TRADITIONAL USE OF PLANTS AGAINST SNAKEBITE IN INDIAN SUBCONTINENT: A REVIEW OF THE RECENT LITERATURE

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Abstract

Snakebite has been a major cause of mortality across the tropical countries including Indian subcontinent. The present review deals with the enormous amount of ethnobotanical work performed in the last few years involving use of different plants against snakebite in Indian subcontinent (India, Bangladesh, Pakistan and Nepal). From a variety of literature sources the data has been compiled mentioning the plants, parts used, dosage, mode of administration, name of the ethnic communities, geographical locations etc. depending on the availability of information.

Keywords: Ethnobotany, snakebite, subcontinent, review

Introduction

Since time immemorial human society has developed amidst with the plant-life (De, 1980). The importance of community-based ethnobotanical knowledge is ever-increasing for designing strategies for sustainable use and conservation of plant wealth, appropriate drugs and dose-illness relationship (Poonam and Singh, 2009). Snakebite, a medical emergency encountered in the tropics and estimated 35,000 to 50,000 people die of snakebite every year in India (Sharma et al., 2004). The common poisonous snakes found in India are Cobra (*Naja naja*), Krait (*Bangarus caeruleus*), Russell's viper (*Daboia russelli*) and Saw-scaled viper (*Echis carinatus*) (Bawaskar, 2004; Brunda and Sashidhar, 2007). Cases of snakebite have been reported from India (Bhat, 1974; Chug, 1989), Pakistan (Zafar et al., 1998; Quraishi et al., 2008), Nepal (Bhetwal et al., 1998; Hansdak et al., 1998), Bangladesh (Harris et al., 2010; Faiz et al., 2010) and other adjoining countries such as Burma (Myint-Lwin et al., 1985; Than-Than et al., 1987, 1988, 1989), Sri Lanka (Phillips et al., 1988; Theakston et al., 1990) etc.
Many medicinal plants are recommended for the treatment of snakebite (Martz, 1992; Houghton and Osibogun, 1993; Mors et al., 2000). Some ethnobotanicals have been confirmed to have snake venom neutralizing properties (Borges et al., 2005). Medicinal plants and plant based natural products have been reported to possess anti venomous properties assayed in laboratories and correlating them with ethnopharmacological studies (Soares et al., 2005). Natural inhibitors of snake venoms have been reported by Sánchez and Rodríguez-Acosta (2008). Certain compounds such as β-sitosterol, stigmasterol (Gomes et al., 2007; Nirmal et al., 2008), isolated from plants were found to be effective against snake venom. Inhibition of *Naja kaouthia* venom activities by plant polyphenols was reported by Pithayanukul et al., 2005.

Some plants used for snake venom neutralization traditionally have been tested pharmacologically for their anti snake venom efficacy. Folk plants against snakebites in Southern part of Tamilnadu, India, have been surveyed by Samy et al. (2008). Anti snake venom botanicals from ethnomedicine and their pharmacological and clinical studies have been reported by Selvanayagam et al. (1994,1995). Pharmacolgical evaluation of Bangladeshi medicinal plants has been reviewed by Rahman et al. (2001) with some reports on plants used against snakebite.

Enumeration

The authors have compiled the data collected from available reports on plants used against snakebite from Indian subcontinent (India, Bangladesh, Pakistan and Nepal) in the last few years. The plant families (F1-F73) and species (1-198) are documented alphabetically on the basis of respective families, genera and species and indicated numerically.

Angiosperms
F1. Family: Acanthaceae
1. *Acanthus ilicifolius* L.
Vernacular names: *Kazhimulli* (Pichavaram mangroves of East Coast, Tamil Nadu, India); *Harakancha* (Bhitarkanika wildlife sanctuary, Orissa, India)
Crushed fruits are used for dressing snakebite by the local communities of Pichavaram mangroves of East Coast, Tamil Nadu, India (Ravindran et al., 2005). The plant is also being used against snakebite by the inhabitants of Bhitarkanika wildlife sanctuary, Orissa, India (Pattanaik et al., 2008).
2. *Adhatoda vasica* Nees (*Justicia adhatoda* L.)
Vernacular name: *Kolyar Sag* (Ayubia National Park, Pakistan)
The plant is used in snakebite in the region of Ayubia National Park, Pakistan (Ahmad and Javed, 2007).

http://dx.doi.org/10.4314/ajtcam.v9i1.20

3. *Andrographis paniculata* (Burm. f.) Wall. ex Nees
Vernacular name: *Hirota* (*Khamti* tribe, Arunachal Pradesh, India)
Leaf powder of the plant along with *Evolvulus alsinoides*, roots of *Aristolochia indica, Cryptolepis buchananii, Ichnocarpus frutescens, Rauvolfia serpentina* and *Rhinacanthus nasutus* is administered orally in snakebite by the people of Tamil Nadu, India (Srivastava and Pandey, 2006). *Khamti* tribe of Arunachal Pradesh, India uses seed powder orally to counter snake poison (Das and Tag, 2006). *Korku* community of central India uses plant paste with mustard oil on wounds (Kadel and Jain, 2008).
4. *Barleria cristata* L.
Vernacular names: *Tadrelu, Bansa siyah* (Margallah Hills National Park, Islamabad, Pakistan)
Sahariya community of central India uses seed extract on wounds (Kadel and Jain, 2008). It is also being used by the people of Margallah Hills National Park, Islamabad, Pakistan (Jabeen et al., 2009).
5. *Elytraria acaulis* (L. f.) Lindau
Vernacular name: *Sahasmuria* (Chitrakoot, Madhya Pradesh, India)
Root paste with black piper is applied on snakebite by the tribal communities of Chitrakoot, Madhya Pradesh, India (Sikarwar et al., 2008).
6. *Lepidagathis cristata* Willd.
Vernacular name: *Siyarbethca* (Chitrakoot, Madhya Pradesh, India)
Leaf juice with copper sulphate is given during snakebite for regaining consciousness by the tribal communities of Chitrakoot, Madhya Pradesh, India (Sikarwar et al., 2008).
7. *Peristrophe paniculata* (Forssk.) Brummitt
Vernacular name: *Atrilal* (Sariska and Siliserh regions, Alwar district, Rajasthan, India)
This plant (common name: *Atrilal*) is used by the people of Sariska and Siliserh regions from Alwar district of Rajasthan, India. Whole plant macerated in an infusion of rice, is taken orally in large quantity as an antidote (Jain et al., 2009).
8. *Thunbergia grandiflora* Roxb.
To treat snakebites, this plant is used with other plants by the *Karbi* tribes of Assam, India (Teron, 2005).

F2. Family: Acoraceae
9. *Acorus calamus* L.
Vernacular name: *Skha waja* (Buner, NWFP, Pakistan)
While discussing the effect of polyherbal unani formulation on chronic urticaria, the plant was reported against snakebite (Shamsi et al., 2006). Hamayun et al., 2006 have mentioned the use of rhizome against snakebite in district Buner, NWFP, Pakistan. In Swat valley, Pakistan this plant is also used for the same purpose (Hamayun, 2007). *Korku* and *Gond* communities of central India use root paste on wounds (Kadel and Jain, 2008). Kumar and Narain (2010) have mentioned its use against snakebite in a report describing herbal remedies of wetland macrophytes in India.

F3. Family: Amaranthaceae
10. *Achyranthes aspera* L.
Vernacular names: *Nayurivi* (Kanyakumari district, Tamil Nadu, India); *Hatijhara* (Bijagarh, West Nimar district, Madhya Pradesh, India); *Apang* (Lahore-Islamabad Motorway M-2); *Ubat Kandri* (Nara desert, Pakistan); *Chaim-per-on* (Chittagong Hill Tracts region, Bangladesh); *Chichidi* (Chatara block, district Sonebhadra, Uttar Pradesh, India); *Chirchiri/Latjira* (Rewa district, Madhya Pradesh, India)
Inflorescence and seed paste is applied on the wounds by the rural people of Kanyakumari district, Tamil Nadu, India (Jeeva et al., 2006a). Leaf juice is applied by the tribes of Bijagarh, West Nimar district, Madhya Pradesh, India (Mahajan, 2007). Every part of the plant (local name: *Apang*) found in the Lahore-Islamabad Motorway (M-2) is recommended in the treatment of snakebite (Ahmad, 2007). *Sahariya* community of central India uses root and plant paste as poultice on wounds (Kadel and Jain, 2008). The plant is being reported as a part of folklore against snakebite from Nara desert, Pakistan (Qureshi and Bhatti, 2009). Root paste is applied by the *Rakhain* tribe inhabiting the Chittagong Hill Tracts region of Bangladesh in case of poisonous animal bites including snakes (Hanif et al., 2009). Root powder is used as an antidote by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010). This plant is being used by the *kavirajes* (local medical practitioners) within Rampal upazilla of Bagerhat district, Bangladesh (Mollik et al., 2010). Whole plant extract is given orally once as antidote to snakebite by the tribes of Rewa district, Madhya Pradesh, India (Shukla et al., 2010).
11. *Achyranthes bidentata* Blume
Vernacular name: *Golda* (*Jaunsari* tribe, Garhwal Himalaya, Uttaranchal)
Jaunsari tribe of Garhwal Himalaya, Uttaranchal uses plant extract or root paste (Bhatt and Negi, 2006).
12. *Achyranthes porphyristachya* Wall. ex Moq.
Sahariya community of central India uses root paste on wounds (Kadel and Jain, 2008).
13. *Aerva lanata* (L.) Juss. ex Schult.
Crushed roots are given orally as a part of indigenous healthcare practices in Udaipur district, Rajasthan, India (Nag et al., 2007).
14. *Amaranthus blitum* L.
Vernacular name: *Chjaurai* (Chatara block of district Sonebhadra, Uttar Pradesh, India)
Sahariya community of central India takes root powder orally (Kadel and Jain, 2008). The powder is also being used as an antidote to snakebite by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).
15. *Amaranthus Spinosus* L.
Vernacular names: *Kontamariso* (Malkangiri district of Orissa, India); *Kateli Chaurai* (Chatara block, district Sonebhadra, Uttar Pradesh, India)

Leaf juice is applied locally by the tribes of Malkangiri district of Orissa, India (Prusti and Behera, 2007a).The species is also being used as an antidote to snakebite by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

16. *Amaranthus viridis* L.

Vernacular names: *Chanlai, Chaulai, Dhindo* (Margallah Hills National Park, Islamabad, Pakistan); *Cholai* (Tehsil Chakwal, Pakistan)

Santals of Rajshahi district, Bangladesh apply crushed whole plant to snakebites. At the same time juice from crushed *chiari gach* (unidentified plant) is taken (Shahidullah et al., 2009). It is being used in snakebite by the people of Margallah Hills National Park, Islamabad, Pakistan (Jabeen et al., 2009; Ahmad et al., 2009). Crushed leaves are applied by the indigenous people of Tehsil Chakwal, Pakistan (Qureshi et al., 2009).

17. *Chenopodium album* L.

Vernacular names: *Bathueya, Batho* (Margallah Hills National Park, Islamabad, Pakistan)

Tha plant is being used as an antidote by the people of Margallah Hills National Park, Islamabad, Pakistan (Jabeen et al., 2009).

F4. Family: Amaryllidaceae

18. *Allium cepa* L.

Vernacular name: *Piaj* (Keshavraipatan Tehsil, Bundi district, Rajasthan, India)

People of Keshavraipatan Tehsil of Bundi district, Rajasthan, India uses two teaspoonful bulb juice of the plant mixed with mustard oil and administers to expel poison by vomiting (Shekhawat and Batra, 2006). *Bheel* community of central India uses bulb extract mixed with mustard oil (Kadel and Jain, 2008).

F5. Family: Anacardiaceae

19. *Buchanania lanzan* Spreng.

Vernacular names: *Kolamavu* (Kalrayan and Shervarayan hills, Eastern Ghats, Tamil Nadu, India); *Chironji* (Chatara block of district Sonebhadra, Uttar Pradesh, India)

Bark is used by the people of Kalrayan and Shervarayan hills, Eastern Ghats, Tamil Nadu, India (Kadavul and Dixit, 2009) and Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

20. *Mangifera indica* L.

Vernacular name: *Aam* (*Tharu* tribe, Devipatan division, Terai belt, Uttar Pradesh)

As a protective measure against snakebite, inflorescence of the plant (local name: *Aam*) is massaged on hands by the *Tharu* tribe of Devipatan division in the Terai belt of Uttar Pradesh (Kumar et al., 2006).

F6. Family: Annonaceae

21. *Annona squamosa* L.

Incision of snakebite is washed with this plant's juice and then *Datura metel* leaf paste is applied by the *Nicobarese* of Car Nicobar, India (Verma et al., 2010).

22. *Miliusa eriocarpa* Dunn.

Vernacular name: *Karu naarai* (Tirunelveli hills, Tamil Nadu, India)

Leaf decoction along with stem bark of *Murraya koenigii*, leaves of *Terminalia bellirica* and *Zizyphus xylopyra* is heated first and then taken internally to treat snakebite by the tribals of Tirunelveli hills, Tamil Nadu, India (Ayyanar and Ignacimuthu, 2005).

F7. Family: Apocynaceae

23. *Alstonia scholaris* (L.) R. Br.

Vernacular name: *Maddale* (NR Pura taluk, Chikmagalur district, Karnataka, India)

Stem bark is given to chew during snakebite by the people of NR Pura taluk in Chikmagalur district of Karnataka, India (Prakasha et al., 2010).

24. *Calotropis gigantea* (L.) R.Br.

Vernacular name: *Arka* (Sundargarh district, Orissa, India)

Fresh root with milk of cow, is ground to a fine paste and taken as an antidote for snakebite by the people of Sundargarh district, Orissa, India (Prusti and Behera, 2007b).

25. *Calotropis procera* (Aiton) W.T. Aiton

Vernacular names: *Biliekke* (Bhadra wildlife sanctuary, Maland region, Western Ghats, India); *Vellerukku* (Kumaragiri hills, Salem district, Tamilnadu, India); *Aragh*/*Karag* (Kalat and Khuzdar regions of Balochistan, Pakistan); *Sada akondo* (villages adjoining Ghaghot, Bangali and Padma rivers of Bangladesh)

About three drops of latex are put on the snake bitten area and pressed downward to bleed by the local medicine men of Bhadra wildlife sanctuary, Maland region of Western Ghats, India (Parinitha et al., 2004). Use of latex is also being reported against snakebite in the Indian desert of Rajasthan (Kumar et al., 2005). *Bheel* community of central India prescribes root extract two cups a day (Kadel and Jain, 2008). Flower powder is mixed with black pepper and taken in snakebites by the villagers in Kumaragiri hills of Salem district of Tamilnadu, India (Alagesaboopathi, 2009). The plant is reported against snakebite in a survey of indigenous knowledge of folk medicine by the women of Kalat and Khuzdar regions of Balochistan, Pakistan (Tareen et al., 2010). Leaves and roots are used by the folk medicinal healers in villages adjoining the Ghaghot, Bangali and Padma rivers of Bangladesh (Rahmatullah et al., 2010b).

26. *Cryptolepis buchananii* Schult.

Vernacular name: *Karibantana balli* (Uttara Kannada district, Karnataka, India)

About 100 g leaves, crushed in buttermilk is given twice to the cattle in snakebite (*Haavu kachchuvudu*) by the rural folk of Uttara Kannada district, Karnataka, India (Harsha et al., 2005).

27. *Ervatamia coronaria* (Jacq.) Stapf
Root and bark infusion of the plant and *Leucas aspera* leaves with roots of *Ocimum adscendens* and bark of *Artocarpus* mixed with milk and butter are filtered and used in snakebite by the local medicine men of Bhadra wildlife sanctuary, Maland region of Western Ghats, India (Parinitha et al., 2004).
28. *Hemidesmus indicus* (L.) R. Br.
Vernacular names: *Anantamul, Analsing* (Purulia district, West Bengal, India)
Root paste is applied as an antidote to snakebite by the tribals of Purulia district, West Bengal, India (Chakraborty and Bhattacharjee, 2006) while *Korku* community of central India uses pounded roots (Kadel and Jain, 2008). Austin (2008) has also mentioned its usefulness in his review.
29. *Holarrhena antidysenterica* (L.) Wall. ex A. DC.
Vernacular name: *Kurai* (Sundargarh District, Orissa, India)
Jain and Srivastava (2005) have reported the use of the bark against snakebite while mentioning traditional use of Indian plants by the islanders of Indian Ocean. Prusti and Behera (2007b), in an ethno-medicobotanical study of Sundargarh District, Orissa, India, have reported the roots rubbed on a stone with a few drops of water and the paste obtained is given internally and applied externally in snakebite.
30. *Nerium indicum* Mill.
Vernacular names: *Lal kaner* (Solan, Himachal Pradesh, India); *Kaner/Kanali* (Chatara block, district Sonebhadra, Uttar Pradesh, India)
Leaves are used by the indigenous people of Kunihar forest division, district Solan, Himachal Pradesh, India (Verma and Chauhan, 2007). Roots are used as an antidote by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).
31. *Nerium oleander* L.
Vernacular names: *Zangi Gul* (Mahal Kohistan, Khirthar National Park, Pakistan); *Kanair, Ganira* (Margallah Hills National Park, Islamabad, Pakistan)
In Mahal Kohistan (Khirthar National Park), Pakistan (Panhwar and Abro, 2007) and Margallah Hills National Park, Islamabad, Pakistan (Jabeen et al., 2009), the plant is used against snakebite.
32. *Nerium odorum* Sol.
Vernacular name: *Kaner* (Lahore-Islamabad Motorway M-2)
The plant found in the Lahore-Islamabad Motorway (M-2) is recommended in the treatment of snakebite (Ahmad, 2007).
33. *Rauvolfia serpentina* (L.) Benth. ex Kurz
Vernacular names: *Sarpagandhi* (Bhadra wildlife sanctuary and NR Pura taluk, Chikmagalur district of Karnataka, India); *Sarpaganthi* (Kanyakumari district, Tamil Nadu, India); *Serpagandha* (Shahjahanpur district, Uttar Pradesh, India); *Sarpagandha* (Chatara block, district Sonebhadra, Uttar Pradesh, India) A review on this plant describes its ethnobotanical use against snakebite in different parts of India (Dey and De, 2010a). Roots and leaf buds are crushed with milk and made into a paste and used internally and externally on the affected area by the medicine men of Bhadra wildlife sanctuary, Karnataka, India (Parinitha et al., 2004). Rhizome and root decoction is given orally by the rural people of Kanyakumari district, Tamil Nadu, India (Jeeva et al., 2006a). Leaf paste is given by the rural communities of Shahjahanpur district, Uttar Pradesh, India (Sharma et. al, 2010). This plant is being used against snakebite by the *kavirajes* (local medical practitioners) within Rampal upazilla of Bagerhat district, Bangladesh (Mollik et al., 2010). Squeezed root is tied on the snake bitten area in NR Pura taluk in Chikmagalur district of Karnataka, India (Prakasha et al., 2010). It is used as an antidote to snakebite by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010). Leaf and root are used by the folk medicinal practitioners in three villages of Natore and Rajshahi districts, Bangladesh (Rahmatullah et al., 2010f).
34. *Rauvolfia tetraphylla* L.
Vernacular name: *Patalagarudi* (Sundargarh District, Orissa, India)
Root paste (25 g) is fed to the victim slowly by the people of Sundargarh District, Orissa, India (Prusti and Behera, 2007b).
35. *Rhazya stricta* Decne.
Vernacular name: *Sainwar* (Mahal Kohistan, Khirthar National Park, Pakistan)
The plant is used against snakebite by the people of Mahal Kohistan (Khirthar National Park), Pakistan (Panhwar and Abro, 2007).
36. *Tabernaemontana divaricata* (L.) R. Br. ex Roem. & Schult.
Vernacular name: *Nandi battalu* (NR Pura taluk, Chikmagalur district, Karnataka, India)
Root paste is administered with butter milk by the people of NR Pura taluk in Chikmagalur district of Karnataka, India (Prakasha et al., 2010).
37. *Tylophora indica* (Burm. f.) Merr.
Vernacular name: *Adumuttada balli* (Bidar district, Karnataka, India)
Handful of leaves is crushed in urine of snake bitten person and 2-3 drops of extract is passed through the nostrils by the traditional people of Bidar district, Karnataka, India (Prashantkumar and Vidyasagar, 2006).
38. *Willughbeia edulis* Roxb.
Vernacular name: *Surjamukhi ludi* (*Chakma* tribes in Hill Tracts districts, Bangladesh)
Leaf paste is taken by the *Chakma* tribes in Hill Tracts districts of Bangladesh (Rahman et al., 2007).

F8. Family: Araceae
39. *Arisaema jacquemontii* Blume
Vernacular names: *Khaprya/Saperi mausi* (*Jaunsari* tribe of Garhwal Himalaya, Uttaranchal); *Marjary* (Kot Manzaray Baba Valley Malakand Agency, Pakistan)
Jaunsari tribe of Garhwal Himalaya, Uttaranchal uses fruit decoction (Bhatt and Negi, 2006). It is reported against snakebite in an ethnobotanical survey in Kot Manzaray Baba Valley Malakand Agency, Pakistan (Zabihullah et al., 2006).

40. *Arisaema tortuosum* (Wall.) Schott
Vernacular names: *Chhamboos/Bagmungri* (*Jaunsari* tribe of Garhwal Himalaya, Uttaranchal)
Jaunsari tribe of Garhwal Himalaya, Uttaranchal uses tuber paste externally to treat snakebite (Bhatt and Negi, 2006).
41. *Sauromatum venosum* (Aiton) Kunth
Vernacular name: *Sanp the boti* (Margallah Hills National Park, Islamabad, Pakistan)
The plant is used as stimulating poultice by the people of Margallah Hills National Park, Islamabad, Pakistan (Jabeen et al., 2009).

F9. Family: Arecaceae
42. *Nypa fruticans* Wurmb
Vernacular name: *Nipa* (Bhitarkanika wildlife sanctuary, Orissa, India)
The plant is used by the inhabitants of Bhitarkanika wildlife sanctuary, Orissa, India (Pattanaik et al., 2008).

F10. Family: Aristolochiaceae
43. *Aristolochia bracteata* Retz.
Vernacular name: *Aduthinnapalai* (Kumaragiri hills of Salem district of Tamilnadu, India)
Leaf paste is applied on snakebites by the villagers in Kumaragiri hills of Salem district of Tamilnadu, India (Alagesaboopathi, 2009).
44. *Aristolochia indica* L.
Vernacular names: *Ishwarmul/Kirmar* (*Gond* Tribe of Naoradehi wild life sanctuary, Madhya Pradesh, India); *Beelieshwari balli* (Bidar district, Karnataka, India); *Iswaramuli* (Kanyakumari district, Tamil Nadu, India); *Ishermul, Bhedi-Janete* (Purulia district, West Bengal, India); *Iswar* (Malkangiri district of Orissa, India); *Perumarindu* (Kumaragiri hills of Salem district of Tamilnadu, India); *Choto ishe* (Jessore district of Bangladesh); *Iche gach* (Balidha village in Jessore district, Bangladesh); *Ishwarmul* (Station Purbo Para village of Jamalpur Sadar Upazila in Jamalpur district, Bangladesh)
A. indica has been described as an important ethnobotanical remedy against snakebite (Dey and De, 2011a). *Gond* Tribe of Naoradehi wild life sanctuary, Madhya Pradesh, India uses leaf paste externally. They also use roots and eat leaves for the same purpose (Tiwari and Yadav, 2003). Fresh or shade dried leaves are crushed with *Piper nigrum* to make pills, two of which are taken internally twice a day by the traditional people of Bidar district, Karnataka, India (Prashantkumar and Vidyasagar, 2006). Leaf and root paste is applied by the rural people of Kanyakumari district, Tamil Nadu, India (Jeeva et al., 2006a). Root paste with paste of seven long peppers is prescribed as an antidote by the tribals of Purulia district, West Bengal, India (Chakraborty and Bhattacharjee, 2006). The juice of fresh root is given in snakebite by the tribes of Malkangiri district of Orissa, India (Prusti and Behera, 2007a). Root paste is applied by the villagers in Kumaragiri hills of Salem district of Tamilnadu, India (Alagesaboopathi, 2009). Roots are chewed to destroy snake poison in Jessore district of Bangladesh (Nawaz et al., 2009). This plant is used by the *kavirajes* (local medical practitioners) within Bagerhat Sadar upazilla of Bagerhat district and Bagha upazilla of Rajshahi district, Bangladesh (Mollik et al., 2010). Root is used by the *kavirajes* of Balidha village in Jessore district, Bangladesh (Rahmatullah et al., 2010d). Whole plant is used in snakebite by the folk medicinal practitioners of Station Purbo Para village of Jamalpur Sadar Upazila in Jamalpur district, Bangladesh. The plant is kept in the home or tied to the body to prevent snakes from biting. Juice is given to snake-bitten patients (Rahmatullah et al., 2010e). Leaf and root are used by the folk medicinal practitioners in three villages of Natore and Rajshahi districts, Bangladesh (Rahmatullah et al., 2010f). *Malasar* tribe in Coimbatore District of Tamil Nadu (South India) uses it against snakebite (Venkataswamy et al., 2010).
45. *Aristolochia krisagathra* Sivar. & Pradeep
Vernacular name: *Akaasha karudan* (Tirunelveli hills, Tamil Nadu, India)
Juice of leaf and rhizome along with leaf and rhizome of *Aristolochia indica*, unripened fruit and stem bark of *Melia azedarach*, leaves of *Cryptolepis buchananii* and seeds of *Strychnos nux-vomica* with neem (*Melia azedarach*) oil is applied externally on skin for 40 days in snakebite by the tribals of Tirunelveli hills, Tamil Nadu, India (Ayyanar and Ignacimuthu, 2005).
46. *Aristolochia tagala* Cham.
Vernacular name: *Jarboporol* (Chittagong Hill Tracts, Bangladesh)
A. tagala has been used traditionally in the treatment of snakebite (Dey and De, 2011b). It is being used by the tribal people of Chittagong hill tracts of Bangladesh. Root paste is applied immediately after snakebite and fresh leaf juice is given orally to reduce venom action (Biswas et al., 2010).

F11. Family: Asparagaceae
47. *Asparagus racemosus* Willd.
Vernacular names: *Halavu makkala beru* (Sringeri *taluk*, Karnataka); *Bahumoola* (NR Pura taluk in Chikmagalur district of Karnataka, India)
Indigenous people of Sringeri *taluk*, Karnataka, India uses leaf extract as an effective antidote to snakebite (Prakasha and Krishnappa, 2006). Leaf extract is applied on the bitten area by the people of NR Pura taluk in Chikmagalur district of Karnataka, India (Prakasha et al., 2010).
48. *Muscari commutatum* Guss.
Fresh leaf alcoholic extract is believed to have properties to repel snakes and used as an antidote by the traditional people of Manipur, India (Singh and Singh, 2005).
49. *Sansevieria roxburghiana* Schult. f.
Vernacular name: *Dumparasu ossoh* (*Khonds* of Visakhapatnam district, Andhra Pradesh, India)
1-2% of the paste prepared from leaves and roots is applied on the affected portion 3 times a day for 3 consecutive days to treat snakebite by *Khonds* of Visakhapatnam district, Andhra Pradesh, India (Rao et al., 2006).

50. *Sansevieria trifasciata* Prain
Vernacular name: *Shaper gach* (Balidha village, Jessore district, Bangladesh)
Whole plant and leaves are used as snake repellent by the *kavirajes* of Balidha village in Jessore district, Bangladesh (Rahmatullah et al., 2010d).

F12. Family: Asteraceae
51. *Ageratum conyzoides* L.
Jain and Srivastava (2005) have reported use of the leaves by the islanders of Indian Ocean. In some sacred groves of Meghalaya, India, leaves are also used against snakebite (Jeeva et al., 2006b).
52. *Bidens biternata* (Lour.) Merr. & Sherff
Korku and *Gond* communities of central India use leaf paste on wounds (Kadel and Jain, 2008).
53. *Blepharispermum petiolare* DC.
Vernacular name: *Kaattu puthur* (Tirunelveli hills, Tamil Nadu, India)
Powdered leaf and stem bark with leaves of *Strychnos nux-vomica, Pavetta indica, Cyanodon dactylon,* root of *Sida cordifolia* and *Hedyotis umbellata* is internally taken by the tribals of Tirunelveli hills, Tamil Nadu, India (Ayyanar and Ignacimuthu, 2005).
54. *Blumea lanceolaria* (Roxb.) Druce
Vernacular name: *Buarze* (Mizoram, North-East India)
Root paste is used by the people of Mizoram, North-East India, an Indo-Burma hotspot region (Rai and Lalramnghinglova, 2010).
55. *Chrysanthemum cinerariifolium* (Trevir.) Vis.
Vernacular name: *Chondro mollicka* (Vasu Bihar village, Shibganj sub-district, Bogra district, Bangladesh)
Whole plant is used as an antidote to poison by the village *kavirajes* of Vasu Bihar village, Shibganj sub-district, Bogra district, Bangladesh (Rahamatullah et al., 2010c).
56. *Eclipta alba* (L.) Hassk.
Vernacular name: *Kayyantakara* (Kanyakumari district, Tamil Nadu, India)
Roots are used in snakebite by the rural people of Kanyakumari district, Tamil Nadu, India (Jeeva et al., 2006a).
57. *Eclipta prostrata* (L.) L.
Kumar and Narain (2010) have mentioned the plant against snakebite while discussing herbal remedies of wetland macrophytes in India.
58. *Enhydra fluctuans* Lour.
Kumar and Narain (2010) have reported this plant against snakebite as a part of herbal remedies of wetland macrophytes in India.
59. *Mikania micrantha* Kunth
The plant is used by *Nyishi* (*Daffla*) tribe of Arunachal Pradesh, India (Srivastava and *Nyishi* community, 2010).
60. *Taraxacum officinale* F.H. Wigg.
Vernacular names: *Aachak* (*Malanis* of Kullu district, Himachal Pradesh, India); *Karnphool* (in Hindi, Himachal Pradesh)
Crushed plant paste is prescribed orally in snakebite by the *Malanis* of Kullu district and by some other tribal groups of Himachal Pradesh, India (Sharma et al., 2005; Sharma and Lal, 2005).
61. *Vernonia anthelmintica* (L.) Willd.
Vernacular name: *Kynbat-jiraiong* (*Khasi* and *Jaintia* community of Meghalaya, Northeast India)
Seed powder moistened in water is applied in the snake bitten area by the *Jaintia* tribal community of Meghalaya, Northeast India (Jaiswal, 2010). It is also a folk herbal remedy of the *Khasi* community of Meghalaya (Dolui et al., 2004).

F13. Family: Bignoniaceae
62. *Oroxylum indicum* (L.) Kurz
Bark is used by 4 communities (*Kondh, Poraja, Gadaba* and *Bonda*) of 16 villages of two districts of Orissa, India (Koraput and Malkangiri) (Franco and Narasimhan, 2009).

F14. Family: Boraginaceae
63. *Heliotropium marifolium* Koen. ex Retz.
Vernacular name: *Choti-santri* (Sariska and Siliserh regions, Alwar district, Rajasthan, India)
This plant is used against snakebite by the people of Sariska and Siliserh regions, Alwar district of Rajasthan, India (Jain et al., 2009).
64. *Trichodesma indicum* (L.) R. Br.
Vernacular names: *Gaozaban* (Mahal Kohistan, Khirthar National Park, Pakistan); *Kallri Booti, Chota kulfa, Nila karaji* (Margallah Hills National Park, Islamabad, Pakistan)
From an ethnobotanical study of Mahal Kohistan (Khirthar National Park), Pakistan, the plant was reported against snakebite (Panhwar and Abro, 2007). Leaves and roots are reported against snakebite in the Salt Range (Kallar Kahar) of Pakistan (Ahmad and Husain, 2008). This plant is also used by the people of Margallah Hills National Park, Islamabad, Pakistan (Jabeen et al., 2009).

F15. Family: Brassicaceae
65. *Brassica campestris* L.
Bheel community of central India uses this plant mixed with mustard oil and *Allium cepa* paste on wounds caused by snakebite (Kadel and Jain, 2008).

F16. Family: Burseraceae
66. *Boswellia serrata* Roxb. ex Colebr.
Vernacular name: *Salai* (Chatara block, district Sonebhadra, Uttar Pradesh, India)
Seeds are used as an antidote by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

F17. Family: Calophyllaceae
67. *Mesua ferrea* L.
Vernacular name: *Herhse* (Western Mizoram, India)
Flowers and leaves are used against snakebite by the people of western Mizoram, India (Lalfakzuala et al., 2007).

F18. Family: Campanulaceae
68. *Lobelia nicotianifolia* Roth. ex Schult.
Vernacular name: *Heddumbe* (Sringeri *taluk*, Karnataka, India; NR Pura taluk in Chikmagalur district of Karnataka)
Indigenous people living in Sringeri *taluk*, Karnataka, India uses the plant during snakebite (Prakasha and Krishnappa, 2006). Leaf extract is applied on the bitten area by the people of NR Pura taluk in Chikmagalur district of Karnataka (Prakasha et al., 2010).

F19. Family: Capparaceae
69. *Capparis decidua* (Forssk.) Edgew.
Vernacular names: *Kareel/Karerua* (Chatara block , District Sonebhadra, Uttar Pradesh, India)
Seeds are used as antidote by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).
70. *Capparis zeylanica* L.
Fruits are eaten in snakebite by the tribals of Purulia district, West Bengal, India (Jain and De, 1966).

F20. Family: Celastraceae
71. *Gymnosporia royleana* Wall. ex M.A. Lawson
Vernacular name: *Chabbe* (Bhadra wildlife sanctuary, Maland region, Western Ghats, India)
Root paste is applied with cow milk and taken internally and applied externally by the local medicine men of Bhadra wildlife sanctuary, Maland region of Western Ghats, India (Parinitha et al., 2004).
72. *Parnassia nubicola* Wall. ex Royle
Root paste is given to animal and also applied on the wound as a part of the indigenous veterinary practices of Darma valley of Pithoragarh district, Uttaranchal, India (Tiwari and Pande, 2006).

F21. Family: Cleomaceae
73. *Cleome gynandr*a L.
Vernacular name: *Hul-hul* (Chatara block, district Sonebhadra, Uttar Pradesh, India)
Leaves are used by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

F22. Family: Colchicaceae
74. *Gloriosa superba* L.
Vernacular names: *Kalihari* (Sariska and Siliserh regions, Alwar district of Rajasthan, India); *Kariyari* (Chatara block, district Sonebhadra, Uttar Pradesh, India)
This plant is used by the people of Sariska and Siliserh regions, Alwar district of Rajasthan, India (Jain et al., 2009). Malasar tribals in Coimbatore District of Tamil Nadu (South India) use it against snakebite (Venkataswamy et al., 2010). Rhizome is used as antidote by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

F23. Family: Combretaceae
75. *Anogeissus latifolia* (Roxb. ex DC.) Wall. ex Bedd.
Korku and *Gond* communities of central India use whole plant as poultice on wounds caused by snakebite (Kadel and Jain, 2008).
76. *Lumnitzera racemosa* Willd.
Vernacular name: *Churunda* (Bhitarkanika wildlife sanctuary, Orissa, India)
The plant is used by the inhabitants of Bhitarkanika wildlife sanctuary, Orissa, India (Pattanaik et al., 2008).

F24. Family: Commelinaceae
77. *Commelina paludosa* Blume
Vernacular name: *Kanjuna* (Margallah Hills National Park, Islamabad, Pakistan)
This plant is used by the people of Margallah Hills National Park, Islamabad, Pakistan (Jabeen et al., 2009).

F25. Family: Convolvulaceae
78. *Ipomoea pes-tigridis* L.
Root is given as antidote by the tribes of Rewa district, Madhya Pradesh, India (Shukla et al., 2010).

F26. Family: Cornaceae
79. *Alangium salviifolium* (L. f.) Wangerin
Vernacular name: *Dhol anku* (Malkangiri district of Orissa, India)

Leaf juice is applied by the tribes of Malkangiri district of Orissa, India (Prusti and Behera, 2007a). *Malasar* tribe in Coimbatore District of Tamil Nadu (South India) also use the species against snakebite (Venkataswamy et al., 2010).

F27. Family: Costaceae

80. *Costus speciosus* (J. Konig) Sm.

Vernacular names: *Keokanda* (Bay Islands, India); *Keukonda* (Malkangiri district of Orissa, India)

Fresh rhizome juice is used by the tribal people of Bay Islands, India (Das et al., 2006). The same preparation is given in snakebite by the tribes of Malkangiri district of Orissa, India (Prusti and Behera, 2007a). Rhizome and a part of the stem are eaten raw in case of snakebite by *Nyishi* (*Daffla*) tribe of Arunachal Pradesh, India (Srivastava and *Nyishi* community, 2010).

F28. Family: Cucurbitaceae

81. *Luffa acutangula* (L.) Roxb.

Vernacular name: *Jangli Torai* (Chatara block, district Sonebhadra, Uttar Pradesh, India)

Tendrils are used as an antidote to snakebite by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

82. *Momordica dioica* Roxb. ex Willd.

Vernacular name: *Kakoda* (Sariska and Siliserh regions, Alwar district, Rajasthan, India)

The plant is used by the people of Sariska and Siliserh regions, Alwar district, Rajasthan, India (Jain et al., 2009).

83. *Trichosanthes tricuspidata* Lour.

Fruit and root extract is used in snakebite by the tribes of Nasik district, Maharastra, India (Patil and Patil, 2005).

F29. Family: Cyperaceae

84. *Cyperus rotundus* L.

Vernacular name: *Motha* (Rewa district, Madhya Pradesh, India)

Tuber powder mixed with cow butter is given by the tribes of Rewa district, Madhya Pradesh, India (Shukla et al., 2010).

F30. Family: Euphorbiaceae

85. *Drypetes assamica* (Hook. f.) Pax & K. Hoffm.

Vernacular name: *Torulelu* (*Negrito* tribes of Bay Islands, India)

Leaf juice is applied by the *Negrito* tribes of Bay Islands, India (Sharief, 2007).

86. *Emblica officinalis* Gaertn.

Vernacular name: *Awala* (Nasik district, Maharastra, India)

Stem infusion is given orally as an antidote by the tribes of Nasik district, Maharastra, India (Patil and Patil, 2005).

87. *Euphorbia hirta* L.

Vernacular names: *Dudhejhar*, *Chhumen* (Kavrepalanchowk district, Nepal)

Jain and Srivastava (2005) have reported use of leaves against snakebite while mentioning traditional use of Indian plants by the islanders of Indian Ocean. Root paste is used by the indigenous peoples of Kavrepalanchowk district, Nepal (Malla and Chhetri, 2009).

88. *Pedilanthus tithymaloides* (L.) Poit.

Jain and Srivastava (2005) have reported use of stem against snakebite while mentioning traditional use of Indian plants by the islanders of Indian Ocean.

F31. Family: Fabaceae

89. *Abrus precatorius* L.

Vernacular name: *Mikiakuiang* (*Khamti* tribe of Arunachal Pradesh, India)

Khamti tribe of Arunachal Pradesh, India uses a pinch of seed powder mixed with *Andrographis paniculata* seed powder to consume with lemon juice (Das and Tag, 2006).

90. *Aeschynomene indica* L.

Vernacular name: *Kodi thuvarai* (Tirunelveli hills, Tamil Nadu, India)

Decoction of leaves with that of *Andrographis paniculata*, *Andrographis lineata*, root of *Thespesia populnea* and stem bark of *Strychnos nux-vomica* is taken internally for 40 days by the tribals of Tirunelveli hills, Tamil Nadu, India. The decoction is also mixed with bathing water to treat snakebite (Ayyanar and Ignacimuthu, 2005).

91. *Albizia amara* (Roxb.) Boivin

Vernacular name: *Usilai* (Tirunelveli hills, Tamil Nadu, India)

Paste of leaf and root bark with *Jasminum angustifolium* root bark and rhizome of *Cyperus rotundus* is heated with *neem* oil and applied externally on affected places for 10 days by the tribals of Tirunelveli hills, Tamil Nadu, India (Ayyanar and Ignacimuthu, 2005).

92. *Albizia lebbeck* (L.) Benth.

Vernacular names: *Siris* (Lahore-Islamabad Motorway M-2; Chatara block, district Sonebhadra, Uttar Pradesh, India); *Shareen* (Margallah Hills National Park, Islamabad, Pakistan).

Flowers of the plant, found in the Lahore-Islamabad Motorway (M-2) is recommended in the treatment of snakebite (Ahmad, 2007). The plant is used in snakebite by the people of Margallah Hills National Park, Islamabad, Pakistan (Jabeen et al., 2009). It is also being used as an antidote by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

93. *Bauhinia variegata* L.

Vernacular names: *Kachnar* (Margallah Hills National Park, Islamabad, Pakistan); *Koilara* (Tharu community of Parroha VDC, Rupandehi district, Nepal)

The plant is used in snakebite by the people of Margallah Hills National Park, Islamabad, Pakistan (Jabeen et al., 2009; Ahmad et al., 2009). Bark and stem are used by the Tharu community of Parroha VDC, Rupandehi district, Nepal (Acharya and Acharya, 2009).

94. *Butea monosperma* (Lam.) Taub.

Vernacular names: *Palas, Dhak, Chichra* (Margallah Hills National Park, Islamabad, Pakistan); *Muttuga* (NR Pura taluk, Chikmagalur district, Karnataka, India)

Bheel community of central India gives leaf extracts twice after half an hour interval (Kadel and Jain, 2008). The plant is used by the people of Margallah Hills National Park, Islamabad, Pakistan (Jabeen et al., 2009). Bark infusion with ginger is given immediately for drinking in case of snakebite by the people of NR Pura taluk in Chikmagalur district of Karnataka, India (Prakasha et al., 2010).

95. *Butea superba* Roxb.

Plant extract is used as a folk remedy of snakebite in Gujarat, India (Gavali and Sharma, 2004).

96. *Caesalpinia bonduc* (L.) Roxb.

Vernacular name: *Karanj* (Chatara block of district Sonebhadra, Uttar Pradesh, India)

Seed powder is used as an antidote by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

97. *Cassia fistula* L.

Vernacular names: *Kakkegida* (Bidar district, Karnataka, India); *Sharakkonnai* (Kalrayan and Shervarayan hills, Eastern Ghats, Tamil Nadu, India); *Dhanba/Amaltas* (Chatara block of district Sonebhadra, Uttar Pradesh, India)

As a remedy against snakebite, one teaspoonful fruit powder is taken internally by the people of Bidar district, Karnataka, India (Prashantkumar and Vidyasagar, 2006). *Sahariya* and *Gond* communities of central India use this plant in snakebite (Kadel and Jain, 2008). This plant is also being used by the aboriginals of Kalrayan and Shervarayan hills, Eastern Ghats, Tamil Nadu, India (Kadavul and Dixit, 2009). Seeds are used as an antidote by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

98. *Cassia hirsuta* L.

Vernacular names: *Sabo-daru* (*Chakma* community of Bangladesh); *Sapdaru* (Chittagong hill tracts of Bangladesh)

Chakma community of Bangladesh use the leaves against snakebite (Roy et al., 2008). Leaf and root extract is used by the tribal people of Chittagong hill tracts of Bangladesh. Extracts are also used to prepare juice and paste. Juice is taken orally and paste is applied locally (Biswas et al., 2010).

99. *Cassia occidentalis* L.

Vernacular names: *Amla* (Lahore-Islamabad Motorway M-2); *Datalong* (Chittagong hill tracts of Bangladesh); *Kasondhi* (Chatara block of district Sonebhadra, Uttar Pradesh, India**)**

This plant found in the Lahore-Islamabad Motorway (M-2) has been recommended in the treatment of snakebite (Ahmad, 2007). It is used in snakebite by the tribal people of Chittagong hill tracts of Bangladesh (Biswas et al., 2010). Leaves are used as an antidote by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

100. *Cassia tora* L.

Vernacular names: *Chakunda* (*Jaunsari* tribe of Garhwal Himalaya, Uttaranchal); *Chakwar* (Chatara block of district Sonebhadra, Uttar Pradesh, India)

Jaunsari tribe of Garhwal Himalaya, Uttaranchal uses the plant to treat snakebite (Bhatt and Negi, 2006). *Gond* community of central India uses leaves and seeds (Kadel and Jain, 2008). Roots are used by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

101. *Clitoria ternatea* L.

Vernacular names: *U-misyntiew* (*Khasi* and *Jaintia* of Meghalaya, India); *Gokari/Aparajita* (Rewa district, Madhya Pradesh, India); *Aparajita* (Chatara block of district Sonebhadra, Uttar Pradesh, India)

Root powder (1 teaspoonful) mixed with *ghee* is taken orally immediately after snakebite as a folk herbal remedy of *Khasi* people in Meghalaya. It is also taken with milk or turmeric juice (Dolui et al., 2004). Root powder mixed with milk is taken orally immediately after snakebite by the *Jaintia* tribal community of Meghalaya, Northeast India (Jaiswal, 2010). Root powder is also given in snakebite by the tribes of Rewa district, Madhya Pradesh, India (Shukla et al., 2010). Roots are used by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

102. *Crotalaria pallida* Aiton

Vernacular name: *Uhutesimil* (*Karens* of Middle Andaman, India)

Leaf paste is applied on the wound from upside down for 10 days as a traditional phytotherapy among *Karens* of Middle Andaman, India (Sharief et al., 2005).

103. *Crotalaria prostrata* Rottler ex Willd.

Vernacular name: *Beeli khulkhuli* (Bidar district, Karnataka, India)

10 g fresh leaves are crushed in water and taken internally by the traditional people of Bidar district, Karnataka, India (Prashantkumar and Vidyasagar, 2006).

104. *Derris scandens* (Roxb.) Benth.

Bark is used as a remedy in snakebite as a folk medicine in Gujarat, India (Gavali and Sharma, 2004).

105. *Desmodium gangeticum* (L.) DC.

Vernacular name: *Salparni* (Chatara block of district Sonebhadra, Uttar Pradesh, India)

Roots are used by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

106. *Entada rheedei* Spreng.

Vernacular name: *Hanuman lota* (Malkangiri district of Orissa, India)

Seed paste is applied externally by the tribes of Malkangiri district of Orissa, India (Prusti and Behera, 2007a).

107. *Erythrina indica* Lam.

Vernacular names: *Fartuah* (Western Mizoram, India); *Kappu halivala* (NR Pura taluk in Chikmagalur district of Karnataka, India)

Bark is used as an antidote to snakebite by the people of western Mizoram, India (Lalfakzuala et al., 2007). Leaf paste with *Leucas aspera* and a seed of pepper prepared with *ghee* is applied on the snake-bitten area by the people of NR Pura taluk in Chikmagalur district of Karnataka, India (Prakasha et al., 2010).

108. *Erythrina variegata* L.

Jain and Srivastava (2005) have reported the use of the leaves against snakebite while mentioning traditional use of Indian plants by the islanders of Indian Ocean.

109. *Indigofera tinctoria* L.

Vernacular name: *Neelamari* (*Mullu kuruma* tribe of Wayanad district, Kerala)

Root juice or leaf juice is used internally by the *Mullu kuruma* tribe of Wayanad district, Kerala (Silja et al., 2008).

110. *Mimosa pudica* L.

Vernacular names: *Thottasiniki* (Villupuram district of Tamil Nadu, India); *Chhuimui/Lajwanti* (Chatara block, district Sonebhadra, Uttar Pradesh, India); *Yikira tera* (*Lotha-Naga* tribes of Wokha district, Nagaland, India)

The plant is used against snake poison by the traditional users in Villupuram district of Tamil Nadu, India. Root is popularly used against cobra bite by snake charmers and *Bejs* (Sankaranarayanan et al., 2010). Roots are also used by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010). Leaf paste is used by the *Lotha-Naga* tribes of Wokha district, Nagaland, India (Jamir et al., 2010).

111. *Mucuna pruriens* (L.) DC.

Vernacular name: *Kevanch* (Chatara block of district Sonebhadra, Uttar Pradesh, India)

The plant is used by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

112. *Tamarindus indica* L.

Vernacular name: *Chinch* (Jalgaon district, Maharastra, India)

Plant powder is used by the aboriginals of Jalgaon district, Maharastra, India. To treat snakebite, spoonful powder with honey is consumed thrice a day after every two hours (Pawar and Patil, 2007).

113. *Uraria picta* (Jacq.) Desv. ex DC.

Vernacular names: *Mahadevjata, Ishwarjata* (Purulia district, West Bengal, India)

Leaf paste is given twice daily by the tribals of Purulia district, West Bengal, India (Chakraborty and Bhattacharjee, 2006).

F32. Family: Gentianaceae

114. *Enicostemma axillare* (Lam.) Raynal.

Vernacular name: *Vellarugu* (Kanyakumari district, Tamil Nadu, India)

Plant paste is applied locally by the rural people of Kanyakumari district, Tamil Nadu, India (Jeeva et al., 2006a).

F33. Family: Hypoxidaceae

115. *Curculigo orchioides* Gaertn.

Vernacular names: *Milni pata* (*Chakma* tribes in Hill Tracts districts, Bangladesh); *Kali musli* (Chatara block of district Sonebhadra, Uttar Pradesh, India)

Petiole paste is taken orally by the *Chakma* tribes in Hill Tracts districts of Bangladesh (Rahman et al., 2007). Roots are used as an antidote by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

F34. Family: Lamiaceae

116. *Anisomeles malabarica* R. Br.

Vernacular names: *Peyimarutti* (Kanyakumari district, Tamil Nadu, India); *Siriyapaeyamarati* (Kumaragiri hills, Salem district, Tamilnadu, India)

Leaf paste is applied on affected part by rural people of Kanyakumari district, Tamil Nadu, India (Jeeva et al., 2006a). Leaf juice is applied by the villagers in Kumaragiri hills of Salem district of Tamilnadu, India (Alagesaboopathi, 2009).

117. *Clerodendrum serratum* (L.) Moon

Oinment made from leaves boiled with oil and butter is used by the tribes of Rewa district, Madhya Pradesh, India (Shukla et al., 2010).

118. *Hyptis suaveolens* (L.) Poit.

Vernacular name: *Ban Tulsi* (Chatara block of district Sonebhadra, Uttar Pradesh, India)

Roots are used by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

119. *Leucas aspera* (Willd.) Link

Vernacular names: *Gadde tumbe* (Sringeri *taluk*, Karnataka, India); *Gayasa* (*Kandha* tribe, Kandhamal district, Orissa, India)

Leaves with pepper and garlic chewed and spit into the nostril of cattle with force by the local medicine men of Bhadra wildlife sanctuary, Maland region of Western Ghats, India (Parinitha et al., 2004). Indigenous people living in Sringeri *taluk*, Karnataka, India gives leaves with *Stephania japonica* roots for consumption during snakebite in case of domestic animals (Prakasha and Krishnappa, 2006). *Kandha* tribe of Kandhamal district of Orissa, India uses leaf paste with black pepper and leaf juice is poured into the nostrils (Behera et al., 2006).

120. *Leucas capitata* Desf.

Vernacular names: *Chatra, Gulloda, Goma* (Margallah Hills National Park, Islamabad, Pakistan)

The plant is used by the people of Margallah Hills National Park, Islamabad, Pakistan (Jabeen et al., 2009).

121. *Leucas cephalotes* (Roth) Spreng.

Vernacular names: *Dronpushpi* (*Jaunsari* tribe, Garhwal Himalaya, Uttaranchal, India); *Gumbi* (Chatara block, district Sonebhadra, Uttar Pradesh, India)

Jaunsari tribe of Garhwal Himalaya, Uttaranchal uses plant decoction to treat snakebite (Bhatt and Negi, 2006). The same preparation is used by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

122. *Leucas linifolia* (Roth) Spreng.
Vernacular name: *Dron* (Mahmora area, Sivasagar district, Assam, India)
Fresh leaf juice (5 ml) is taken orally at an interval of 15 mins in the treatment of snakebite as a folk medicinal plant of Mahmora area, Sivasagar district, Assam, India (Acharyya and Sharma, 2004).
123. *Ocimum adscendens* Willd.
Vernacular name: *Heddumbe* (Bhadra wildlife sanctuary, Maland region, Western Ghats, India)
Root and bark infusion of *Ervatamia coronaria* and *Leucas aspera* leaves with root of this plant and bark of *Artocarpus* mixed with milk and butter are filtered and used in snakebite by the local medicine men of Bhadra wildlife sanctuary, Maland region of Western Ghats, India (Parinitha et al., 2004).
124. *Ocimum basilicum* L.
Vernacular name: *Kali Tulsi* (Chatara block, district Sonebhadra, Uttar Pradesh, India)
The plant is used by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).
125. *Plectranthus rugosus* Wall. ex Benth.
Vernacular name: Sloi (Uri, Kashmir Himalaya, India)
Leaf extract is mixed with hot water or milk to form bitter syrup and administered orally by the ethnic groups of Uri, Kashmir Himalaya, India (Khan et al., 2004).

F35. Family: Lauraceae
126. *Litsea ligustrina* Hook. f.
Vernacular name: *Kaattu senbagam* (Tirunelveli hills, Tamil Nadu, India)
Powder of leaf, stem bark and flower along with leaves of *Vitex altissima, Hygrophylla auriculata* and *Pavetta indica* is mixed and heated with water and taken internally by the tribals of Tirunelveli hills, Tamil Nadu, India (Ayyanar and Ignacimuthu, 2005).

F36. Family: Lecythidaceae
127. *Barringtonia racemosa* (L.) Spreng.
Vernacular name: *Moha shomudro gach* (Balidha village, Jessore district, Bangladesh)
Leaves are used as a snake repellent and in snakebite by the *kavirajes* of Balidha village in Jessore district, Bangladesh (Rahmatullah et al., 2010d).

F37. Family: Loganiaceae
128. *Strychnos nux-vomica* L.
Vernacular name: *Kochila* (Kalahandi district, Orissa, India)
Antisnake venom activity of ethanolic seed extract of the plant was reported by Chatterjee et al., 2004. Root paste is applied locally as an ethnomedicine against snakebite in Kalahandi district of Orissa, India (Nayak et al., 2004).

F38. Family: Malvaceae
129. *Althaea officinalis* L.
Vernacular names: *Risha Khatmi / Tukhm-e-khitmi* (Morgah Biodiversity Park, Rawalpindi, Pakistan)
The plant is reported against snakebite in a survey involving ethonobotanical properties and uses of medicinal plants of Morgah Biodiversity Park, Rawalpindi, Pakistan (Husain et al., 2008).
130. *Bombax ceiba* L.
Vernacular names: *Phunchawng* (Western Mizoram, India); *Ilavu* (*Mullu kuruma* tribe of Wayanad district, Kerala, India); *Semal/ Semar* (Chatara block of district Sonebhadra, Uttar Pradesh, India)
Fruits and flowers are used by the people of western Mizoram, India (Lalfakzuala et al., 2007). Leaf paste is used against snakebite by the *Mullu kuruma* tribe of Wayanad district, Kerala (Silja et al., 2008). Leaves are used as an antidote to snakebite by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).
131. *Grewia gamblei* J.R. Drumm.
Vernacular name: *Karadi kasavu* (Tirunelveli hills, Tamil Nadu, India)
Leaf juice and root bark along with leaves and roots of *Tragia involucrata*, leaves of *Smilax zeylanica* and roots of *Datura innoxia* are mixed with water, filtered and taken internally for 5 days to treat snakebite by the tribals of Tirunelveli hills, Tamil Nadu, India (Ayyanar and Ignacimuthu, 2005).
132. *Helicteres isora* L.
Vernacular name: *Maror phalli* (Chatara block, district Sonebhadra, Uttar Pradesh, India)
Sahariya community of central India uses root decoction orally (Kadel and Jain, 2008). Roots are also used as by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).
133. *Malva sylvestris* L.
Vernacular name: *Bendi gida* (Bhadra wildlife sanctuary, Maland region of Western Ghats, India)
Leaf extract mixed with lime juice is used in snakebite by the local medicine men of Bhadra wildlife sanctuary, Maland region of Western Ghats, India (Parinitha et al., 2004).
134. *Sida acuta* Burm. f.
Leaves are used by the tribes of Rewa district, Madhya Pradesh, India (Shukla et al., 2010).
135. *Sida cordifolia* L.
Vernacular names: *Nilatutti* (Kanyakumari district, Tamil Nadu, India); *Kungyi* (Sariska and Siliserh regions from Alwar district of Rajasthan, India)
Leaf juice is applied to cure snakebite by the rural people of Kanyakumari district, Tamil Nadu, India (Jeeva et al., 2006a). This plant is also used by the people of Sariska and Siliserh regions from Alwar district of Rajasthan, India (Jain et al., 2009).

136. *Sida rhombifolia* L.
Vernacular name: *Sohbyrthit rit* (*Khasi* and *Jaintia* community of Meghalaya, India)
Root (50 g) and leaves (50 g) and black pepper (2-3) are ground to make a paste and taken orally and also applied locally in snakebite as a folk herbal remedy of *Khasi* community of Meghalaya, India (Dolui et al., 2004). Paste of root and leaves and black pepper is taken orally and also applied locally in snakebite by the *Jaintia* tribal community of Meghalaya. (Jaiswal, 2010).
137. *Urena lobata* L. subsp. *lobata* (L.) Bross. Wal.
Vernacular name: *Kodi thutthi* (Tirunelveli hills, Tamil Nadu, India)
Decoction of root along with leaves of *Adhatoda vasica, Alangium salvifolium* and *Coccinia grandis* is taken internally by the tribals of Tirunelveli hills, Tamil Nadu, India (Ayyanar and Ignacimuthu, 2005).

F39. Family: Meliaceae
138. *Aglaia roxburghiana* var. *courtallensis* Gamble
Vernacular name: *Chokkalai* (Tirunelveli hills, Tamil Nadu, India)
Decoction of leaves and seeds is mixed with decoction of roots of *Aristolochia tagala, Strychnos nux-vomica* and *Coscinium fenestratum* and taken orally by the tribals of Tirunelveli hills, Tamil Nadu, India (Ayyanar and Ignacimuthu, 2005).
139. *Cipadessa baccifera* (Roth.) Miq.
Vernacular name: *Maramalli* (Tirunelveli hills, Tamil Nadu, India)
Leaf decoction along with the leaves of *Commelina longifolia* and *Aristolochia indica* is taken internally for 41 days by the tribals of Tirunelveli hills, Tamil Nadu, India (Ayyanar and Ignacimuthu, 2005).
140. *Melia azadirach* L. (*Azadirachta indica* A. Juss.)
Vernacular name: *Neem* (Rewa district, Madhya Pradesh, India)
Seed extract is used by the tribes of Rewa district, Madhya Pradesh, India (Shukla et al., 2010).

F40. Family: Menispermaceae
141. *Cissampelos pareira* L.
Vernacular names: *Kalipar* (Shekhawati region, Rajasthan, India); *Chokipar, Tijumala* (Purulia district, West Bengal, India); *Pilligar, Pilajar* (Margallah Hills National Park, Islamabad, Pakistan); *Ponmusutai* (Villupuram district, Tamil Nadu, India)
Folk people from Shekhawati region of Rajasthan, India use root decoction against snakebite (Katewa and Galav, 2006). Root paste with 10 g long pepper is prescribed once daily for 5 days by the tribals of Purulia district, West Bengal, India (Chakraborty and Bhattacharjee, 2006). *Korku* and *Gond* communities of central India use pounded roots in snakebite (Kadel and Jain, 2008). The plant is also used against snakebite by the people of Margallah Hills National Park, Islamabad, Pakistan (Jabeen et al., 2009) and Villupuram district of Tamil Nadu, India (Sankaranarayanan et al., 2010).
142. *Parabaena sagittata* Miers
Leaf paste boiled with coconut oil is applied on incision of snakebite by the *Nicobarese* of Car Nicobar, India (Verma et al., 2010).
143. *Stephania hernandiifolia* (Willd.) Walp.
Vernacular name: *Thandamanik* (Chittagong hill tracts of Bangladesh)
The plant is used by the tribal people of Chittagong hill tracts of Bangladesh (Biswas et al., 2010).
144. *Tinospora cordifolia* (Willd.) Miers
Vernacular names: *Limbvel* (*Bhil* tribe of Bibdod, Madhya Pradesh, India); *Gurch, Giloy* (*Tharu* tribe of Devipatan division in the Terai belt of Uttar Pradesh, India); *Sindal*, *Amrudam* (Kalrayan & Shervarayan hills, Eastern Ghats, Tamil Nadu, India)
Stem juice is used to cure snakebite by *Bhil* tribe of Bibdod, Madhya Pradesh, India (Jadhav, 2006). Aerial root pieces are worn around neck to cure snakebite by the *Tharu* tribe of Devipatan division in the Terai belt of Uttar Pradesh, India (Kumar et al., 2006). The plant is also being used in snakebite by the aboriginals of Kalrayan & Shervarayan hills, Eastern Ghats, Tamil Nadu, India (Kadavul and Dixit, 2009).

F41. Family: Moraceae
145. *Artocarpus hirsutus* Lam.
Bark paste is made with coconut oil and applied in snakebite by the local medicine men of Bhadra wildlife sanctuary, Maland region of Western Ghats, India (Parinitha et al., 2004).
146. *Ficus hirta* Vahl
Vernacular name: *Teng bhang gaas* (*Chakma* tribes in Hill Tracts districts of Bangladesh)
Root and fruit paste is applied on wounds caused by snakebite by the *Chakma* tribes in Hill Tracts districts of Bangladesh (Rahman et al., 2007).
147. *Ficus prostrata* (Wall. ex Miq.) Miq.
Vernacular name: *Theitit* (Western Mizoram, India)
Root juice is used by the people of western Mizoram, India (Lalfakzuala et al., 2007).
148. *Ficus racemosa* L.
Seed cake is traditionally used by the people of Madhya Pradesh, India. A few drops of its decoction are put into the nostrils, resulting into vomiting and relief (Srivastava and Pandey, 2006). Bark paste is applied over the injury as a part of indigenous healthcare practices in Udaipur district, Rajasthan, India (Nag et al., 2007).

F42. Family: Moringaceae
149. *Moringa oleifera* Lam.
Vernacular name: *Sajina* (Assam, India)
Root paste is applied by the tribals of Assam, India (Purkayastha and Nath, 2006).

F43. Family: Myrtaceae
150. *Syzygium cumini* (L.) Skeels
Vernacular name: *Jambakoli* (Kalahandi district, Orissa, India)
Bark paste is used as an ethnomedicine against snakebite in Kalahandi district of Orissa, India (Nayak et al., 2004).

F44. Family: Nyctaginaceae
151. *Boerhaavia diffusa* L.
Vernacular names: *Puruni* (*Kandha* tribe, Kandhamal district, Orissa, India); *Punarnawa/Gadahpunna* (Chatara block, district Sonebhadra, Uttar Pradesh, India); *Gadapurena/Punarnava* (Rewa district, Madhya Pradesh, India)
Kandha tribe of Kandhamal district of Orissa, India uses the plant paste orally and applies on the snake bitten area (Behera et al., 2006). *Sahariya* community of central India uses leaf paste on wounds (Kadel and Jain, 2008). The plant is used by the people of Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010). Leaves are used by the tribes of Rewa district, Madhya Pradesh, India (Shukla et al., 2010).
152. *Boerhaavia repens* L.
Vernacular name: *Ponownowa* (Majuli island and Darrang districts, Assam, India)
Roots are used by the communities residing in Majuli island and Darrang districts of Assam, India (Barua et al., 2007).

F45. Family: Onagraceae
153. *Ludwigia adscendens* (L.) H. Hara
Vernacular name: *Hara* (Kanyakumari district, Tamil Nadu, India)
Poultices made of pounded fresh plant are applied externally by the rural people of Kanyakumari district, Tamil Nadu, India (Jeeva et al., 2006a).

F46. Family: Orchidaceae
154. *Eulophia nuda* Lindl.
Vernacular name: *Jhulukia* (Chitrakoot, Madhya Pradesh, India)
Root juice is given to treat snakebite by the tribal communities of Chitrakoot, Madhya Pradesh, India (Sikarwar et al., 2008).

F47. Family: Orobanchaceae
155. *Lindenbergia muraria* (Roxburg ex D. Don) Brühl
Vernacular name: *Chatti* (Sariska and Siliserh regions, Alwar district, Rajasthan, India)
This species is used by the people of Sariska and Siliserh regions, Alwar district, Rajasthan, India (Jain et al., 2009).

F48. Family: Oxalidaceae
156. *Biophytum candolleanum* Wight
Vernacular name: *Perumani vaatti* (Tirunelveli hills, Tamil Nadu, India)
Leaf powder with the leaves of *Aristolochia tagala, Alangium salvifolium*, stem bark of *Strychnos nux-vomica*, *Wrightia tinctoria*, *Thespesia populnea* and roots of *Abrus precatorius* is heated with water and taken internally for 14 days by the tribals of Tirunelveli hills, Tamil Nadu, India (Ayyanar and Ignacimuthu, 2005).
157. *Oxalis corniculata* L.
Vernacular name: *Khati booti* (Tehsil Chakwal, Pakistan)
In some sacred groves of Meghalaya, India, leaves of the plant are used against snakebite (Jeeva et al., 2006b). Leaves are applied by the indigenous people of Tehsil Chakwal, Pakistan (Qureshi et al., 2009).
158. *Oxalis debilis* var. *corymbosa* (DC.) Lour.
Vernacular name: *Khatti booti* (Chatara block, district Sonebhadra, Uttar Pradesh, India)
The plant is being used by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).

F49. Family: Papaveraceae
159. *Argemone mexicana* L.
Vernacular name: *Pilikateli* (Sariska and Siliserh regions, Alwar district, Rajasthan, India)
It is used by the people of Sariska and Siliserh regions, Alwar district, Rajasthan, India (Jain et al., 2009).

F50. Family: Phyllanthaceae
160. *Antidesma alexiteria* L.
Leaves are used by the tribals of Tirunelveli Hills, Western Ghats, India (Jothi et al., 2008).
161. *Cleistanthus collinus* (Roxb.) Benth. ex Hook. f.
Vernacular name: *Korda* (Malkangiri District, Orissa, India)
Bark juice is applied externally by the tribes of Malkangiri district of Orissa, India (Prusti and Behera, 2007a).

F51. Family: Piperaceae
162. *Piper nigrum* L.
Kali mirch (pepper) roasted in *ghee* is given orally to the snakebitten animal in South eastern part of Chamoli district, Uttaranchal, India. Application of a root paste of *kali haldi* (black turmeric) on the wounds of the snakebitten animal and touching of a red hot iron on the wounds quickly are the other practices (Tiwari and Pande, 2004).

F52. Family: Plantaginaceae
163. *Bacopa monnieri* (L.) Edwall
Vernacular names: *Jalneem/ Brahmi* (Rewa district, Madhya Pradesh, India)
Paste is bandaged as snakebite antidote in Barak Valley, Northeast India (Barbhuiya et al., 2009). Whole plant decoction is used by the tribes of Rewa district, Madhya Pradesh, India (Shukla et al., 2010).

F53. Family: Plumbaginaceae
164. *Plumbago zeylanica* L.
Vernacular names: *Chita*, *Jaundicea* (Tripura, India)
Tribal and non-tribal medicine men of Tripura state, India use the root paste against snakebite (Majumdar et al., 2006).

F54. Family: Poaceae
165. *Cynodon dactylon* (L.) Pers.
Kumar and Narain (2010) have mentioned this plant as an effective remedy against snakebite while discussing herbal remedies of wetland macrophytes in India.
166. *Eleusine indica* (L.) Gaertn.
Vernacular name: *Malkantari-Mundari* (*Munda* tribe of West Dinajpur district, West Bengal, India)
20 g root is crushed along with 10 g *Zingiber officinale* and 9 black pepper pieces. This paste is divided into two equal parts. A part with a few drops of honey is administered orally and another part is applied on the snake bitten area by *Munda* tribe of West Dinajpur district, West Bengal, India (Mitra and Mukherjee, 2005).
167. *Oplismenus compositus* (L.) P. Beauv.
Incision of snakebite is warmed with the smoke produced by putting green plants on fire by the *Nicobarese* of Car Nicobar, India (Verma et al., 2010).

F55. Family: Polygonaceae
168. *Persicaria chinensis* (L.) H. Gross
Vernacular name: *Bangori bhanga gaas* (*Chakma* tribes in Hill Tracts districts of Bangladesh)
Leaf extract is taken orally by the *Chakma* tribes in Hill Tracts districts of Bangladesh (Rahman et al., 2007).
169. *Polygonum perfoliatum* (L.) L.
Vernacular name: *Lilhar* (Manipur, India)
Seed powder paste is applied in the wetlands of Manipur, India (Jain et al., 2007).

F56. Family: Ranunculaceae
170. *Aconitum heterophyllum* Wall. ex Royle
Vernacular name: *Aatish* (Darjeeling and Sikkim Himalaya, India)
Rhizome is used by the local people of Darjeeling and Sikkim Himalaya (Hussain and Hore, 2007).

F57. Family: Rubiaceae
171. *Anthocephalus cadamba* (Roxb.) Miq.
Vernacular name: *Kadam* (Chatara block, district Sonebhadra, Uttar Pradesh, India)
It is used as an antidote to snakebite by the Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010).
172. *Anthocephalus chinensis* (Lam.) Rich. ex Walp.
Vernacular name: *Kadam* (Pirojpur District, Bangladesh)
Leaf and bark are used by the folk medicinal practitioners in three areas of Pirojpur District, Bangladesh (Rahmatullah et al., 2010g).
173. *Chasalia curviflora* var. *ophioxyloides* (Wall.) Deb & Krishna
Vernacular name: *Hel gaas* (*Chakma* tribes in Hill Tracts districts of Bangladesh)
Crushed leaves are applied on wounds caused by snakebite by *Chakma* tribes in Hill Tracts districts of Bangladesh (Rahman et al., 2007).
174. *Tarenna odorata* Roxb.
Vernacular name: *Khalagor song* (Mizoram, North-East India)
Root paste is used on snakebite by the people of Mizoram, North-East India, an Indo-Burma hotspot region (Rai and Lalramnghinglova, 2010).

F58. Family: Rutaceae
175. *Aegle marmelos* (L.) Corr.
Vernacular name: *Orai-si-apang* (Chittagong Hill Tracts region of Bangladesh)
Jain and Srivastava (2005) have reported the plant against snakebite while mentioning traditional use of Indian plants by the islanders of Indian Ocean. Paste of leaves, roots and bark is applied on snakebites by the *Rakhain* tribe inhabiting the Chittagong Hill Tracts region of Bangladesh (Hanif et al., 2009).
176. *Ruta graveolens* L.
Vernacular name: *Nagadali* (Maland region, Western Ghats, India)
Root paste is applied externally by the local medicine men of Bhadra wildlife sanctuary, Maland region of Western Ghats, India (Parinitha et al., 2004).

F59. Family: Salicaceae
177. *Flacourtia indica* (Burm. f.) Merr.

Vernacular name: *Sela* (Kalrayan & Shervarayan hills, Eastern Ghats, Tamil Nadu, India)
Jain and Srivastava (2005) have reported the leaves against snakebite while mentioning traditional use of Indian plants by the islanders of Indian Ocean. This plant is also used by the aboriginals of Kalrayan & Shervarayan hills, Eastern Ghats, Tamil Nadu, India (Kadavul and Dixit, 2009).

178. *Casearia graveolens* Dalz.
Vernacular name: *Kirmira* (Nasik district, Maharastra, India)
Stem pieces are chewed raw once daily for 5-6 days by the tribals of Nasik district, Maharastra, India (Patil and Patil, 2005).

F60. Family: Santalaceae
179. *Viscum articulatum* Burm. f.
Vernacular name: *Mang-kariang-khlen-sia* (*Khasi* and *Jaintia* tribal community of Meghalaya, India)
Khasi and *Jaintia* communities of Meghalaya, India use this plant against snakebite (Dolui et al., 2004; Jaiswal, 2010).

F61. Family: Sapindaceae
180. *Sapindus laurifolius* Vahl
Vernacular name: *Arithi* (Porbandar district, Gujarat, India)
Fruit foam is applied on snakebite while the fruit juice is given orally as a part of indigenous animal healthcare practised in the Porbandar district, Gujarat (Jadeja et al., 2006).

F62. Family: Sapotaceae
181. *Isonandra lanceolata* Wight
Vernacular name: *Sirumottai* (Tirunelveli hills, Tamil Nadu, India)
Laef, unripened fruit and root bark along with leaves of *Andrographis paniculata* and leaf and root bark of *Thespesia populnea* are heated with water to make a decoction and taken internally for 30 days by the tribals of Tirunelveli hills, Tamil Nadu, India (Ayyanar and Ignacimuthu, 2005).

F63. Family: Solanaceae
182. *Capsicum annuum* L.
Sahariya and *Bheel* communities of central India use this plant against snakebite (Kadel and Jain, 2008).
183. *Datura metel* L.
Vernacular name: *Kala Dhatura* (Chatara block of district Sonebhadra, Uttar Pradesh, India)
Sahariya community of central India uses seed extracts (Kadel and Jain, 2008). Leaves are used by the people of Chatara block of district Sonebhadra, Uttar Pradesh, India (Singh et al., 2010). Incision of snakebite is washed with *Annona squamosa* juice and then *D. metel* leaf paste is applied by the *Nicobarese* of Car Nicobar, India (Verma et al., 2010).
184. *Solanum capsicoides* All.
Vernacular name: *Tit baegun* (Barisal Town, Barisal District, Bangladesh)
Seeds are used by *kavirajes* of Barisal Town in Barisal District, Bangladesh. 8 seeds are orally administered to the patients. Seeds are administered 3 times in 24 hrs following which the patient vomits and gets cured. This remedy applies to any type of poisonous snake bite (Chowdhury et al., 2010).
185. *Solanum torvum* Sw.
Vernacular name: *Tit baegun* (Pirojpur District, Bangladesh)
Root and fruit are used by the folk medicinal practitioners in three areas of Pirojpur District, Bangladesh. Root juice is mixed with 250 ml water and 100 ml mustard oil. First, Ammonium chloride is rubbed on the snake bitten area and then the mixture of root juice, water and oil is given orally. Otherwise, 1 handful of fruit is boiled in ½ litre of water. The fruits are then squeezed to get the juice, which is orally given to the snakebitten person to vomit out the poison (Rahmatullah et al., 2010g).
186. *Withania somnifera* (L.) Dunal
Vernacular name: *Ashwagandhi* (NR Pura taluk, Chikmagalur district, Karnataka, India)
Root paste is applied on the bitten area by the people of NR Pura taluk in Chikmagalur district of Karnataka, India (Prakasha et al., 2010).

F64. Family: Staphyleaceae
187. *Staphylea emodi* Wall.
Vernacular name: *Chitra* (Margallah Hills National Park, Islamabad, Pakistan)
The plant is used by the people of Margallah Hills National Park, Islamabad, Pakistan (Jabeen et al., 2009).

F65. Family: Theaceae
188. *Schima wallichii* Choisy
Vernacular name: *Khiang* (Western Mizoram, India)
Fruit decoction is used by the people of western Mizoram, India (Lalfakzuala et al., 2007).

F66. Family: Vitaceae
189. *Leea compactiflora* Kurz
Flowers and berries pounded of the plant are tied tightly with a cloth against snakebite by *Nyishi* (*Daffla*) tribe of Arunachal Pradesh, India (Srivastava and Nyishi community, 2010).

F67. Family: Verbanaceae
190. *Lantana camara* var. *aculeata* (L.) Moldenke

Vernacular name: *Raimunia* (Rewa district, Madhya Pradesh, India)
Decoction of roots, flowers and stems is prescribed by the tribes of Rewa district, Madhya Pradesh, India (Shukla et al., 2010).

191. *Lantana indica* Roxb.
Vernacular name: *Ghaneri* (Margallah Hills National Park, Islamabad, Pakistan)
This plant is used by the people of Margallah Hills National Park, Islamabad, Pakistan (Jabeen et al., 2009).

192. *Vitex negundo* L.
Vernacular names: *Bana* (Kunihar forest division, district Solan, Himachal Pradesh, India); *Karinochi* (*Mullu kuruma* tribe of Wayanad district, Kerala, India); *Bili lakki* (NR Pura taluk in Chikmagalur district of Karnataka, India)
Paste of leaves is used with *Albizzia chinensis* by the indigenous people of Kunihar forest division, district Solan, Himachal Pradesh, India (Verma and Chauhan, 2007). Leaf paste with rhizome paste of turmeric is applied on the snake-bitten spot by the *Mullu kuruma* tribe of Wayanad district, Kerala (Silja et al., 2008). Leaf or root paste mixed with turmeric powder is applied on the bitten area by the people of NR Pura taluk in Chikmagalur district of Karnataka (Prakasha et al., 2010).

F68. Family: Zingiberaceae
193. *Hedychium spicatum* Buch.-Ham. ex Sm.
Vernacular name: *Aithur* (Western Mizoram, India)
Rhizome is used by the people of western Mizoram, India (Lalfakzuala et al., 2007).

F69. Family: Zygophyllaceae
194. *Fagonia bruguieri* DC.
Vernacular name: *Drummahu* (Mahal Kohistan, Khirthar National Park, Pakistan)
People of Mahal Kohistan (Khirthar National Park), Pakistan use the plant in snakebite (Panhwar and Abro, 2007).

Pteridophytes
F70. Family: Adiantaceae
195. *Adiantum philippense* L.
Vernacular name: *Kali-Jhant* (Amarkantak, Madhya Pradesh, India)
Rhizome powder is used by the indigenous people of Amarkantak, Madhya Pradesh, India (Singh et al., 2005).

F71. Family: Dryopteridaceae
196. *Dryopteris cochleata* (D.Don) C. Chr
Vernacular name: *Jatashankari* (Amarkantak, Madhya Pradesh, India)
Fresh paste of rhizome and fronds is applied externally by the indigenous people of Amarkantak, Madhya Pradesh, India (Singh et al., 2005).

F72. Family: Polypodiaceae
197. *Microsorium punctatum* L.
Tender leaf paste is applied on incision of snakebite by the *Nicobarese* of Car Nicobar, India (Verma et al., 2010).

F73. Family: Thelypteridaceae
198. *Christella parasitica* (L.) H. Lev.
Vernacular name: *Bih-logani* (Gohpur, Sontipur district, Assam)
Tribals of Gohpur of Sontipur district, Assam use the leaves in snakebite treatment (Saikia, 2006).

Discussion

From the present review 73 plant families (69 angiosperm and 4 pteridophyte families) having 198 species used against snakebite were found to be reported from different ethno-botanical investigations mostly carried out during the last few years in India, Bangladesh, Pakistan and Nepal. Plant Family Fabaceae represents the maximum species (25) followed by Apocynaceae (16), Asteraceae (11), Lamiaceae (10), Malvaceae (9), Acanthaceae (8), Amaranthaceae (8), Solanaceae (5), Asparagaceae (4), Euphorbiacae (4), Menispermaceae (4), Moraceae (4), Aristolochiaceae (4), Rubiaceae (4) etc. Among the most common genera are *Cassia* sp. (4), *Leucas* sp. (4), *Aristolochia* sp. (4), *Achyranthes* sp. (3), *Amaranthus* sp. (3), *Ficus* sp. (3), *Nerium* sp. (3), *Sida* sp. (3), *Albizia* sp. (2), *Anthocephalus* sp. (2), *Arisaema* sp. (2), *Boerhaavia* sp. (2), *Butea* sp. (2), *Calotropis* sp. (2), *Crotalaria* sp. (2), *Eclipta* sp. (2), *Erythrina* sp. (2), *Lantana* sp. (2), *Ocimum* sp. (2), *Oxalis* sp. (2), *Rauvolfia* sp. (2), *Sansevieria* sp. (2) and *Solanum* sp. (2). (Digit within parenthesis indicates number of species.). *Aristolochia indica* (12) represents the highest usage, followed by *Achyranthes aspera* (9), *Rauvolfia serpentina* (8), *Acorus calamus*(5), *Cissampelos pareira* (5), *Amaranthus viridis* (4), *Boerhaavia diffusa* (4), *Calotropis procera* (4), *Cassia fistula* (4), *Clitoria ternatea* (4) and *Hemidesmus indicus* (4) (Digits represent to the number of reports.).

Pharmacological investigations for anti snake venom properties have been carried out in many of the reported plants such as *Vitex negundo*, *Emblica officinalis* (Alam and Gomes, 2003), *Mimosa pudica* (Mahanta and Mukherjee, 2001; Girish et al., 2004), *Eclipta prostrata* (Melo et al., 1994; Pithayanukul et al., 2004), *Andrographis paniculata, Aristolochia indica* (Meenatchisundaram et al., 2009), *Mucuna pruriens* (Guerranti et al., 1999; Meenatchisundaram and Michael, 2010) *Strychnos nux vomica* (Chatterjee et al., 2004), *Hemisdesmus indicus* (Alam et al., 1994), *Cissampelos pareira* (Badilla et al., 2008), *Sida acuta* (Otero et al., 2000a,b), *Tamarindus indica* (Ushanandini et al., 2006), *Withania somnifera* (Lizano et al., 2003; Machiah and Gowda, 2006; Machiah et al., 2006) etc. Gomes et al. (2010) have mentioned certain active compounds

found among the plants responsible for anti venomous properties. Aristolochic acid (*Aristolochia indica*), *Azadirachta indica* phospholipase A_2 inhibitor (*Azadirachta indica*) (Mukherjee et al., 2008), wedelolactone (*Eclipta prostrata*) (Mors et al., 1989), pentagalloyl glucopyranose (*Mangifera indica*), lupeol actate and 2-hydroxy-4-methoxy benzoic acid (*Hemidesmus indicus*) (Chatterjee et al., 2006; Alam and Gomes, 1998a,b) etc. are among the several biomolecules investigated for anti snake venom activities. It is interesting to note that a positive correlation exists between traditional use of medicinal plants and their pharmacological investigations. A very small percentage of the folklore has been evaluated scientifically. Further investigation of crude extracts and purified compounds may lead to the discovery of active biomolecules having therapeutic potential. The ethnobotanical wealth of Indian subcontinent can serve as a rich source of herbal drugs which can be exploited in future drug discovery programmes. India with a heritage of plant resources and diversified aboriginal cultures provides an interesting ground for work (De, 1968). To conserve this rich folklore, public and governmental recognition of the use of these medicinal plants is of utmost importance (Rahmatullah et al., 2010a). It is also evident that certain plants become more useful when applied in combination with some other plants (Dey and De, 2010b). Synergistic interaction among plants and compounds present in the crude extracts could be the major factor responsible for pharmacological efficacy of ethnomedicinal preparations. Apart from the direct use of the plants, some customs and beliefs persist among tribal communities. *Raika* pastoralists of Rajasthan associated with camel husbandry believe that a cotton thread around the neck of a snake bitten camel is a local custom (Tripathi and Rajput, 2006).

Conclusion

World Health Organization (WHO) documented that 80% of world population rely on plant based medicines for their primary healthcare. If this tribal knowledge of medicinal plants is evaluated and utilized scientifically, mankind will be benefited with the use of herbal drugs as part of their regular healthcare practices. Several medical emergencies like snakebite can be dealt with pharmacological investigations of the folklore. Many countries have started documentation, cultivation, scientific evaluation and sustainable utilization of medicinal flora used by traditional people. It is high time for us to exercise and propagate our ethnic knowledge against human mortality and morbidity.

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