

ETHNOMEDICINAL CLAIMS ON ANTIVENOM ACTIVITY OF CERTAIN FRUIT AND SEED DRUGS - A REVIEW

Sarang P Lakhmale^{1*}, Rabinarayan Acharya², Nikita Yewatkar³

1. Ph.D. scholar, Dept. of Dravyaguna, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar, Gujarat, India.
2. Associate Professor, Dept. of Dravyaguna, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar, India.
3. Ayurveda consultant, A/P Waghru (J.), Jalna, Maharashtra, India.

Abstract

Snake bite is one of the major health hazards that lead to high mortality rate in India. Many ethno botanical survey reports and books were published highlighting the use of plant drug for the management of snake bite. Single hand information regarding the plant with their specific parts used for antivenom activity is lacking. Hence present study is an attempt to compile the fruit and seed drugs reported for their antivenom activity from different research articles and books related to ethno medicine and ethno botany. It is observed that 50 ethno medicinal plants belonging to 34 families (Cucurbitaceae, Euphorbiaceae and Rutaceae etc.) with fruit (29/50) and seed (23/50) as a part used are reported for their antivenom activity. Among them 49 plants reported for snake bite, four for scorpion sting, four for insect bite and one as antidote to all poisons. This article may help the researchers to bring novelty in the field of herbal products for the management of snake bite.

Key words: Snake bite; Herbal antivenom; Ethno medicine; Fruit; Seed.

*Address for correspondence:

Dr. Sarang P Lakhmale, Ph.D. Scholar, Dept. of Dravyaguna,
I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar, Gujarat, India – 361 008.
E-mail: saranglakhmale@gmail.com

Received: 02 May 2012; Revised: 12 May 2012; Accepted: 27 May 2012

INTRODUCTION

Snake bite is one of the major health hazards that leads to high mortality rate especially in India and the common poisonous (Venomous) snakes found in India are cobra (*Naja naja*), krait (*Bangarus caeruleus*), Russell's viper (*Daboia russelli*), and saw scaled viper (*Echis carinatus*).^[1] Anti venom immunotherapy is the only specific treatment against snake venom envenomation. There are various side effects of antivenom sera such as anaphylactic shock, pyrogen reaction and serum sickness.^[2] Most of these symptoms may be due to the action of high concentrations of non-immunoglobulin proteins present in

commercially available hyper immune antivenom.^[3] Over the years many attempts have been made for the development of snake venom antagonists especially from the plant origin. Several medicinal plants, which appear in old drug recipes or which have been passed on by oral tradition are believed to be snakebite antidotes. Though medicinal plants remain largely unnoticed and neglected, protective activity of plant extracts have been confirmed in biological assays: resverotrol (3, 4'5-trihydroxy trans-stilbene) from an herbal *Cissus assamica*;^[4] reduction of venom-induced effects of *Naja nigricollis* and *Echis ocellatus* venom in rats by pre-incubation with *Parkia biglobosa* extracts;^[5] and activation of

coagulative (prothrombin) activity by *Mucuna pruriens* seed extract.^[6]

Many ethno botanical survey reports and books were published highlighting the use of plant drug for the management of snake bite. Single hand information regarding the plant with their specific parts used for antivenom activity is lacking. Hence, the present research work has been planned with an aim to compile the fruit and seed drugs reported for their antivenom activity in published ethno botanical and ethno medicinal research articles.

MATERIALS AND METHODS

Various books incorporating the research articles related to ethno botany and ethno medicine were scrutinized and reviewed in respect to reported antivenom activity of medicinal plants. The details of the books including title, publisher, year of publication and page number were noted.^{[7] to [17]} The medicinal plants which are reported for antivenom activity wherein fruit and seeds are the part used were noted down in a specially designed format in regards to their botanical names, family, form of administration, use, place of reporting and book reference along with page number. The shortlisted plants were cross checked from the classical text of Ayurveda with regards to their pharmacological properties and actions.

RESULTS AND DISCUSSION

In the present study, 50 plants with fruit and seed as useful part, reported for their antivenom activity in 11 published ethno botany books were scrutinised (Table 1). The data collected were reflecting the words or terminologies used by the tribal people and was being retranslated to equivalent english terms by the concerned ethno botany experts. Among these plants, many plants were

reported for same activity from different areas of India, indicating their ample uses. *Bombax ceiba* L. was reported from maximum five places namely Maharashtra, Harayana, Garhwal, Bihar and eastern Nepal; *Baliospermum montanum* (Willd.) Muell. from Uttar Pradesh, Bihar and Andhra Pradesh; *Achyranthes aspera* Linn. from Tamil Nadu and Uttar Pradesh; *Capparis zeylanica* L. from Uttar Pradesh and West Bengal. (Table 1) Tribal people use fruit (29/50) followed by seed (23/50) as the source of medicine. (Table 2) Taking into consideration the high demand of medicinal plants and to prevent the destruction of plants, vegetative parts of perennial plants should be researched for further studies. Plants are also found useful for different antivenom activities as reported by various tribal. (Table 3) Family wise classifications of plants are noted. (Table 4) It was found that plants belonging to Cucurbitaceae, Euphorbiaceae and Rutaceae were maximum. The plants of first two families are mostly of bitter taste (Tikta rasa) and Rutaceae is of sour taste. In Ayurveda, Tikta rasa has been highlighted for its Vishaghna (antidote) properties.^[18] Hence may be used either as an antidote or management of different animal and insect bite.

Many Indian medicinal plants are recommended for the treatment of snakebite. The antivenom activity of different medicinal plants has been evaluated. Sariva (*Hemidesmus indicus* R.Br.), a Vishaghna plant mentioned in Ayurveda effectively neutralized Viper venom induced lethal, haemorrhagic, coagulant, anticoagulant and inflammatory activity (Alam *et al.*, 1994).^[19] Lupeol acetate isolated from the root extract of Indian sarsaparilla *Hemidesmus indicus* R.Br. could significantly neutralize lethality, haemorrhage, defibrinogenation, edema, PLA2 activity induced by *Daboia russelli* venom. It also neutralized *Naja kaouthia* venom induced lethality, cardiotoxicity, neurotoxicity and

Table 1: Ethno medicinal plants highlighted for their antivenom activity

Sl. No.	Botanical Name (Family)	Part used	Form of administration (area of reporting) ^{[Book] (page)}	Use
1.	<i>Ablemoschus moschatus</i> Medic. (Malvaceae)	Seed	Seed paste with milk ^{[17] (2)}	Snake bite
2.	<i>Achyranthes aspera</i> Linn. (Amaranthaceae)	Seed	Seeds and inflorescence ground to paste form and applied locally on the wound (Tirunelveli TN) ^{[10] (363)} The decoction of the seed and plant is administered (North eastern UP) ^{[14] (262)}	Snake bite and poisonous insect bite
3.	<i>Aegle marmelos</i> (L.) Corr. (Rutaceae)	Fruit	Method of administration is not mentioned ^{[14] (308)}	Snake bite
4.	<i>Anthocephalus indicus</i> Mig (Rubiaceae)	Fruit	Method of administration is not mentioned ^{[14] (308)}	Snake bite
5.	<i>Argemone mexicana</i> L. (Papaveraceae)	Seed	The seeds in the powder form are given orally along with water to neutralize the snake venom at short interval (North eastern UP) ^{[14] (265)}	Snake bite
6.	<i>Artemisia vulgaris</i> Linn. (Asteraceae)	Seed	Method of administration is not mentioned ^{[17] (179)} Method of administration is not mentioned ^{[14] (308)}	Snake bite
7.	<i>Azadirachta indica</i> A.Juss. (Meliaceae)	Seed	Method of administration is not mentioned (Madhubani Bihar) ^{[10] (653)}	Snake bite and scorpion sting
8.	<i>Baliospermum montanum</i> (Willd.) Muell. (Euphorbiaceae)	Seed	Seeds are chewed (Tharu tribe UP) ^{[10] (239)} Applied externally (Madhubani Bihar) ^{[10] (653)} Seeds pulverized and mixed with boiled water and taken orally (Nallamalais AP) ^{[11] (216)} Method of administration is not mentioned ^{[14] (309)}	Snake bite
9.	<i>Barleria cristata</i> Linn. (Acanthaceae)	Seed	Method of administration is not mentioned ^{[8] (355)}	Snake bite
10.	<i>Bombax ceiba</i> L. (Bombacaceae)	Fruit	Method of administration is not mentioned (Chikhaladara MS) ^{[10] (275)} Method of administration is not mentioned (Madhubani Bihar) ^{[10] (653)} Method of administration is not mentioned (Terai eastern Nepal) ^{[11] (424)} Method of administration is not mentioned (Harayana) ^{[14] (156)} Method of administration is not mentioned (Garhwali tribes) ^{[17] (299)}	Snake bite
11.	<i>Boswellia serrata</i> Roxb.ex Colebr. (Burseraceae)	Seed	Method of administration is not mentioned (Tribes of Abujh Marh MP) ^{[17] (303)}	Snake bite
12.	<i>Caesalpinia bonduc</i> (L.) Roxb. (Caesalpinaceae)	Seed	Seed pulverized mixed in hot water taken orally (Nallamalais AP) ^{[11] (215)}	Snake bite
13.	<i>Capparis sepiaria</i> L. (Capparidaceae)	Seed	Method of administration is not mentioned (Tribes of Dharampuri forest TN) ^{[17] (363)}	Snake bite
14.	<i>Capparis zeylanica</i> L. (Capparidaceae)	Fruit	The roasted fruit is used with salt as precautionary measure (Tharu tribe UP) ^{[10] (240)} Method of administration is not mentioned (Tribes of Purulia WB) ^{[17] (365)}	Snake bite
15.	<i>Cassia fistula</i> L. (Caesalpinaceae)	Fruit	Method of administration is not mentioned (Dang Gujarat) ^{[17] (388)}	Snake bite, insect bite
16.	<i>Cassia hirsuta</i> L. (Caesalpinaceae)	Fruit	The fruit of this plant (50 g) together with stem bark of Gulanchi (<i>Aridisia solanacea</i> Roxb.) and that of Samarkana (<i>Clerodendrum viscosa</i> Vent.) are powdered and the powder half tsf with water given as antidote for reptile poison for 3 days and applied externally for 3 days (Chaibasa Bihar) ^{[11] (405)}	Snake bite

17.	<i>Citrullus colocynthis</i> (L.) Schard. (Cucurbitaceae)	Fruit	Method of administration is not mentioned (Nagpur and Wardha MS) ^{[13] (32)}	Snake bite
18.	<i>Clitoria ternatea</i> L. (Fabaceae)	Seed	Method of administration is not mentioned (Terai eastern Nepal) ^{[11] (427)}	Snake bite
19.	<i>Cordia dichotoma</i> Forest. (Ehretiaceae)	Fruit	Method of administration is not mentioned (Harayana) ^{[14] (178)}	Snake bite
20.	<i>Croton roxburghii</i> Balak. (Euphorbiaceae)	Fruit	Fruit paste locally (Terai eastern Nepal) ^{[11] (434)}	Snake bite
21.	<i>Elettaria cardamomum</i> (L.) Maton (Zingiberaceae)	Fruit	Dried fruit: method of administration is not mentioned ^{[9] (132)}	Antidote to all poisons, snake bite
22.	<i>Embelica ribes</i> Burm. f. (Myrsinaceae)	Fruit	Dried fruit method of administration is not mentioned ^{[7] (233)}	Snake bite, scorpion sting
23.	<i>Entada rheedii</i> Sprengel. (Nimosaceae)	Seed	Seed infusion orally (Nallamalais AP) ^{[11] (216)}	Snake bite
24.	<i>Feronia limonia</i> (L.) Swingle (Rutaceae)	Fruit	Fruit pulp: Applied externally ^{[9] (186)} Fruit pulp: Applied externally (Madhubani Bihar) ^{[10] (655)}	Bites of venomous reptiles and insects
25.	<i>Ficus carica</i> Linn. (Moraceae)	Fruit	Method of administration is not mentioned ^{[14] (308)}	Snake bite
26.	<i>Gossypium herbaceum</i> L. (Malvaceae)	Seed	Method of administration is not mentioned ^{[14] (308)}	Snake bite
27.	<i>Helicteres isora</i> L. (Sterculiaceae)	Seed	Seed decoction orally (Nallamalais AP) ^{[11] (216)}	Snake bite
28.	<i>Heliotropium indicum</i> L. (Boraginaceae)	Seed	Seed crushed with jaggery orally (Nallamalais AP) ^{[11] (215)}	Snake bite, insect stings
29.	<i>Holarrhena antidysenterica</i> (Linn.) Wall. (Apocynaceae)	Fruit	The fruits are said to be applied locally to allay swelling and irritation ^{[8] (304)}	Snake bite
30.	<i>Lagenaria siceraria</i> (Moi.) Standl. (Cucurbitaceae)	Fruit, seed	Method of administration is not mentioned ^{[14] (309)}	Snake bite
31.	<i>Lasianthus andamanicus</i> Hk.f (Rubiaceae)	Fruit	Fruit sap applied locally (Onge tribe Andaman) ^{[10] (573)}	Snake bite
32.	<i>Leucas cephalotas</i> (Roth.) Spreng. (Lamiaceae)	Fruit	Fruit extract is dropped in ear and given orally at the interval of 15 min (Kol tribe Varanasi UP) ^{[11] (136)}	Snake bite
33.	<i>Limonia elephantum</i> (Correa) (Rutaceae)	Fruit	Unripe fruit pulp externally ^{[8] (129)}	Bites of venomous reptiles and insects
34.	<i>Luffa cylindrica</i> (Linn.) M. (Cucurbitaceae)	Fruit, seed	Method of administration is not mentioned ^{[14] (309)}	Snake bite
35.	<i>Madhuca indica</i> J. Gmelin (Sapotaceae)	Seed	Seed decoction orally (Nallamalais AP) ^{[11] (216)}	Snake bite
36.	<i>Mallotus philippensis</i> Muell.-Arg. (Euphorbiaceae)	Fruit	Fruit hair: method of administration is not mentioned ^{[8] (412)}	Snake bite
37.	<i>Martynia annua</i> L. (Martyniaceae)	Fruit	Fruit paste: method of administration is not mentioned ^{[12] (186)}	Snake bite
38.	<i>Mimusops elengi</i> L. (Sapotaceae)	Seed	Seed decoction orally ^{[12] (144)}	Snake bite
39.	<i>Momordica charantia</i> L. (Cucurbitaceae)	Fruit	Method of administration is not mentioned (Terai eastern Nepal) ^{[11] (429)}	Snake bite

40.	<i>Naringi crenulata</i> (Roxb.) Nicolson (Rutaceae)	Fruit	Dried fruit: method of administration is not mentioned ^{[12] (48)}	Snake bite
41.	<i>Opuntia dillenii</i> (Ker-Gawler) Haworth (Cactaceae)	Fruit	Method of administration is not mentioned (Harayana) ^{[14] (168)}	Snake bite
42.	<i>Oroxylum indicum</i> L. (Bignoniaceae)	Seed	Seed paste prepared with hot water applied externally (Nallamalais AP) ^{[11] (215)}	Snake bite
43.	<i>Phyllanthus acidus</i> (L.) Skeels. (Euphorbiaceae)	Fruit	Fruit decoction along with root and leaves orally (Terai eastern Nepal) ^{[11] (435)}	Snake bite
44.	<i>Piper longum</i> L. (Piperaceae)	Fruit	Method of administration is not mentioned (Terai eastern Nepal) ^{[11] (434)}	Snake bite and scorpion sting
45.	<i>Sapindus mukorossi</i> Gaertn. (Sapindaceae)	Fruit	Fruit pulp decoction internally ^{[8] (147)}	Venomous reptile bites
46.	<i>Semecarpus anacardium</i> L.f. (Anacardiaceae)	Seed	Seed powder: method of administration is not mentioned (Salem TN) ^{[10] (423)}	Snake bite
47.	<i>Solanum trilobatum</i> L. (Solanaceae)	Fruit	Fruit juice orally ^{[10] (46)}	Snake bite
48.	<i>Strychnos nux-vomica</i> L. (Loganiaceae)	Seed	Seeds mixed in water and diluted (Salem TN) ^{[10] (423)} Seeds are used in venomous reptile bite ^{[15] (486)}	Snake bite
49.	<i>Symphorema polyandrum</i> Wight. (Verbenaceae)	Fruit	Fruit along with black pepper is given (Bastar MP) ^{[16] (119)}	Snake bite
50.	<i>Syzygium cumini</i> (L.) Skeels (Myrtaceae)	Seed	Seed paste and bark mixed with common salt orally (Korapat Orissa) ^{[10] (484)}	Snake bite, scorpion sting

AP=Andhra Pradesh; MP= Madhya Pradesh; MS=Maharashtra; TN=Tamil Nadu; UP=Uttar Pradesh

Table 2: Classification of antivenom plants according to their parts used

Sl. No.	Part used	Number
1.	Fruit	29
2.	Seed	23

Table 3: Classification of antivenom plants reported according to their pharmacological activities

Sl. No.	Action	Number of Drugs
1.	As an antivenom for snake bite	49
2.	Scorpion sting	04
3.	Insect bite	04
4.	Antidote to all poisons	01

respiratory changes in experimental animals (Chatterjee *et al.*, 2006).^[20] The methanolic root extracts of Nirgundi (*Vitex negundo* Linn.) and Amalaki (*Embllica officinalis* Gaertn.), in vitro and in vivo studies, found significantly neutralizing the *Vipera russellii* and *Naja kaouthia* venom induced lethal activity and *V. russelli* venom-induced haemorrhage, coagulant, defibrinogenating and inflammatory activity (Alam *et al.*, 2003).^[21] The pentacyclic triterpenes (free or as glycosides) are found widely in several antisnake venom plants (*Aegle marmelos*, *Centipeda minima*, *Aloe vera*, *Phyllanthus niruri*, *Alstonia scholaris*, *Phyllanthus emblica*, *Elephantopus scaber*, etc.) and provide nearly 20% protection against snake venom (Mors *et al.*, 2000).^[22]

Table 4: Classification of antivenom plants according to family

Sl. No.	Name of families	Total number of enlisted families	Plants found in each
1.	Acanthaceae, Amaranthaceae, Anacardiaceae, Apocynaceae, Asteraceae, Bignoniaceae, Bombacaceae, Boraginaceae, Burseraceae, Cactaceae, Ehretiaceae, Lamiaceae, Loganiaceae, Martyniaceae, Meliaceae, Moraceae, Myrsinaceae, Myrtaceae, Papaveraceae, Piperaceae, Sapindaceae, Solanaceae, Sterculiaceae, Verbenaceae and Zingiberaceae	25	01
2.	Capparidaceae, Fabaceae, Malvaceae, Rubiaceae and Sapotaceae	05	02
3.	Caesalpiniaceae	01	03
4.	Cucurbitaceae, Euphorbiaceae and Rutaceae	03	04
	Total	34	50

Table 5: Rasapanchaka of certain antivenom plant drugs mentioned in Ayurveda

Sl. No.	Botanical name	Rasa	Virya	Vipaka	Guna	Prabhava
1.	<i>Ablemoschus moschatus</i> Medic.	T, M, K	Sh	K	l, r, t	
2.	<i>Achyranthes aspera</i> Linn.	K, T	Us	K	l, r, t	
3.	<i>Aegle marmelos</i> (L.) Corr.	Ks, T	Us	K	l, r	
4.	<i>Anthocephalus indicus</i> Mig	T, Ks	Sh	K	R	Vedanastaphana
5.	<i>Argemone mexicana</i> L.	T	Sh	K	l, r	
6.	<i>Artemisia vulgaris</i> Linn.	T, Ks	Us	K	l, r, t	
7.	<i>Azadirachta indica</i> A.Juss.	T, Ks	Sh	K	L	
8.	<i>Baliospermum montanum</i> (Willd.) Muell.	K	Us	K	g, t	
9.	<i>Barleria cristata</i> Linn.	T, M	Us	K	L	
10.	<i>Bombax ceiba</i> L.	M	Sh	M	l, s, p	
11.	<i>Boswellia serrata</i> Roxb.ex Colebr.	Ks, T, M	Us	K	l, r	
12.	<i>Caesalpinia bonduc</i> (L.) Roxb.	T, Ks	Us	K	l, r	
13.	<i>Capparis sepiaria</i> L.	K, T	Us	K	r, l	
14.	<i>Capparis zeylanica</i> L.	K, T	Us	K	r, l	
15.	<i>Cassia fistula</i> L.	M	Sh	M	g, m, s	
16.	<i>Citrullus colocynthis</i> (L.) Schard.	T	Us	K	l, r, t	
17.	<i>Clitoria ternatea</i> L.	K	Sh	K		
18.	<i>Cordia dichotoma</i> Forest.	M	Sh	M	s, g, p	Vishaghna
19.	<i>Elettaria cardamomum</i> (L.) Maton	K, M	Sh	M	l, r	
20.	<i>Embelica ribes</i> Burm. f.	K, Ks	Us	K	l, r, t	Krimighna
21.	<i>Gossypium herbaceum</i> L.	K, Ks	Us	K	l, t	
22.	<i>Helicteres isora</i> L.	KA	Sh	K	l, r	
23.	<i>Holarrhena antidysenterica</i> (Linn.) Wall.	T, Ks	Sh	K	l, r	
24.	<i>Lagenaria siceraria</i> (Moi.) Standl.	T	Sh	K	l, r	
25.	<i>Leucas cephalotas</i> (Roth.) Spreng.	K	Us	K	g, r, t	
26.	<i>Luffa cylindrica</i> (Linn.) M.	T	Us	K	l, r, t	Ubhayatobhagahara
27.	<i>Madhuca indica</i> J. Gmelin	M, Ks	Sh	M	g, s	
28.	<i>Mallotus philippensis</i> Muell.-Arg.	K	Us	K	l, r, t	
29.	<i>Mimusops elengi</i> L.	Ks, K	Sh	K	g	
30.	<i>Momordica charantia</i> L.	T, K	Us	K	l, r	
31.	<i>Oroxylum indicum</i> L.	M, T, Ks	Us	K	l, r	
32.	<i>Phyllanthus acidus</i> (L.) Skeels.	A	Sh	A	v, r, g	
33.	<i>Piper longum</i> L.	K	Aus	M	l, s, t	
34.	<i>Semecarpus anacardium</i> L.f.	K, T, KA	Us	M	l, s, t	
35.	<i>Strychnos nux-vomica</i> L.	T, K	Us	K	r, l, t	
36.	<i>Syzygium cumini</i> (L.) Skeels	Ks, M, A	Sh	K	l, r	

M= Madhura (Sweet); A= Amla (Sour); L= Lavana (Salty); K= Katu (Pungent); T= Tikta (Bitter); Ks= Kashaya (Astringent); Sh= Shita (Cold); Us= Ushna (hot); Aus= Anushna (Neither so hot nor so cold); l= Laghu (Light); r= Ruksha (Dry); t= Tikshna (Sharp); g= Guru (Heavy); s= Snigdha (Unctuous); p= Pichila (Slimmy); m= Mrudu (Soft); v= Vishada (Non Slimmy)

Table 6: Drugs reported for their Vishaghana action in Brihatrayi

Sl. No.	Drug	Brihatrayi		
		Charaka S ^[30]	Sushruta S ^[31]	Ashtanga Hridaya ^[32]
1.	Apamarga (<i>Achyranthes aspera</i> Linn.)	Ci 23/245	Ka 6/12, 8/54,106	U 37/73
2.	Bilwa (<i>Aegle marmelos</i> (L.) Corr.)		Ka 5/76, 8/47	U 36/62, 84; 37/83, 84; 38/20, 27
3.	Kadamba (<i>Anthocephalus indicus</i> Mig)		Ka 8/108	
4.	Swarnakshiri (<i>Argemone mexicana</i> L.)	Ci 23/203		U 37/78
5.	Nimba (<i>Azadirachta indica</i> A.Juss.)	Ci 23/51, 69, 79, 202, 243	Ka 8/136	
6.	Danti (<i>Baliospermum montanum</i> (Willd.) Muell.)	Ci 23/203, 241, 243	Ka 6/8	U 37/78, 79
7.	Saireyaka (<i>Barleria cristata</i> Linn.)			U 38/31
8.	Shalmali (<i>Bombax ceiba</i> L.)		Ka 6/21	
9.	Aragavadha (<i>Cassia fistula</i> L.)		Ka 5/54, 85; 7/14, 28	U 36/88
10.	Indravaruni (<i>Citrullus colocynthis</i> (L.) Schard.)		Ka 6/18	
11.	Shelshamantaka (<i>Cordia dichotoma</i> Forest.)		Ka 5/75; 6/3; 8/120	U 37/70
12.	Ela (<i>Elettaria cardamomum</i> (L.) Maton)	Ci 23/54, 77	Ka 2/47; 3/17; 5/66, 69; 6/16; 8/104, 106	U 35/39; 37/73, 74
13.	Vidanga (<i>Embelica ribes</i> Burm. f.)	Ci 23/57	Ka 2/48; 3/12; 5/63, 69, 85; 6/3, 8; 7/17	U 35/58; 37/27
14.	Kutaja (<i>Holarrhena antidysenterica</i> (Linn.) Wall.)	Ci 23/188, 206	Ka 6/3; 8/108	U 37/36
15.	Madhuka (<i>Madhuca indica</i> J. Gmelin)	Ci 23/188, 202		
16.	Pipali (<i>Piper longum</i> L.)	Ci 23/50, 56, 183, 184, 185	Ka 1/85; 2/51; 7/17; 8/45	U 35/39; 37/43, 84
17.	Bhallataka (<i>Semecarpus anacardium</i> L.f.)	Ci 23/100	Ka 1/71	
18.	Jambu (<i>Syzygium cumini</i> (L.) Skeels)		Ka 1/49	

S= Samhita; Ci= Chikitsasthana; Ka=Kalpastana; U= Uttarasthana

Among the 50 reported 36 plants are used in Ayurveda.^[23] When reviewed for their pharmacological properties (Rasadigunas) it was observed that maximum 19 drugs are having Tikta rasa (Bitter) followed by 15 Kashaya rasa (Astringent) followed by 14 Katu rasa (Pungent) rasa, 9 Madhura rasa (sweet)^[24] (Table 5). According to Acharya Charaka Tikta rasa (bitter taste) is having Vishaghna property.^[25] According to Ayurveda the Vishaghna karma of a plant drug is mainly attributed to prabhava.^[26] Madhura rasa^[27] and Tikta rasa^[28] are reported for its

Vishaghna property. Further, the 10 gunas attributed to Oja^[29] are responsible for antivenom activity. The eighteen drugs namely Apamarga (*Achyranthes aspera* Linn.), Bilwa (*Aegle marmelos* (L.) Corr.), Kadamba (*Anthocephalus indicus* Mig), Swarnakshiri (*Argemone mexicana* L.), Nimba (*Azadirachta indica* A.Juss.), Danti (*Baliospermum montanum* (Willd.) Muell.), Saireyaka (*Barleria cristata* Linn.), Shalmali (*Bombax ceiba* L.), Aragavadha (*Cassia fistula* L.), Indravaruni (*Citrullus colocynthis* (L.) Schard.), Shelshamantaka (*Cordia dichotoma*

Forest.), Ela (*Elettaria cardamomum* (L.) Maton), Vidanga (*Embelica ribes* Burm. f.), Kutaja (*Holarrhena antidysenterica* (Linn.) Wall.), Madhuka (*Madhuca indica* J. Gmelin), Pippali (*Piper longum* L.), Bhallataka (*Semecarpus anacardium* L.f.) and Jambu (*Syzygium cumini* (L.) Skeels) are reported in classical texts of *Ayurveda* for their Vishaghna karma.^[30,31,32] (Table 6)

CONCLUSION

Many researches are going now-a-days to evaluate antivenom activities of drugs of herbal origin. This article is a preliminary step in this regard and will help the researchers for further detailed studies on the reported plants.

REFERENCES

- Bawaskar HS. Snake venoms and antivenoms: Critical supply issues. *J Assoc Phys India* 2004; 52:11-13.
- Parikh CK. Parikh's Textbook of Medical Jurisprudence Forensic Medicine and Toxicology, 6th ed. New Delhi: CBS Publishers and distributors; 2007.p.9.46-49.
- Devi CM, Bai MV, Lal AV, Umashankar PR, Krishnan LK. An improved method for isolation of anti viper venom antibodies from chicken egg yolk. *J Biochem Biophys Methods* 2002; 51:129-38.
- Yang LC, Wang F, Liu M. A study of an endothelin antagonist from a Chinese anti-snake venom medicinal herb. *J Cardiovasc Pharmacol* 1998; 31: 249-50.
- Asuzu IU, Harvey AL. The antisnake venom activities of *Parkia biglobosa* (Mimosaceae) stem bark extract. *Toxicon* 2003; 42(7):763-8.
- Guerranti R, Aguiyi JC, Errico E, Pagani R, Marinello E. Effects of *Mucuna pruriens* extract on activation of prothrombin by *Echis carinatus* venom. *Journal of Ethnopharmacology* 2001; 75(2-3):175-80.
- Pullaiah T. Medicinal Plants in India, Vol.1. New Delhi: Regency Publication; 2002.
- Anil K Dhiman. Medicinal Plants of Uttaranchal State, 1st ed. Varanasi: Chowkhamba Sanskrit Series Office; 2004.
- Guha Bakshi DN, Sensarma P, Pal DC. A Lexicon of Medicinal Plants in India, Vol.2. Calcutta: Naya Prakash; 1999.
- Maheshwari JK. Ethnobotany and Medicinal Plants of Indian Subcontinent. Jodhpur: Scientific Publishers (India); 2003.
- Maheshwari JK. Ethnobotany in South Asia, Maheshwari JK, editor. Jodhpur: Scientific Publisher; 1996.
- Raveendra Retnam K, Martin P. Ethnomedicinal Plants, Jodhpur: Agrobios (India); 2006.
- Badhe PD, Pande VK. Medicinal plants of Nagpur and Wardha forest divisions (Maharashtra). New Delhi: CCRAS publication; 1999.
- Trivedi PC. Medicinal Plants: Ethnobotany Approach. Agrobios (India); 2006.
- Pullaiah T. Medicinal Plants in India, Vol.II. New Delhi: Regency Publication; 2002.
- Anonymous. Glimpses of Medico-Botany of Bastar District (M.P.). New Delhi: CCRAS publication; 1990.
- Guha Bakshi DN, Sensarma P, Pal DC. A Lexicon of Medicinal Plants in India, Vol. 1. Calcutta: Naya Prakash; 1999.
- Charaka. Charaka samhita, Part I, Sutra Sthana, Aateryabhadrakapiya Adhyaya. Rajeswaradatta Shastri, Yadunandana Upadhaya, Ganga Sahaya Pandeya, Banarasidasa Gupta, editors. Varanasi: Chaukhamba Sanskrit Pratishthan; 2001. 26/42.p.506.
- Alam MI, Auddy B, Gomes A. Isolation purification and partial characterization of Viper venom neutralizing factor from the root extract of Indian medicinal plant *Hemidesmus indicus* R. *British Toxicon* 1994; 32:155-1557.
- Iphita Chatterjee, Chakravarty AK, Gomes A. *Daboia russellii* and *Naja kaouthia* venom neutralization by lupeol acetate isolated from the root extract of Indian sarsaparilla *Hemidesmus indicus* R.Br. *Journal of Ethnopharmacology* 2006;106: 38-43.
- Alam MI, Gomes A. Snake venom neutralization by Indian medicinal plants (*Vitex negundo* and *Embllica officinalis*) root extracts. *Journal of Ethnopharmacology* 2003; 86: 75-80.
- Mors WB, Nascimento MC, Pereira BMR, Pereira NA. Plant natural products active against snake bite-the molecular approach. *Phytochemistry* 2000; 55(6): 627-642.
- Sharama SK, Chunekar KC, Chotelal Yadav. Medicinal plants used in Ayurveda. New Delhi: Rashtriya Ayurveda Vidyapeeth (National Academy of Ayurveda); 1998.
- Sharma PV. Dravyaguna Vigyan. Vol.2. Varanasi: Chaukhamba Bharati Academy; 2009.
- Charaka. Charaka samhita, Part I, Sutra Sthana, Aateryabhadrakapiya Adhyaya. Rajeswaradatta Shastri, Yadunandana Upadhaya, Ganga Sahaya Pandeya, Banarasidasa Gupta, editors. Varanasi: Chaukhamba Sanskrit Pratishthan; 2001. 26/42.p.506.
- Ibid. 26/69.p.514.
- Ibid. 26/42.p.503.
- Ibid. 26/42.p.506.

29. Charaka. Charaka samhita, Part II, Chikitsa Sthana, Madatyayachikitsa Adhyaya. Vidyadhar Shukla, Ravidatta Tripathi, editors. Varanasi: Chaukhamba Sanskrit Pratishthan; 2004.24/31.p.581.
30. Charaka. Charaka samhita, Part II, Vishachikitsa Adhyaya. Vidyadhar Shukla, Ravidatta Tripathi, editors. Varanasi: Chaukhamba Sanskrit Pratishthan; 2004.p.538-574.
31. Sushruta. Sushruta samhita, Vol.2, Kalpa Sthana. Anantram Sharma, editor. Varanasi: Chaukhmbha Surbharati Prakashan; 2004.p.505-596.
32. Vagbhata. Ashtangahridaya, Uttara Sthana. Kaviraj Atridev Gupt, Yadunandan Upadhaya, editors. 14th ed. Varanasi: Chaukhamba Sanskrit Sansthan; 2003.p.575-594.

Source of Support: Nil

Conflict of Interest: None Declared