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Suman Singh
Ph.D. Scholar, Department of Dravyaguna, I.P.G.T & R.A, G.A.U, Jamnagar, Gujarat, India

Neha Parmar
Ph.D. Scholar, Department of Dravyaguna, I.P.G. & R.A, G.A.U, Jamnagar, Gujarat, India

Bhupesh Patel
Assistant Prof, Department of Dravyaguna, I.P.G.T & R.A, G.A.U, Jamnagar, Gujarat, India

Correspondence:
Suman Singh
Ph.D. Scholar, Department of Dravyaguna, I.P.G.T & R.A, G.A.U, Jamnagar, Gujarat, India

A review on *Shalparni* (*Desmodium gangeticum* DC.) and Desmodium species (*Desmodium triflorum* DC. & D*esmodium laxiflorum* DC.) – Ethnomedicinal perspectives

Suman Singh, Neha Parmar, Bhupesh Patel

Abstract
Shalparni is one of the drug of *Laghupanchamoola* so of *Dashamoola. Shalparni* is mainly found to be used as one of the ingredient of *Parnidwaya, Chatuparni* or as *Laghupanchmoola/Dashamoola*. *Shalparni* is found widely used in Samhitas, its various single uses were reported in various *chikitsagranthas*. It possess *Tikta-kashaya* rasa, *Ushna veerya*, *Madhura vipaka* and *Guru guna*. It is found indicated in various conditions like, *Jwara*, *Atisara*, *Shwasa*, *Chardi*, *Shwasa* etc. Accepted botanical source of *Shalparni* is *Desmodium gangeticum* which belongs to family Fabaceae, is reported as endangered species. In India 49 Desmodium species are found where, 15 Desmodium species are reported in Gujarat. Vaidyas of Gujarat use different species of Desmodium at the place of *Shalparni* i.e. *Desmodium triflorum* and *Desmodium laxiflorum. Desmodium gangeticum* is used by most of the tribal communities of India. Some tribal communities of Assam and Bihar also use *Desmodium laxiflorum* for treating various disorders. *Desmodium triflorum* is also found to be used by many tribal communities of different states of India like, A.P., W.B., U.P., M.P., Tamilnadu etc. *Desmodium gangeticum* is also found being used by tribes of Uganda and China. The present study is an attempt to review various tribal claims regarding different Desmodium species being used in India

Keywords: *Desmodium, Desmodium gangeticum, Desmodium laxiflorum, Desmodium triflorum, Shalparni*

1. Introduction
Dashmoola is a combination of *bhruhatpanchmoola* and *laghupanchamoola*, which consists of roots of ten drugs. Established botanical source of *Shalparni* is *Desmodium gangeticum* Linn. DC, which is an endangered plant belonging to family Fabaceae. In Hooker's "Flora of British India" (1879, 1999 (reprint)), 49 species of Desmodium were recorded. Among which *Desmodium gangeticum* is an important and well explored species in Ayurveda. *Shalparni* is found widely used in samhita singly or as one of the content of *chatuparni*, *parnidwaya*, *laghupanchmoola* and *Dashamoola*. Which suggests its availability at that time and popularity as medicinal herb. Shah (1978) in his "Flora of Gujarat State" provided the first comprehensive account of Desmodium species in Gujarat recording 14 species. [1] Latter on Raghvan et. al. (1981) listed 15 Desmodium species in their checklist of the plants of Gujarat. [2] In gujarati *Shalparni* is known as ek-pan pandadiyo. Some plants of same family and genus which looks like *Shalparni* are being used by local vaidyas of Gujarat which are known as *Ruchado-pandadiyo*, *Zinko-pandadiyo* etc.

In different countries approx. 20,000 medicinal plants are being used, out of which 10,000 (approx.) plants are used for phyto-therapy in Indian system of medicine, which has been compiled recently by World Health Organization (WHO). According to Biological Conservation Letter, more than 7,000 species of plants found in various ecosystems are said to be medicinal in the country [3]. So, India is one of the world's richest sources of medicinal and aromatic plants.

In India 65% of the population bank on ethno medicine which is the main source of their primary health care needs [4]. Over 550 tribal communities are covered under 227 ethnic groups residing in about 5000 villages of India in different forests and vegetation types. [5] It is also necessary to collect the information about the knowledge of traditional medicines, preserved in tribal and rural communities of various parts of India before it is lost permanently. Recently various ethno botanical studies have been reported to expose the knowledge from the various

tribe's of India. Documenting the indigenous knowledge through ethno botanical studies is important for the conservation of biological resources as well as their sustainable utilization. In such a way the aim of the present review is to document the ethno medicinal uses found for Desmodium genus and to suggest that the traditional knowledge should be integrated with modern practices to formulate their sustainable utilization.

Materials and methods

In the present study information were collected for the source plant being used as *Shalparni* in Gujarat. Ayurvedic classics, lexicons and other compilatory treatises were reviewed for documenting the information about *Shalparni*. And various books on ethno-botany were referred.

The published works on journals, and web pages were also reviewed about *Shalparni* in terms of Ethnomedicinal uses.

Observations and Results

Table 1: *Rasapanchaka* of *Shalparni* are as follows:

Raspanchaka		***Nighantu***					
		DN	**M N**	**KN**	**BP**	**RN**	**Sha.N**
Rasa	***Madhura***	-	+	+	-	+	+
	Tikta	-	+	+	+	+	+
Guna	***Guru***	+	+	+	+	-	-
Veerya	***Ushna***	+	+	-	+	-	+
Vipaka	***Madhura***	-	-	-	-	+	+

Table 2: The *Rogaghnata* of drug *Shalparni* are mentioned as follows: [6-13]

Sr.no.	***Rogaghnata***	**D.N**	**So.N**	**M.N.**	**K.N**	**B.P.**	**R.N**	**Sha.N**	**N.Sh.**
1.	*Vishamajwar*	+	-	-	-	-	+	+	-
2.	*Prameha*	+	-	-	+	-	+	-	-
3.	*Arsha*	+	-	-	-	-	+	-	-
4.	*Shopha*	+	+	-	-	-	+	-	-
5.	*Shoola*	-	+	-	-	-	-	-	-
6.	*Kitanashak*	-	+	-	-	-	-	-	-
7.	*Vishaghna*	-	-	-	+	+	-	+	-
8.	*Krumi*	-	-	-	+	+	-	+	-
9.	*Kshata*	-	-	-	-	+	-	+	-
10.	*Kasa*	-	-	-	+	+	-	+	-
11.	*Chardi*	-	-	+	+	+	-	+	-
12.	*Jwara*	-	-	+	+	+	-	+	-
13.	*Shwasa*	-	-	+	+	+	-	+	-
14.	*Atisara*	-	-	+	+	+	-	+	-
15.	*Shosha*	-	-	+	+	+	-	+	-
16.	*Santapa*	+	-	-	-	-	+	-	-
18.	*Hridroga*	-	-	-	-	-	-	-	+
19.	*Trisna*	-	-	-	-	-	-	-	+

Single uses of *Shalparni* found in Samhita are as follows:

a. Cardiac pain:

Shalparni boiled with milk is efficacious in cardiac pain. [14]

b. *Raktapitta*:

Shalparni with *mudagrasa* in *ahara*. [15]

c. *Vatarakta*:

Shalparni, *Prisniparni* or both types of *Brihati* pounded with milk and mixed with saturating drink should be taken. [16]

d. *Netraroga*:

Root of *Shalparni* combined with rocksalt and *Maricha* and rubbed with sour gruel in a copper vessel should be used as collyrium. It destroys *pilla*. [17]

e. Hemicrania:

1. Juice of *Shalparni* should be applied locally. [18]
2. Snuffing with *Shalparni* juice alleviates hemicranias. [19]

f. For easy parturition:

Application of the paste of *Shalparni* root on navel, pelvis, vulva etc. expels the confounded foetus. [20]

g. Pediatric diseases:

Water decocted with *Shalparni*, *Prishniparni* and *Puga* bark and mixed with honey pacifies three *doshas* and checks all types of diarrhea. [21]

Table 3: Ethno-medicinal uses of various Desmodium species being used by tribes of India.

Sr.no.	**Drug**	**Parts used**	**Uses**	**Tribes/State**
		Leaf	1. In acidity[1] [22], boils / blisters / burns.	Srikakulam/A.P.
			2. Decoction with black piper (*Piper nigrum*) used as blood purifier, and to cure fever. [23]	Buxar/Bihar
			3. Leaf decoction is given to drink twice a day for 2 - 3 days to cure diarrhoea and dysentery. Leaf paste is applied on anus once a day for two weeks to cure piles. [24]	Sivagangai/ Tamilnadu
			4. Moreover, the leaves powder with a pinch of salt and applied on boils and blisters. [25]	Chenchu tribal communities, Nallamalai hill/ Andhra Pradesh,
			5. Topically apply the paste of leaves of to cure the eczema infection along with other dermal disorders. [26]	Assam
			6. The leaf paste along with Aloe-vera as anti-dandruff and to prevent hair falling. [27]	Kharwas,Polekero, Kevat, Dhobhi communities of Chandauli district,

				U.P.
			7. Topically applied fresh leaves juice to treat scabies and ringworm. [28]	Bheel and Bhilala tribes, Jhabua District, M.P.,
			8. The leaf is regarded beneficial in chronic fever and is consumed in the form of decoction. [29]	Gorakhpura/U.P
			9. Whooping cough, chewed for about to cure toothache. [30]	Rewa/M.P.
			10. Used as antidote to snakebite and scorpion sting. [31]	Santhal pargana/Bihar
			11. It is useful drug in the treatment of diarrhea, asthma, tuberculosis and in urogenital diseases. [32]	Gorakhpura/U.P
			12. Decoction of root given in fever. [33]	Birbhum/W.B.
A.	*Desmodium gangeticum*DC		13. Decoction is given to treat intermittent fever and malaria. [34]	-
			14. Rheumatism. [35]	Salegu/A.P
			15. Oral administer of one spoonful root extract (locally known as Gitanaramu) twice a day, to cure whooping cough. [36]	Chenchu tribal communities, Nallamalai hill/ Andhra Pradesh,
			16. Use 20 ml root decoction twice daily to treat diarrhoea. [37]	Kondh tribe/Odisha
			17. The root chewed to cure jaundice. [38]	Tharus-Basti dist./U.P.
		Root	18. Oral administration of root paste and powder used to treat typhoid fever, cerebrospinal meningitis and also as an antidote of snake venom. [39]	Tribes of Gond, Kols, Mushar, Baiga & Nutts in Vindhya region/ U.P.
			19. The root powder of D.gangeticum with honey and applied frequently to treat mouth ulcer. [40]	Pawara tribals-Nandurbar district/ M.H.
			20. 10 gm of dried crushed roots and Pseudarthria is mixed together and boiled in 200 ml of water for 3 minute and 2ml of water decoction is prescribed thrice daily after meal by tribal people to treat type 2 diabetes mellitus. [41]	Waynad / Kerala
			21. Root powder is boiled with milk and half cup of it is prescribed for seven or more days by tribal people, to promote flatulence. [42]	Jalgaon District, Maharastra,
			22. Paste of the root is given orally to the victim of snake bite once or twice. It is claimed that the patients are being cured by this treatment. Sour things should be avoided. [43]	Bankura/W.B.
			23. Panchang is to be taken during menstrual period, women become sterile. [44]	Bastar/M.P.
			24. As antidote in snake bite, Asthma bronchitis, Cough, Diarrhea, Dysentery, Fever, Mouth ulcer, Rheumatism,Sedative agent and medicine for abortion, To cure premature ejaculation, Toothache, Typhoid and Vomiting. [45]	Sitamata(Rajasthan),Purulia(W.B), Nandurbar(MH), Theni (Western ghat),
		Panchanga (Whole plant)	25. Decoction is given to treat dysentery, digestive disorders, oedema, diarrhea, fever and urinary tract infections; it is also used as anti-inflammatory. [46]	-
			26. Whole plant is prescribed traditionally by Tribal peoples against several gynecological disorders and to prepare “Salampak” tonic. [47]	Jhalod Taluka of Dhahod district, Gujarat
			27. Plant is used as febrifuge, bitter tonic, diuretic, anticatarrhal. [48]	Amravati Tahsil/MH
			1. In bone fracture, malaria	Srikakulam/A.P.
			2. Whole plant chewed for tooth ache. [49, 50]	Rewa/M.P.,Nepal
			3. Whole plant is used in curing stomachache and piles. [51]	Kurichyas-kannur dist/Kerela
			4. The whole plants are boiled & the water is taken for kidney problem & urinal problems. [52]	Mizoram
			5. The whole plant is considered as a beneficial drug in the treatment of various gastric ailments and is administered in the form of decoction mixed with honey. [53]	Gorakhpura/U.P
		Panchanga (Whole plant)	6. Cooked whole plant given in diarrhea and dysentery and as tonic to epileptic patient. [54]	Birbhum/W.B.
			7. Plant laxative, bechic; [55]	Lucknow/U.P
B.	*Desmodium triflorum* DC.		8. The whole plant made into mixture with leaves of *Leucas cephalotes* and taken to cure diarrhea and dysentery. [56]	Tharus-Basti dist./U.P.
			9. About 10g root powder is given with water twice	Raebareli dist/U.P.

			a day to check fever. [57]	
		Root	10. Mixture of roots and dried spikes along with roots of *Solanum anguivi* Lam. and leaves of *Desmodium triflorum* are given for curing cough, bronchitis and fever. [58]	Kannur/Kerela
		Leaf	11. Decoction of leaves is taken orally along with 100 ml of milk twice a day for 2 days to get relief from dysentery. [59]	Sivagangai/ Tamilnadu
			12. Leaf extract is used for dysentery and diarrhoea.[60]	Dindigul / Tamil Nadu
			13. Leaf antidiarrhoeal, galactogenic [61] and used in skin disease.	Srikakulam/A.P
			14. Leaf paste is applied externally in the case of inflammation. [62]	Wayanad/Kerela
			15. Fresh leaf juice is applied on wounds, [63] on sores. [64]	Mizoram, Birbhum/W.B.
			16. The leaf juice is used to cure wounds. The fruit is consumed in the liver complaints. 17. Leaves paste on wound and abscesses. [65]	Kullu dist/North-west himalaya
C.	*Desmodium laxiflorum* DC.	*Panchanga* (Whole plant)	1. Plant is pounded, mixed with water and given in stomach pain and fever. [66]	Santhal Pargana/Bihar
		Leaves	2. Leaves and stem are boiled with water and taken. Menstrual Cycle irregularity disappears, helps fight Uterus infection. [67]	Dhemaji dist./Assam
		Root	3. 50-100 g roots are crushed and boiled in water; 50 ml extract mixing with powder of three fruits of *Piper longum* L. is taken daily for 10-15 days to cure jaundice. [68]	Golaghata dist./Assam

Table 4: Ethno-medicinal uses of *Desmodium gangeticum* found being used by tribes of other countries.

Drug	Parts used	Uses	Country
Desmodium gangeticum DC	Root	1. The roots are chewed by the tribal people to cure premature ejaculation. [69]	**Bulamogi community/ Uganda,**
		2. Root extract administered (9–15 gm/day) orally to treat diarrhea and given to children as sedative agent. Root and leaf pastes are applied externally to get relief from toothache and headache respectively. [70]	**Chinese tribes**

Discussion

Shalparni is in use since *Vedic* periods. *Rasa panchaka* of *Shalparni* found in various nighantus are *Madhura-tikta rasa*, *Ushna veerya*, *Guru guna* and *Madhura vipaka*. (Table no. 1) It is indicated in conditions like *Jwara* (Fever), *Atisara* (Diarrhea), *Chardi* (Vomiting), *Shosha*, *Shopha* (Odema), *Krimi* (Worms), *Visha* (Poison) etc. by most of the referred nighantus. (Table no. 2) It is mainly used in compound form as *Panchamoola* or *Dashamoola* or either as *Chaturparni* form or as *Parnidwaya*. Single uses of *Shalparni* are very rarely found in texts. In Charak Samhita it is indicated in *Vatrakta chikitsa* in *kwatha* form and given with milk as *sahpana*, which is due to its *madhura –tikta rasa* and *madhura vipaka* which helps in alleviating vitiated *vata* and *dushta rakta.* In *Hrudshoola*, *Shalparni* is indicated with milk by Acharya Charak, which suggests it can be given in *Vataja hrudshoola*. Acharya charak has advised *Shalparni* in *Raktapitta chikitsa* in *ahara kalpna* with *mudga rasa*. *Shalparni's* single uses are found in *Netraroga*, *Ardhavabhedaka*, *Balaroga* and for easy parturition.

Various ethnomedicinal claims regarding *Desmodium gangeticum* were found from different parts of India like, Andrapradesh, Uttarpradesh, Madhyapradesh, West Bengal, Tamilnadu, Maharastra etc. which shows its availability and popularity among tribal peoples. Ethnomedicinal claims are found mostly in the context of *D. gangeticum* and *D. triflorum*. *Desmodium laxiflorum* is found less popular or have less availability as compared to other two species. *D.gangeticum* is also found using by tribes of Uganda and China. (Table no. 4)

Different part wise uses of *Desmodium gangeticum* is found in practice in various tribal communities of India. Individual uses of leaf and roots are found, whereas uses of whole plant are also observed. Maximum uses of roots of *D.gangeticum* are found in compared to leaf and whole plant. Classically, also mentioned part used is root of *Shalparni.* Root is advised in whooping cough by tribal communities of rewa district of M.P. and also found being used by chenchu tribal communities of A.P. Roots and *Panchang* (Whole plant) are used as antidote for snake bite by tribes of Bihar, A.P, various tribes of U.P., W.B., and in Rajasthan, where also used as antidote for scorpion sting by tribal communities of santhal pargana of Bihar. Tribes of W.B. claimed that victim of snake bites are cured by oral use of root paste. Leaves, roots and whole plant are used in treating fever. (Table no. 3)

Desmodium triflorum is also found popular in various tribes equal to *D. gangeticum*. Leaves and whole plant of *D.triflorum* are found extensively used in comparison to root. Whole plant is found to be used in treating toothache, stomachache, piles, kidney problems, urinal problems, diarrhea, dysentery and also used as tonic in epileptic patients. *Panchanga* (Whole plant) is also found to be given in bone fracture by tribes of Srikakulam district, A.P. (Table no. 3)

Desmodium laxiflorum is mainly used by tribes of Santhal pargana region of Bihar, Dhemaji district and Golaghat district of Assam. *Panchanga* (whole plant) is used in treating stomachache and fever, where leaves and stems are found in treating gynaecological disorders. (Table no. 3)

D. laxiflorum is also found indicated in similar conditions like

D. gangeticum i.e. Fever, Diarrhea, Dysentry, Stomachache, UTI (urinary tract infection), Bronchitis, Cough etc. Leaves of *D. triflorum* are used locally on inflammation, wounds, sores and on abscess by the tribes of Kerela, Mizoram and W.B. Leaf paste of *D. gangeticum* is also used on boil, blisters and burns by tribes of Srikakulam district and Chenchu tribal of A.P. and also used in treating scabies, ringworm and dandruff. Tribes of Kullu district, Himachala uses fruits of *D. triflorum* in treating Liver complaints, where roots of *D. laxiflorum* are used to be given with *Piper longum* daily for 15-16 days for treating jaundice by tribes of Assam. (Table no. 3)

Conclusion

Shalparni is indicated singly in various conditions like *Ardhavbhedak* (Hemicrania), *Raktapitta* (Hemorrhagic disorder), *Vatarakta* (Gouty arthritis), *Hrudshoola* (Cardiac pain), etc. in different *Chikitsagranthas* which suggests its potency in particular conditions. *Desmodium gangeticum* and *Desmodium triflorum* are used by tribals in many similar conditions like, fever, diarrhea, dysentery toothache, rheumatism and leaf of both the species are found to be used locally on wound, sores, boils, abscess, scabies, eczema etc. Same indications for *shalparni* are mentioned in classics as found in ethnomedicine. Similar uses of both the species suggests that they might possess similar *Rasapanchak* i.e. *Tikta-madhura rasa*, *Guru Guna*, *Ushna veerya* and *Madhura vipaka*. Less claims regarding *D. laxiflorum* is found, it is also indicated in similar conditions like other two species. Roots and *Panchanga* (Whole plant) of *D. gangeticum* are found indicated as antidote in snakebite and scorpion sting by different tribal communities of India like Bihar, A.P., W.B., U.P etc. which reflects its efficacy as antidote. Same uses of Desmodium species are being found in different tribal communities in different parts of India, which shows popularity of Desmodium species and its efficacy. Extensive uses of *D. gangeticum* and *D. triflorum* by tribal communities and less claims regarding *Desmodium laxiflorum* suggests there more and less availability respectively in the forest areas of A.P., U.P., M.P., W.B., Tamilnadu, Mizoram, Kerala, Maharashtra etc.

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