



Plants used in treatment of snakebite by the tribal communities of Paschim Medinipur district, West Bengal

Sumana Sarkhel

Department of Human Physiology with Community Health,
Vidyasagar University, Paschim Medinipur, (West Bengal) - India

Abstract

An ethno-medicinal survey was conducted in 8 villages of the *Paschim Medinipur* district of West Bengal during 2012-2013 to collect information from traditional health healers/tribal communities on the use of medicinal plants for treatment of snake bites through questionnaire and personal interviews. The tribal communities residing in this region are the *Santhals, Mundas, Lodhas, Bhumijs, Oraon* and *Kherias*. The present study enumerates 20 plant species belonging 16 families used by the tribal communities and medicinal healers of *Paschim Medinipur* district, West Bengal in treatment of snakebite. Each plant species has been listed alphabetically according to its botanical name, family, vernacular name, part(s) used, mode of preparation/administration.

Key-Words: Traditional medicines, snakebite, Paschim Medinipur, West Bengal

Introduction

Traditional human populations have a broad natural pharmacopoeia consisting of wild plants and animal species. Ingredients sourced from plants and animals are not only used in traditional medicines, but are also increasingly valued as raw materials in the preparation of modern medicines and herbal preparations. The World Health Organization (WHO) defines traditional medicines as practices, knowledge, and belief system which uses minerals, plants and animal based remedies, spiritual therapies and exercises to prevent, treat and maintain well being[1]. A great number of the natural products have come to us from the scientific study of remedies traditionally employed by various cultures [2]. Traditional ecological knowledge is of significance from a conservation perspective and an attribute of societies with a continuity in resource use practice[3]. Snake bite is a major health hazard world wide. Conservative sources estimate that the number of accidents globally reach one million, resulting in 600,000 envenomations and more than 20,000 deaths annually[4]. Agricultural and tropical regions report more snake bites than anywhere else[5]. In India alone more than 200,000 cases are reported and an estimated 35,000 to 50,000 people die each year[6]. Antiserum[7] is the only therapeutic agent available throughout the world. Antiserum contains purified, enzyme-refined and concentrated heterologous immunoglobins.

In India, particularly in the rural areas snake bite victims depend on traditional medicine men and healers, due to lack of availability of antiserum. A review of past literature on ethnobotany indicates that ample research work has been done in various parts of the world on herbal antagonists of snake venom [8-12]. In India, medicinal plants have been used to cure specific ailments since ancient times. Plants are primarily used due to their safety, effectiveness, cultural preferences, inexpensiveness and abundant availability. Plants are used either single or in combination, as antidotes for snake envenomation by rural populations in India and in many parts of the world [13]. Several medicinal plants with accepted therapeutic values in snake bite treatment are now attracting attention. Recently due to unplanned developmental programs, increasing modern healthcare facilities and impact of modern civilization, natural resources as well as traditional knowledge and tribal cultures are depleting rapidly at an alarming rate. Therefore, it is imperative to explore and document this unique and indigenous, traditional knowledge of the tribal community, before it diminishes with the knowledgeable persons.

Paschim Medinipur is one of the eleven districts of West Bengal (Fig.1). Geographically located in 21°36' to 22°57' North latitude to 86°33' to 88°11' East longitude, it covers an area of 9345 square kilometres (Fig.2). North and North west of this district is a part of Chotanagpur plateau. The area has a gentle slope from

* Corresponding Author

E.mail: sumana.sarkhel@yahoo.co.in

east to west. The flora of this region is constituted predominantly with *sal* of coppice origin and covers 60% of the average area. The usual associates of *sal* in this region are *Pterocarpus marsupium*, *Terminalia arjuna*, *Madhuca latifolia*, *Bombax ceiba*, *Terminalia belerica*. Plantation mainly includes *Eucalyptus*, *Akashmoni*, *Bamboo* and *Kaju*. The tribal communities residing in this region are the *Santhals*, *Mundas*, *Lodhas*, *Bhumijis*, *Oraon* and *Kherias*. This region is characterized by sandy loam or loamy soil of reddish or reddish brown colour. The maximum temperature recorded in April is 45°-46°C and minimum temperature in winter is 6°C. The average annual rainfall is about 1500 mm. The present work is an attempt to provide a comprehensive account of some of the Indian medicinal plants used in the treatment of snake bite in *Paschim Medinipur* district of West Bengal by the tribal communities and traditional healers.

Material and Methods

Field investigations were conducted during April 2012 to March 2013 in 8 different villages of *Paschim Medinipur* district, West Bengal. Ethnobotanical data was collected through individual and Focus Group Discussion (FGD) interviews using semistructured open-ended questionnaires as proposed in standard literature [14]. Subjects were selected on the basis of their knowledge pertaining to the use of medicinal plants in tradition [15]. A total of 88 individuals (30-70 years) were interviewed during the survey including medicine men (*ojha*), elder villagers, plant collectors and forest dwellers belonging to four different communities – *Santhal*, *Munda*, *Lodha* and *Oraon*. Interview based field study and guided field work was done in which the taxonomic diversity, distribution, local names, parts of plants used in treatment of snake bite, preparatory methods and mode of administration of these plants were recorded [16]. Group discussion was made with the healers and local people to know their perception about the use of traditional folk medicines, awareness about the conservation of phytodiversity and indigenous knowledge. Plant collection was carried out by standard method [17]. Herbaria were prepared according to conventional herbaria technique [18]. All the voucher specimens were identified using relevant floras and standard literature [19, 20] and deposited in the herbarium of the Department of Botany and Forestry, Vidyasagar University, *Paschim Medinipur*, West Bengal. The collected plants were crosschecked by neighbouring herbalists and traditional medicinal healers. For each species the proportion of informants who

independently reported its use in snake bite was assessed following [21].

Results and Discussion

The present study reports 20 ethnomedicinal plants from 16 families traditionally used in treatment of snakebite by the tribal population of *Paschim Medinipur* district West Bengal (Table 1). The plants have been enumerated alphabetically according to their scientific name, habit, local name, family, parts used, mode of preparation and medicinal uses. A high degree of informant consensus for each species was observed. The focus of the present study is to provide a comprehensive picture of the medicinal plants with antsnake venom activity that are used by the tribal population of *Paschim Medinipur* district, West Bengal. *Paschim Medinipur* is a repository of floral and faunal resources. It is inhabited by a number of tribal communities like *Santhals*, *Mundas*, *Lodhas*, *Bhumijis*, *Oraon* and *Kherias*. The use of medicinal plants was a chosen practice in this district throughout history, the knowledge of which was gathered through the experience of many generations. The present study documents 20 species of ethnomedicinal plants from 16 families used by the tribal healers and practitioners of the district. Among the plants reported there are 4 species of trees, 8 species of shrubs, 7 species of herbs and one species of climber. The reported plants are used by more than one ethnic group. The local tribes mainly used leaf, root, bark, rhizome, stem, fruit, seed and latex of these plants as antidote against snakebite. The reported plants are mostly administered as decoction, extracts, paste, juice and poultice. Some of these plants like *Emblica officinalis* Linn [22], *Hemidesmus indicus* L. [23], *Tamarindus indicus* [24], *Rauwolfia serpentina* (L.) Benth. ex Kurz [25] have been earlier reported to have antsnake venom activity in various ethnomedicinal studies. In Indian tradition, some plants are supplemented with pepper and garlic for snakebite treatment [26]. Thus the reported data validates the claims of traditional healers and tribal communities of *Paschim Medinipur* district regarding the herbal antagonists of snakebite. The consensus among users indicates that plants have protective activity when administered in snake bite. Particularly plants like *Rauwolfia serpentina* (L.) Benth. ex Kurz, *Emblica officinalis* Linn and *Moringa oleifera* Lam have a high consensus agreement regarding their use in snakebite. Thus the present investigation can provide leads for specific venom inhibitory compounds from the reported medicinal plants that could be used in combined therapy with antiserum in the near future.

Conclusion

Snakebite till date remains a public health hazard in tropical countries especially in India. The first antivenom was developed by Albert Calmette, a French scientist of Pasteur Institute in 1895. Due to lack of availability, cost and hypersensitivity alternative therapy for snakebite has received much attention. Snake bite remedies are of interest since they may have recognizable therapeutic or toxic effects and are steeped in cultural beliefs that invariably conflict with formal health care practices. Envenomations due to snakebites are commonly treated by parenteral administration of horse or sheep-derived polyclonal antivenoms aimed at neutralization of toxins. However, despite the widespread success of this therapy, it is still important to search for different venom inhibitors, either synthetic or natural, that could complement or substitute for the action of antivenoms. The present study investigates the ethnomedicinal resources of Paschim Medinipur district of West Bengal to identify the therapeutic potential of some herbal remedies against snake bite. The high degree of consensus among the informants suggests the current use and knowledge about the plants used in snakebite treatment are still strong. Thus studies exploring pharmacopoeia of unrelated cultures for plants treating specific medical conditions (like snake bites in this study) present one way of validating anecdotal field reports, corroborating and selecting promising lead plants and conservation of potentially threatened species.

Acknowledgement

Author is grateful to the Head, Department of Human Physiology with Community Health, Vidyasagar University for his encouragement and support. Author is indebted to UGC for financial support received in the form of a minor grant. Author is thankful to all the tribal informants who have participated in this survey and provided their valuable knowledge relevant to this work.

References

1. WHO (2003). Traditional Medicine. *Fact Sheet No 134*.
2. Holmstedt, B., Bruhn, J.G.(1983). Ethnopharmacology-a challenge. *J Ethno Pharmacol*; **8(3)**: 251-256.
3. Gadgil, M., Berkes, F., Folke, C. (1993). Indigenous knowledge of biodiversity conservation. *Ambio*; **22(2-3)**: 151-6.
4. Chippaux, J.P. (1998). Snake-bites: Appraisal of the global situation. *Bulletin WHO*; **76(5)**: 515-524.

5. Russell, F.E.(1980). *Snake venom poisoning*. Philadelphia JB Lippincott Company; p. 235-285.
6. Bawaskar, H.S.(2004). Snake venoms and antivenoms: critical supply issues. *Journal Association Physicians India*; **52**: 11-13.
7. Calmette, A.(1894). Contribution a letude du venin des serpent.Immunization des animax et traitement de Ienvenimation. *Ann .Inst.Pasteur*; **8**: 275.
8. Mebs, D. (2000). Notes on the traditional use of plants to treat snake bite in northern Papua New Guinea. *Toxicon*; **38**: 299-302
9. Houghton, P.J., Osibogun, I.M. (1993). Flowering plants used against snakebite. *Journal of Ethnopharmacology*; **39**: 1-29.
10. Asuzu, I.U., Harvey, A.L. (2003). The antisnake venom activities of *Parkia biglobosa* (Mimosaceae) stem bark extract. *Toxicon*; **42**: 763-8.
11. Yang, L.C., Wang, F., Liu, M. (1998). A study of an endothelin antagonist from a Chinese anti-snake venom medicinal herb. *Journal of Cardiovascular Pharmacology*; **31**.
12. Mors WB (1991). Plants against snake-bites. *Memoirs Institute Oswaldo Cruz*; **86**: 193.
13. Perumal,S.R., Maung,T.M., Gopalakrishnakone,P., Ignacimuthu, S. (2008). Ethnobotanical survey of folk plants for the treatment of snakebites in Southern part of Tamilnadu, India. *Journal of Ethnopharmacology*; **115**: 302-312.
14. Karehed, J., Odulg, E. (1997).An ethnobotanical study among the Maasai of the Loita Hills, Kenya. *Minor field studies No. 14*, Swedish University of Agriculture Sciences, international office, Uppsala.
15. Cotton, C.M.(1996). *Ethnobotany: Principles and Applications*. Chichester (John Wiley and sons, Ltd, New York).
16. Martin, G. J.(1995). *Ethnobotany: A Methods Manual*. People and plants conservation manual (Chapman and Hall, London).
17. Jain, S. K and Rao, R.R. (1977). *A Handbook of herbarium methods*, (Today and Tomorrow's Printers and Publishers, New Delhi).
18. Mitra, J. N. (1974). *An Introduction to Systemic Botany and Ecology*, (The World Press Private Limited), p.52.
19. Kirtikar, K. R., Basu, B. D (1935). *Indian Medicinal Plants*, Lalit Mohan Basu, (Leader Road, Allahabad, India); p.1-4.
20. Hooker, J. D (1989). *The Flora of British India*, (L Reeve & Co, London); **7**: 1872-1879.

21. Trotter R, Logan M. Informant consensus: a new approach for identifying potentially effective medicinal plants (1986). In *Plants in Indigenous Medicine and Diet: Biobehavioural Approaches*; Edited by Etkin NL. Bedford hills: Redgrave Publishers; p.91-112.
22. Sarkhel, S., Chakravarthy, A.K., Das, R., Gomes, Aparna, Gomes, A. (2011). A snake venom neutralizing factor from the root extract of *Embolia officinalis* Linn. *Oriental Pharmacy Experimental Med* ; **11(1)**: 25-33
23. Chatterjee, I., Chakravarty, A. K., Gomes, A. (2006). *Daboia russelli* and *Naja Kaouthia* venom neutralization by lupeol acetate isolated from the root extract of Indian sarsaparilla, *Hemidesmus indicus* R.Br., *J Ethnopharmacol*; **106(1)** : 38-43.
24. Ushanandini, S., Nagaraju, S., Harish, K., Vedavathi, M., Machiah, D.K., Kemparaju, K., Vishwanath, B.S., Gowda, T.V., Girish, K.S.(2006). The anti-snake venom properties of *Tamarindus indica* (leguminosae) seed extract; **20(10)**: 851-8
25. Dey, A. and De J.N. (2011). Ethnobotanical aspects of *Rauwolfia serpentina* (L.)Benth. ex Kurz. in India, Nepal and Bangladesh. *Journal of Medicinal Plants Research*; **5(2)**: 144-150.
26. Reddy et al., Reddy, C.S., K.N. Reddy, E.N. Murthy, V.S. Raju (2009). Traditional medicinal plants in Seshachalam hills, Andhra Pradesh, India. *J. Med. Plants Res* **3**: 408-412.

Table 1: Plants used in treatment of snakebite by the tribal communities of Paschim Medinipur, West Bengal

S/ No	Scientific Name/habit/Voucher Number	Family	Local name	Parts used	Mode of Preparation and administration
1.	<i>Achryanthes aspera</i> L/Herb/SS102	Amaranthaceae	Apang	Roots	The roots are ground and the filtrate is taken with 2-3 black pepper.
2	<i>Acorus calamus</i> L/Herb/SS101	Acoraceae	Bach	Rhizome	Rhizomes are crushed to paste and given with warm water.
3.	<i>Allium sativum</i> L/Herb/SS103	Amaryllidaceae	Rosun	Bulbs	Bulb is made into paste and given orally.
4.	<i>Andrographis paniculata</i> (Burm f)Wall. Ex. Nees/Herb/SS106	Acantheceae	Kalmegh	Leaf	Dried leaf is powdered and taken in snakebite.
5.	<i>Aristolochia indica</i> L/climber/SS107	Aristolochiaceae	Ishwarmul	Root	Root is crushed and juice given orally in snake bite.
6.	<i>Azadirachta indica</i> A.Juss/Tree/SS108	Meliaceae	Nim	Leaf	The leaf ash or crushed leaves rubbed into scarifications around the snake bite as antidote and leaf juice is given as decoction.
7.	<i>Calotropis gigantea</i> (L)W. T.Aiton/Shrub/SS111	Apocynaceae	Akanda	Roots,Latex	Root bark is ground into paste and made into pills. Plant latex is applied over the bitten area..
8.	<i>Datura metel</i> L/ Shrub/SS120	Solanaceae	Dhutura	Root	Extract of roots are taken with garlic in snake bite.
9.	<i>Embolia officinalis</i> Linn/tree/SS122	Phyllanthaceae	Amla	Roots	Root extract is given orally along with black pepper.

10.	<i>Euphorbia neriifolia</i> L/Shrub/ SS123	Euphorbiceae	<i>Manasa</i>	Latex	Latex is applied locally on the wound in snakebite.
11.	<i>Gymnema sylvestre</i> R.Br. /Herb/SS125	Asclepiadaceae	<i>Gurmar</i>	Leaf	Leaf juice is applied on the bitten area soon after bite.
12	<i>Hemidesmus indicus</i> L. R.Br. /shrub/SS126	Apocynaceae	<i>Anantmula</i>	Roots	Root are ground with bulbs of <i>Allium sativum</i> (1:1). Paste is applied on the bitten areas.
13.	<i>Kalanchoe pinnata</i> (Lam.)Pers/ herb/SS129	Crassulaceae	<i>Pathar kuchi</i>	Leaf	1-2 spoons of leaf decoction is given every one hour after snakebite.
14	<i>Mimosa pudica</i> L/herb/SS132	Fabaceae	<i>Lajjabati lata</i>	Leaf	Leaves are ground and made into paste and applied over affected area.
15.	<i>Moringa oleifera</i> Lam/tree/ SS133	Moringaceae	<i>Sajna</i>	Root	Root are made to paste and given orally.
16.	<i>Rauwolfia serpentina</i> (L.) Benth. ex Kurz/shrub SS141	Apocynaceae	<i>Sarpagandha</i>	Root	Root paste along with that of <i>Azadirachta indica</i> and black pepper seeds are made into paste and the extract is administered orally soon after bite.
17.	<i>Tamarindus indicus</i> L/Tree/SS142	Fabaceae	<i>Tetul</i>	Seed	The extract of the seed is given in snake bite.
18.	<i>Tinospora cordifolia</i> (Thunb.) Miers /Shrub/SS145	Menispermaceae	<i>Guduchi,</i> <i>Gulanchi</i>	Root	Roots are ground along with that of <i>Rauwolfia serpentina</i> (1:1) and made into pills and administered with warm water.
19.	<i>Vitex negundo</i> L./shrub/ SS148	Verbenaceae	<i>Nishindi</i>	Root,Leaf	Leaf paste applied over the bitten area. Root extract is given with warm water.
20.	<i>Winthania somnifera</i> (L)Dunal/Shrub/ SS150	Solanaceae	<i>Ashwagandha</i>	Root	Root decoction is administered to snakebite victims.

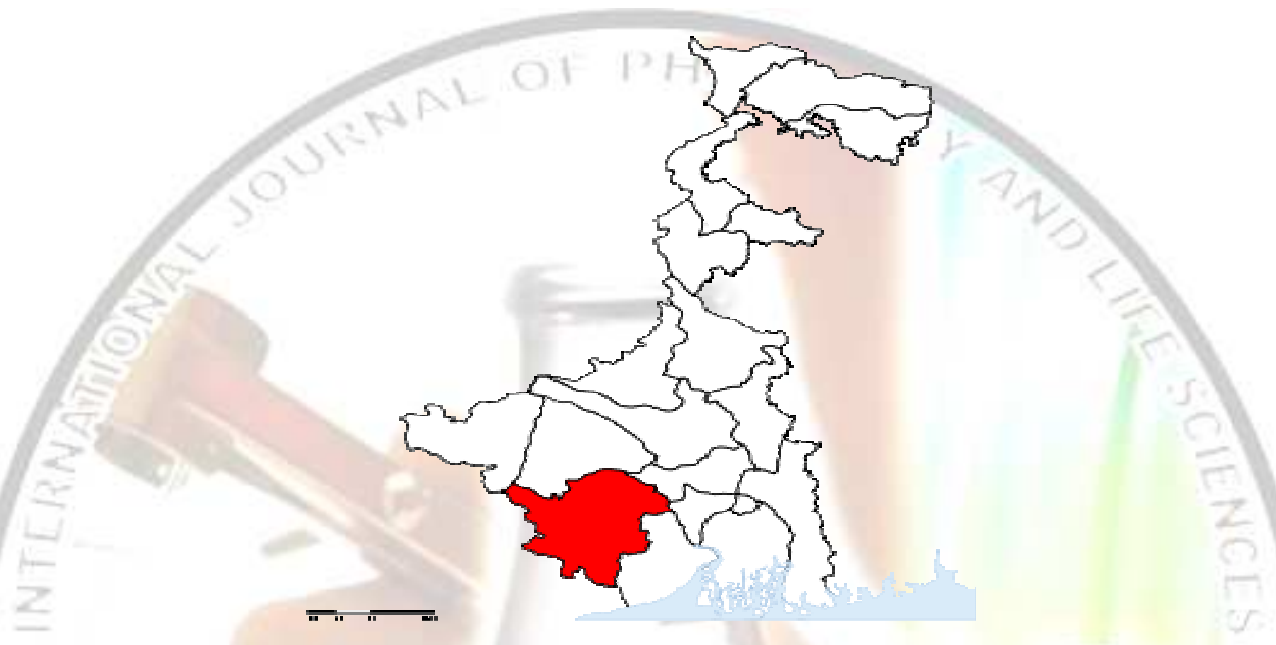


Fig. 1: Map of West Bengal



Fig. 2: Paschim Medinipur district