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Unveiling the Healing Legacy: A Medico-Historical Review of *Sharpunkha (Tephrosia purpurea (Linn.) pers.)*

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ABSTRACT

Ayurveda, a traditional system of medicine provides preventive and curative care for diseases. A review of ayurvedic and contemporary literature with the goal of medico-historical aspects and the identity of the herbaceous perennial plant *Sharpunkha (Tephrosia purpurea)* was carried out. For the retrieval of published articles, a variety of recognized databases were used. Geographical distribution and taxonomical overview, synonyms and vernacular names, classification, Pharmacological properties, and therapeutic indications per Ayurveda literature. Phytoconstituents, the structure of the relevant constituents, and pharmacological properties of the root, bark, seed, and leaf are reviewed in this paper. This review article has delved into the medico-historical background and case studies clear that *Tephrosia purpurea* has a significant effect on hepatotoxicity, portal hypertension, ureteric stones, and various other diseases.

Keywords: Hepatotoxicity, Ethno-medical, phytoconstituents, hepatoprotective

INTRODUCTION

Herbal medicine has been an integral part of healthcare systems worldwide for centuries, with a rich history steeped in traditional and cultural significance. Ayurveda, a traditional system of medicine provides preventive and curative care from diseases. *Sharpunkha* has been identified as *Tephrosia purpurea* pers. (Family: *Leguminosae*) has a longstanding reputation in traditional medicine for its diverse pharmacological properties and purported health benefits. Despite its historical roots, renewed scientific interest has propelled *Sharpunkha* into the spotlight, with growing evidence supporting its efficacy in the management of various health conditions.

Our review aims to delve into the multifaceted aspects of *Tephrosia purpurea*, encompassing its mechanism of action, therapeutic indications, and current research landscape. By synthesizing the latest evidence from observational studies and systemic reviews, we endeavor to provide a comprehensive understanding of Tephrosia purpura role in contemporary healthcare practice. By shedding light on its pharmacological nuances and clinical relevance, our review aims to inform healthcare providers, researchers and patient alike, facilitating evidence-based decision-making and fostering a deeper appreciation for the therapeutic potential of herbal medicines.

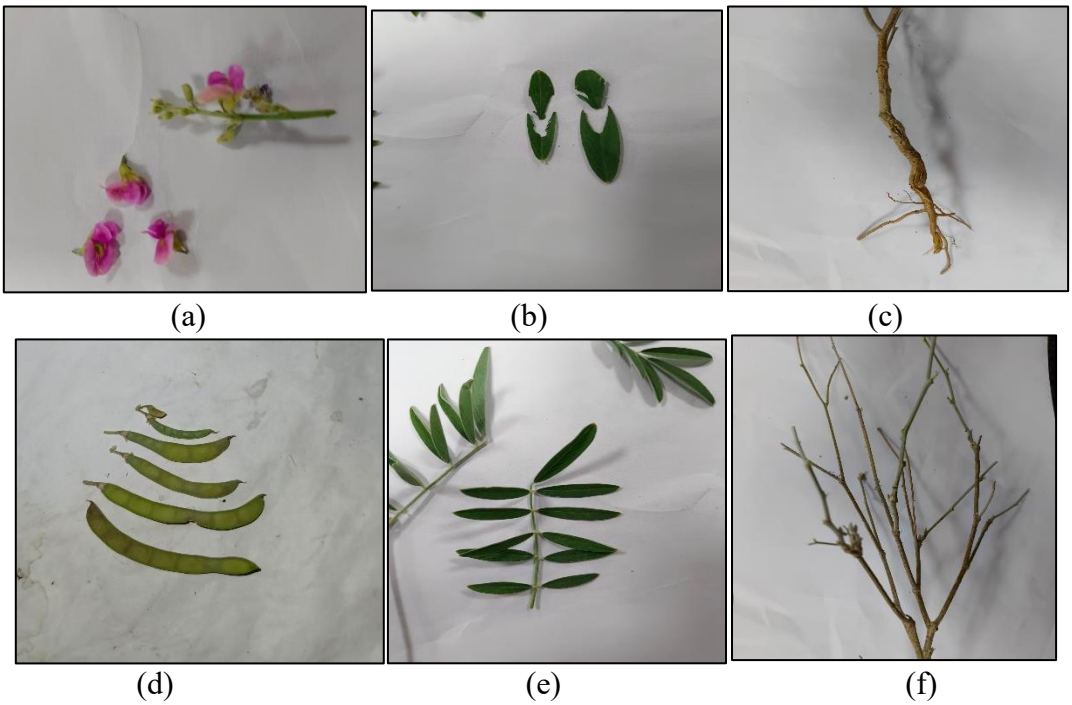
MATERIALS AND METHODS

A review of ayurvedic and contemporary literature with the goal of medico-historical

aspects and identity of plant *Sharpunkha* was carried out. For the retrieval of published articles, a variety of recognised database were used. The search was focused on identifying scientific data from the available ethnomedical, clinical reports to understand the role of Tephrosia purpurea in various diseases.

GEOGRAPHICAL DISTRIBUTION/ TAXONOMICAL OF *TEPHROSIA PURPURA* [1]:

Plant type- herbaceous perennial
Height- typically 30-60 cm tall, but can reach up to 150 cm.
Stems- woody base, many branched and ridged.
Leaves- compound with 9-7(-21) leaflet, arranged along a rachis. Leaflet blades are oblong-elliptic, oblanceolate-elliptic, or obovate-elliptic, with secondary veins 7-12 on each side of the midvein. Leaflet base is narrowly rounded, and apex is obtuse, truncate, or retuse and cuspidate.
Flowers- mauve in color, with a standard (upper petal) that is orbicular and white puberulent, typically around 8mm in size, flowering Mar-Oct.
Inflorescence- pseudo racemes are terminal, appearing opposite to a leaf or axillary near the apex or branchlets, about 2 or 10-15 cm in length.
Fruits- legume is linear, measuring 3-5 cm ×3.5-4(-6) mm, with sparse appressed trichomes, and slightly curved the apex. Fruits Sep-Dec.
Seeds- usually around 6 per legume, greyish-brown, ellipsoid, approximately 3×1.5 mm in size, with or without spots, and can be smooth or rough.
Botanical name: *Tephrosia purpurea (Linn.) pers.*
Kingdom: Plantae
Family: Leguminosea
Group: Angiosperms
Common name: Common Tephrosia
Synonymous names: Tephrosia hamiltonii, Tephrosia wallichi, Tephrosia purpura, Cracca purpurea
System of medicine: Ayurveda, Siddha, Unani



Images 3. (a) flowers, (b) fang like leaflet, (c) root, (d) pods, (e) leaves, (f) stem

SYNONYMS AND VERNACULAR NAMES USED FOR TEPHROSIA PURPERA [2]

Arabic (3) :	sarboka, sarphonka, sufaru
English (1) :	wild indigo
Hindi (16) :	ban-nil, bisoni, biyani, boyonia, dhamasia, pal, saphanko, sar punkha, sarpanka, sarpankha, sarphankha, sarphanko, sarphenka, sarphoka, sarphomka, sarphonka
Kannada (19) :	adavi hurali, adavi neeli, empali, honnaavarike, kaggi, koggali, kogge, koggi, koggili, kolingili, koliniji, marali gida, phanike, phankee gida, phanki, punike, vajaranili, vajra neeligida, vajradanili
Malayalam (10) :	colinil, kattamari, kazhinnila, kazlunnilla, kolinnil, koluva, korinil, kotikkolinnil, kozhinnil, kozhinnila
Marathi (8) :	sarpunk, sharapunkha, sirapakha, udhadi, unhaali, unhal, unhali, untoali
Persian (1) :	Sarphoka
Sanskrit (21) :	banah, banapunkha, banapunkhah, ishupunkhika, kalashaka, kalika, kandapunkha, kriti, neelabralakrati, nilavriksha, nilavrksakrti, plihari, plihasatru, plihashatru, puleehashtree, sarapunkha, sarapunkhah, sayakapunkha, sharapuchchha, sharapunkha, poonkhie
Tamil (30) :	carapunku 2, cimmantukacceti, cimmantukam, kat-kolingi, kattukkolincai, kattukkolunci 3, kavali, kayvelai, kolinci 2, kolinji, kollilai, kollilaicceti, kolluk-kay-velai, kolluk-kay-welai, kollukai, kollukkai velai, kollukkay velai, kollukkayvelai, kolunchi, kolunci, kozhungi, kumpuranacceti, kumpuranam, muka velai, nallicacceti, nallicam, tilapavi, caat kolingie, kallu-k-kay-velai, koolingie
Telugu (10) :	bonta vemapli, bonta vempali, bontavempali, karusembai, pamparachettu, tella vempali, tellavempali, thellavempali, vaympalie, vempali
Urdu (4) :	sarabhuka, sarphoka, sarphooka, sarphuka

ETYMOLOGY OF *SHARPUNKHA* [3]– *Sharpunkha* is derived from sanskrit words "*sharasya punkheva akrutirtasya"* means arrow like leaflet and mentioned *kandpunkha*, *banpunkha, ishupunkha, shyakpunkha* and *ishupunkhika* as synonyms of sharpunkha.

CLASSIFICATION OF TEPHROSIA PURPUREA ACCORDING TO VARIOUS AYURVEDA TEXTS-

Sharpunkha is described under various classes according to different ayurveda texts as per its different uses and properties.

Ayurveda classics	**Class (*Ghana/varga*)**
Sushrut Samhita [4]	*Sursadi*
Sodhala nigantu [5]	*Lakshmanadhi*
Madanpal nigantu[6]	*Abhyadi*
Bhavprakasha nigantu[7]	*Guduchyadi*
Raj nigantu[8]	*Shtahvadi*
Shaligram nigantu[9]	*Guduchyadi*
Hridya deepaka[10]	*Eknaam*
Sarasvati nigantu[11]	*Kshupa*
Madhava Dravyaghuna[12]	*Shaak*
Nigantu Adarsha[13]	*Plashadi*

RASA PANCHAKA OF *SHARPUNKHA*-

Aurveda Classics	*Rasa*	*Ghuna*	*Virya*	*Vipaka*	*Prabhava*
Bhavprakasha Nigantu	*Tikta Kashya*	-	-	-	*Yukrutplihagulmavishapaha*
Madanpal Nigantu	*Tikta Kashya*	*Laghu*	-	-	*Pleehari*
Raj Nigantu	*Katu*	-	*Ushna*	-	*Krimivatrujapaha*
Madhava Drvyaghunaa	*Katu*	-	-	-	-
Raj Vallabha [14]	*Katu*	-	-	-	-
Dravya ghun vigyana[15]	*Tikta Kashya*	*Laghu, Ruksha, Tikshna*	*Ushna*	*Katu*	*Pleehghna*

THERAPEUTIC USES OF TEPHROSIA PURPUREA -

1. *Charaka Samhita* [16]- *Sharpunkha* is named as *Kalshaak* mentioned *pathya shaak* for *Udarrog*i in *Udar Roga Chikitsa*.

2. *Shushrut Samhita-* *Sharpunkha* is mentioned under *Sursadi Gana*.

Acharya Shushrut also mentioned root of *Sharpunkha* in *Alarka visha* as mix with equal quantity of *Shudha Dhatura*.

3. *Ashtang hridya* [17]- a formulation with *Sharpunkha* seed powder beneficial in *mushika visha* (Rat bite poisoning).

4. *Chakradutt*[18]- Acharya Chakrapani mentioned *Sharpunkha* paste in *plihayukrut chikitsa*(spleen and liver disorders).

5. *Rasa Ratna Sammuchya*[19]- *Rasa Vaghbatt* mentioned *Sharpunkha* root for female infertility.

6. *Yogaratnakar*[20]- *Yogartanakar* use *Sharpunkha* root paste in *udar roga chikitsa*.

7. *Bhaishjaya Ratnavali* [21]- *Sharpunkha* is mentioned as *Sharpunkhadhi lepa* in *sadhyovrana chikitsa* and it is also used as ingredient in *Raktprdarahara yoga*.

***8. Nigantu*:**

8.1. *Sodhala nigantu-* *Sharpunkha* is included in *lakshmanadhi varga* and described as two synonyms *Sharpunkha* and *bhaanpunkha* with *vrushdrava and varini* properties.

8.2. *Madanpal nigantu-* *Sharpunkha* is included in *abhyadhi varga*. It is mentioned as two synonyms *Sharpunkha* and *Kalashaka*. It is described as *pleehari* (beneficial in splenomegaly) and also beneficial in liver disorders, *dusta vrana* (non-healing ulcer), poisoning, respiratory disorders.

8.3. Bhavprakash nigantu- *Sharpunkha* is included in *guduchyadhi varga*. It is mentioned as *plehashatru* (effective in splenomegaly), *neelvrukshakrit*i due to its blue-coloured flowers, beneficial in liver disorders, worm infestation, bloating, poisoning and also contain wound healing property.

8.4. Raja nigantu- *Sharpunkha* is included in *Shtavadhi varga* and mentioned six types of *Sharpunkha*. *Sharpunkha* is refers as beneficial in worm infestation, itching and also *vatadoshahara* effect.

8.5. *Madav Dravya Ghuna-* *Sharpunkha* is named *Kaalshaka* and beneficial in poisoning, *kaphadosha* and also containing anti-inflammatory and *deepan* properties (digestive enzymes stimulator).

8.6. *Shaligram Nigantu*

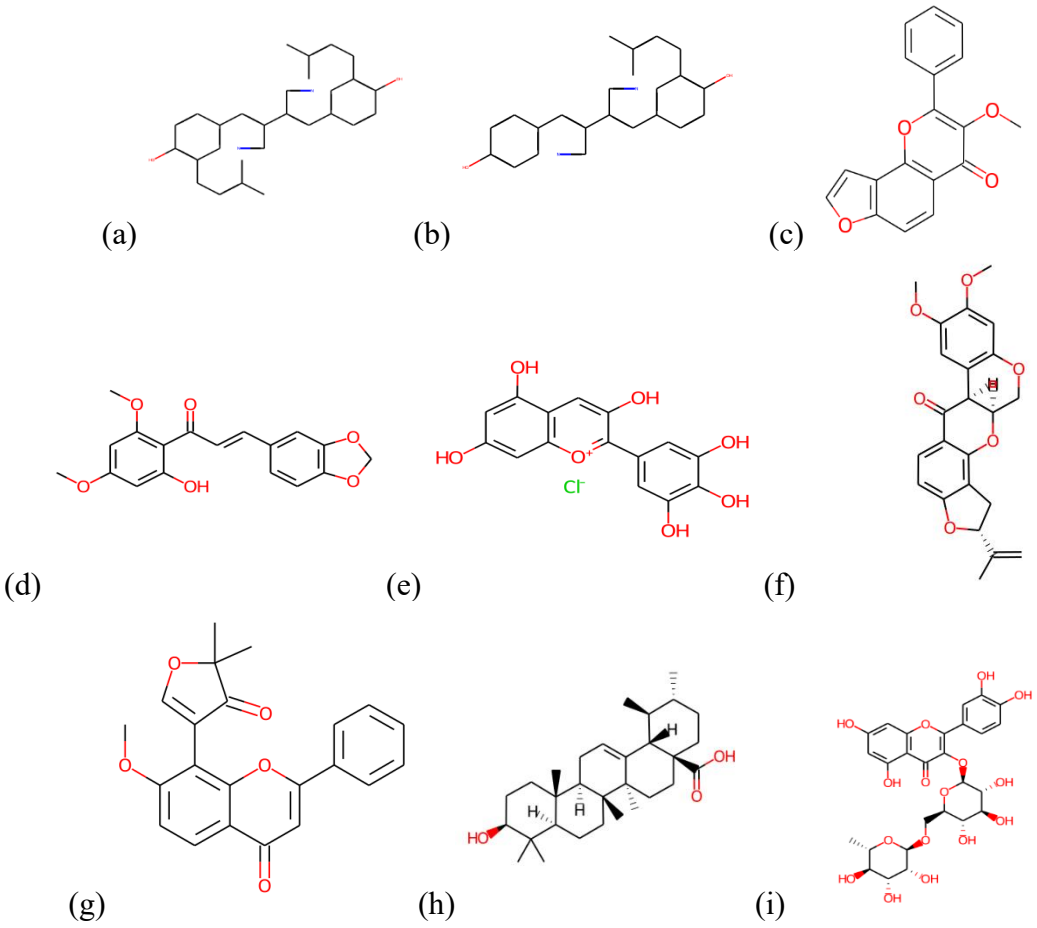
9. *Gada Nigraha-* *Sharpunkha* paste with buttermilk is used for splenomegaly. (udarrogadhikara32/131 page712). There are found another reference in which *Sharpunkha* seed powder with buttermilk in the management of rat poisoning. (6/10 page594)

10. *Sidha Bhaishaja Manimala* [22]- Sharpunkha root powder with panchuja kshara is prescribed for Ashmari Chikitsa.

11. *Rasatargini* [23]- *Rasatarangini* mentioned equal quantity of *Sharpunkha* powder with *yava kshara* beneficial in *gulma* and *pleeha roga*. (13th chapter verse 12). Another reference of *Sharpunkha kshar* with *tilakashar* used for *gulma roga chikitsa* also found. (14/90) It is named as *plihashtru* mentioned in *plehvrudhi* (splenomegaly) with powder of *shudha kasis* and *anupana* of hot water or juice of aloe vera. (15/243)

PHYTOCHEMISTRY OF TEPHROSIA PURPUREA [24]-

S.No.	Plant Part	Chemical Constituents
1.	Flower	Delphinidin, Cyanidin Chloride
2.	Fruit	Purpurin A, Villinol, Villosinol, Villosone, Villosin, Villosol, 1-Triacontanol, Tephrone, Beta- Sitosterol
3.	Leaf	2-Phenylfuro[2,3-H]Chromen-4-One, (+)-Tephrorin B, (+)-Tephrosone, Purpuritenin A, Purpurin B, Degulin, Karanjin, Purpurnone, 4H-1-Benzopyran-4-One, 8-(2,5-Dihydro-5,5-Dimethyl-2-Oxo-3-Furanyl)-7-Methoxy-2-Phenyl, Kanjone, Tephrorina, Purpuritenin B, Maxima Isoflavone C, Quercetin, Steric Acid, Lanceolatin A, Beta-Hydroxychalcone, Tephrone, Tepirindole, Rotenone, Purpurin, Palmitic Acid, (-)-Isolonchocarpin, (Z)-3-Methoxy-1,3-Diphenylprop-2-En-1-One, Semiglabrinol, Palmitoleic Acid, Oleic Acid, Caffeic Acid, Tephrosin, Lupeol, Vitamin P, Linolenic Acid, Beta-Sitostreol, Linoleic Acid, Rutin
4.	Root	2-Phenylfuro[2,3-H] Chromen-4-One, Karanjin, Purpurenone, Kanjone, O-Methylpongamol, Lanceolatin A, Tepirindole, Rotenone, Anhydropisatin, Flemichapparin C, (-)-Isoonchocarpin, Tephroglabrin, Maackiain, Tephrosin, Beta-Sitosterol,
5.	Seed	2-Phenylfuro[2,3-H] Chromen-4-One, Purpuritenin A, Karanjin, Purpuritenin B, Lanceolatin A, Purpurin, (-)-Isolonchocarpin, 1,3- Propanedione, Caffeic Acid, Beta-Sitosterol
6.	Wood	Rutin
7.	Whole Plant	(+)- Tephrosone, Kanjone, Tepirindole, Delphinidin, Rotenone, Purpurin, Anhydropisatin, Flemichapparin C, 7,4-Dihydroxy-3,5- Dimethoxyisoflavone, Cyanidin Chloride, (+)- Isolonchocarpin, (+)- Tephropurpurin, Tephroglabrin, Alpha-Spinasterol, Ursolic Acid, Betulinic Acid, 12a- Hydroxyrotenone, Tephrosin, Lupeol, Beta-Sitosterol, Rutin



Chemical constituents: (a)Purpurin A (b) Purpurin B (c)Karanjin (d)Tephrone (e) Delphinidin (f)Rotenone (g) Ursolic acid (h)Tephroglabrin (i) Rutin

PHARMACOLOGICAL ACTIONS OF TEPHROSIA PURPUREA [25]-

Plant Part	Therapeutic use
Bark	Colic
Leaf	Contusions, dyspepsia, gonorrhea, hemorrhage, pectoralis muscles, syphilis
root	Abdominal pain, acne vulgaris, anaemia, anthelmintics, antirheumatic, asthma, bronchitis, colic, diarrhoea, dysmenorrhea, dyspepsia, elephantiasis, fever, fishes poisonous, flatulence, gingivitis, hemorrhage, hepatomegaly, inflammation, liver diseases, otitis media, skin diseases, hydrocele, toothache, turberculosis, urination disorders
seed	Anthelmintics, eczema, leprosy, scabies,
stem	Toothache
Whole plant	Anthelmintics, antirheumatic, attention deficit disorder with hyperactivity, diuretics, fibrosis, jaundice, laxatives, liver disorder

Tephrosea purpurea shows hepatoprotective, antiulcer, anti-inflammatory, antimicrobial, antianxiolytic, antioxidant, cytotoxic, anti-allergic, antiviral, antituberculosis, spasmolytic, antiepileptic and nephro-protective activities.[26] Rakesh Pundir et al., (2009) [27] studied alkaline preparation of Tephrosia purpurea is used in treatment of liver and spleen diseases. It is protective against CCl4 and D-galactosamine poisoning.

A case study on liver cirrhosis with ascites reveals that Sharpunkha (Tephrosia purpurea) removes portal hypertension. It is specifically considered for the treatment of inflammation of spleen and liver. Powdered aerial parts prevent an elevation of SGOT, SGPT and bilirubin levels.[28] Tephrosia purpurea controls the bleeding through its

hot, pungent, bitter properties, and pleehaghna prabhav. Tephrosia purpurea is more over acts on detoxification and purification of blood reservoir organs like liver and spleen. It stops the aggravation of vitiated pitta and rakta and breaking the etiopathogenesis of Raktapradar.[29]

a case report of urolithiasis with bilateral uretric stone affected patient produced complete relief in pain and urinary obstruction with complete expulsion of both ureteric stone at the end of three months when treated with kulatha kwatha with the anupana of sharpunkha and sendha namak (rock salt).[30]

DISCUSSION

Sharpunkha is widely used plant in Ayurveda classics for the treatment of various diseases. This study shows that all parts of Sharpunkha have been used for medicinal approach. Most of its synonyms contains word punkha in it.

The review clearly stated that sharpunkha is designated as yukrutplehari (acts on liver and spleen), beneficial in gulma roga, visha (poisoning) and works on wound healing. Its pungent, bitter and astringent taste and having laghu, ruksha, deepan and Tikshna properties with hot potency pacifies vata and kapha dosha. Sharpunkha also having properties to treat female infertility, ashamri (calculi) and swasa roga (respiratory disorders). Pharmacological profile shows its hepatoprotective, anti-helminthic, antiulcer, antirheumatic and digestion stimulant activity.

Review of Previous research and case study clears its significant effect in hepatotoxicity, portal hypertension, uretric stone and various other diseases. kim et al., (2023) [31] studied that Tephrosin reduced the expression of the anti-apoptotic factor XIAP. This study demonstrates that tephrosin is a potent antitumor agent that can be used in the treatment of paclitaxel-resistant ovarian cancer via the inhibition of the FGFR1 signaling pathway. Another research by Du J et al., (2021) [32] reveals that Tephrosin significantly inhibited the proliferation of pancreatic cancer cells and induced mitochondrial-related apoptosis. ROS are required for tephrosin to exhibit antiproliferative activity and trigger apoptosis in pancreatic cancer cells. Tephrosin significantly inhibited the growth of pancreatic cancer cells *in vivo* and has no observable toxicity, indicating that tephrosin is a potential anticancer agent, and deserves further development as a new therapy for pancreatic cancer. A study in which, assessed the effect of *Tephrosia purpurea* on 12-O-tetradecanoyl phorbal-13-acetate (TPA; a well-known phorbol ester) induced cutaneous oxidative stress and toxicity in murine skin. The pre-treatment of Swiss albino mice with *Tephrosia purpurea* prior to application of croton oil (phorbol ester) resulted in a dose-dependent inhibition of cutaneous carcinogenesis. opical application of *Tephrosia purpurea* 1 h prior to each application of croton oil (phorbol ester) resulted in a significant protection against cutaneous carcinogenesis in a dose-dependent manner. The animals pre-treated with *Tephrosia purpurea* showed a decrease in both tumor incidence and tumor yield as compared to the croton oil (phorbol ester)-treated control group. In addition, a significant reduction in TPA-mediated induction in cutaneous ornithine decarboxylase (ODC) activity and [^{3}H] thymidine incorporation was also observed in animals pre-treated with a topical application of *Tephrosia purpurea*.[33]

CONCLUSION

This review article has delved into medico-historical background and contemporary aspects related to drug Sharpunkha (Tephrosia purpurea). Through studying, we have gained a deeper understanding of drug activity and pharmacological actions of tephrosia purpurea. Overall, it is evident that sharpunkha has good hepatoprotective activity.

However, this review only based on ayurveda literature and contemporary research related to sharpunkha, there is also scope of further clinical trials related to drug action and efficacy.

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