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Research Article

Ethnobotanical and Phytochemical Studies of *Tephrosia calophylla* Bedd.

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Abstract: The present study deals with the ethnobotanical studies and preliminary phytochemical screening of rare taxa *Tephrosia calophylla* collected from Talakona region of Chittoor District. This research was taken up based on the ethnobotanical claim and literature perusal. Results reported that drug powder prepared from whole plant is prescribed as medicine for different ailments and posses potent therapeutic phytochemicals.

Key words: *Tephrosia calophylla*, whole plant, Ethnobotanical drug, Talakona.

Introduction

Tephrosia calophylla Bedd. (Family: Fabaceae) is a rare, endangered, endemic undershrub, possessing rhizomatous roots with less population and is restricted in open hill top of Talakona, Chittoor district of Andhra Pradesh (Chetty *et al*., 2016; Parine *et al*., 2015; BSI 2011; Nayar and Sastry, 1997) (Figure A: 1&2). *Tephrosia calophylla* locally known as Dumpa vempali, Adivi vempali, Gadda vempali and Kommu vempali. Flowering and fruiting occurs between March-August. (Chetty *et al*., 2016). Perusal of literature (Nirmaladevi *et al*., 2017; Sindhu *et al*., 2017; Parine *et al*., 2015; Ramadevi 2014; Divya 2011; Ganapaty *et al*., 2009; Reddy *et al*., 2009; Subramanyam *et al*., 2009; Adinarayana *et al*., 2009 & 2011; HariKishore *et al*., 2003) revealed that phytochemical and biological investigation were done only with specific parts. Regarding ethnobotanical usage of *T.calophylla,* there are numerous reports prescribed only on particular part (Padmavathy *et al*., 2012; Anitha and Sudarsanam, 2013; Touqueer *et al*., 2013).

In this investigation, we intended to work on the crude drug which was prescribed and formulated by tribal physicians, village vaidyas and herbal healers.

Materials and methods

Plant material was collected from Talakona and authentication was done by Dr.K.Madhava chetty, Department of Botany, Sri Venkateswara University. Voucher specimens (SVUTY/FB-03093) were deposited in the Herbarium, Department of Botany, Sri Venka-teswara University, Tirupati.

Ethnobotanical studies

Ethnobotanical studies on some medicinal taxa was done during 2016 to 2019 at Talakona. Data on the usage of *Tephrosia calophylla* as potent ethnic medicine was documented by interviews.

Phytochemical analysis

Crude drug powder as reported in ethnobotanical studies was taken for the phytochemical investigation. Whole plant parts are taken into formulation in equal quantity of root, stem, leaf (1:1:1 ratio) and milled for powder. Shade dried powder then made into aqueous extract. This extract obtained were evaluated to determine the presence of alkaloids, flavonoids, phenols, saponins, terpenoids, ster-oids, tannins, anthraquinones according to standard methods (Harborne and Turner 1984; Kokate and Gokhale, 2006) and refered methodology by

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Mitta *et al*., (2014) and Maria *et al*., (2018). Any change of colours or the precipitate formation was observed as indicative of positive response to these tests.



Figure A: *Tephorosia calophylla*. **1.** Whole plant. **2**. Dried plant material and powdered crude mixture

Results and Discussion

Ethnobotanical claims of *Tephrosia calophylla*

- Whole plant is shade dried and made into fine powder. About one teaspoonful of the powder is taken along with honey on empty stomach once a day for 5 weeks to heal pectic ulcers, spleen, heart and blood disorders (Prescribed by Macha Erranna, herbal vendor, Nerabailu, near Talakona).
- Whole plant decoction (20-30 ml) is given once in a day at bed time for 20-15 days for gastrointestinal disorders and gastric ulcers (Formulated by Pedda Venkatappa, Irula tribal, Talakona).
- Whole plant (100 g) is made into paste with turmeric (15 g), 5 g paste is taken in the early morning an empty stomach daily for 10-30 days is useful as an anthelmintic, anti-pyretic, ale-xiteric and an anticancer agent at an early stages (Suggested by Boku Suranna, Irula tribal, Nerabailu, near Talakona).
- Root tuber is made into paste with water and prepared pills of peanut size. Four pills are taken twice a day for 1-2 weeks. It act as diretic, allays thrist, improves blood content, cures diarrhoea and is useful in bronchial asthma, inflammation, and act as an apptizer (Recommended by Pullachari,Yanadi healer, Mallemadugu, near Talakona).
- Root tuber + Leaf is shade dried and made into finepowder; 5 g powder is taken once a day for controlling diabetes (Adviced by Jambaiah, Yanadi herbal vendor, Bhakrapet, near Talakona).
- Root tuber (50 g) is made into paste with garlic (2 g) and pepper (2 g) with water. 5 g paste is taken orally twice a day for 5 days to cure jaundice (Claimed by Yengamma Goat's keeper, Talakona).
- Leaf juice (100 ml) is mixed with turmeric powder (3 g) and lime juice (10 ml) and 20 ml of this mixed juice is taken orally at bed time everyday once for one to two week, for treating as antiseptic and for anti-bacerial and anti-fungal diseases (Prescribed by Gadi Sambaiah, Irula herbal physician, Nerabailu, near Talakona).
- A poultice of leaves + fresh roots is used to heal boils, cuts, wounds, skin allergies (Penchalaiah, Wood cutter, near Talakona).
- Whole plant is crushed and boiled in coconut oil and used as an external application to Joint pains, paralysis, chronic rheumatism and swellings thrice a day. (Santhamma, Tribal physician, Talakona).

Phytochemical Analysis

The crude drug fine powder appears Brown and aromatic which is slightly bitter in taste. Preliminary phytochemical analysis of *Tephrosia calophylla* crude aqueous extract reported in Table 1.

Table 1. Preliminary phytochemical studies.

Name of the Phytoconstituent	*Tephrosia calophylla*
Alkaloids	++
Terpenoids	+
Steroids	++
Coumarins	+
Tannins	+
Saponins	-
Flavonoids	+
Quinones	+
Anthroquinones	+
Phenolic compounds	++
Proteins	++
Carbohydrates	+
Glycosides	++
Gums	+
Starch	+
Fixed oils and Fats	-
Phytosterol	-
Lipids	+
Lignins	++
Lignans	+
Anthocyanidins	++
Indoles	+
Reducing sugars	-
Amino acids	++

The qualitative results are expressed as (+) for the presence and (-) for the absence of phytochemicals.

Qualitative analysis of anthocyanidins showed Delphinidin, Petunidin, Malvidin. Flavo-noid compounds detected are Rutin, Myricetin, Quercetin, Luteolin, Apigenin, Orientin and Unidentified flavonoids are four and yet to be identified (04). Phenolic compounds detected are Protocatechnic acid, Chlorogenic acid, homo Protocatechuic acid, Gentisic acid, cis-p-Coumaric acid, trans-p-Coumaric acid, p-Hydroxybenzoic acid, Phloretic acid, Aesculetin, cis-Sinapic acid, trans-Sinapic acid, Vanillic acid, Syringic acid, Salicylic acid, Cinnamic acid. Lipids detected are Phosphatidic acid, Phosphatidyl serine, Phosphatidyl inositol, Phosphatidyl choline, Phosphatidyl ethan-olamine, Digalactosyl diglyceride, Phosphatidyl glycerol, Sulphoquinovosyl diglyceride, Dipho-sphatidyl glycerol, Steryl glucoside and Steryl glycoside.

Summary and conclusions

This research aims the evaluation of herbal formulation with *Tephrosia calophylla* employed in folklore medicine prescribed normally in certain region of Talakona of Andhra pradesh. In our ethnobotanical research it was claimed that *T.calophylla* whole plant is prescribed as a drug in different dosages is prescribed for Anti-cancer, gastrointestinal disorders, anthelmintic, anti-pyretic, alexiteric, leprosy, ulcers and used as alternative cure for diseases of the liver, spleen, heart and blood. Root tuber is prescribed for Diuretic, thrist, enriches blood, cure diarrhoea, bronchitis, inflammation, boils, pimples, diabetes and jaundice. Leaf is used for antiseptic, antibacterial, antifungal and anti-inflammatory agent. This research reveals that whole plant drug formulation of *Tephrosia calophylla* prescribed by different ethnic healer's posses proved medicated phytoconstitues.

Further research should be carried out with different solvents and on different microbes and animal models to prove this claim as potent medicine. We have also observed the decline in population of *Tephrosia calophylla* which should be conserved. Overhelmed collection by ethnic healers, exploitation for medicinal research, habitat loss are the main reasons for deprive of population.

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References

1. Adinarayana K, Jayaveera KN, Madhu Katyayani B, Mallikarjuna Rao P. Growth inhibition and induction of apoptosis in estrogen receptor positive and negative human breast carcinoma cells by *Tephrosia calophylla* roots. Pharma.Chem. 2009. 3: 35–41.

2. Adinarayana K, Jayaveera KN, Rao PM, Chetty CM, Sandeep DK, Swetha C, Saleem TM. Acute toxicity and hepatoprotective effect of methanolic extract of *Tephrosia calophylla.* J.Med. plants res. 2011. 5: 266-273.

3. Anitha G. and Sudarsanam G. Studies on antimicrobial activity on *Tephrosia calophylla* against *Xanthomonas citri* and *Salmonella typhimurium*. Int. J. app. Biol. and Pharma. Tech. 2013. 4(1): 339-342.

4. BSI (Botanical survey of India). Threatened Plants of India. 2011. www.bsienvis.nic.in

5. Chetty KM, Sivaji K, Tulasi Rao K. Flowering Plants of Chittoor District-Andhra Pradesh, Students Offset Printers, Tirupati. 2016. pp.102.

6. Divya S, Haritha V, Prasad KVSRG. Evaluation of *Tephrosia calophylla* for antiulcer activity in experimental rats. Pharmacologyonline. 2011. 3: 573-585.

7. Gamble JS. Flora of the Presidency of Madras, 1957.318 (224).

8. Ganapaty S, Srilakshmi GVK, Pannakal ST, Rahman H, Laatsch H, Brun R. Cytotoxic benzyl and coumestan derivatives from *Tephrosia calophylla*. Phytochem. 2009. 70: 95-99.

9. HariKishore P, VijayaBhaskar Reddy M, Gunasekar D, Marthanda Murthy M, Caux C, Bodo B. A new coumestan from *Tephrosia calophylla*. Chem. Pharmacol.bull. 2003. 51: 194-196.

10. Harborne JB. and Turner BL. Plant chemosystematics. Acamedic Press, London, Sanscisco and New York. 1984.

11. Kokate CK and Gokhle SB. Practical Pharma-cognosy. 10th edition. Nirali Prakashan, Pune-2. 2006.

12. María R, Shirley M, Xavier C, Jaime S, David V, Rosa S, Jodie D. Preliminary phytochemical screening, total phenolic content and antibacterial activity of thirteen native species from Guayas province Ecuador. J King Saud Univ. – Science. 2018. 30: 500–505

13. Mitta MN, Rao MS, Ramesh L and Chetty KM. Phyto-Chemical Evaluation and Anti-oxidant potentiality of *Cycas beddomei* Dyer Male cone aqueous Extract. Int. J. Drug Dev. & Res. (2014). 6 (2): 220-227.

14. Nayar and Satry. Red data book plants of India. Bot.Surv.India. 1997. 1987-1988.

15. NirmalaDevi B, Swarnalatha D, Gopinath C, Adhinarayana K. Anthelmintic activity of *Tephrosia calophylla*. J.pharm. Res. 2017. 11(1): 35-38.

16. Padmavathy C, Padmavathi PL and Rajendrudu G. Effect of different plant growth regulators on multiple shoot induction in *Tephrosia calophylla* Bedd., a rare medicinally important plant. Curr. Biotica. 2012. 6(1): 93-97.

17. Parine NR, Lakshmi P, Kumar D, Shaik JP, Alanazi M, Patan AAK. Development and charecterization of Nine Polymorphic microsatellite markers for *Tephrosia calophylla* Bedd. (Fabaceae). 2015. 22:164-167.

18. Ramadevi D. Antimicrobial activity of *Tephrosia callophylla* roots. World J Pharm and pharma sci. 2014. 3(7): 633-637.

19. Reddy RV, Khalivulla SI, Reddy BA, Reddy MV, Gunasekar D, Deville A, Bodo B. Flavonoids from *Tephrosia calophylla*. Nat. prod. comm. 2009. 4: 59-62

20. Sindhu G, Usha Kiran Reddy T, Chandini R, Veera Swamy A, Rajeswari P, Sumiya N, Keerthi G, Girish C. A Review on the Pharmacological Profile of *Tephrosia calophylla,* Indo Am.J.P.Sci. 2017. 4(05): 1361-1365

21. Subramanyam R, Gollapudi A, Bonigala P, Chinnaboina M, Amooru DG. J. Phytochem. Phytobiol. Biology. 2009. 94(1): 8-12.

22. TouqeerS, Saeed MA and Ajaib M. A review on the phytochemistry and pharmacology of genus *Tephrosia.* Phytopharmacol. 2013. 4(3): 598-637.

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