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Sharapunkha (Tephrosia purpurea) Linn.: A Concise Drug Review

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ABSTRACT

Ayurveda is the first systematically written record of medicine in the world, originated in India. *Ayurveda* is called 'science of life' and exists prior to prevedic period. In many *Ayurvedic* texts we get highly rich description of medicine including plant origin .*Tephrosia purpurea* is a plant of Fabaceae family and Leguminoseae (Papilionateae) Sub-family, commonly known in *Sanskrit* as *'sharapunkha'. Nighantuadarsh* has given the etymology of the word Sarapunkha*(Sharasya iv punkhahyasyasah)* 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 hence, the name is *sharapunkha*. It is also called *plihashatru*, meaning an enemy of the spleen (splenic diseases).The plant grows throughout India and Western Himalaya up to height of 1500 meters. It is a perennial herb grows 30-60 cm. in height, with spreading branches. Whole plant and various parts of the plant are useful as *ayurvedic*medicines. Medicinal uses of drugs are tonic, laxative, diuretic, , and cures disease of heart bronchitis, boils, pimples, splenic diseases, tumours, enlargement of liver and spleen, diabetes and skin diseases act as blood purifier. The recent pharmacological studies have shown that *Sharapunkha(Tephrosia purpurea)* possess various activities such as antiulcer, antimicrobial, antibacterial, anti viral, anti asthmatic,hepatoprotective, antihyperglycemic and antihyperlipidemic, immuno modulatory activity, antioxidant, wound healing property, ant allergic. Recently it has attracted the attention of the scientists all over the world, for its hepato-protective and stimulant activity. The present review highlights the description of *Sharapunkha(Tephrosia purpurea)* in Ayurvedic lexicons, morphology, chemical constituents its traditional uses ,tribal uses and uses as extract level to explore*Sharapunkha(Tephrosia purpurea)* as a potent herbal drug.

KEYWORDS *Sharapunkha, Tephrosia purpurea, Nighantu*

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INTRODUCTION

The knowledge of medicinal plants goes back to the pre-historical days. In Vedic period, man had intimate contact with the environment particularly plants as he depended on them not only for his day to day requirements but also for domestic use and agriculture. Moreover, plants are also used as drug for alleviation of the diseases of man and animals. In Vedic literature, the description of *Sharapunkha* is not mentioned. In Sanskrit the 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 *Pleehashatru*, meaning an enemy of the spleen (splenic diseases). Recently attention has been paid on numerous herbs like *Sarapunkha*, having less side-effect. Considering the adverse effect of synthetic chemicals people are looking for safe and effective treatment. The aim of present study was to focus on the collective *Ayurvedic* view of *Sharapunkha (Tephrosia purpurea)*, along with to find out its potency at extract level as well.

SARAPUNKHA (Tephrosia purpurea) IN AYURVEDIC LEXICONS:

In CharakSamhita there is not any description about Sarapunkha.In *SushrutaSamhita*, use of roots of *Sharapunkha (Tephrosia purpurea)* is mentioned in *KalpaSthan Mushikakalpam Adhyayam* (chapter related to Rat poison) to overcome the *Alarkavisha*(Rat poison) [1]. In *AshtangHridayam*, roots and seeds of *Sharapunkha (Tephrosia purpurea)* is described at several places in the treatment of some diseases like *Apachiroga* (Swelling and inflammation), *Vishavikara* (Toxicology) *Krimiroga* (Worm Infestation) and in *Aakhuvisha* (Rat poison) [2,3].

The description about *Sharapunkha (Tephrosia purpurea)* have found in several *Nighantus*. *NighantuAdarsh* has given the morphological description, its variety and medicinal uses in several diseases. On using *Dhoompan* (Smoking) of *Sharapunkha* root, it cures *Kasa* (cough)[4]. In *Mudhhagarbha* (fetal mal presentation) treatment, Swaras (juice) of *Sharapunkha* is used as *Nasya* (Nasal drop). It also cures *DantRoga* (Dental problems specially toothache) when used as *Dantdhavanam* (Tooth brush) [5]. Its root is described as *Shukrasthambhana* and in *Krimiroga* as told in *Vaidya Manorama* [6,7]. Paste of *Sharapunkha* with*Takra* cures diseases related to spleen and its root is used in *Shastrakshata (*accidental or weapon cutted wound), *Mudhagarbha* and *Kasa*[8,9,10]. Root of *Sharapunkha* is used in

Splenomegaly as mentioned in *Raj Martand*[11]. In *VrindMadhava*, *kalka* (paste) of *Sharapunkha* with *takra* is used in spleenomegaly and in *Vranaropana* (wond healing) with honey[12,13]. CakrapaniDatta has also quoted, *Kalka* of *Sharapunkha* with*takra*to cure splenomegaly[14].

RajNighantu,BhavPrakashNighantu,NighantuAadarsh,SodhalNighantu, ManovinodNighantu etc., its uses are discussed in some diseases like *Vrana (*Abscess) *Roga* [15,16]. In *ShodhalNighantu*, to cure *ShastraKshata*(accidental or weapon cutted wound), *Mudhhgarbha*(foetalmalpresentation), *Kasa* (cough), Pleehodar(Splenomegaly) etc.; use of Sarapunkha is mentioned [17,18]. In almost all *Nighantus*, main use of *Sharapunkha* is described related to liver and spleen diseases,*Swasa* (Asthma), *Jwara*(fever) and *Krimiroga*(Worm Infestation).

GENERAL FEATURES AND MORPHOLOGY:

The plant grows throughout India and Western Himalaya upto a height of 1500 meters. A much branched perennial, grows 30-60 cm. in height, with spreading branches. The leaves are 4-14 cm. long, imparipinnate leaflets 13-21 in number, lanceolate, glaberescent above and glaucous beneath. The flowers are purple, in racemes and the fruit-pods are 2.5-5.0 cm long and 0.5 cm broad. The seeds are 6-10 per pod, smooth and grey in colour[19]. Two varieties are described in *Ayurvedic* texts as *rakta* and *sweta*. *Sharapukha* being the *Linn*.variant and second the *Pers*-variant. The white variety is botanically known as *Tephrosiavillosa*. It is a rejuvenative[20]. In *Raj Nighantu* another variety of it has described as *Kantpunkha* or *Kantakpukha* (*Tephrosia purpurea*) [21].

DETAILS OF *SHARAPUNKHA* (*Tephrosia purpurea*):

Botanical Name: Tephrosia purpurea (Linn.) Perse

Family: Fabaceae

Sub-Family: Leguminoseae (Papilionateae)

Synonyms: Pleehashatru, Neelvrikshakriti [22]

English Name: Wild Indigo, Purple Tephrosia

Indian Name:

Hindi: Sarponkha

Tamil: Kolluk-kay-welai, Kolinji

Telugu: Vempali

Marathi: Unhali

Gujrati: Sharpankho

Panjabi: Sharpankh Jhojharu

Malayalam: Katamiri

Bengali: Ban Neel

Pharsi: Berg Sugar

Part used:

Root, Panchang ,

especiallyPanchang-kshar

Classical Properties:

Guna: Laghu, ruksha, tikshna

Rasa: Kasaya, Tikta

Vipaka: Katu

Virya: Ushna

Prabhav: Pleehaghna

Figure 1 Plant: Sarapunkha *(Tephosia purpurea)*

Karma:

Shothhar (Anti inflamatory), Kusthagna(Anti Leprotic), Vishaghna(Anti toxic), Jantughna (Anti mcrobial) , Vranaropan (Wound healer), Raktashodhak(Blood purifire), Dantya (odontic)

CHEMICAL CONSTITUENTS:

Roots and leaves contain tephrosin, dengulin and quercetinisotephrosin and rotenone. In the roots and leaves 2.5% rutin is found. A new β-hydroxychalcone-purpurnone is isolated from root and established its structure. Isolonchocarpin, pongamol, Lanceolatin A, Lanceolatin B, Karanjin, Kanjone and β -sitosterol isolated from roots [23] .

Three new unusual flavonoids tephroglabrin, tepurindiol and O-methylpongamol isolated from roots along with seven known closely related flavonoids and structure of a new compounds determined [24] (as shown in figure 02).

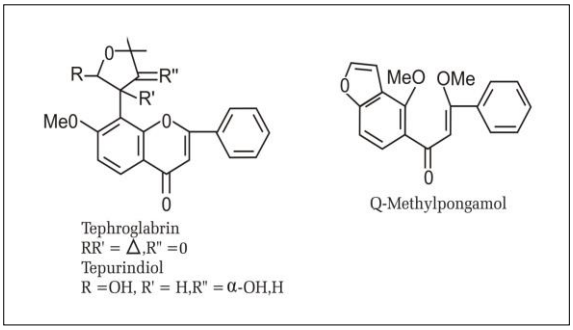

Figure 2 Flavonoids found in the root of sarapunkha *(Tephrosia purpurea)*

Basu (1977) isolated β -Sistosterol, leupeol and rutin from leaves of the plant A new aliphatic ketone, tephrone isolated from pods along with n-triacohtand, n-Hentriacontanol has been isolated from pod husk and trans-2-tridecene-1,13-dioc acid. The compounds have been characterized on the basis of spectra data analysis and chemical reaction [25].

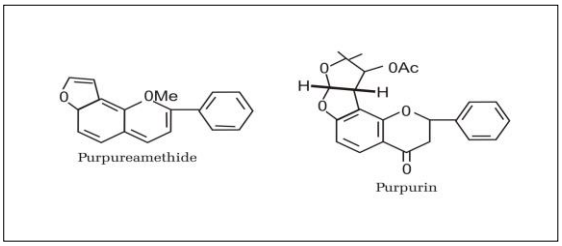

Figure 3 Flavanone and Flavonoids found in the Seed of Sarapunkha *(Tephrosia Purpurea)*

Seeds contain tephrosin, degudin, quercetin, purpurine, flavonone. Caffeic acid isolated from dormant seeds. Purpuritencin A and B and purpureamethide isolated from seeds Isolanchocarpin, Pongamol, Lanceolatin A, Lanceolatin B, Karanjin, Kanjone and β-Sitosterol, isolated from roots and seeds. A new flavanone-purpurin isolate from seeds and its structure determined. New prenylated flavonoids – purpuritinines A and B and purpureamethides isolated from seeds [26] (as shown in figure 03).

A novalneoflavonoid glycoside serration, 7-0-beta-D-glucopyranosyl,(1 to 4)-0-beta-D-galactopyranoside was isolated from the stem of Tephrosia purpurea and identified by its chemical and spectral analysis. Activity-guided isolation of constituents of Tephrosia purpurea with the potential to induce the Phase II enzyme, quinon-reductase. An isoflavone, 7,4 dihyroexy 3, 5-dimethoxyisoflavonem, and a chalcone, (+) – tephropurpurin, both noval compounds as well as six constituents of known use, (+) – purpurinm, pongamol, lanceolatin B, (+) – maackiain, (-)-3-hydroxy-4-methoxy-8, 9 methylene-dioxypterocarpan, and (-)-medicarpinm were obtained as active compounds from Tephrosia purpurea using a bio-assay based on the induction of quinonereductase (QR) activity with cultured Hepa 1c1c7 mouse hepatoma cells. Additionally three inactive compounds of known structure, 3-methoxy-diazen, desmoxyphyllin B, and 3,9-dihydroxy-8-methoxycoumertn, were isolated and identified [27] . Delphinidin chloride and Cyanidine chloride have been isolated from flowers[28.]

MEDICINAL USES OF VARIOUS PART OF *SHARAPUNKHA*

(Tephrosia purpurea):

Root:

Root has a bitter bad taste, diuretic, allays thirst, and enriches the blood, cures diarrhoea, useful in bronchitis, asthma, liver and spleen diseases, inflammations, boils, pimples. Root is bitter and given in tympanitis, dyspepsia and chronic diarrhoea and use as mouthwash. Fresh root-bark, ground and made into a pill, with a little black pepper is frequently given in case of colic [29] .Tephrosia purpurea root and alkali preparation (*SharapunkhaKshara*) was administered orally at a dose of 500 mg/kg. It contains bioflavanoids including rutin, rotenoid and tephrosin. Serum level of transaminases (SGOT and SGPT) and bilirubin were used as the biochemical markers of hepatotoxicity. Tephrosia purpurea inhibited the rise of SGOT, SGPT and serum bilirubin[30,31] .

The drug is useful in cough, asthma, and tightness of the chest, powder of the root is smoked in *Hookka*or *Chilmi*. A decoction of the root with pepper powder added is given in bilious febrile attacks, enlargement and obstruction of the spleen, liver and kidneys. For hepatic dropsy, the root ground in butter milk is given. Root is also recommended for boils, pimples abscesses, especially carbuncle on the back, as tonic and laxative and purifier of blood. Root powdered and mixed with honey is applied to ulcers. Root bark ground and made into a pill with black pepper is very beneficial in obstinate colic. A powder of the root taken with water is used to cure enlarged scrotum. Roots are given orally against any type of poisoning including snake bite[32]. Aqueous extract of root of *Sarapunkha* (AETP, preparation name) treatment decreased the gastric acidity and pepsin protein concentration, which may be due to cyto protective action of drug inhibition on acid secretion in experimental rats[33].

The tribes of Jharkhand apply root paste on elephantiasis and they call it *Nil-gach, Birchakunda, Kulathia and Anuraida*[34]. A paste prepared with milk and the powder of the root of *Sarapunkha* with equal quantity turmeric powder, reduces the swelling scrofula. The powder of the root consumed with buttermilk for one month completely cures swelling, anaemia, pimple and eruption, it is diuretic, allays thirst, enrich blood, cures diarrhea, useful in bronchitis, asthma, liver and spleen diseases, inflammations, boils and pimples. Tribal prescribe root decoction with common salt (3:2) with grape and give root bark paste with decoction of long peppers (3:1) to cure dyspepsia [35.]

Leaves:

Sarapunkha (Tephrosia purpurea) leaves in combination with leaves of *Cannabis indica* in the proportion of 2:1, respectively and this combination is a tonic to the intestines, improves the appetite, useful in disease of lungs and chest, useful in piles, syphilis and gonorrhoea. The leaves are reported to be useful in jaundice. Paste of leaves are useful in wounds of animal bites.The rural people used the paste of leaves along with jiggery orally for three days to cure dog biting[36.]

The tribal people use leaf-paste on skin eruption and other ethnic communities give leaf decoction with honey (5:2) to women against post-natal complication. Tribal in various part of India use flower juice in eyes for treatment of eye inflammation[37].

Seeds:

An infusion of the seeds of *Sarapunkha (Tephrosia purpurea)* is employed as an antihelminthic for children, for itching,

scabies etc. The oil of the seeds is a specific remedy, seeds of its white variety may be beneficial in the poison of rat. Seeds are also used as mosquito-repellent and insect repellent .An infusion of seeds is useful against worm infestation in children and oil is used externally in scabies and dermatitis[38].

Whole plant:

The whole plant is bitter and acrid, digestible, anthelminthic, laxative, anti-pyretic, alternative cures the diseases of liver, spleen, heart, cures tumours, ulcers, leprosy, asthma, bronchitis, piles, and carries of the teeth and purifier of blood. A review of experimental studies on anti-hepatotoxic activity of certain medicinal plants including Sarapunkha *(Tephrosia purpurea)* used in Ayurveda has anti-ulcer activity. Forty cases of viral hepatitis were studied by treating with an indigenous preparation 'Tefroli' consisting of *Tephrosia purpurea*(120 mg) *Ecliptaelba*(60 mg) *A.paniculata* (30 mg), *T. Chebula* (30 mg*) O. Santum* (30 mg), Tefroli cut short the duration course and severity of the disease. It is safe and non-toxic and richly deserves to be used as routine treatment in all patients of viral hepatitis. Its hepatoprotective action was evaluated for its efficacy in rats by inducing hepatotoxicity with D-glactosamineHCl (Acute) and CCl4 (Chronic). The drug also demonstrated liver tissue regenerating capacity as evident by histopathological changes. So conclusion of the study was, the drug to be effective in acute and chronic hepatotoxicity and the action may be due to membrane stabilizing effect on liver cells[39,40].

Anti-cholestatic activity of HD-03, an herbal formulation in thioacetamide (TAA) induced experimental cholestasis. HD-03 a multi-herbal formulation, consisting of *S. nigrum*, *Picorrhizakurroa*, *Tephrosia purpurea* (whole plant 20%) and *Andrographispaniculata*was investigated for its anti-cholestatic activity in TAA-induced cholestasis in an anesthetized guinea pigs. Administration of TAA at a dose of 100 mg/kg body wt. significantly reduced the bile flow, bile acid and bile salt excretion. Pre -treatment with HD-03 at a dose of 750 mg/kg wt. orally for 15 days in guinea pigs significantly prevented thioacetamide induced changes in bile flow, bile acids and bile salts excretion. HD-03 has been suggested to serve as potent anti-hepatotoxic and anti-cholestatic agent[41]. The whole plant is used as a bitter tonic. It is also useful in tympanitis and as a blood purifier. *Tephrosia purpurea*induced significant increase in hemoglobin % and total RBC count. After irradiation there was no fall in RBC count

and Hb% unlike in control group. This indicate that *Tephrosia purpurea* has a selective effect on erythroid compartment [42].

CONCIUSION:

Lots of descriptions about Sarapunkha *(Tephrosia purpurea)* shows that, it is used traditionally. Various preclinical investigations have been carried on *Sarapunkha*, such pharmacological activities are hepatoprotective, antimicrobial, antihyperlipidemic, anti asthmatic, blood purifier, anti carcinogenic, anti diarrheal, anti hhyperglycemic, antiviral and diuretic etc. The plant is enriched with reported wide range of chemical constituents. Thus the present review explore the properties of the Sarapunkha as mentioned in ancient Ayurvedic lexicons. More extensive studies and clinical trials should be designed to investigate the mechanism of action of Sharapunkha at molecular level and also to discover novel leads from them. The data presented here, emphasizes the potential of Sarapunkha*(Tephrosia purpurea).*

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Conflict of interest: None Declared

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