

# International Journal of Pharmacognosy and Pharmaceutical Sciences



ISSN Print: 2706-7009  
ISSN Online: 2706-7017  
IJPPS 2024; 6(1): 35-38  
[www.pharmacognosyjournal.net](http://www.pharmacognosyjournal.net)  
Received: 06-01-2024  
Accepted: 08-02-2024

**Shyam W Dafare**  
Department of Chemistry, J.  
M. Patel College, Bhandara,  
Maharashtra, India

**Jagannath V Gadpayale**  
Department of Botany, S. N.  
Mor College of Arts, Comm.  
and Smt. G. D. Saraf Science  
College, Tumsar, Maharashtra,  
India

## Preliminary phytochemical investigation in seeds of *Tephrosia villosa* (L.) Pers., plant specimen from Fabaceae family

**Shyam W Dafare and Jagannath V Gadpayale**

DOI: <https://dx.doi.org/10.33545/27067009.2024.v6.i1a.136>

### Abstract

The present research paper represents the preliminary phytochemical screening of the crude extract of Seeds of *Tephrosia villosa* (L.) Pers. plant belongs to the Fabaceae Family exposed to find out the presence of various bioactive components. The specimen shows the occurrence of Alkaloids, Glycosides, Flavonoids, Phytosterols, and Carbohydrate while Phenolic compounds, Tannins, Saponins, Proteins and Free Amino Acids and Gums & mucilage in trace amount. The diversity of phytochemicals found suggests that the studied plant specimen could serve as a source of useful drugs for future.

**Keywords:** *Tephrosia villosa* phytochemical, alkaloid, flavonoids, phytosterols, tannin

### Introduction

*Tephrosia villosa* (L.) Pers traditionally known as “Sharpunkha” of genus *Tephrosia* Pers, which is a large seasonal pantropic genus of about 400 species belongs to family Fabaceae (Paul *et al* 1088) <sup>[1]</sup>. Traditionally *Tephrosia villosa* has been found to be used in different parts of the world. Ethnobotanical studies reveals that root powder and paste has been used for stomach ache, fever and in typhoid (Behra *et al* 2006) <sup>[2]</sup>, used for various skin disorders in Karnataka (Prashantha *et al* 2008) <sup>[3]</sup>, used for dental pain in Tamilnadu (Sathiyaraju *et al* 2015) <sup>[4]</sup>, used for the treatment of dropsy and enlargement of viscera (Pandey *et al* 2017) <sup>[5]</sup>. In Ethiopia it is used for respiratory tract disorders (Giday *et al* 2009) <sup>[6]</sup>, literature survey reveals that *Tephrosia villosa* has been found to possess anti-microbial property (Ganapathy *et al* 2008) <sup>[7]</sup>, anti-diabetic (Patel *et al* 2012) <sup>[8]</sup>, anthelmintic property (Odhong *et al* 2014) <sup>[9]</sup>, anti-oxidant (Mani *et al* 2005) <sup>[11]</sup>, used as potential bio-insecticide (Bobbrala *et al* 2012) <sup>[12]</sup>, and green corrosion inhibitor. Considering the medicinal importance of this widely available plant, the present study was aimed to identify the qualitative and quantitative estimation of phytoconstituents present in alcoholic extract of the seeds of this plant specimen.

The genus *Tephrosia* is of high therapeutic importance with reference to its investigated pharmacological activities such as hepatoprotective, anti-diabetic, anti-oxidant, anti-cancer, anti-hyperlipidemic, antiulcer, antibacterial, anti-fungal, larvicidal, anti-inflammatory, wound healing and anti-feedant activities of few species. Among all the phytoconstituents, flavonoids were the major constituent isolated from most of the species (Satya Obbalareddy *et al* 2022) <sup>[10]</sup>. The preliminary phytochemical analysis is done from root, stem and leaves of the studied plant specimen but there is no any information about the seed Phytochemistry of *Tephrosia villosa* (L.) Pers., hence the present work is conducted and findings are communicated in this communication.

### Materials and Methods

**Sample Collection:** Whole plant parts of *Tephrosia villosa* (L.) Pers., were collected in a separate sterile polythene bags from the Tumsar town (Bhandara district Maharashtra state, India Collected by J. V. Gadpayale), Collected plant parts were examined and identified with the help of regional floras and Taxonomic experts.

**Corresponding Author:**  
**Jagannath V Gadpayale**  
Department of Botany, S. N.  
Mor College of Arts, Comm.  
and Smt. G. D. Saraf Science  
College, Tumsar, Maharashtra,  
India

**Morphological description *Tephrosia villosa* (L.) PERS**

*Tephrosia villosa* (L.) Pers. Syn. Pl. 2: 329. 1807; Baker in Hook. f. Fl. Brit. India 2: 113. 1876; Cooke, Fl. Pres. Bombay 1:347. 1958 (Repr. ed.); Bossman & de Hass in Blumea 28:476. 1983; Sanj. Legumes of India 260. 1991. *Cracca villosa* L. Sp. Pl. 752. 1753. *Tephrosia villosa* var. *incana* (Roxb.) Baker in Hook. f. op. cit.

Annual or briefly perennial bushy herb 0.3-1.3 m tall; stems tomentose. Leaf-rachis up to 10 cm long, including a petiole of up to 10 mm., prolonged up to 7 mm beyond the lateral leaflets; stipules narrowly triangular, up to 8 mm long; leaflets 11-15, cuneate-oblong or elliptic, up to 35 x 12 mm., densely appressed villous beneath, more sparsely so above; main nerves about 9 on each side. Flowers purple in moderately dense terminal pseudo racemes and often also in upper leaf-axils; bracts narrowly triangular; pedicels densely tomentose, 2-4 mm long. Calyx densely tomentose, the hairs 1 mm or more long; tube up to  $\pm 2$  mm long; lobes long-

acuminate, the lowest up to 8 mm or more long, upper pair up to  $\pm 7$  mm long, united for up to  $\pm 2$  mm. Standard densely fulvous tomentose outside, up to 11-15 mm long, including a claw of  $\pm 2$  mm., up to 9-10 mm wide; keel glabrous. Upper filament lightly attached, widened but not callous a little above the base; filament-sheath up to  $\pm 6$  mm, free parts up to 2-2.5 mm., anthers 0.5 mm long. Style glabrous, tapering, twisted, bent sharply upward at base, penicillate, up to 3-5 mm long. Pod strongly curved usually becoming deflexed so that the base is often parallel with the stem, bent sharply up near the tip, up to 5.4 cm long and up to 5-6 mm wide, densely silvery or fulvous tomentose, the hairs often up to 2 mm long. Seeds 6-12, muricate, longitudinal, oblong,  $\pm 4 \times 2.5$  mm., distance between their centres under 5 mm.; hilum central, aril small and strap-shaped or none.

**Flowering and Fruiting:** August-September



**Fig 1:** Plate of *Tephrosia villosa* (L.) Pers: - A- Habitat, B- Flowering twig, C- Fruits (Pods/Legumes), D- Seeds.

**Preparation of Solvent Extracts**

The cleaned, healthy plant materials are cut in to small sections and dried under shade for three to four weeks. The dried material was ground into fine powder in an electric

grinder. Powder so obtained was stored in desiccator's setup and used for extraction. It was extracted in soxhlet apparatus using various solvents according to their polarity. Petroleum ether extract, Chloroform extract, Acetone extract, Ethanolic extract, Aqueous extract.

**Phytochemical Evaluation:** The extracts were subjected to find the occurrence of preliminary phytoconstituents present in it following the standard procedures described in the practical Pharmacognosy by C.K. Kokate (1999) [14] and R. K. Khandelwal (2004) [15].

#### Preliminary phytochemical screening is done as follows

- 1. Detection of carbohydrates:** The extract is dissolved in 5mL distilled water and filtered. The filtrates are used to test for the presence of carbohydrates. Molisch's test: 1mL of filtrate solution is treated with 2 drops of alcoholic alpha - naphthol solution in a test tube. 2mL of concentrated sulfuric acid is added on the side of the test tube. Formation of the violet coloured ring at the junction indicates the presence of carbohydrates.
- 2. Detection of proteins and amino acids Ninhydrin test:** To the extract, 0.25% w/v ninhydrin reagent is added and boiled for few minutes. Formation of blue-violet color indicates the presence of amino acids or protein.
- 3. Detection of alkaloids:** The crude extract powder is dissolved in 2N Hydrochloric acid and filtered. The filtrate is divided into four portions to achieve the following tests.
- 4. Dragendroff's test:** One filtrate portion is treated with Dragendroff's reagent (solution of potassium bismuth iodide). Formation of red precipitate indicates the presence of alkaloids.

#### Detection of flavonoids

- Alkaline reagent test:** Extract sample is treated with a few drops of sodium hydroxide solution. Formation of intense yellow colour, which becomes colourless on addition of dilute acid, indicates the presence of flavonoids.
- Shinoda's test:** The alcoholic extract is treated with magnesium turning and concentrated HCl gives red

colour which indicates the presence of flavonones. Orange-red color indicates the presence of flavonols.

#### Detection of tannins

**Gelatin test:** To the extract, 1% gelatin solution containing NaCl is added. Formation of white precipitate indicates the presence of tannins.

#### Detection of diterpenes

**Copper acetate test:** Extracts is dissolved in water and treated with a few drops of copper acetate solution, Formation emerald green color indicates the presence of diterpenes.

#### Detection of steroids and tri-terpenoids

**Liebermann-Burchard test:** The extract sample is dissolved in 2mL of chloroform in a dry test tube. 10 drops of acetic anhydride and 2 drops of concentrated sulphuric acid are then added. If the solution becomes red, then blue and finally bluish green in color, it indicates the presence of steroidal nucleus while formation of purple or red color indicates the presence of tri-terpenoids.

#### Detection of Saponins

**Froth test:** Crude dry powder of extract is vigorously shaken with 2mL of distilled water and is allowed to stand for 10 min. If stable froth appears, it indicates the presence of Saponins.

#### Detection of cardiac glycoside

**Keller-Kiliani's test:** A portion of dry extract is treated with 1mL of FeCl<sub>3</sub> reagent (1 volume of 5% FeCl<sub>3</sub> and 99 volume of glacial acetic acid). To this solution a few drops of concentrated H<sub>2</sub>SO<sub>4</sub> is added. The presence of greenish blue color within few minutes indicates the presence of deoxy sugar of cardiac glycosides.

The following results are found in Table 1, after the evaluation of extracts:-

**Table 1:** Preliminary Phytochemical Screening of *Tephrosia villosa* (L.) Pers.

Sr. no	Phytoconstituents	Petroleum Ether extract	Chloroform extract	Acetone extract	Ethanolic extract	Aqueous extract
1	Alkaloids	++	+	+	++	+
2	Carbohydrates	-	+	+	+	+
3	Glycosides	++	+	-	+++	+
4	Flavonoids	++	+	-	+++	++
5	Phytosterols	-	+	-	++	-
6	Fixed oils and Fats	+	-	-	-	+
7	Saponins	-	-	-	+	+
8	Phenolic compounds and Tannins	+	+	+	+	+
9	Lignins	+	+	+	-	+
10	Proteins and Free Amino Acids	+	+	-	-	-
11	Gums and Mucilage	+	-	-	+	+

#### Results

All the seed extracts of *Tephrosia villosa* (L.) Pers., in different solvents was subjected to preliminary phytochemical investigation. More number of phytoconstituents like alkaloids, Glycosides, flavonoids, Phytosterols was found to be present in Ethanolic extract while Saponins, Proteins and Free Amino Acids and Gums and mucilage in trace amount in rest of the extracts.

#### Conclusion

Phytochemicals found present in seed extracts of *Tephrosia villosa* (L.) Pers. indicates their potential for preparation of novel medicines due to the occurrence of phytoconstituents. Furthermore, isolation purification and characterization of the phytochemicals found present will make interesting studies.

**References**

1. Paul SR, Gupta RC. Pharmacobotanical studies on “Shevet Sharpunkha” – a comparative diagnostic account of *Tephrosia villosa* per and *Purpurea* (linn) Pers. Ancient Science of Life. 1988;7(3&4):207-221.
2. Behra SK, Panda A, Behra SK. Indian Journal of Traditional Knowledge. Indian Journal of Traditional Knowledge. 2006;5(4):519-528.
3. Prashanth P, Sagar V. Indian Journal of Traditional Knowledge. Indian Journal of Traditional Knowledge. 2008;7(2):273-276.
4. Sathiyaraju R, Arul Balachandran AS, Reddy RK. Diversity of Ethnomedical plants in Bodamali hills eastern ghats Namakkal district Tamil Nadu. Journal of Plant Science. 2015;3(2):77-84.
5. Pandey A, Singh S. Ethnobotanical evidences of common wild medicinal herbs existing on Delhi ridge a chick list. Journal of Medicinal Plants Studies. 2017;5(5):46-60.
6. Giday M, Asfaw Z, Woldu Z. Medicinal plants of the Meinit ethnic group of Ethiopia: An ethnobotanical study. J Ethnopharmacol. 2009;2:34.
7. Ganapathy S, Nymathulla S, Srilakshmi GVK. Chemical and antibacterial studies of roots of *Tephrosia villosa* (L) per. Asian Journal of Chemistry. 2008;20(6):4498-4502.
8. Patel DK, Kumar R, Haloo D. Diabetes mellitus: An overview on its pharmacological aspects and reported medicinal plants having anti-diabetic. Asian Journal of Tropical Biomedicine. 2012;2(5):411-420.
9. Odhong C, Wahane RG, Vaarst, Nalubwana. *In vitro* anthelmintic effect of crude aqueous extracts *Tephrosia vogeli*, *Tephrosia villosa* and *Carica papaya* leaves and seeds. African Journal of Biotechnology. 2014;13(52):4467-4672.
10. Obbalareddy S, Kolli PK, Yejella RP, Athili LD, Ponnada S. A Review on *Tephrosia* genus. IJRPC. 2022;12(3):208-247.
11. Mani AS, Prasad YR. Phytochemical and antioxidant activity and screening of chloroform leaf and aerial parts extract of *Tephrosia villosa*; c2005.
12. Bobbrala V, Naidu CKN. Alternative approaches for the control of Sorgham pathogens using selected medicinal plants. Intech Open Access Book; c2012.
13. Begum S, Nasser AJA. Corrosion inhibition by aqueous extract of *Tephrosia villosa* leaves. World Journal of Pharmaceutical Research. 2017;6(17):1072-1100.
14. Kokate CK. Practical Pharmacognosy. 4th Ed. New Delhi: Vallabha Prakashan; c1999, 169.
15. Khandelwal KR. Practical Pharmacognosy. 11th ed. Pune: Nirali Prakashan; c2004. p. 149.