

RESEARCH NOTE

Preliminary Phytochemical Screening of Some *Tephrosia* spp. (Family Fabaceae) in Sri Lanka

A. I. S. Priyadarshan¹, S. P. Senanayake^{1*}, M. P. Jayatilleke² and S. Rajapakse³

¹Department of Botany, University of Kelaniya, Sri Lanka.

²Department of Science, Technology and Engineering, Western College of Idaho, USA.

³Department of Molecular Biology & Biotechnology, University of Peradeniya, Sri Lanka.

Accepted November 02, 2015

ABSTRACT

Tephrosia is a genus of medicinally important perennial shrubs or herbs distributed in warm temperate and tropical regions, and belongs to Family Fabaceae. To study the phenetic and phytochemical variations of six *Tephrosia* species (*T. purpurea*, *T. villosa*, *T. noctiflora*, *T. tinctoria*, *T. maxima* and *T. pumila*), sixteen floral and vegetative characters of *Tephrosia* spp. were examined. Air dried leaves were subjected to sequential solvent extractions using solvents with different polarities such as hexane, chloroform and methanol. These extracts were subjected to preliminary phytochemical screening tests to detect the occurrence of carbohydrates, protein and amino acids, glycosides, alkaloids, saponins, flavonoids, tannins, phenolics, and phytosteroids. Further isolations and purifications are needed to elucidate the chemical constituents to assess the efficacy.

Keywords: floral and vegetative characters, phytochemicals.

INTRODUCTION

Tephrosia is a genus that belongs to family Fabaceae, subfamily Faboideae, tribe Millettieae and consists of about 300-400 species distributed in warm temperate and tropical areas. The genus is represented in Sri Lanka with 10 species (*T. purpurea*, *T. villosa*, *T. tinctoria*, *T. noctiflora*, *T. pumila*, *T. maxima*, *T. candida*, *T. vogelii*, *T. senticosa* and *T. spinosa*) and they are distributed throughout Sri Lanka. The genus is with perennial herbs or shrubs; stems erect; leaves imparipinnate, 3 to many foliate, stipulate; racemose inflorescence, axillary, few to many flowered, calyx 5, petals, white to purple or reddish, stamens free; fruit sessile, linear to oblong, 1 to many seeded (Dasanayake and Fosberg, 1991).

Several *Tephrosia* species are used extensively in traditional therapeutic systems in Sri Lanka as well as in some other countries. *Tephrosia purpurea* is a perennial herb that grows up to a height of about 30-60 cm and it is more common in both wet and dry zones of Sri Lanka. This plant is widely exploited as a medicinal plant in the Ayurvedic therapeutic systems and it is used for healing any type of wounds and also very effective in the treatment of inflammation and enlargement of spleen and liver (Abayasekara *et al.*, 2009). Whole plant of *T. purpurea* and *T. villosa* are commonly used in disorders in liver, spleen and kidney and also as an anthelmintic in children in Sri Lanka, India, Vietnam, Nigeria and West Africa. Antibiotic

substance in the roots of *T. purpurea* indicated the possibility of using water and alcoholic extracts in preparation of decoctions for skin infections, dyspepsia, chronic diarrhoea (Rangama *et al.*, 2007). *Tephrosia purpurea* has been shown to possess significant activity against hepatotoxicity, pharmacological and physiological disorders and inhibits benzoyl peroxide-mediated cutaneous oxidative stress and toxicity. The animals pre-treated with *T. purpurea* have shown a decrease in both tumor incidence and tumor yield (Saleem *et al.*, 2001). Antioxidant and antidiabetic activity of the different parts plant such as leaf, stem and root of *T. tinctoria* extracted with various solvents from nonpolar to polar basis (hexane, chloroform, ethyl acetate and ethanol). *Tephrosia* genus is richness in prenylated flavonoids and possesses insect repellent, larvicidal, pesticidal, antimicrobial and anticancer properties (Rajaram and Kumar, 2011).

Due to the increasing popularity of using *Tephrosia* spp. as an ingredient in traditional therapeutic systems, phenotypic characterization and phytochemical screening of different species is a timely requirement. The results of the preliminary questionnaire survey indicated the use of different *Tephrosia* spp. as substitutes to *T. purpurea*. Therefore the main aim of the present study was to infer the interspecific relationships of *Tephrosia* spp. using phenetic and phytochemical variations in order to determine the degree of efficacy in various *Tephrosia* spp. as ingredients in preparation of traditional medicines.

*Corresponding author's email: priyangi.senanayake@kln.ac.lk

CONCLUSION

Interspecific phenetic relationships of *Tephrosia* spp. in Sri Lanka are clearly identified by the cluster analysis of phenetic characters. Multi-access key constructed using DELTA package in this study have provided useful information for accurate identification and authentication of the species for future diagnostic purposes. Preliminary phytochemical screening of the different *Tephrosia* spp. indicated a close relationship in species level and further isolations and purifications are needed to elucidate the chemical constituents and to assess the efficacy. These findings would lead to the effective use of different *Tephrosia* spp. in preparation of traditional therapeutic systems for various ailments.

ACKNOWLEDGEMENTS

We acknowledge the financial assistance provided by the National Science Foundation, Sri Lanka (Research grant: NSF RG/2011/NRB/06).

REFERENCES

- Abayasekara, C.L., Panagoda, G.J., Rangama, B.N.L.D. and Senanayake, M.R.D.M. (2009). Antimicrobial activity of *Tephrosia purpurea* (Linn.) Pers. and *Mimusops elengi* (Linn.) against some clinical bacterial isolates. *Journal of National Science Foundation, Sri Lanka* **37**(2): 139-145.
- Dasanayake, M.D. and Fosberg, F.R. (1991). *A Revised Handbook to the Flora of Ceylon*, Vol. VII, pp. 144-157.
- Gurib-Fakim, A. (2006) Medicinal plants: Traditions of yesterday and drugs of tomorrow. *Molecular Aspects of Medicine* **27**(1): 1-93.
- Rajan, M., Kumar, V.K., Kumar, P.S., Venkatachalam, T. and Anbarasan, V. (2011). Pharmacognostical and Phytochemical Studies of the Leaves of *Albizia odoratissima* (L.F) Benth, *International Journal of Pharmacognosy and Phytochemical Research* **3**(3): 47-55.
- Rajaram, K. and Kumar, S.P. (2011). In-vitro antioxidant and antidiabetic activity of *Tephrosia tinctoria* PERS.: an endemic medicinal plant of South India, *Journal of Pharmacy Research* **4**(3): 891-893.
- Saleem, M., Ahmed, S., Alam, A. and Sultana, S. (2001). *Tephrosia purpurea* alleviates phorbol ester-induced tumor promotion response in murine skin. *Pharmacological Research* **43**(2): 135-44.
- Oshie, O.A., Neji, P.A., Etim, E.E. and Ensor, G.E. (2013). Phytochemical screening and antimicrobial activities of *Phyllanthus amarus* stem bark extracts. *International Journal of Modern Biology and Medicine* **3**(3): 101-112.