



Review Article

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A COMPREHENSIVE REVIEW ON *PRISHNIPARNI -DESMODIUM GANGETICUM* (LINN.) DC.

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Abstract-*Prishniparni* is a significant and well-known drug expoundly discussed in the *Ayurvedic* classics. The illustration and description of the drug commences from the *Vedic* period itself. Various therapeutic potential and uses of the drug is described in *Charaka Samhita*, *Susrutha Samhita*, *Ashtanga Hridaya* and *Chikitsa Manjari*. In *Ashtanga hridaya* it is described as one among the *amshumatidwaya* and as an ingredient of the group of *dashamoola*. The drug *Prishniparni* is extensively described along with its synonyms, properties and uses in various *Nighantus*. The plant is botanically identified to be *Desmodium gangeticum* (Linn.) DC. belonging to the family Fabaceae, which is an erect diffusely branched under shrub or herb. It has poorly developed main root and prominent lateral roots. In Kerala *Desmodium gangeticum* (Linn.) DC. is *Prishniparni* and is commonly known as orila. The plant is a rich source of alkaloids, flavonoids, steroids and glycosides. The plant is known to exhibit anti-oxidant, cardioprotective, anti-hypertrophic, anti-ulcer, hepatoprotective, anti-amnesic, wound healing and, anti-inflammatory activities.

Key words: *Prishniparni*, *Desmodium gangeticum* (Linn.) DC., *Ayurvedic* classics, Pharmacological activity.

INTRODUCTION

Prishniparni is a significant and well-known drug expoundly discussed in the *Ayurvedic* classics. The illustration and description of the drug commences from the *Vedic* period itself. In the *Samhita period* it is described as one among the *amshumatidwaya* and as an ingredient of the group of *dashamoola*.^{1,2}Synonyms appertaining to the identification of the drug, its therapeutic properties (*rasadipanchaka*), actions (*karma*) and therapeutic indications (*rogagnata*) of the drug is mentioned in various *Nighantus*.

MATERIALS AND METHODS

Literary review of the current literary research was done by referring various *Ayurvedic* classical texts to extract information regarding *Prishniparni-Desmodium gangeticum* (Linn.) DC. Also, the review has been done following various research journals, scientific papers and internet sources.

RESULTS AND DISCUSSION

I. Historical background

Vedic period

Information regarding the plant can be traced out from *Vedic* treatise like *Adharvaveda*. In the book ‘The Atherva -Veda and The Ayur-Veda’³, it is quoted that *Prishniparni* is capable of providing protection against evil beings. The drug has been voiced to be useful in destroying *krimi* and is assigned names such as *devi*, *sahamana*, *sahasvati* according to its *guna bheda*.⁴

Samhita period

Prishniparni is mentioned in the classics as a drug with multidimensional uses. Acharya Charaka has included it under *ghrita* preparations advocated orally in curing *hridroga*⁵ and *Paithika hridroga*.⁶It is described as best among the *sangrahika*(causing astringent effect), *vatahara* (alleviates vata), *deepaneeya* (promotes digestion) and *vrishya* (increases virility) drugs by Acharya Charaka.⁷ Acharya Susrutha has mentioned it as an

ingredient in a formulation used in *Panchakarma* therapy, known as the *rodradhi basthi*.⁸ In *Ashtanga hridaya*, Acharya Vagbhata included *Prishniparni* under *Vidaryadigana* having *hridya karma*.⁹ In the *Ashtanga hridaya* it is described as one among the *amshumatidwaya* and as an ingredient of the group of *dashamoola*.^{1,2} *Prishniparni* is such a plant which finds to possess varied medicinal uses. Oral administration of *Sthirasidha payas* is mentioned in *vatavyadhi chikitsa* advocated to be given in *hridayagata vata*.^{10,11}

Nighantu Period

The drug *Prishniparni* is extensively described along with its synonyms, properties and uses in various *Nighantu*'s. Various *Nighantu*'s like *Amarakosha*¹², *Madanadi Nighantu*¹³, *Dhanwantari Nighantu*¹⁴, *Sodhala Nighant*¹⁵, *Madanapala Nighantu*¹⁶, *Kaiyyadeva Nighantu*¹⁷, *Raja Nighantu*¹⁸, *Bhavaprakasha Nighantu*¹⁹, *Saraswati Nighantu*²⁰, *Saligrama Nighantu*²¹, *Nighantu Adarsha*²², *Abhidhana Manjari*²³, *Mahoushadhi Nighantu*²⁴, *Priya Nighantu*²⁵ and *Ayurvediya Oushadi Nighantu*²⁶ has provided details pertaining to the drug. Individual *Nighantukara*'s has described the drug under specific *vargas*. The synonyms regarding the morphology of root, leaf and flowers aid in identification of the drug. The information regarding the therapeutic properties (*Rasadipanchaka*), actions (*Karma*) and therapeutic indications (*Rogaghnata*) of the drug is well emphasized during the *Nighantu* period. The *Dhanwantari Nighantu*¹⁴ has mentioned about *Prishniparni* and *Prishniparnivishesha*. The indication of *Prishniparni* in *vaticarogas* is mentioned specifically in *Raja Nighantu*.¹⁸ The *upayukthaanga* and its *matra* of half to one *tola* is mentioned for the first time in *Nighantu Adarsha*.²² *Priya Nighantu* mentions that the drug is *balaprada*.²⁵

The plant is widely used and quite popular among the traditional *Ayurvedic* physicians. The specification of the drug in *hridroga* is mentioned in famous *Malayalam* medical textbook *Chikitsa Manjari* in *hridroga chikitsa*.²⁷ There are references pertaining to the therapeutic utility of the drug in textbooks like *Yogamritam*²⁸ and *Sahasrayoga*.²⁹

II. Classification (Vargeekarana)

As per the information available from the literature, the drug *Prishniparni* is included under *rasa skanda, gana* or *varga*.

Table No:1 Classification (*Vargeekarana*)of *Prishniparni*

Sl. No	Name of the text	Skanda/ Varga/ Gana
1	<i>Caraka Samhita</i>	<i>Sandhaneeyavarga</i> ³⁰ , <i>Sothahara varga</i> ³⁰ , <i>Angamardaprasamana varga</i> ³⁰
2	<i>Susruta Samhita</i>	<i>Vidarigandhadi gana</i> ³¹ , <i>Laghu panchamoola</i> ³¹
3	<i>Ashtanga Sangraha</i>	<i>Madhura skandha</i> ³² , <i>Vidaryadi gana</i> ³³ , <i>Hraswa panchamoola</i> ³⁴ , <i>Sandhaneeya mahakashya</i> ³⁵ , <i>Shothahara mahakashya</i> ³⁵ , <i>Angamardaprashamana mahakashya</i> ³⁵
4	<i>Ashtanga Hridaya</i>	<i>Madhura skandha</i> ³⁶ , <i>Vidaryadi gana</i> ⁹ , <i>Hraswa panchamoola</i> ³⁷
5	<i>Madanadi Nighantu</i>	<i>Madanakutajadi varga</i> ¹³
6	<i>DhanwantariNighantu</i>	<i>Guduchyadi varga</i> ¹⁴
7	<i>Sodhala Nighantu</i>	<i>Guduchyadi varga</i> ¹⁵
8	<i>Madanapala Nighantu</i>	<i>Abhayadi varga</i> ¹⁶
9	<i>Kaiyyadeva Nighantu</i>	<i>Oushadi varga</i> ¹⁷
10	<i>Raja Nighantu</i>	<i>Shatahwadi varga</i> ¹⁸
11	<i>Bhavaprakasa Nighantu</i>	<i>Guduchyadivarga</i> ¹⁹
12	<i>Saraswati Nighantu</i>	<i>Utpaladi Varga</i> ²⁰
13	<i>Nighantu Adarsha</i>	<i>Palashadi varga</i> ²²
14	<i>Abhidhanamanjari</i>	<i>Madanadi varga</i> ²³
15	<i>Mahaoushadhi Nighantu</i>	<i>Vilwadi Varga</i> ²⁴
15	<i>Priya Nighantu</i>	<i>Hareetakyadi varga</i> ²⁵
16	<i>AyurvediyaOushadi Nighantu</i>	<i>Prithukshupadi Varga</i> ²⁶

III. Synonyms and Interpretations (*Paryayas*)

Synonyms referring to the morphology, properties and actions of the drug *Prishniparni* can be traced out from the various *Nighantus*. The synonyms pertaining to the habit of the plant, the growth and nature of root, the appearance of the leaves and inflorescence can be seen.

Table No: 2 Synonyms (*Paryayas*) of *Prishniparni*

Synonyms	Am.K ¹²	D.N ¹⁴	So.N ¹⁵	M.P ¹⁶	Ka.N ¹⁷	Ra.Ni ¹⁸	B.P ¹⁹	Sa.Ni ²¹	Ni.A ²²	Ab.M ²³	Ma.Ni ²⁴	PN ²⁵
<i>Ahiparni</i>							+					
<i>Ahitila</i>											+	
<i>Amshumati</i>								+				
<i>Anghribalaparni</i>		+										
<i>Chitraparni</i>			+			+	+	+			+	+
<i>Dhamani</i>						+						
<i>Dhavani</i>		+	+	+	+		+	+	+		+	
<i>Deergha</i>						+						
<i>Deerghaparni</i>						+						
<i>Guha</i>		+	+		+	+	+	+	+	+		
<i>Kalashi</i>		+	+	+	+	+	+		+	+	+	
<i>Kleetani</i>					+					+		
<i>Krishnapushpa</i>										+		
<i>Kroshtukapucha</i>		+	+	+	+	+	+	+	+	+		+
<i>Langali</i>			+		+	+				+		
<i>Mahaguha</i>						+						

<i>Parnika</i>		+		+				+				
<i>Praparni</i>										+		
<i>Prishniparni</i>		+	+	+	+	+	+	+	+	+		+
<i>Prithakparni</i>		+	+	+	+	+	+	+		+	+	
<i>Shwapucha</i>						+						
<i>Simhalangali</i>											+	
<i>Simhapucha</i>			+		+	+	+	+				
<i>Snidgaparni</i>					+							
<i>Sreshta</i>										+		
<i>Srigaalaparnika</i>			+									
<i>Srigaalapucha</i>					+							
<i>Srigaalavinna</i>		+	+		+	+				+		
<i>Sthira</i>								+		+		
<i>Tanvi</i>		+										
<i>Upachitra</i>			+			+						
<i>Varthi</i>										+		

The morphological features, pharmacological properties and actions are well interpreted in the synonyms. The interpretations of the synonyms are available from *Amarakosha*¹², *NamrupaVijnanam*³⁸ and *Shabdakalpadruma*.³⁹

Based on morphological Characters:

Amshumati: Roots are fibrous

Aanghribalaparni: Leaves are thickly arranged on the stem.

Chitraparni: Leaves are mottled

Deergha: Roots go deep into the soil

Deerghaparni: that which has roots that go deep into the soil

Guha: Possess roots that go deep into the soil

Krishnapushpa: That which has dark coloured flowers.

Kroshtukapucha, Langali, Shwapucha, Simhapucha, Simhalangali, Srigaalaparnika, Srigaalapucha, Srigaalavinna: The inflorescence resembles the tail of a jackal

Mahaguha: Possess roots that go very deep into the soil

Parnika: That which possess distinct leaves

Praparni: Possess distinct leaves

Prishniparni: small herb that possess distinct leaves

Prithakparni: Leaves are special and distinct from other plants

Snigdhaparni: Leave have an oleated appearance

Tanvi: The plant is thin and small.

Upachitra: Leaves are mottled

Varthi: The roots are like a streak or line

Based on Pharmacological actions:

Dhamani, Dhaavani: That which expels toxins from the body

Kalashi: That which increases semen.

Sthira: That which strengthens the body

Shreshta: That which is supreme in action.

IV. Pharmacological properties (*Rasa Panchaka*)

The *rasa panchaka* of a drug is comprised of *rasa, guna, veerya, vipaka* and *prabhava*. The *rasa panchaka* as mentioned in the literature has been tabulated below.

TableNo:3 Pharmacological properties (*Rasa panchaka*) of *Prishniparni*

<i>Samhitas &Nighantus</i>	<i>Rasa</i>	<i>Guna</i>	<i>Veerya</i>	<i>Vipaka</i>	<i>Prabhava</i>
<i>Madanadi Nighantu</i> ¹³	<i>Madhura</i>	<i>Sara,Laghu</i>	<i>Ushna</i>	-	-
<i>Dhanwantari Nighantu</i> ¹⁴	<i>Madhura</i>	<i>Ushna,Laghu</i>	<i>Ushna</i>	-	-
<i>Madanapala Nighantu</i> ¹⁶	<i>Madhura</i>	<i>Laghu</i>	<i>Ushna</i>	-	-
<i>Kaiyyadeva Nighantu</i> ¹⁷	<i>Madhura</i>	<i>Ushna,Sara</i>	<i>Ushna</i>	-	-
<i>Raja Nighantu</i> ¹⁸	<i>Katu,Amla, Tiktha</i>	<i>Ushna</i>	<i>Ushna</i>	-	-
<i>Bhavaprakasa Nighantu</i> ¹⁹	<i>Madhura</i>	<i>Guru</i>	<i>Ushna</i>	-	-
<i>Nighantu Adarsha</i> ²²	<i>Madhura, Tiktha</i>	-	<i>Ushna</i>	<i>Madhu ra</i>	-
<i>Mahaoushada Nighantu</i> ²⁴	<i>Madhura</i>	<i>Sara</i>	<i>Ushna</i>	-	-
<i>Ayurvedic Pharmacopoeia of India</i> ⁴⁰	<i>Madhura, Amla, Katu,Thikta</i>	<i>Laghu,Sara</i>	<i>Ushna</i>	<i>Madhu ra</i>	-

V. Pharmacological actions (*Karma*)

The action of the drug on *dosha, dhatu, mala, agni, srotas, avayava, sthana, sarvasareera* and *krimi* is available in the literature as follows.

Table No:4 Pharmacological actions (Karma) of Prishniparni

Action on <i>Doshas</i>	<i>Tridosahara</i> ^{14,16,17,19,22,24,25, 26,40} <i>Vatahara</i> ²⁶
Action on <i>Dhatus</i>	<i>Asthi-sandhaneeya</i> ⁴⁰ <i>Sukra-vrishya</i> ^{14,16,17,19,24,25,26,40}
Action on <i>Mala</i>	<i>Sara</i> ¹⁷ , <i>anulomana</i> ²⁶ , <i>mutrala</i> ²⁶ , <i>sangrahi</i> ⁴⁰
Action on <i>Agni</i>	<i>Deepana</i> ⁴⁰
Action on <i>Srotas</i>	<i>Rakthavaha: Asra doshahara</i> ¹⁴ <i>Rasa pradoshaja: Angamardaprashamana</i> ⁴⁰
Action on <i>Avayava</i>	<i>Hridya</i> ²⁶
Action on <i>Sthana</i>	<i>Vranahara</i> ¹⁸
Action on <i>Sarvasareera</i>	<i>Dahahara</i> ^{14,16,17,18,24,26} , <i>balaprada</i> ²⁵
Action on <i>Krimi</i>	<i>Jeevanunashaka</i> ⁴⁰

VI. Therapeutic indications (Rogagnatha)

The therapeutic indications of the drug have been mentioned in various classical textbooks. The indications comprise of both *swatantrarogas* (independent diseases) and *rogaavastha* (disease conditions). Diseases affecting the body and mind are mentioned here.

Table No:5 Therapeutic indications (Rogagnatha) of Prishniparni

Indications	D.Ni ¹⁴	M.P ¹⁶	Ka.Ni ¹⁷	Ra.Ni ¹⁸	B.P ¹⁹	Ni.Ad ²²	Ma.Ni ¹⁶	P.Ni ²⁵	API ⁴⁰
<i>Annavahasrotas</i>									
<i>Chardi</i>	-	+	+	-	+	-	+	-	+
<i>Udakavahasrotas</i>									

<i>Trishna</i>	+	+	+	-	+	-	-	-	+
<i>Pranavahasrotas</i>									
<i>Kasa</i>	+	-	-	+	-	-	-	-	+
<i>Shwasa</i>	+	-	+	-	+	-	+	-	+
<i>Rasaavahasrotas</i>									
<i>Jwara</i>	+	+	+	+	+	-	+	+	+
<i>Raktavahasrotas</i>									
<i>Raktharshas</i>	-	-	-	-	-	-	-	-	+
<i>Rakthavikara</i>	-	-	-	-	-	-	-	-	+
<i>Purishavahasrotas</i>									
<i>Rakthisara</i>	-	+	+	-	+	-	+	-	+
<i>Atisaara</i>	-	-	-	+	-	-	-	+	+
<i>Manovahasrotas</i>									
<i>Unmada</i>	-	+	-	+	-	-	-	-	-

VII. Useful parts (*Prayojyaanga*)

The plant parts used for therapeutic purposes are mentioned in *Madanapala nighantu*¹⁶, *Nighantu Adarsha*²², *Ayurvediya Oushadi Nighantu*²⁶ and *Ayurvedic Pharmacopoeia of India*⁴⁰. The useful parts are the root^{16,22} and Whole plant^{22,26,40}.

VIII. Dosage (*Matra*)

The dose required for internal administration in varied dosage forms are given in *Madanapala Nighantu*¹⁶, *Nighantu Adarsha*²², *Ayurvediya Oushadi Nighantu*²⁶, *Dravyaguna Vijnana*- Prof. P V Sharma⁴¹, *Ayurvedic Pharmacopoeia of India*⁴⁰ and in A textbook of *Dravyaguna Vijnana*- Dr, Prakash L Hedge and Dr. Harini A.⁴²

Panchanga: 1/2 - 1 Tola²²

Mulachurna: 1-2 g²⁶

Kwatha-60-120ml²⁶

Kwatha-80ml⁴²

Mula Kwatha-50-100ml¹⁶

IX. Therapeutic uses (*Amayika prayoga*)

Various therapeutic uses of the drug is mentioned in *Charaka Samhita*, *Susrutha Samhita*, *Ashtanga Hridaya* and *Chikitsa Manjari*.

Paithika Hridroga: Ghrita prepared with paste of *shaalaparni*, *prishniparni*, *brihati*, *kantakari* and *gokshura* with *Ksheera*, *Draksha rasa* and *Ikshurasa*.⁴³

Hridayagatavata: *Sthirasidha Payas* is advised to be given orally .^{10,11}

Arshas: *Peya* prepared out of *Prishniparni* cures *asrasrava*.⁴⁴

Shosha: *Ghrita* prepared from *Sthiradi siddha chaaga* and *avi payas*.⁴⁵

Pithaja Visarpa: Ingredient of *Gauryadi Ghrita* used for *Parisheka* in *Pithaja Visarpa*.⁴⁶

Luta damsha: Paste of root of *Arka*, *Rajani*, *Nakuli* and *Prishniparni* are used as *pana*, *nasya*, *Anjana* and *pradeha*.⁴⁷

Kaphaja madatyaya: Decoction made of *Sunthi*, *Sthira*, *Udichya* and *Dusparsha* is given to be administered orally.⁴⁸

Atisaara: *Peya* made of *Shaaliparni*, *Prishniparni*, *Bala Bilva* and *Dadimamla* is beneficial in *Kaphaja* and *Pittaja Athisaara*.⁴⁹

Rakthaatisaara: *Peya* made of *Chaagapaya*, *Hribera*, *Utpala*, *Nagara* and juice of *Prishniparni* is advised orally in *Rakthaatisaara*.⁵⁰

Vataraktha: Milk boiled with *Satavari*, *Dashamula*, *Rasna*, *Pilu*, *Syama*. *Eranda* and *Sthira* can be taken internally.⁵¹

X. Botanical identity

Some controversy exists regarding the botanical identity of the drug *Prishniparni*. It is described that the controversy arises due to regional variation. In the textbook, Some Controversial Drugs in Indian Medicine written by Bapalal Vaidya⁵², *Prishniparni* is identified to be *Uraria picta* (Jacq.) Dev.ex DC in North India and in South India, *Prishniparni* is identified as *Desmodium gangeticum* (Linn.) DC. In Indian Medicinal Plants by Kirthikar and Basu⁵³ and Wealth of India⁵⁴, *Uraria Picta* is taken as *Prishniparni*. In Ayurvedic Pharmacopoeia⁴⁰ of India, *Uraria Picta* is considered as *Prishniparni*. In the books Compendium of Indian Medicinal Plants⁵⁵, Pharmacognosy of Ayurvedic drugs⁵⁶, Indian medicinal plants a compendium of 500 species⁵⁷ and in Ayurvedic Drugs and their plant sources⁵⁸ *Prishniparni* is considered to be *Desmodium gangeticum* (Linn.) DC.

*Chikitsa Manjari*²⁷, *Yogamrutham*²⁸, *Sahasrayogam*²⁹, and *Ayurvediya Oushadha Nighantu*²⁶ are some of the eminent works which are native to Kerala. *Prishniparni* is stated in all the above books and is told with the Malayalam name Orila. Thereby in Kerala *Desmodium gangeticum* (Linn.) DC. is *Prishniparni* and is commonly known as orila.

Botanical name : [*Desmodium gangeticum*(Linn.)DC.]

Botanical synonyms : *Hedysarum gangeticum*

Desmodium gangeticum Linn.var.neaei

Hippocrepis multisiliquosa

*Meibomia gangetica*O.Kuntze

Desmodium maculatum(L.)

Family : Papilionaceae

Systemic position :

Kingdom : Plantae
Division : Magnoliophyta
Class : Magnoliopsida
Order : Fabales
Family : Fabaceae
Genus : Desmodium
Species : *gangeticum*

Vernacular names

The vernacular names are enlisted in Pharmacognosy of *Ayurvedic* Drugs by Prof M Kolammal⁵⁶, Pharmacographia indica by William Dymock, C J H Warden and David Hooper⁵⁹, Indian Medicinal Plants -A compendium of 500 species published by Kottakkal⁵⁷, Medicinal Plants and raw drugs of India by Purushotham Kaushik and Anil Kumar Dhiman⁶⁰, The wealth of India⁵⁰ and Ayurvedic Pharmacopoeia of India.⁴⁰

Sanskrit : Prishniparni, Dhavani, Guha
English : Sal leaved Desmodium
Malayalam : Orila
Tamil : Oripai, Orila
Hindi : Pitvan, Sankarja, Salvani
Bengali : Sankarjata
Telugu : Kolakupola, Gitanaram
Gujarati : Pitavan, Pitvan
Kannada : Toremora, Nariyalavona
Marathi : Pitvan, Prishniparni

Punjabi	: Detedarnee
Oriya	: Shankarjata, Prushnipamee
Urdu	: Prishniparni

XI. Taxonomy

The detailed description of the taxonomy of the plant is found in , Compendium of Indian Medicinal Plants by Ram P Rastogi and B.N. Mehrotra⁵⁷ and Pharmacognosy of *Ayurvedic* Drugs by Prof M Kolammal,⁵⁶The Indian Medicinal plants by Kirtikar K R and Basu B D,⁵³Pharmacographia indica by William Dymock, C J H Warden and David Hooper,⁵⁹Indian Medicinal Plants -A compendium of 500 species published by Kottakkal,⁵⁷ Medicinal Plants and raw drugs of India by Purushotham Kaushik and Anil Kumar Dhiman,⁶⁰ The wealth of India,⁵⁴ Ayurvedic Drugs and their Plant sources by V.V Sivarajan,⁵⁸Flora of the Presidency of Madras,⁶¹The Flora of British India.⁶²

Distribution and habitat: The plant is found distributed along Tropical Africa, Sri Lanka, South East Asia, China, Malaysia and Australia. It is distributed throughout India. Its range extends to the Himalayas, especially the outer Himalayas, southwards to Kerala. It is very common in Bengal, Silhet, Coromandel, Western Ghats and Travancore. It is found in the plains, in dry forests upto 900m elevations, grows as undergrowth in semi-deciduous forests at low elevations.

Habit : An erect diffusely branched under shrub or herb, 90-120cm in height.

Root : Poorly developed tap root, long deep growing prominent lateral roots.

Stem : Sub erect, short woody stem, reaching 3-4 ft, slightly angular clothed with upwardly directed short soft grey hairs. Branches-numerous, prostrate.

Leaves : Unifoliate compound (apparently simple), alternate, stipulate, membranous. Size -3-3.5cm *2-2.5cm. Shape-ovate, oblong to lanceolate in shape. Margin-entire, wavy; apex-acute to acuminate; colour -light green with mottled grey patches on it. Stipules located at base of petiole; petioles-triangular in shape ,1-2cm in length.

Inflorescence : Terminal axillary raceme.

Flowers: Small about 0.1cm long, with minute setaceous bracts on shortly upwardly directed pedicels. They are white, pale rose or purple or liliac tinted arranged in pairs or few flowered fascicles at each node on the rachis.

Calyx : 2mm long hairy, Calyx tube short, companulate, finely downy, and cleft to the middle in two lips. Upper lip two cleft, lower three partite, teeth-short triangular or rarely lanceolate, longer than companulate tube.

Corolla: one-sixth to one-fourth of an inch, exerted. Standard 3mm broad cuneate at base. Wings obliquely oblong, more or less adhering to the keel. Keel petals obtuse incurved.

Androecium: Stamens-diadelphous; anthers-uniform.

Gynoecium: Ovary-sessile or stipitate, many ovuled; style-filiform; stigma-capitate.

Fruits : An indehiscent pod; Pods-6-8 jointed glabrescent; sparsely clothed with minutely hooked hairs.

Seeds: Small pale yellow, reniform shaped.



Picture No:1 of Plant [*Desmodium gangeticum*(Linn.)DC.]

XII. Phytoconstituents

A vast variety of phytoconstituents are detected in different parts of [*Desmodium gangeticum*(Linn.)DC.]. Detailing of numerous chemical constituents can be found in, Compendium of Indian Medicinal Plants by Ram P Rastogi & R N Mehrotra,⁵⁷ Pharmacographia indica by William Dymock, C J H Warden and David Hooper,⁵⁹ Medicinal Plants and raw drugs of India by Purushotham Kaushik and Anil Kumar Dhiman,⁶⁰ Wealth

of India⁵⁴ and Phytochemical and ethno-pharmacological profile of *Desmodium gangeticum* (L.) DC.: A review.⁶³

Root : Pterocarpan, Steroids, volatile oils, Phenylethylamine alkaloids.

Stem: Flavanoids, alkaloids.

Leaves : Phenylethylamine alkaloids, aminoacids, Anthraquinone Carbohydrates, Cardiac glycosides, Flavonoids, Glycosides, Phenols, Saponins, Steroids, tannins, Terpenoids and Volatile compounds, Polyphenols- Gallic acid, salicylic acid, Chlorogenic acid, caffeic acid, rutin, quercetin.

Flowers: Glycosidic pigments-anthocyanins

Fruits :Phenolic acids- 3,4-Dihydroxybenzoic acid, Vanillic acid

Seeds :Amino glucosyl glycerolipid, Phosphatidyl ethanolamine, Phosphatidyl serine, Phosphatidyl choline.

XIII. Pharmacological studies

The pharmacological evaluation of *Prishniparni* [*Desmodium gangeticum* (Linn.)DC.] includes:

1. Anti-Oxidant activity

A Niranjan and S K Tiwari⁶⁴ conducted the antioxidant activity in methanolic extract of root and aerial parts of *Desmodium gangeticum* (Linn.) DC. Anti-oxidant activity of the extract was determined by coupled oxidation of beta carotene and linolenic acid and expressed as percentage inhibition relative to control. Both the parts of plant showed medium antioxidant activity as compared to quercetin (74%). The free radical scavenging effect of roots in terms of IC₅₀, EC₅₀ and ARP values were 0.31, 0.35mg/ml; 13.48, 15.22mg/mg DPPH and 7.42, 6.57 and reducing power was 2.7 and 2.9 ASE/ml, respectively.

The anti-oxidant activity of the ethyl acetate extract of the root of *Desmodium gangeticum* was studied by Kurian et al⁶⁵for assessing cardio protection from ischemia reperfusion-induced oxidative stress. The in vitro antioxidant potential of the ethyl acetate

extract was assessed in terms of hydroxyl radical scavenging activity, lipid peroxide scavenging activity, nitric oxide scavenging activity and diphenyl picryl hydrazyl radical scavenging activity. The in vivo antioxidant potential of was assessed in an isolated rat heart model. The extract was found to scavenge the free radicals in a concentration-dependent manner.

2. Antihypertrophic activity:

The antihypertrophic activity of methanolic root extract of *Desmodium gangeticum* (Linn.) DC. was studied by Sankar et al.⁶⁶ Hypertrophy was induced by exposing H9C2 cell line to isoproterenol for a period 96 hours. The results demonstrated potent free radical scavenging activity of the root extract. The study showed significant increase in reactive oxygen species generation, dissipation of mitochondrial transmembrane potential and the permeability transition pore opening in isoproterenol treated cells.

3. Cardioprotective activity:

The cardioprotective activity of the aqueous extract of *Desmodium gangeticum* was studied by Hitler et al⁶⁷ in isoproterenol induced LVH (left ventricular cardiac hypertrophy) in adult Wistar rats. Isoproterenol at a dose of 10 mg/kg bodyweight in single injection was administered for seven days, induced LVH in rats. The left ventricular hypertrophic rats were post-treated orally with the root extract (100 mg/kg body weight) for a period of 30 days. Thereafter, changes in heart weight, body weight, heart weight - body weight ratio, percent of hypertrophy, collagen accumulation, activities of matrix metalloproteinase -2 and -9, superoxide dismutase and catalase enzymes, and the level of an oxidative stress marker, lipid peroxide, were determined. The altered levels of ventricular lipid peroxide, collagen, matrix metalloproteinase -2 and -9, and antioxidant enzymes in the isoproterenol treated animals reverted back to near normal upon the root extract treatment. In addition, the anti-hypertrophic activity of the root was comparable to that of the standard drug losartan (10 mg/kg).

4. Anti -inflammatory and anti-nociceptive activity

Aqueous decoction (5, 10 and 20 mg/kg) of root and aerial parts of *Desmodium gangeticum*(Linn.) DC. establishes the anti-inflammatory and anti-nociceptive activity *in-vivo* in dose-dependent manner. The root decoction of *Desmodium gangeticum*(Linn.) DC. exhibited significant anti-inflammatory activity in cotton pellet granuloma in rats. The aerial and root decoctions of *Desmodium gangeticum* exhibited mild analgesic activity by inhibiting the abdominal constriction induced by acetic acid in mice.⁶⁸

5. Wound healing activity

10% w/w ointment of aqueous extract of *Desmodium gangeticum* on topical application showed marked wound healing activity in, *in-vivo* in Wistar rat models. Results indicated a marked decrease in wound closure time and an increase in wound contraction. A significant increase in proline content was also observed. All the studies were compared with standard povidone iodine ointment.⁶⁹

6. Hepatoprotective activity

The chloroform extract of roots of *Desmodium gangeticum* (Linn.) DC. showed hepatoprotective activity when evaluated *in-vivo* against CCl₄ induced liver damage in rat models. The study established that the extract caused an increase in serum levels of total proteins and decrease levels of bilirubin, serum glutamate oxaloacetate transaminase (SGOT) and serum glutamate pyruvate transaminase (SGPT) in pretreated groups.⁷⁰

7. Antiamnesic (nootropic) activity

Scopolamine induced amnesia in mice was reversed on pre-treatment with aqueous extract *Desmodium gangeticum*(Linn.) DC.(100, 200 mg/kg, p.o.) for seven successive days. Study revealed that the plant increased mice brain acetylcholine content and decreased acetyl cholinesterase activity in a similar fashion to the standard cerebro-protective drug piracetam. Therefore, aqueous extract of *Desmodium gangeticum*(Linn.) DC. can be suggested to delay the onset and reduce the severity of the symptoms of dementia and Alzheimer's disease.⁷¹

8. Antidiabetic activity

Administration of methanolic extract of aerial parts of *Desmodium gangeticum*(Linn.) DC. (100 and 250 mg/kg) for 3 weeks showed a significant antidiabetic activity in rats by stimulating insulin secretion from MIN6 and pseudoislets cells of pancreatic islet. It also plays a major role to maintain the lipid profile of the rats by reducing cholesterol and triglycerides level and increase in high density lipoproteins (HDL) significantly ($p < 0.05$).⁷²

9. Anti ulcer activity

Ethanollic root extract of *Desmodium gangeticum* (Linn.) DC. when orally administered significantly decreased the ulcer index and number of lesions in a dose dependent manner against ethanol induced acute gastric ulcer in mice. The highest dose (150 mg/kg) of the extract when administered resulted in a marked increase in protein and glutathione levels, when compared to control. In addition, gastric juice, free acidity and total acid output were inhibited in a dose-dependent manner at $p < 0.05$ level.⁷³

10. Antibacterial activity

Antibacterial activity of *Desmodium gangeticum*(Linn.) DC. was tested with various solvents viz., methanol, ethanol, chloroform and aqueous extract against various bacterial organisms such as *Klebsiella pneumoniae*, *Escherichia coli*, *Salmonella typhi*, *Streptococcus mutants* and *Pseudomonas aeruginosa*. Antibiotic sensitivity assay was performed with amoxicillin, kanamycin, tetracycline, ciprofloxacin and penicillin. The methanolic extract showed maximum zone of inhibition against *S. mutants* and minimum zone of inhibition was observed with aqueous extract against *P. aeruginosa*. In addition, the antibiotic sensitivity was observed with kanamycin, tetracycline, ciprofloxacin against all bacterias.⁷⁴

CONCLUSION

The present article focuses on the drug *Prishniparni* and it's extensive discussion in the Ayurvedic classics. It is discussed in the *Vedas* and *Samhitas* as a drug with multidimensional uses. In the Nighantu period it is emphasized along with its synonyms, properties and therapeutic uses. The plant is known to exhibit anti-oxidant,

cardioprotective, anti-hypertrophic, anti-ulcer, hepatoprotective, anti-amnesic, wound healing and, anti-inflammatory activities.

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