



Phytochemical Estimation of *Tephrosia purpurea* Seed Extract

Muddasir Basheer, Seema Rai, Hindole Ghosh and Younis Ahmad Hajam

Department of Zoology,

Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur (Chhattisgarh), India.

(Corresponding author: Seema Rai)

(Received 12 November, 2017 accepted 15 December, 2017)

(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: India is very rich in medicinal plant diversity, but little information is known about their chemical nature and medicinal values. The extraction of plant components is essential to isolate bioactive compounds which are aimed to understand their role in the treatment of a number of diseases. The present study was designed to explore the preliminary phytochemical analysis of seed extract of *Tephrosia purpurea*. Preliminary phytochemical analysis for alkaloids, glycosides, flavonoids, phenols, saponins, proteins, carbohydrates tannins and terpenes were made by following the standard procedures. Qualitative evaluation confirmed the presence of various biochemical constituents. The presence of various bioactive compounds depicts that that this plant may be used for treating a number of diseases including polycystic ovary syndrome.

Keywords: Phytochemicals, bioactive compounds, alkaloids, flavonoids, *Tephrosia purpurea*

I. INTRODUCTION

India is very rich in biodiversity especially in medicinal plants. The state of Chhattisgarh is known to have a rich wealth of medicinal plants but most of them have remained unexplored. Plants are known to possess a multitude of bioactive compounds which may be helpful in the remedy of various diseases including PCOS. *Tephrosia purpurea* (TP) is one of those plants. It is a highly branched, sub-erect, herbaceous perennial herb. It is a perennial herb which occurs throughout the India [1]. It is commonly known as ‘Sharapunkha’ which means that it has the property of healing all types of wounds [2]. It grows on hard and stony grounds [3]. These plants have wide range of therapeutic activity. *Tephrosia purpurea* is a species of flowering plant in the family, Fabaceae, which grow in poor soils. It has about four hundred species distributed throughout the world [4] among which twenty four species were recorded in India [5]. This plant is one of the excellent gifts by the nature for human beings as it is composed of all such elements which fall under essential constituents that are required for normal and good health of human beings. It offers many important components of some preparations such as Tephroli and Yakrifit which are used for various liver disorders [6]. In Ayurvedic system of medicine, various parts of this plant are used as remedy for impotency, asthma, gonorrhoea, rheumatism, diarrhoea, ulcer and urinary disorders. *Tephrosia purpurea* is well documented for its immunoprotective, hepatoprotective and cell membrane integrity enhancing effect in various models

of animals [7,8]. *Tephrosia purpurea* has played an key role in the traditional medicine. Literature survey till date recommends *Tephrosia purpurea* as a valuable herbal therapy because of its antioxidant [9], antibacterial [10], anti-inflammatory [11], hepatoprotective [12], anti-diabetic activity [13], antibiotic [14], wound healing [15] properties.

Traditional medicines of herbal origin are the naturally occurring substances with a minimum or no processing and have been used to treat various illnesses. These herbal medicines are getting significant attention in global health debates. Traditional medicine has established promotive, preventive, curative and rehabilitative role [16,17]. Therefore, present study was carried out for qualitative phytochemical estimation of seed extract of *Tephrosia purpurea*.

II. MATERIALS AND METHODS

A. Chemicals

All the chemicals used during the study were of analytical grade and procured from Himedia Laboratories Ltd. Mumbai, India and SRL Pvt. Limited Mumbai.

B. Plant Material collection and identification

Tephrosia purpurea was collected from the premises of Guru Ghasidas Vishwavidyalaya, Koni, Bilaspur, Chhattisgarh, India. The plant material was authenticated by the taxonomist from Department of Botany, Guru Ghasidas Vishwavidyalaya, Bilaspur.

C. Extract Preparation of *Tephrosia purpurea*

The seeds were separated from the pods and were air dried. They were crushed and the ethanolic extract was prepared by using Accelerated solvent extraction unit (DIONEX). The extract was concentrated under reduced pressure using a rotary evaporator (Concentrator plus) and was kept under refrigeration (4°C) till further use.

D. Phytochemical estimation

The presence of various phytoconstituents such as alkaloids, flavonoids, phenols, steroids, tannins, terpenoids, saponins, carbohydrates and protein/amino acids in the alcoholic seed extract of study plant was carried out standard procedures [18-20].

III. RESULTS AND DISCUSSION

Phytochemical screening of the extract showed the presence of various bioactive compounds. The bioactive compounds present have a number of roles like antioxidative, chemoprotective, antimutagenic, anti-inflammatory and thus helping in the normal functioning of metabolism (Table 1). These secondary metabolites contribute significantly towards the

biological activities of medicinal plants such as hypoglycemic, antidiabetic, antioxidant, antimicrobial, anti-inflammatory, anticarcinogenic, antimalarial, anticholinergic, antileprosy activities etc [21]. Bioactive components possess well defined roles which protect living organisms against a number of pathogenic agents and environmental stressors. The flavonoids present in the plants possess antiallergic, anti-inflammatory properties. Tannins have some amazing and important properties. They are known to hasten the healing of wounds and inflamed mucous membranes. Flavonoids are also present in selected medicinal plant as a potent water-soluble antioxidant and free radical scavenger, which prevents cell damage and also have strong anticancer activity [22,23]. Efforts need to be taken to explore the pharmacological applications of this plant against a number of diseases like polycystic ovary syndrome (PCOS). In conclusion our findings showed that the alcoholic seed extract of *Tephrosia purpurea* contains various bioactive compounds. The presence of various bioactive compounds depicts its protective role against various stressors which are responsible for a number of diseases.

Table 1: Qualitative photochemical estimation of *Tephrosia purpurea* seed extract.

Parameter	Test	Reaction product	Result
Flavonoid	Lead acetate test	Yellow precipitate	Present
	Schimado's test	Red colour	
	NH ₃ test	Yellow colour	
Tannin	Gelatin test	White precipitate	Present
	FeCl ₃ test	Brownish green/black colour	
	Salkowski Test	Red Colour	
Phytosterols	Liebermann-Burchard test	Brown ring formation at junction	Present
Alkaloid	Wagner's test	Brownish/Reddish colour precipitate	Present
	Hager's test	Yellow precipitate	
Saponin	Froth test	froth formation	Present
	Foam test	Foam persists for 10 minutes	
Protein	Ninhydrin test	Blue solution	Present
Carbohydrate	Fehling's test	Red colour precipitate	Present
	Benedict's test	Orange red Precipitate	
Glycosides	Borntrager's Test	Pinkish red colour of the ammonia layer	Present
Terpenes	Chloroform test	Reddish brown interface	Present
Phenol	Ferric Chloride test	Bluish black colour	Present

ACKNOWLEDGEMENTS

The financial support of DBT BUILDER, Department of Biotechnology, Ministry of Science and Technology [grant number-BT/PR-7020/INF22/172-2012] is highly acknowledged. Authors are highly grateful to Department of Zoology, Guru Ghasidas Vishwavidyalaya for providing the research facilities.

Authors also acknowledge Department of Rural Technology and Social Development, Guru Ghasidas Vishwavidyalaya for the Accelerated Solvent extraction unit facility.

CONFLICTS OF INTEREST

Authors declare that they have no conflicts of interest.

REFERENCES

- [1]. Chopra, R.N., Nayar, S.L., Chopra, I.C. (1956). Glossary of Indian medicinal plants, *Indian Council of Scientific and Industrial Research, New Delhi, India*.
- [2]. Hegazy, M. E. F., El-Razek, M. H. A., Nagashima, F., Asakawa, Y., & Paré, P. W. (2009). Rare prenylated flavonoids from *Tephrosia purpurea*. *Phytochemistry*, **70**: 1474-1477.
- [3]. Khare, C. P. (2007). *Indian Medicinal Plants*, Springer-Verlag, Berlin, Heidelberg pp. 650.
- [4]. Gillet, J.B., Polhill, R.M., Verdcourt, B. (1971). Flora of tropical East Africa. *The Government Printers, Nairobi*, pp. 501.
- [5]. Saldanha, C.J., Singh, B.G., Leguminosae. In: Saldanha, C.J., (Ed.), In: Flora of Karnataka, Vol. I. *Oxford and IBH*, pp. 495-499, 1984.
- [6]. Koca, U., Süntar, I. P., Keles, H., Yesilada, E., & Akkol, E. K. (2009). In vivo anti-inflammatory and wound healing activities of *Centaurea iberica* Trev. ex Spreng. *Journal of Ethnopharmacology*, **126**: 551-556.
- [7]. Murthy, M.S.R., Srinivasan, M. (1993). Hepatoprotective effect of *Tephrosia purpurea* in experimental animals. *Indian Journal of Pharmacology*, **25**: 34-36.
- [8]. Gokhale, A. B., Dikshit, V. J., Damre, A. S., Kulkarni, K. R., & Saraf, M. N. (2000). Influence of ethanolic extract of *Tephrosia purpurea* Linn. on mast cells and erythrocytes membrane integrity. *Indian Journal of Experimental Biology*, **38**: 837-840.
- [9]. Patil, P. V., Huger, S., Nanjappaiah, H. M., Kalyane, N., & Chowdhry, M. (2011). Phytopharmacology of *Tephrosia purpurea* Linn: An Overview. *Pharmacology online* **3**: 1112-40.
- [10]. Gupta, M., Mazumder, U. K., Gomathi, P., & Selvan, V. T. (2008). Antimicrobial activity of methanol extracts of *Plumeria acuminata* Ait. leaves and *Tephrosia purpurea* (Linn.) Pers. Roots. *Natural Product Radiance*, **7**: 102-105.
- [11]. Shenoy, S., Shwetha, K., Prabhu, K., Maradi, R., Bairy, K. L., & Shanbhag, T. (2010). Evaluation of antiinflammatory activity of *Tephrosia purpurea* in rats. *Asian Pacific Journal of Tropical Medicine*, **3**: 193-195.
- [12]. Khatri, A., Garg, A., & Agrawal, S.S. (2009). Evaluation of hepatoprotective activity of aerial parts of *Tephrosia purpurea* L. and stem bark of *Tecomella undulata*. *Journal of Ethnopharmacology*, **122**: 1-5.
- [13]. Pavana, P., Sethupathy, S., & Manoharan, S. (2007). Antihyperglycemic and antilipidperoxidative effects of *Tephrosia purpurea* seed extract in streptozotocin induced diabetic rats. *Indian journal of clinical biochemistry*, **22**: 77.
- [14]. Quave, C. L., Plano, L.R., Pantuso, T., & Bennett, B. C. (2008). Effects of extracts from Italian medicinal plants on planktonic growth, biofilm formation and adherence of methicillin-resistant *Staphylococcus aureus*. *Journal of Ethnopharmacology*, **118**: 418-428.
- [15]. Lodhi, S., Pawar, R. S., Jain, A. P., & Singhai, A. K. (2006). Wound healing potential of *Tephrosia purpurea* (Linn.) Pers. in rats. *Journal of Ethnopharmacology*, **108**: 204-210.
- [16]. Miller, L.G. (1998). Herbal medications, nutraceuticals, and diabetes. In: Miller LG, Murray WJ, editors. *Herbal Medicinal, A Clinician's Guide*. Binghamton, NY: *Pharmaceutical Products Press, Imprint of the Haworth Press, Inc* pp. 115-33.
- [17]. Tilburt, J. C., & Kaptchuk, T. J. (2008). Herbal medicine research and global health: an ethical analysis. *Bulletin of the World Health Organization*, **86**(8): 594-599.
- [18]. Evans, W.C. (2002). *Trease and Evans Pharmacognosy*. Elsevier, pp. 145.
- [19]. Harborne, J.B. (1984). *Phytochemical Methods*. Springer, Chapman and Hall, New York, London, pp. 288.
- [20]. Wagner, H.; Baldt, S.; Zgainski, E.M. *Plant Drug Analysis*. Springer Verlag, Berlin/New York, 1984.
- [21]. Negi, J.S., Singh, P., & Rawat, B. (2011). Chemical constituents and biological importance of *Swertia*: a review. *Current Research in Chemistry*, **3**: 1-15.
- [22]. Benavente-García, O., Castillo, J., Marin, F. R., Ortuño, A., & Del Río, J. A. (1997). Uses and properties of citrus flavonoids. *Journal of Agricultural and Food Chemistry*, **45**: 4505-4515.
- [23]. Salah, N., Miller, N. J., Paganga, G., Tijburg, L., Bolwell, G.P., & Riceevans, C. (1995). Polyphenolic flavanols as scavengers of aqueous phase radicals and as chain-breaking antioxidants. *Archives of Biochemistry and Biophysics*, **322**: 339-346.