4. Anthelmintic Activity
Helmintheasia also affect millions of livestock resulting in considerable economic loses in domestic farm yard animals. Because of limited availability of modern medicines most of the world’s population depends to a greater extent on traditional medical medicines. Some common parasite which infects most of the population are *Taenia solium*, *Ancylostoma duodenale*, *Ascaris lumbricoides*, *Schistosoma mansoni*, *Schistosoma hematobium*, *Pheretima posthuma*, *Ascaridagalli* etc.

Adult Indian earthworm, *Pheretima posthuma*, has been used as test worm in most of the anthelmintic screening, as it shows anatomical and physiology resemblance with intestinal round worms parasite of human beings. Because of easy availability, earthworms and ascariadiagalli worms are used as suitable models for screening of anthelmintic drugs. These in vitro screening are important as they give basis for further in vivo studies.

![Fig:2 showing anthelmintic activity of control, std and ethanolic extract *Terphrosia calophylla* against helmenthic](image)

Table 2: Anthelmintic activity of ethanolic extract of *Terphrosia calophylla*

<table>
<thead>
<tr>
<th>Groups</th>
<th>Treatment</th>
<th>Concentration (mg/ml)</th>
<th>Time taken for Paralysis (min)</th>
<th>Time taken For death (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Albendazole</td>
<td>15</td>
<td>20:25</td>
<td>55:56</td>
</tr>
<tr>
<td>3</td>
<td>Test Dose</td>
<td>25</td>
<td>24:20</td>
<td>60:45</td>
</tr>
<tr>
<td>4</td>
<td>Test Dose</td>
<td>50</td>
<td>18:02</td>
<td>43:05</td>
</tr>
<tr>
<td>5</td>
<td>Test Dose</td>
<td>100</td>
<td>14:30</td>
<td>28:51</td>
</tr>
</tbody>
</table>

3. RESULTS AND DISCUSSION
The roots of *Terphrosia calophylla* which belongs to the family Fabaceae have been investigated in a systematic way for extraction, qualitative phytochemical analysis (Table 1) and in-vitro anthelmintic activity (Fig 2 and Table 2). The powdered material of the plant (500gm) was subjected to solvent extraction in soxhlet apparatus by using solvent like ethanol and the % yield is 13.8% and dark brown colour powder.
Ethanolic extracts of *Tephrosia calophylla* roots were subjected for the preliminary phyto-chemical analysis and found the presence of alkaloids, glycosides, saponins, flavonoids, carbohydrates compounds and ethanol extract contains flavanoids. The above said activity shown by the *Tephrosia calophylla* roots may be due to the presence of secondary metabolites like flavanoids.

Anthelmintic activity was performed by using the ethanol extracts of *Tephrosia calophylla* roots. The various concentrations of the extracts and standard (Albendazole) were prepared in the order of 25, 50, and 100 mg/ml. The above said activity shown by the *Tephrosia calophylla* roots may be due to the presence of flavonoids.

4. CONCLUSION

From the literature review the root of *Tephrosia calophylla* (Fabaceae) was selected for the investigation of following parameters are preliminary phyto chemical screening and invitroanthelimitic activity. The results obtained in this study were proved that the efficacy of ethanolic extract *Tephrosia calophylla* 100mg/ml Showed significant anthelimitic activity and it is a dose dependent activity which may be due to the presence of flavanoids in it.

The future work may be extended with active principles of the plant extract(instead of using crude) to assess the précised and most effective dose of the drug as anti helminthic agent.

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REFERENCES


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