Research Article

www.ijrap.net

PHARMACOGNOSTICAL PROFILING ON WHOLE PLANT *TEPHROSIA PURPUREA* (L.) PERS (SARPUNKHA)

Sahu Dipsundar ^{1*}, Bolleddu Rajesh ², Das Manosi ³, Debnath Saroj Kumar ¹, Das Debajyoti ¹, Rao M.M. ⁴

¹Research Officer (Ayurveda), Hospital Division, Central Ayurveda Research Institute for Drug Development, CCRAS, 4-CN Block, Sector V, Bidhannagar, Kolkata, India

²Research Officer (Pharmacognosy), Department of Pharmacognosy, Central Ayurveda Research Institute for Drug Development, CCRAS, 4-CN Block, Sector V, Bidhannagar, Kolkata, India

³Research Officer (Chemistry), Chemistry Department, Central Ayurveda Research Institute for Drug Development, CCRAS, 4-CN Block, Sector V, Bidhannagar, Kolkata, India

⁴Director, Central Ayurveda Research Institute for Drug Development, CCRAS, 4-CN Block, Sector V, Bidhannagar, Kolkata, India

Received on: 19/06/18 Accepted on: 25/07/18

*Corresponding author

E-mail: drdssahu@gmail.com

DOI: 10.7897/2277-4343.094106

ABSTRACT

Background: Wild Indigo or Purple Tephrosia occurs throughout the India. It is widely used in diseased conditions like asthma, diabetes, diarrhoea, inflammation, rheumatism and many other diseases. The different parts of plant reported to contain flavonoids like rutin, quercetin, retinoids, deguelin, elliptone, rotenone, tephrosin and sterols such as sitosterol. Aim: But so far the pharmacognostic standardization of whole plant has not been reported for its proper identification. Hence the present study was carried out for the establishment of Pharmacognostical standardization of whole plant. Methods: Macroscopy, powder analysis (Organoleptic and powder microscopy), physicochemical properties like ash values, extractive values and HPTLC Profile of whole plant was done. Results and conclusion: In powder microscopy unicellular trichomes of different sizes, vessels with annular thickening were observed. Water soluble and alcohol soluble extractives were found to be 12.5% and 8.3% respectively. By observing morphological, powder microscopical, physicochemical and HPTLC characters the given crude drug is confirmed as whole plant of *Tephrosia purpurea*.

Keywords: *Tephrosia purpurea*, Pharmacognosy, Phytochemistry, HPTLC, Sarpunkha

INTRODUCTION

Tephrosia purpurea Linn. commonly known in Sanskrit as Sarapunkha, in English as Wild indigo belongs to family Leguminosae. The genus *Tephrosia* comprises between 300 to 400 species of annual and perennial woody herb, distributed in tropical and subtropical regions of the world. The Sanskrit word Sarapunkha generally means Sara, an arrow and punkha, the wings; i.e. if both the ends of its leaf are held and pulled, edges like that of an arrow are formed. It is also called plihashatru, meaning an enemy of the spleen (splenic diseases). In Ayurvedic literature this plant has also given the name of "Sarva vranvishapaha" which means that it has healing property in all types of wounds ¹. The plant has high economic value due to the presence of phytochemicals like flavonoids, alkaloids, carbohydrates, tannins and phenols, gums and mucilage, fixed oils and fats and saponins and lipids. Flavonoids have antioxidants and they have strong antimicrobial activity ². It is also used in the treatment of bronchitis, bilious febrile attack, boils, pimples and bleeding piles². Flower is used in the treatment of bronchitis, asthma, liver and spleen disorders ³. Root is also effective in inflammation, skin disorders, elephantitis, flatulence, hemorrhoids, asthma, bronchitis, anaemia, dysmenorrhea, chronic fever, boils, pimples, gingivitis⁴. Infusion of seed is used as anthelmintic oil. Also used in skin disorders like scabies and leucoderma⁵. Whole plant is effective as digestive, anthelmintic, antipyretic, laxative, liver and spleen disorders, heart, tumors, ulcers, leprosy, asthma, bronchitis, piles, carries teeth⁶. Seeds are

used for poisoning due to rat bite. Leaves are used for diseases of lungs and chest, intestinal problems, gonorrhea, piles and syphilis⁷. Sarapunkha is generally used in splenic diseases, tumors, enlargement of liver and spleen, diabetes and skin diseases ⁸. In Ceylon, used as anthelmintic for children. In Punjab, infusion of seeds considered cooling. In Sri Lanka, decoction of roots used as nematicide for treatment of *Toxocara canis* larvae which causes lung disease. Also used for colic, diarrhea and dyspepsia, and as anthelmintic. Fresh root-barks are ground and made into a pill, mixed with a little black pepper powder, used for obstinate colic. In Indian medicine, a common ingredient of formulations for liver ailments. Also, used for bilious febrile attacks, liver, spleen infections, cirrhosis and hepatitis⁹.

Previous photochemical investigations on materials of roots shown the presence of coumarins, flavonoids rotenoids, flavanones, isoflavanones and quercetin (1:1). Recently invented constituents are an isoflavone, 4- dihydroxy-3, 5 dimethoxyisoflavone, chalcone, tephropurpurin, purpurin, pongamol, lanceolatin B, Different cell structures were studied and measured maackiain, 3-hydroxy-4-methoxy-8, 9-methylene-Three novel flavonoids, (+)-tephrosins A and B and (+)-tephrosone, were isolated.

MATERIALS AND METHODS

The plant specimen for the proposed study was collected from Contai West Bengal. It was identified and authenticated by a

Taxonomist of Botany Department, P.K.College Contai. A specimen sample of whole plant kept in Pharmacy Dept of CARIDD, Kolkata. The pharmacognostical and phytochemical work carried out in Department of Pharmacognosy and chemistry of CARIDD, Kolkata.

Sarpunkha

Plant part: Whole plant

Botanical name: *Tephrosia purpurea* (L.) Pers.

Family: Fabaceae

Macroscopy

Macroscopical evaluation was done by observing the leaf, stem and root under simple microscope and with the naked eyes and taking note of the colour, size, odour and other diagnostic parameters. Different macroscopic parameters of the leaves, stem and root were noted. Evaluation of the leaves included the observation of type of leaf, shape, arrangement, apex, margin, venation, base, texture *etc.*

Powder microscopy

The coarsely powdered whole plant of *T. purpurea* was studied under the microscope. The powder was macerated in chloral hydrate reagent. The macerated powder was then stained with phloroglucinol, iodine reagents separately. Small quantities of the various stained powders were mounted on a slide with glycerine. Photomicrographs of the different cellular structures and inclusions were taken.

HPTLC PROFILE

Sample preparation: The dried plant powder 10 gm was subjected to hot extraction with methanol for 1 hour and extract was filtered using filter paper (Whatman-41). Whole extract was concentrated and taken for the following HPTLC profile.

Chromatography experimental

Stationary Phase: Precoated (support on Aluminum Sheets) Silica Gel Plate. Silica Gel 60F₂₅₄ Mfg. by Merck

Mobile Phase: Hexane: Ethyl Acetate: Methanol, 6.0:3.0:1.0 (v/v) [G R grade solvent used, mfg. by MERCK, India]

Sample application: Applied volume 20 µL as 10 mm band and applied at 10 mm from the base of the plate. Plate size was 5x10 cm.

Development: Developed up to 80 mm in CAMAG Twin trough chamber, (temp 27°C and relative average humidity was 48%)

Derivatising Reagent: Dipped in 20% aq. Sulphuric acid and charred at 105°C for 10 minutes.

RESULTS AND DISCUSSIONS

Macroscopy: Macroscopic investigation showed that leaflets having silky-hairy beneath. Pods 1.5-3.8 cm long, flat, linear, straight or slightly curved, at length glabrous. Seeds 4-8, blackish-brown, oblong, somewhat compressed, smooth, and glabrous. Roots having rough surface, curved, blackish gray in color. Stems are light yellow in color with 0.2-0.5mm diameter width.

Fig. 1: Whole plant of *Tephrosia purpurea* (L.) Pers.

Powder Analysis: The following characters are observed.

Organoleptic study: Powder creamish green in colour; texture-rough; odour- tobacco like odour, taste- Slightly bitter;

Microscopy: Powder sample shows that unicellular, simple horn shaped trichomes of various sizes, prismatic crystals of calcium oxalate, lignified border pitted, annular vessels, brown content, cork, simple, compound starch grains, xylem fibers and bundle of phloem fibers.

Fig. 2: Powder microscopy of whole plant of *Tephrosia purpurea* (L.) Pers. A., B. Unicellular trichomes of different sizes; C. Vessels with pitted thickening; D. Vessels with annular thickening; E. Brownish matter; F. Epidermis; G. Simple starch grains; H. calcium oxalate crystals and compound starch grains; I. Group of stone cells; J. Xylem fibres; K. Bundle of phloem fibres; L. Cork cells

Physicochemical Properties

Table 1: Physico chemical parameters of Sharapunkha

Sl. No.	Parameters	Result
1	Total Ash	2.3%
2	Acid insoluble ash	0.25%
3	Alcohol soluble extractive	8.3%
4	Water soluble extractive	12.5%
5	Loss on Drying	9.75%

HPTLC Result

R_F values Observed at 366 nm : (0.04,0.06,0.09,0.12,0.24,0.28,0.39,0.44,0.48,0.54,0.59, 0.63, 0.69, 0.74)

R_F values Observed at white light after derivatisation: (0.06,0.09,0.17,0.21,0.31)

Photography of HPTLC Plate of *Tephrosia purpurea* observed at 366 nm and white light after derivatisation

366nm

White light

Physicochemical Parameters

Physico chemical parameters of Sarpunkha revealed that Total Ash (2.3%), Acid Insoluble Ash (0.25%), Alcohol soluble extractive (8.3%), Water soluble extractive (12.3%) and Loss on Drying (9.75%). [Table 1]

CONCLUSION

By observing morphological, organoleptic and powder microscopical characters the given crude drug is confirmed as whole plant of *Tephrosia purpurea* (L.) Pers.(Sarpunkha).

REFERENCES

1. Deshpande S. E; Shah G. B; Parmar N. S. Indian journal of Pharmacology., 2003,35,168-172.
2. Kumari, S; Srivastava, M and Abbasi, P (2014), "Response of *Tephrosia purpurea* to salinity stress in relation to germination, carotenoid content and proline content", An International Quarterly Journal of Biology & Life Sciences, Vol. 2, 276-281.
3. Sujatha et al. integrated imminent wide scientific potential from tropical weedy medicinal plant of *Tephrosia purpurea* (Linn.) pers. an overview, World Journal of Pharmaceutical Research, Vol 3, Issue 4, 2014.
4. William C evans, trease and evans pharmacogony, 15th edition, published by reed elsvier india private limited india ;418:2006.
5. Anonymous, the British Pharmacopoeia. Published by the Stationary Office on Behalf of the Medicines and Health Care Products. Regulatory agency (MHRA) 2009;8: 1456-1460.
6. Baranwal Akanksha et al. Phytopharmacological uses of *Tephrosia purpurea* - a review, Pharmacophore 2014, Vol. 5 (4), 658-665
7. Chaudhari Tejal B; Tambe Deepak A; Chaudhari S. R. Indian J Clin Biochem, 2012, 22(1),77-83.
8. Kumar Manoj. International journal of ayurvedic & herbal medicine 2(2) April. 2012(328-335)
9. Sharma R, Mehan S, Kalra S, Khanna D *Tephrosia purpurea* – A Magical Herb With Blessing In Human Biological System Int J Of Recent Advan In Pharmal Research 2013; 3(3): 12-22.

Cite this article as:

Sahu Dipsundar et al. Pharmacognostical profiling on whole plant *Tephrosia purpurea* (L.) Pers (Sarpunkha). Int. J. Res. Ayurveda Pharm. 2018;9(4):38-41 <http://dx.doi.org/10.7897/2277-4343.094106>

Source of support: Nil, Conflict of interest: None Declared

Disclaimer: IJRAP is solely owned by Moksha Publishing House - A non-profit publishing house, dedicated to publish quality research, while every effort has been taken to verify the accuracy of the content published in our Journal. IJRAP cannot accept any responsibility or liability for the site content and articles published. The views expressed in articles by our contributing authors are not necessarily those of IJRAP editor or editorial board members.