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EFFECT OF *SHALAPARNI* (DESMODIUM GANGETICUM) IN THE MANAGEMENT OF ESSENTIAL HYPERTENSION *(VYANABALA VAISHAMYA)*

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ABSTRACT

Desmodium gangeticum (Sanskrit: *Shalaparni*) is one of the herbs mentioned in all ancient scriptures of *Ayurveda*. It is one of the herb amongst *Dashmoola* which is the group of 10 herbs. Desmodium gangeticum root is thermogenic and nervine tonic posses aphrodisiac, carminative, constipating, diuretic, febrifuge, cardiotonic, anti inflammatory and expectorant property. Its Hydroalcoholic extract showed antimicrobial activity. Hence in view of immense medicinal importance of the plant this review is therefore compile all the information related to Desmodium gangeticum.

KEWWORDS: Desmodium gangeticum, *Shalaparni*, Hydroalcoholic extract, Antimicrobial.

INTRODUCTION

The incidence of essential hypertension is very high in our country & has almost taken an epidemic shape. Among the several psychosomatic diseases, the cardiovascular disorder like hypertension is quite significant. It doubles the risk of cardiovascular diseases including CHD, CHF, ischemic and hemorrhagic stroke, renal failure, and peripheral arterial diseases.

In classical literature of *Ayurveda* there is no direct reference for essential hypertension so here an *anukta vyadhi*[1] concept of *Ayurveda* can be implemented to deal with the symptom complex with the help of *nidana panchaka (nidana, purvrupa, rupa, upashaya and samprapti)* and to understand probable pathogenesis of EHT in *Ayurveda* perspective.

Maharshi Sushruta, emphasized that no disease can be developed without the interaction of "somatic *dosha* & mental influences"[2] which are the basic physiological entities of the body.[3] Every disease is the resultant of *dosha prakopa* and for *dosha prakopa aharadi* (*ahara* and *vihara*) plays pivotal role.

Hypertension is a disease related with heart and blood circulatory system. On the other hand in *Ayurveda*, *rasa rakta samvahana* is done by *vyana vayu* when this get vitiated then this *samvahana* get affected so here concept of *vyanabala vaishamya* is taken because *vyana vayu* plays important role in *rasa rakta samvahana* and its *adhisthana* is *hridaya* which make more better correlation of *vyanabala vaishamya* with hypertension. Sign and symptoms appeared in hypertension can be explained in correlation with involved *dosha* as following:

Sr.No.	***Vata dosha***	***Pitta dosha***	***Kapha dosha***
1.	Headache (*shirashool*)	Anger (*krodha*)	Heaviness (*guruta*)
2.	Mental irritation	Flushing (*lalima*)	Drowsiness (*tandra*)
3.	Dizziness (*bhrama*)	Perspiration(*swedadhikya*)	Oedema (*shotha*)
4.	Lassitude (*klama*)	Epistaxis (*urdhwaga* RP)	Polyurea(*mutradhikya*)
5.	Palpitation (*hritaspadana*)	Blurred vision	
6.	Angina (*hritashool*)	Insomnia (*anidra*)	
7.	Paralysis (*pakshavadha*)	Fainting (*murchha*)	
8.	Tingling		

Above correlation implies that in hypertension is disease in which tridosha vitiation is occurred. Hence hypertension can be called as *Vata Pitta pradhana tridoshaja vyadhi* with predominance of *vata* and whose *adhisthana* is *hridaya*.

Shalaparni is a drug which works on *tridosha* because Maharshi Charaka said that it is *sarvadoshahara*[4] and also works on *hridayagata prakupita vata*. Previous research work shows its cardioprotective, nervine tonic and lipolytic property which also are helpful in the management of essential hypertension. So this drug is selected.

MATERIALS AND METHODS

Ayurveda literature was collected from all *samhita*, commentaries and *Nighantu*. Modern literature was collected from Modern books, journals and internet. All information was collected, analyzed and interpreted.

OBSERVATION AND RESULTS

Ayurvedic Properties and Action[5]

Rasa – *Madhura, tikta*

Guna – *Guru, snigdha*

Virya – *Usna*

Vipaka - *Madhura*

Doshaghnata *– Tridosashamaka*

Roghnata *- Agnimandya, arsha, atisara, vamana, krimi roga, hridroga, shotha, raktavikara, urahkshta, kasa, yakshma, shukradaurbalya, mutrakricchra, prameha, vishamjwara, vatavyadhi, nadidaurbalya, kosthavata, shosha, kshaya.*

Karma *– Tridoshahara[6], nadibalya, deepana, snehana, anulomana, stambhana, krimighna, hridya[7], shothahara, shonitasthapana, krimighna, kaphanihsaraka, vrishya, mutrala, jwaraghna, balya, brihana, rasayana, angamardaprashamana.*

Shalparni is having *snigdha* and *ushna guna* and pacifies *vata.* It is having *madhura vipaka* and pacifies *pitta* and its *tikta rasa* pacifies *kapha dosha.*

Classical categorization[8]

Charaka: Angamardaprasamana, sothahara, balya, snehopaga, madhura skandha

Sushruta: Vidarigandhadi, laghu panchmula

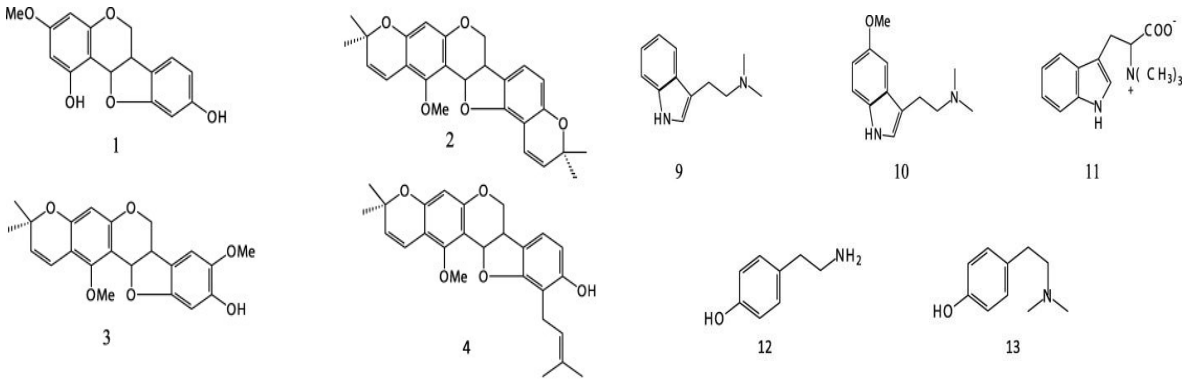
Vagbhatta: Vidarigandhadi

Phytochemical Constituents

The plant *shalaparni* belongs to family ‘fabaceae’. The plant yields three pterocarpanoids gangetin, gangetinin and desmodin. Seven alkaloids viz. N, N- dimethyltryptamine and its Nb – oxide, hypaphorine, hordenine, candicine, N- methyltyramine and β- phenylethylamine have been reported from roots. A new antifungal isoflavonoid phytoalexin – desmocarpin- isolated together with genistien, diphysolone and kievitone from fungus – inoculated leaflets, its structure determined.[9]

Chemical examination of *Desmodium gangeticum* root and aerial parts has resulted into lupeol, lauric acid and mixture of β-sitosterol and stigmasterol. The total phenolic contents (TPC) were 14.4, 13.8 mg/g GAE; antioxidant activity (AOA) 58.9, 54.8% and reducing power (RP) in terms of ascorbic acid equivalent (ASE/ml) 2.7 and 2.9 in roots and aerial parts of the plant, respectively. Free radical scavenging activity (FRSA) measured by α, α-

diphenyl- β-picrylhydrazyl (DPPH) showed IC50 (Inhibitory Concenteation) 0.31, 0.35 mg/ml; EC50 (Efficient Concentration) 13.48, 15.22mg/mg DPPH and ARP (Antiradical Power) 7.42, 6.57 in roots and aerial parts, respectively. AOA in different assays expressed as IC50 in aforesaid plant parts ranged from 0.27-0.83 mg/ml and 0.41-1.11 mg/ml, respectively. The extract of both parts showed significant protective effect against Fenton's reaction on supercoiled pUC 18 DNA assayed by agarose gel electrophoresis. The specific phenolic composition assayed through HPLC and MS/MS showed the presence of gallic, protocatechuic, salicylic, chlorogenic, caffeic acids, rutin, quercetin and kaempferol in both parts of plant.[10]



Pterocarpans
1. Desmocarpin; 2. Gangetinin; 3. Desmodin; 4. Gangetin

Alkaloids
9. N,N-dimethyltryptamine; 10. 5-methoxy-N,N-dimethyltryptamine; 11. Hypaphorine; 12. Tyramine; 13. Hordenine

Toxicity: The aqueous extract of root was found to be nontoxic in acute toxicity studies. Gangetin- a pterocarpene from hexane extract of root is nontoxic up to oral dose of 7 gm/ kg in mice.[11]

Substitutes and Adultrants: In Kerala, Pseudarthria viscida (Linn.) is used as substitute for *Desmodium gangeticum*. Some other taxa viz, *Desmodium polycarpum* DC, *Uraria lagopoides* DC, U. *hamosa* Wall, *Flemingia paniculata* Wall and F. stricta roxburghi is used as *shalparni* in different parts of the country.[12]

Formulations and Preparations:[13] *Shalaparnyadi kwatha, chyavanaprasha, dashamoolarishta, chitrakaharitaki, mahanarayana taila, brahachchhagaladya ghrita, dashamoola taila, mooshikadya taila, vayuchhaya surendra taila, vyaghri taila.*

Dosage: Decoction 50 – 100 ml

Pharmacological / Biological activities

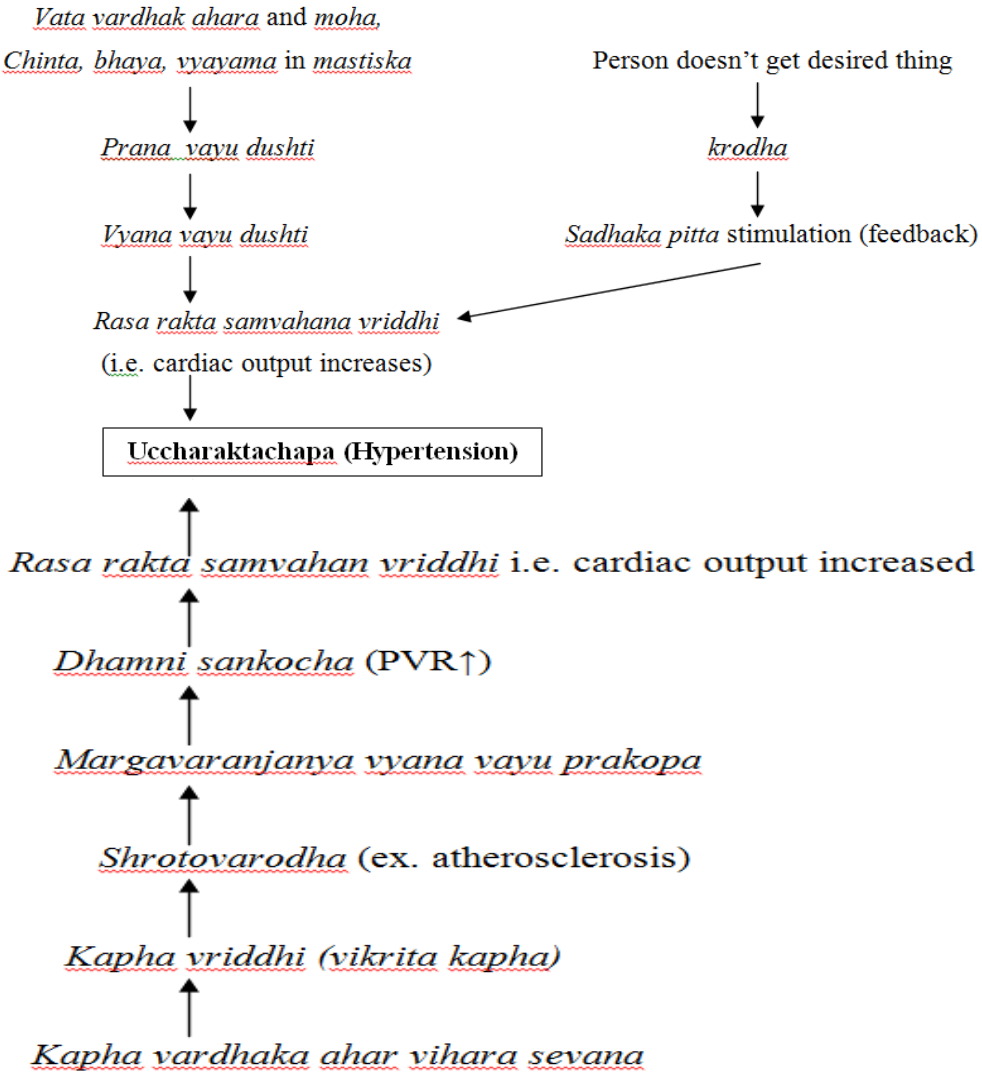
1. **Cardioprotective**: *Desmodium gangeticum* possesses the ability to scavenge the free radicals generated during ischaemia and ischaemia reperfusion thereby preserving the mitochondrial respiratory enzymes that eventually lead to cardio-protection and has potential prophylactic and therapeutic efficacy against *Leishmania* infection.[14] Administration of DG root extract prior to reperfusion showed better antioxidant status in myocardial tissue homogenate and mitochondrial, complemented by the levels of cardiac specific marker proteins in myocardial tissue and perfusate. Even though DG methanol root extract mimics its action similar to that of Ach, the myocardial protection mediated by the extract was superior to Ach, due to the presence of antioxidants in the crude extract.[15]
2. **Anti- inflammatory and antioxidant Activity:** Flavanoid and alkaloid fractions of *Desmodium gangeticum* were evaluated for anti inflammtory and antioxidant activities in carrageenan – induced inflamed rats. The flavanoid fraction of D. gangeticum possesses potent antioxidant activity compared with the alkaloid fraction and also with respect the standard drug indomethacin, in terms of augmentation of the liver and spleen superoxide dismutase(SOD), catalase(CAT), glutathione peroxidase (GPX) activities, concomitant with a reduction in lipid peroxidation.[16]
3. **Antidiabetic activity**: *Desmodium gangeticum* is reported to contain flavones and isoflavonoid glycosides. Treatment of diabetic rats with aerial parts of D. Gangeticum extract (DG, 100 and 250 mg/kg body weight) for 3 weeks showed a significant reduction in blood glucose significant increase in insulin secretion from MIN6 cells grown as monolayers and pseudoislets.[17]
4. **Lipolytic activity**: *Desmodium gangeticum* also had a role on the lipid profile of the rats by causing reductions in cholesterol and triglycerides and increasing the HDL significantly.
5. **Antiamnesic effects**: aqueous extract of *Desmodium gangeticum* (DG) as a nootropic agent in mice. DG (50, 100 and 200 mg/kg, *p.o.*) was administered for 7 successive days to both young and older mice resulted in significantly improved learning and memory in mice and reversed the amnesia induced by both, scopolamine (0.4 mg/kg, *i.p.*) and natural ageing. DG also decreased whole brain acetyl cholinesterase activity.[18]
6. **Effect in irritable bowel syndrome:** classical herbal preparation, *shalparnyadi churna*, consisting of *Desmodium gangeticum* (L.) DC., *Zingiber officinale Rosc, Aegle marmelos* (L.) Correa ex Roxb. *Coriandrum sativum* Linn. And *Sida cordifolia* Linn was subjected

to the patients of irritable bowel syndrome in doses of 3 gm TDS for 30 days. It shows positive response.[19]

DISCUSSION

To know the mode of action of *shalaparni* in the management of essential hypertension, there is need to understand the pathophysiology of essential hypertension according to *Ayurveda*. According to Maharshi Charaka, *anukta vyadhi* can be treated on the basis of *dosha, dushya, desha, kala, rog- rogi bala* etc. Hypertension is one of them which have no clear description and correlation in *Ayurveda* texts so present research work is an effort to explain this disease with the help of *Ayurveda* parameters *dosha*, *dushya*, *adhisthana*, *srotas* by correlating its sign and symptoms mentioned in modern science.

Samprapti



Shalparni is having *snigdha* and *ushna guna* which pacifies *vata dosha.* It is having *madhura vipaka* and pacifies *pitta dosha* and its *tikta rasa* pacifies *kapha dosha.* Thus it works on all three *dosha* that is *tridoshahara*. By working on *vata dosha* it pacifies the *vikrita prana vayu* and *vikrita vyana vayu* and by establishing the *samyaka rasa rakta samvahana* and cardiac output, it brings the blood pressure at approximate normal level.

By pacifying the *kapha dosha* it removes the *srotovarodha* and by this clears the pathway of *vayu*, thus heart gets proper nourishment and pumps the normal blood volume followed by a normal cardiac output. Hence maintains the blood pressure at normal level. Thus by alleviating the *vata dosha* it maintain the physiological disturbance in the blood circulation, regulate the metabolic activities by mitigating the *pitta dosha* and by alleviating the *kapha dosha* it prevent the anatomical perversion. Its *hridya* and *balya guna* give the strength to the heart for proper functioning against overload.

By possesing *shothahara* property, *shalaparni* takes out the *kleda* and so on *sneha* which helps in *medaharana* and by *meda niskashan* clears the *srotas* passage and finally normalizes the blood pressure. Its *mutral* property increases the urine (*mutra*) frequency. So urine carries out the *kleda* from body. Thus cardiac output diminishes and so on the blood pressure (SBP). Being a content of *dashmoola* it posses the *ama pachana* property which reduces the *ama* and clear out the *srotovarodha*, improves the *rasa rakta samvahana* and eventually blood pressure. Its *kaphanihsaraka guna* also helpful in normalizes the blood pressure in the similar way.

Shalaparni is a *rasayana* also so it nourishes the *rasa raktavaha srotas* and other *srotas* also. By this, it maintains the normal vasculature of channels keeps the myocardium healthy and helps in its proper functioning. It also reduces the chances of arteriosclerosis by keeping the arteriolar cells in healthy state especially in old age patients and thus reduces the chances of development of hypertension also. *Shalaparni* is one of the herbs mentioned in all ancient scriptures of *Ayurveda*. It is one of the herbs amongst *dashmoola* which is the group of 10 herbs. *Desmodium gangeticum* root is thermogenic and nervine tonic posses' aphrodisiac, carminative, constipating, diuretic, febrifuge, cardiotonic, anti inflammatory and expectorant property.

Therapeutic Uses

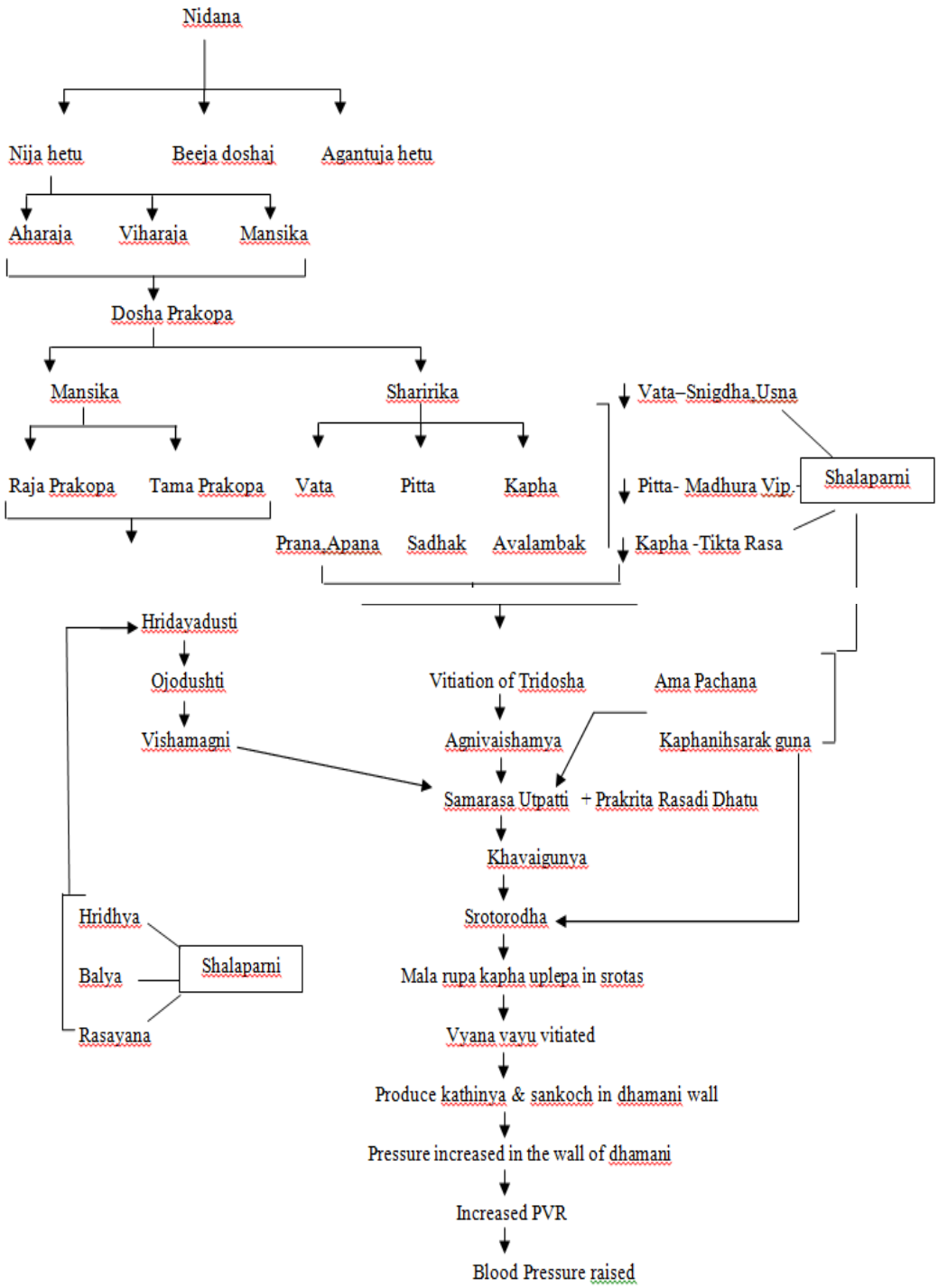
1. Root decoction is used in burning micturation.[20]

2. Bronchial and pulmonary oedema is reduced by giving hot infusion of its root.
3. Decoction is effective in lung ulcers.
4. Hemicrania: snuffing with *shalaparni* juice alleviates hemicranias. (G.N.).[21]
5. Delayed Labour : application of paste of *shalaparni* root on navel, pelvis, vulva etc facilitates easy delivery.(V.M.)
6. Diarrhoea : In this one should take *shalaparni* as a vegetable regularly.(C.S.)
7. *Vatarakta*: *shalaparni*, *prisnaparni* or both types of *brihati* pounded with milk and mixed with saturating drink should be taken.(SS.Ci.5.10).[22]

All *Acharya* mentioned its action as *Rasayana, Brimhana, Vrishya* (Table 6) and *Rogaghnata* as *Vishamajwaraghna, Pramehaghna, Shoolaghna,* Arshoghna (Table 7) etc. Modern researches also prove the various pharmacological actions mentioned in Ayurveda. *Desmodium gangeticum* DC. possesses the ability to scavenge the free radicals generated during ischaemia and ischaemia reperfusion thereby preserving the mitochondrial respiratory enzymes that eventually lead to cardio-protection and has potential prophylactic and therapeutic efficacy against Leishmania infection15. D. gangeticum appears to be a promising candidate for improving memory and it would be worthwhile to explore the potential of this plant in the management of dementia and Alzheimer disease.

Here an effort is made to understand the mode of action shalaparni in some symptoms of essential hypertension' patients:
Shirashool is mainly due to *vata* and *rakta. Snigdha* and *ushna guna* of *shalaparni* pacifies the *vata dosha* and its *madhura vipaka* pacifies *pitta dosha,* so on the *rakta*. Hence it reduces the symptom of *shirashool*. *Bhrama* is also due to *vata dosha* so explanation is same for this.

Shalaprni reduces the *klama* by its *amapachaka* property. It is effective in reduction of *hritspandana* and *swedadhikya* by having *hridya* property and its antiamnesic property & *tridoshahara* property keeps the all three *dosha* in *samyaka awastha* so improves the *nidra* also.



Probable Mode of Action of Shalaparni

CONCLUSION

Hence we can conclude that *Shalaprni* is the very important drug mentioned in Ayurved having anti-oxidant, cardio-protective, anti-inflammatory, anti-ulcer, antidiabetic, nootropic, anti-Laishmanial, immunomodulatory activity. This shows its multidimensional uses in essential hypertension disease conditions which prove its *Sarvadoshahara karma.*

REFERENCES

1. *Charaka, Charaka Samhita, Vidyotini Hindi commentary by Shastri K., Gorakhnath Shastri, Chaukhambha Bharti Academy Varanasi, (2012).
2. **Sushruta, Sushruta Samhita, Ayurveda Tattva Sandeepika Commentry by Ambikadutta Shastri Chaukhambha Sanskrit Series, Varanasi, Vikram Samvat 2066, Sutrasthana. *24/9*
3. **ibidem *Sutrasthana.15/3*
4. *Ibidem sutrasthana. 25/40
5. *Ibidem chikitsasthana·28/96
6. Dravyaguna Vigyan, Chapter 374 Salaparni, Sharma PV, Chaukhambha Bharti Academy, Vol. II, 2011, page no. 820,821
7. *Ibidem sutrasthana. 25/40
8. *Ibidem chikitsasthana·28/96
9. Madanapala Nighantu, Abhayadi Varga, Adhaya 1, shastry JLN, Raghunathan K, 1st Edition, Chaukhambha orientalia, Varanasi, 2010, Page 45.
10. Indian Medicinal Plants: Forgotten Healers; A Guide to Ayurvedic Herbal Medicine, Adhyaya salaparni, Paranjpe Prakash, Chaukhambha Sanskrit Pratishthan, reprint 2005, 2012, Page 231.
11. Phytochemical composition and antioxidant potential of Desmodium gangeticum (Linn.) DC, Article in Indian Journal of Natural Products and Resources· January 2008, A Niranjan and S K Tewari* Nutraceutical Chemistry National Botanical Research Institute Lucknow-226 001, Uttar Pradesh, India *Correspondent author, E-mail: drsktewari@rediffmail.com Received 27 December 2006; Accepted 12 September 2007
12. Ibidem 26
13. Ibidem 26
14. Ibidem 26
15. An ethnomedicinal, phytochemical and pharmacological profile of Desmodium gangeticum (L.) DC. and Desmodium adscendens (Sw.) DC. Rastogi, Subha; Pandey, Madan Mohan; Rawat, Ajay Kumar Singh - JOURNAL OF ETHNOPHARMACOLOGY Volume: 136 Issue: 2 Pages: 283 296 DOI: http://dx.doi.org/10.1016/j.jep.2011.04.031 Published: JUN 22 2011.
16. Methanol extract of Desmodium gangeticum DC root mimetic post-conditioning effect in isolated perfused rat heart by stimulating muscarinic receptors Kurian, Gino A.; Paddikkala, Jose - ASIAN PACIFIC JOURNAL OF TROPICAL MEDICINE Volume: 5

Issue: 6 Pages: 448-454 DOI: http://dx.doi.org/10.1016/S1995-7645(12)60076-5 Published: JUN 2012.

17. Antiinflammatory and antioxidant activities of Desmodium gangeticum fractions in carrageenan-induced inflamed rats Govindarajan, R.; Vijayakumar, M.; Rao, Ch. V.; et al. - PHYTOTHERAPY RESEARCH Volume: 21 Issue: 10 Pages: 975-979 DOI: http://dx.doi.org/10.1002/ptr.2199 Published: OCT 2007
18. Effect of Desmodium gangeticum extract on blood glucose in rats and on insulin secretion in vitro Govindarajan, Raghavan; Asare-Anane, Henry; Persaud, Shanta; et al. - PLANTA MEDICA Volume: 73 Issue: 5 Pages: 427 432 DOI: http://dx.doi.org/10.1055/s-2007-967176 Published: MAY 2007
19. Antiamnesic effects of Desmodium gangeticum in mice Joshi, Hanumanthachar; Parle, Milind - YAKUGAKU ZASSHI-JOURNAL OF THE PHARMACEUTICAL SOCIETY OF JAPAN Volume: 126 Issue: 9 Pages: 795-804 DOI: http://dx.doi.org/10.1248/yakushi.126.795 Published: SEP 2006
20. Database on medicinal plants used in Ayurveda, Published by central council of Research in Ayurveda and Siddha New Delhi, year of Publication 2001, vol II.
21. Bhavaprakasah, Purvakhanda Prathamabhaga, Guduchyadi Varga, Bhava Mishra Author, Sitaram Bulusu commentator, Chaukhambha Orientalia, Vol.I, Page 236.
22. Textbook of Dravyaguna, Salaparni Chapter 29, Nishteswar K. Author, Edition 1st, Chaukhambha Surbharti Prakashan, 2007, Page 192.
23. Classical uses of Medicinal plants, Chapter 347 Salaparni, Sharma PV Author, Chaukhmbha Visvabharati Varanasi, Reprint Year 2004, Page 365.