

PHYTOCHEMICAL AND PHARMACOGNOSTICAL STUDIES OF “*TEPHROSIA PURPUREA*” LINN. AERIAL AND ROOT PARTS

S. Gopalakrishnan*, E. Vadivel and K. Dhanalakshmi

Department of Pharmaceutical Chemistry, Manonmaniam Sundaranar University,
Tirunelveli-627 012, India.

*Corresponding author Email: sgkmsu@yahoo.co.in

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ABSTRACT: In ayurvedic the leaves of the *Tephrosia purpurea* Linn. is useful in jaundice and the decoction of the roots given in dyspepsia, diarrhea rheumatism, asthma and urinary disorders. In order to ensure the use of only genuine and uniform material in preparation of herbal formulation, work on standardization was carried out. Microscopic, physicochemical and phytochemical studies, have been carried out, which would facilitate quick identification and selection of the drug from various adulterants. Even though the whole plant have medicinal important the present investigation will be useful towards establishing comparative pharmacognostic standards of aerial and root parts

Keywords: *Tephrosia Purpurea* Linn, pharmacognostic standardization, physicochemical studies.

INTRODUCTION

Herbal medicines are promising choice over modern synthetic drugs. They show minimum/no side effects and are considered to be safe. Generally herbal formulations involve the use of fresh or dried plant parts. Correct knowledge of such crude drugs is very important aspect in preparation, safety and efficacy of the herbal product. Pharmacognosy is a simple and reliable tool, by which complete information of the crude drug can be obtained [1-4]. There is a need for documentation of research work carried out on traditional medicines [5]. With this backdrop, it becomes extremely important to make an effort towards standardization of the plant material to be used as medicine. The process of standardization can be achieved by stepwise pharmacognostic studies [6]. These studies help in identification and authentication of the plant material. Correct identification and quality assurance of the starting materials is an essential prerequisite to ensure reproducible quality of herbal medicine which will contribute to its safety and efficacy. Simple pharmacognostic techniques used in

standardization of plant material include its morphological, anatomical and biochemical characteristics [7]. These standards are of utmost importance not only in finding out genuity, but also indetection of adulterants in marketed drug [8]. *Tephrosia purpurea* Linn. is one of the medicinally important plants belongs to *Fabaceae* family [9-10]. It is common known as wild indigo in Tamil “Kolanji”. In literature details, medicinal properties and uses of *Tephrosia purpurea* Linn. aerial and root parts are very sparce therefore, in present study pharmacognostic standards of the aerial and root parts of *Tephrosia purpurea* Linn. are studied

MATERIALS AND METHODS

Chemicals and collection of plant material

All the chemicals and reagents used were of analytical grade purchased from Sigma Chemical Co. (St Louis, MO, USA), Merck (Darmstadt, Germany) and Qualigens (Mumbai, India).

The first step in standardization of herbal drugs is the correct identification of plant, macroscopic and microscopic characters. *Tephrosia purpurea* Linn. was collected in Tirunelveli, India and it was identified by Prof.P.Jayaraman, Plant Anatomy Research Center, West thambaram, Chennai.

Macroscopic and Microscopic properties

The macroscopic evaluation was carried out for shape, size, color, and fracture of the drug . These macroscopic characters are presented in Fig.1

The fresh and mature roots and stem of the plant *Tephrosia purpurea* Linn. subjected to the present investigation were collected in the month of March and fixed in FAA. Free hands Section were taken. The process of killing was done by keeping the section in 90% ethanol successively for about 5 mins in each case. At first the section were stained with saffranin and were kept in xylene for about 5 mins. Then the sections were removed and kept in another bottle. Then the sections were stained with fast green and the stained sections were kept in clove oil. The sections were removed and kept again in xylene for about 5 mins. The process of keeping in xylene was using DPX. This was done by following the usual plant micro technique [48]. The photographs were taken by using the camera “PENTAX K-1000” (JAPAN) fitted with the trinocular research Microscope “LABO TRIUMPH PM-3” and Binocular Research Microscope “HERTEL &

KASSEK” CN-Hf-zt (West Germany). The microscopic TS of *Tephrosia purpurea* Linn. Stem (Figs 2A–2C) and root (Figs 3A, 3B) are presented.

Physico-chemical parameters

Different physico-chemical values such as ash value [11-15], extractive values [16-23] and loss on drying [24] were determined and presented in Table 1. Preliminary phytochemical screening of drug was carried out as per method described by Harborne [25], Trease and Evans [26] and presented in Table 2

RESULTS

Macroscopic

The plant is polymorphic, greenish Grey coloured, much branched subtract, perennial herb, 30-60 cm height, Leaves are imparipinnate, 5-15 cm long leaflets, 9-21 narrow, oblanceolate, Green and glabrous above, obscurely silky beneath, Flowers are red or purple in leaf -opposed racemes.

DISCUSSION

Microscopic characters of TS of stem of *Tephrosia Purpurea* Linn. (Figs 2A-2C) the stem is 1-9 mm thick. It has a thick walled epidermal layer and narrow cortex with parenchymaous cells. The vascular cylinder is thick, dense and exhibits one or two growth rings (Fig 2A). The pith is fairly wide with central cavity.

Table 1. Physico-chemical characters of the aerial part and root of *Tephrosia purpurea* Linn.

S.No	Particulars	Aerial part (%)	Root part (%)
Ash Values			
1.	Loss on drying	3.96	6.28
2.	Total ash	5.64	3.75
3.	Acid insoluble ash	1.18	1.63
4.	Water soluble ash	2.69	2.45
5.	Sulphated ash	28.32	30.00
Extractive Value			
6.	Water extractive	15.26	12.69
7.	Ethanol extractive	20.25	16.18
8.	Benzene extractive	10.40	15.18
9.	Chloroform extractive	10.86	8.46
10.	Petroleum ether extractive (40-60°C)	10.28	10.53

Table 2. Preliminary phytochemical screening

Data showing presence of compounds in the various extracts of the aerial and root parts of *Tephrosia Purpurea* Linn.

S. No.	COMPOUNDS	AERIAL PART EXTRACTS					ROOT PART EXTRACT				
		Petroleum ether (40-60 C)	Benzene	Chloroform	Ethanol	Water	Petroleum ether (40-60 C)	Benzene	Chloroform	Ethanol	Water
1	Steroids	-	+	+	-	-	-	-	-	-	-
2	Reducing sugars	+	+	+	-	+	-	-	+	-	
3	Terpenoids	-	-	-	-	-	-	-	-	-	
4	Alkaloids	-	-	+	+	-	-	-	+	-	
5	Phenolic compounds	-	+	-	+	+	+	+	+	+	
6	Saponins	-	+	+	+	+	-	-	-	-	
7	Anthroquinones	-	-	-	-	-	-	-	-	-	
8	Tannins	-	-	+	-	+	-	-	-	+	
9	Flavonoids	+	+	+	+	+	+	+	+	+	
10	Xantho proteins	-	-	-	-	-	-	-	-	-	

+ represents the presence of the compound; - represents the absence of the comp

Microscopic characters of the stem of *Tephrosia purpurea* Linn.

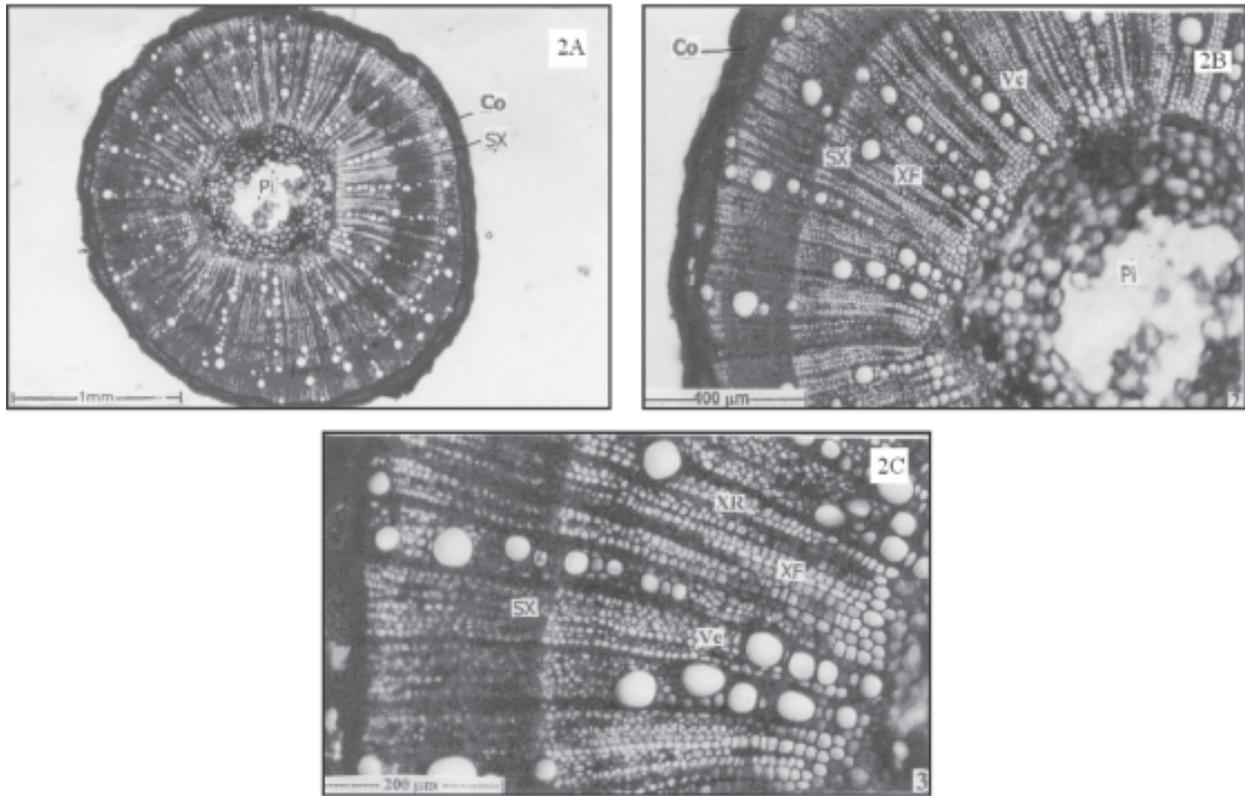


Fig 2A TS of the stem of *Tephrosia purpurea* Linn. showing pith (Pi), cortex (Co) and secondary xylem (SX)

Fig 2B TS of the stem a sector enlarged showing pith (Pi), cortex (Co) and secondary xylem (SX), Vessel (Ve), Xylem filies (XF),

Fig 2C TS of the stem of *Tephrosia purpurea* Linn. secondary xylem enlarged Showing Xylem filies (XF), Xylem rays (XR), vessel (Ve) and secondary xylem (SX),

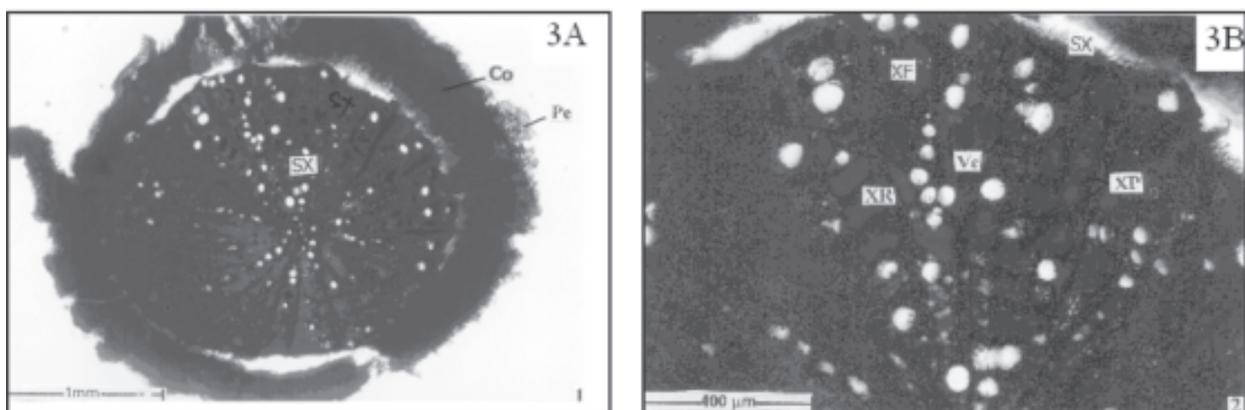


Fig 3A TS of the root ground plant of *Tephrosia purpurea* Linn Showing, cortex (Co) secondary xylem (SX) and periderm

Fig 3B TS of the root of *Tephrosia purpurea* Linn. Secondary xylem enlarged showing Xylem filies (XF), Xylem rays (XR), Xylem parenchyma (XP), vessel (Ve) and secondary xylem (SX)

The cortex is nearly 50 mm wide. The xylem cylinder is 500 mm wide. It consists of vessels, fibers and xylem rays. Growth rings are seen as one or two distinct cylinders. The vessels are solitary, circular to oval in sectional view, their walled and are 15-50 mm in diameter. Xylem filues are their walled with wide cavity (Figs 2B, 2C). The filues are 10 mm in diameter. Xylem rays are prominent and run straight. The ray cells have their walls. Microscopic characters of TS of root of *Tephrosia Purpurea* Linn. (Fig 3A,3B) the root has thick and fissused periderm,narrow cortex and wide, solid secondary xylem. (Fig 3A). Secondary xylem has no distinct growth rings. the vessels are circular, mostly solitary and diffuse in distribution.diameter of the vessel rays from 20-60 mm .Xylem filures are thick walled with narrow lumen. Xylem parenchyma occurs in thick targential bends (Fig 3B). They are paratracheal and bended. Xylem rays are fairly wide and straight. The physico-chemical parameters such as Loss on drying, total ash, sulphated ash, water and ethanol extractive values of root were comparatively higher than that of the aerial part of *Tephrosia purpurea*, even though some of the physico-chemical constituent such as acid insoluble ash, water soluble ash and petroleum ether extractive values are slightly vary for aerial and root part. The results are shown in the Table 1. The preliminary phyto-chemical screening of various extracts of root and aerial part of *Tephrosia purpurea* shows significant results, flavonoids are present in all extracts of aerial and root part while saponins, tannins, phenolic compound, reducing sugar and steroids are present in aerial part of the extract. The phenolic compound, alkaloid and reducing sugar are present in root parts of the extract terpenes, anthroquinones and xanthoproteins are not present in both parts of the extracts. The result are shown in the Table 2.

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