Exploring the Potential of Three Plants Used for Treating Snake Bites in the Indian Subcontinent

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Abstract

Snake bite by venomous snakes is a cause of concern in many countries of the world where various species of venomous snakes are still present in large numbers and are in frequent contact with people like rural and remote area inhabitants, where anti-venom and modern treatment for snake bites are absent. Such people are still dependent on traditional medicinal practitioners, whose mainstay of treatment is phytotherapy or treatment with plants. Despite their apparent backwardness, surprisingly scientists are discovering that many of these plants or rather phytochemicals present in these plants can neutralize venom of a number of the most venomous snakes of the world. In this review, we describe and analyze three such anti-snake venom plants, namely Acorus calamus, Amaranthus viridis and Aegle marmelos. These three plants are used in the Indian sub-continent countries for treatment of snake bites and which have potential for discovery of drugs against snake bites as shown in preliminary scientific studies.

Keywords: Snakes; Venom; Anti-Snake Bite Plants; Phytochemicals

Introduction

Snakes are top predators and play an important role in the ecosystem [1]. However, a number of snake species are venomous and so can be dangerous to humans. Almost 15 percent of the 3000 species are considered to be risky for humans. Three categories of people are victimized by snakes and they are who do not take anti-venom, take anti-venom with a delay, and take anti-venom in insufficient quantities [2]. Normally venomous snakes can be found in every continent except Antarctica. Researchers estimate that almost 421,000 people are envenomed and 20,000 people die among them per year. Snake bite is the highest in South Asia, Southeast Asia and East Sub-Saharan [3]. In Africa and Latin America less people die of snakes than other countries; however, Bangladesh (Indian sub-continent country) has one of the highest snake bite incidences in the world and of the 82 species of snakes of the country, 28 are venomous [4]. Snake venom is a mixture of peptides and proteins and 25 enzymes are present. For envenoming to occur, there would be medical complications such as systemic myolysis, flaccid paralysis, coagulopathy, hemorrhage, cardiotoxicity, renal damage and failure and local tissue injury [5]. Antiserum is the only therapeutic agent against snake venom because purified, enzyme-refined, and concentrated heterologous immunoglobins are present in it. In rural area, snakebite patients depend on their conventional medicinal healers because of the shortage of antiserum. In most traditional medicines of various countries, a large number of plants are widely used as medicines against snakebite because they have safety, effectiveness, cultural preferences, inexpensiveness and availability. Hence, those become the crucial indigenous herbal treatment among especially the indigenous communities [6].

Cobras, kraits, green pit vipers, and sea snakes in coastal areas are considered as venomous snakes in Bangladesh. Cobra and krait bites result in rapid paralysis requiring artificial respiratory support due to involvement of diaphragm. Sea snakes bite may cause mild paralysis and green pit viper bite may cause mild type effect such as local swelling, bleeding, and ecchymosis. Most of the victims in Bangladesh
are fishermen, farmers, hunters and rural foot walkers and they usually go for treatment to traditional healers called ‘Ozhas’ who may use plants, incantations, and other rituals for treatment. A number of patients survive when bitten by venomous snakes following treatment by ozhas [7]. In the Indian sub-continent countries (Bangladesh, India, Nepal and Pakistan), among the plants used for treatment of snake bites are medicinal plants like Acorus calamus, Amaranthus viridis, Aegle marmelos etc [8]. The objective of this review is to explore the potential of these plants in the treatment of snake bites on the basis of their ethnic uses and pharmacological studies. We shall mainly focus on the anti-inflammatory, analgesic, and snake venom neutralizing scientific studies of whole plant or plant parts because these three activities form important inter-related components of a plant’s potential for use in the treatment of snake bites. However, other relevant pharmacological activities will also be considered. Scientific literature searches have been conducted through PubMed, SCOPUS and Google Scholar.

**Acorus calamus**

**Traditional uses**

* A. calamus plays an important leading role against snake bites. In India, *A. calamus* is known as Vekhand, Ghorbach, Bach, Bojo, Shyoiako, Vasamboo and rhizomes are used to neutralize snake venom. Normally, rhizome paste is applied with warm water externally [9]. Rhizomes are also used as emetic, to kill lice, for throat infection, diarrhea, smallpox, respiratory, gastrointestinal tract disorders, gout, rheumatism, antispasmodic, sedative, anticonvulsant and mental disorder treatment [10,11]. Different extractions of roots are used as CNS depressant, anti-cancer, anti-ulcer, cryoprotective, hypolipidemic, anti-microbial, behavioral changes, and acetylcholine inhibitory activity. Leaves are used to kill lice and stems used for cold, cough and toothache. Bark has also anti-venom activity [12]. In Bangladesh, *A. calamus* is known as boch, safed, shet boch and it is used as anti-venom especially in the Chittagong Hill Tracts region in the southeast portion of Bangladesh. Snake-bitten patients are administered fresh rhizomes made into a paste, which is taken with a glass of lukewarm water twice a day for three successive days orally [13].

**Phytoconstituents**

* Acorus calamus* has been reported to contain many phytochemicals such as geranylacetate, cis-methylisoegenol, β-farnesene, acorenone, calamenone, n-heptanic acid, calamendiol, numerous sesquiterpenes, starches, mucin, soft gums, resins, 4-terpineol, 2-allyl-5-ethoxy-4-methoxyphenol, epieudestdine, lisdine, spathulenol, borneol, furylethyl ketone, nonanoic acid, 2,2,5,5-tetramethyl-3-hexanol, bornyl acetate, galgravin, retusin, (9E, 12E, 15E)-9,12,15-octadecatrien-1-ol, butyl butanoate, sakurarin, acetic acid, isoelemicin, α-ursolic acid, acetophenone, dehydroabietic acid, isoeugenol methyl ether, apigenin 4’7-dimethyl ether, dehydrodiisoeugenol, linalool, elemicin, linolenic acid and calamenene [11]. The rhizomes of *A. calamus* contain different essential oils like β-asarone which is active against different microorganisms [14]. The rhizomes also contain γ-asarone, calame, calamenenol, calame, α-pinene, β-pinene, camphene, p-cymene, eugenyl acetate, eugenol, isoeugenol, methyl isoeugenol, calamol, azulene, eugenol methyl ether, dipentene, methyleugenol, asaronaldehyde, terpinolene, 1,8-cineole, camphor, α-caryophyllene, and hydrocarbons. The oil also comprises fatty acids such as palmitic acid and its ester, heptyl acid, and an ester of butyric acid. Other compounds reported in the rhizomes were cyclobutanolignan acoradin, 2,4,5-trimethoxybenzaldehyde, 2,5-dimethoxybenzoquinone, glaglin (5,7-dihydroxylavanol), sitosterol, and acoramide. Two phenyl indanens have also been reported, namely 2,3,-(2,4,5-trimethoxyphenyl)-2-propenal and 2,3-dihydro-4,5,7-trimethoxy-1-ethylacoradin, 2,4,5-trimethoxybenzoquinone, glangin (5,7-dihydroxylavanol), sitosterol, and acoramone. Two sesquiterpenic ketones of the guaianetype - calamensudone and its isomer were extracted from sweet flag oil. Sesquiterpenes like shyobunone, isoshyobunone, isocalamendiol, dehydroyisocalamendiol and epishyobunone have also been reported from oil. The thermal isomerization of shyobunone, an elemene type sesquiterpene, resulted in the formation of preisocalamendiol, a germacrone-type compound, and acorone [15].

Matrine, curcumin and thioctic acid are also present in this plant. Studies revealed that the aqueous and hydroalcoholic extracts contain glycosides, flavonoids, saponins, tannins, mucilage and volatile oil [16]. Some of the constituents are shown in figure 1.

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Pharmacological activity

Anti-inflammatory

The extract of rhizomes has important anti-inflammatory effect in acute, chronic and immunological models of inflammation. It also showed inhibition of the carrageenan-induced paw edema, cotton pellet granuloma formation and croton oil granuloma pouch inflammatory response when it is taken orally. Essential oils are responsible for anti-inflammatory effect [17]. Leaf extract also showed anti-inflammatory effect in human HaCat cells and keratinocytes [11].

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Analgesic
The alcohol and ethanol extract of *A. calamus* has been reported for significant analgesic effect [15].

Venom neutralizing
The root extracts of *Acorus calamus* and *Withania somnifera* were used for neutralizing the venom of *Echis carinatus* (Saw scaled viper) by *in vitro* and *in vivo* methods. 0.14 mg *A. calamus* and 0.16 mg *W. somnifera* root extracts were able to neutralize the venom completely. The different pharmacological complications such as edema forming activity, hemorrhagic activity and phospholipase activity (PLA2) and pro-coagulant due to *Echis carinatus* bite could be also neutralized by *A. calamus* and *W. somnifera* [17]. Hexane and oil extracts of *A. calamus* also have significant activity against snake venom [18] and reported for the treatment of three poisonous snake bites, namely *Naja naja* (cobra), *Viper russelli* (Russell’s viper) and *Bungarus caeruleus* (krait) and two non-poisonous snakes namely *Ptyas mucosus* (rat snake) and *Elaphe helena* (trinket snake) [19]. Methanolic extract of rhizomes of *A. calamus* has been found to be active against Viperidae family snakes like Russell’s viper and showed inhibition in the caseinolytic activity exhibited by Viperidae family snake venom [20].

*Amaranthus viridis*

Traditional uses
Leaf and stem part of *A. viridis* are used in India for snake bite treatment topically; the plant is known as khutora, and chaulai [9]. In Bangladesh, the Santal tribe of Rajshahi district uses the whole plant; the plant is called by the Santals as gandhori ara [21]. Traditionally, all parts are used as diuretic, analgesic, antipyretic, vermifuge, antilucre, anti-diabetic, anti-cholesterolemic, and laxative, and to treat asthma and veneral diseases. Negritos of the Philippines use the smashed leaves to treat eczema, psoriasis and rashes. Layer of leaves are used to treat inflammation, boils and abscesses. In India, it is used to treat diuretic, anti-rheumatic, antilucre, laxative, anti-leprotic, respiratory problem and antidote of snake venom. Decoction of whole plant is used to treat dysentery and inflammation [22]. The root juice of *A. viridis* is also used to treat inflammation during constipation and urination [23]. *Amaranthus viridis* is used for many medicinal purposes in Rajshahi district of Bangladesh. The plant is used in burning sensation, hallucination, leprosy, bronchitis, piles, leucorrhoea and constipation and the leaves are used as emollient. The root diminishes the menstrual flow and is convenient to treat leucorrhoea and leprosy. The whole plant is considered as antipyretic, appetizer, stomachic and alexiteric [24].

Phytoconstituents
In ethanol extract and aqueous extract of the plant, phenols, tannins, saponin, flavonoids, alkaloids, proteins, terpenoid and cardiac glycosides have been identified [25]. The methanolic extracts of leaves contain rutin and quercetin. It is also reported that the major compound in the extract is spinosterol (24-ethyl-22-dehydrocholesterol) along with 24-methylcholesterol 24-ethylcholesterol, 24-methyl-22-dehydrocholesterol, 24-ethyl cholesterol, and 24-ethyl-22-dehydrocholesterol as minor compounds. The root contains steroidal compound such as amasterol (24-methylene-20-hydroxycholesta-5,7-dien-3β-ol) [22].

Pentatriacontane, hexatriacontane, triacontane, 6-pentatriacontane, hentriacontane, ecdyserone, oxalic acid and carotenoids has been obtained from seeds. Leaves of *A. viridis* revealed many phytochemicals such as flavonoids, resin, phlobatannins, reducing sugar, linoleic acid, α-linoleic acid, iron, magnesium, calcium, β-carotene, zinc [25] and 5,7,3′,4′, tetrahydroxy falvonol-3-rhamnoglucoside, and quercetin 5,7,3′,4′-tetrahydroxy flavonol [27]. Earlier studies demonstrated that trilinolein, polyprenol and phytol were present in leaves. Squalene has been isolated from the stems and leaves [28]. Some of the constituents are shown in figure 2.

Pharmacological activity
Anti-inflammatory
Spinasterol and trilinolein phytochemicals reportedly exhibited anti-inflammatory effect [28]. Leaf extracts of *A. viridis* reportedly showed anti-inflammatory effect by inhibiting hyaluronidase, lipoxygenase and xanthine oxidase [29]. Leaf extract of *A. viridis* reduced the production of NO (nitric oxide) in LPS (lipo-polysaccharide)-induced RAW 264.7 cells. NO is responsible for inflammation when it is secreted from RAW 267.4 cells induced by LPS [30].

Analgesic
Methanolic extract of *A. viridis* revealed significant analgesic properties (both peripheral and central) [31].

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**Figure 2: Some notable chemical constituents of Amaranthus viridis.**

**Venom neutralizing**

India, Pakistan, Nepal are highly at risk for venomous snakes such as Russell’s viper (*Daboia russelli*), Cobra (*Naja naja*), Krait (*Bungarus caeruleus*), Saw-scaled viper (*Echis carinatus*). The whole plant of *Amaranthus viridis* is used against snakebite by crushing and making paste and topical application of the paste to bitten area. Decoction of whole plant is also used in Pakistan. Crushed leaves have been reported for the treatment of snake bite in Tehsil Chakwal, Pakistan [6,32]. Leaves also have pivotal role as an antidote to snake poisoning in Pakistan [27]. Rabha tribe people of Kooch Bihar district, India use the whole plant to make into paste with liquid residue obtained after washing of ‘Atapchaf’ (unboiled rice), and snake bite patients topically apply this paste 6 - 8 times a day for two consecutive days as an antidote to snake venom [33].

**Aegle marmelos**

**Traditional uses**

Traditionally, *A. marmelos* is used in various countries to treat different disorders. It also has many names according to country. ‘Bael’ is the common name in Bangladesh. Various tribes of India such as Santhals, Bhottada use it for abdominal pain, cholera, night fever, stomach disorders, snake bite, and bite of mad dog. Leaves are used in jaundice and abdomen, backache, diabetes, and abscess treatment.

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Piles and constipation are treated with the decoction of small unripe fruit and mature fruit, respectively. The root and bark is used to treat hypochondriasis, melancholia, palpitation of heart, stomachache, and dysentery in Eastern Rajasthan and Malabar [34].

The root bark is used to treat snake bite in India [35]. The leaves are useful for the treatment of fever, dysentery and nausea. Leaves are taken orally for malaria, hepatitis, tuberculosis, and backache treatment. Leaf extract is administered to treat ascetic, cardiac disorder and leaf paste is applied for rheumatic pain. Decoction of fruit of *A. marmelos* is taken as scorbutic and used for postpartum disorder as well [36].

Phytoconstituents

*Aegle marmelos* has been reported to contain various classes of phytochemicals such as alkaloids, terpenoids, coumarins, vitamins, tannins, carbohydrates, flavonoids, fatty acids, essential oils, aminoacids and miscellaneous compounds which have been isolated from various parts of plant. Reported alkaloids are ethyl cinnamate, O-3,3-(di methylallyl) halofordinol, N-2-methoxy-2-[(3',3'-dimethylallyloxy) phenyl] ethyl cinnamate, N-2-ethoxy-2-ethyl cinnamid, halordino, marmeline, anhydromarmeline, aegelinosides A and aegelinosides B. Synthesized terpenoids are α-phellandrene, p-cymene, p-Menth-1-en-3,5-diol, limonene, α-pinene, β-myrcene, isosylevstrene, δ-carene and β-ocimene. Reported coumarins are marmelosin, marmesin, imperatorin, marmin, alloimperatorin, methyl ether, xanthotoxol, scopoletin, scoparone, umbelliferone, psoralen and marmelide. Reported carbohydrates are galactose, arabinose, uronic acid, L-rhamnose, aralrinose, D-galacturonic acid [37]. Thiamin, riboflavin, niacin and ascorbic acid are vitamins which are present in the various parts of *A. marmelos*. Palmityc acid, stearic acid, oleic acid, linoleic acid and linolenic acid are significant fatty acids present in the plant [38]. Various tannins such as 4,7,8-trimethoxyfuro-quinoline are present in the fruit pulp and leaves [39]. Rutin, flavone, flavone-3-ols and flavone glycosides are the most important flavonoids in *A. marmelos* [40]. Essential oil of the plant contains α-pinene, β-myrcene, α-phellandrene, isosylevstrene, δ-carene, β-ocimene, trans-2-hydroxy cinnamic acid, γ-terpinene, terpenolene, linalool, 3-isothujanol, 4-terpineol, thuj-3-en-10-al, α-terpineol, δ-elemene, α-cubebene, γ-elemene, α-humulene, α-terpinyl isobutyrate, γ-murolone, valencene, β-bisabolene, γ-cadinene, β-bisabolol and α-murolone [41]. Scientists have reported some molecules from *Aegle marmelos* such as chlorormarin, epoxypaurapetine, aurapten, decursinol, marmeline, marmin, aeglemaerose, O-isopentenyl halofordin, anhydromarmeline, lupeol, psoralen, linalool, halofordin (aegeline), β-phellandrene, α-pinene, β-stitosterol, γ-stitosterol and marmesinin, which were active against fourteen cobra venom proteins such as PLA2 (phospholipase A2), COX (cyclooxygenase), IL1β (interleukin-1β), IL6 (interleukin-6) and MIP-1α (macrophage inflammatory protein 1-alpha) to induce anti-inflammatory activity [42]. To be noted is that ethanol extract of root bark had high anti-hemolytic activity, methanol extract of leaves had the highest inhibitory activity on venom-induced anti-acetylcholinesterase activity, and ethanol extract of leaves had maximum anti-proteolytic activity [42]; docking studies between 81 phytochemicals of the plant and cobra venom proteins showed that the phytochemicals had the potential to neutralize all cobra venom proteins. Some of the constituents are shown in figure 3.

Pharmacological activity

Anti-inflammatory

Acute inflammation and sub-acute inflammation was studied by using methanol, chloroform, diethyl ether and acetone extract of leaves of *A. marmelos*. Methanolic and chloroformic extracts showed more significant effects compared to other extracts [43]. Using aspirin as standard drug, leaf extract produced anti-inflammatory effect in rat [44]. In addition, hydroalcoholic extracts showed activity against acute and chronic inflammation [45]. Aqueous extract of root bark and ethanolic extract of leaf also revealed significant anti-inflammatory activity [46,47]. Aqueous extract of root also inhibited pro-inflammatory cytokines such as IL-1β, IL-6 (interleukin-6) and MIP-1α (macrophage inflammatory protein 1-alpha) to induce anti-inflammatory activity [48].

Analgesic

Antinoceptive activity of methanol extract of *A. marmelos* was found by using tail immersion and writhing test. The extract exhibited significant effect at the maximum dose (200 mg/kg) than other doses [37]. Various extracts of leaves also had important analgesic effects [37]. Ethanolic extracts of fruit pulp also showed significant analgesic effects [48].

Venom neutralizing

The pentacyclic triterpenes (free of glycosides) in *A. marmelos* can provide nearly 20% protections against snake venom [49,50]. The Rakhain people of Chittagong Hill Tracts region, Bangladesh use the root of this plant for snake bite patients [51]. The decoction of bark

is used by the people of Chhattisgarh for snake bite patients [52]. In vitro, methanolic extract of leaves revealed that it has high anti-cobra venom activity and induced anti-acetylcholinesterase activity. In silico process also identified 81 phytochemical in *A. marmelos* which has anti-venom activity against 14 toxin proteins of cobra [42].

**Snake venom action and mode of snake venom neutralization by plants**

The toxicity of snake venoms depend on a number of factors like species and size of snake, age and health status of victim, the part of the body where the victim has been bitten, and the amount of venom that has entered the body [53]. Bites by cobras are extremely painful with severe swelling of the tissue around the bitten area within a short time of even five minutes. Eventually, tissue necrosis can occur [54]. In general, snake venoms are divided into three types based on their effect, namely hemotoxic, cytotoxic, and neurotoxic [55]. Like the venoms, different plants can have different types of properties for neutralizing the activity of the venoms. For instance, the plant *Andrographis paniculata* and its active constituent andrographolide exert their action by inhibiting snake venom phospholipase A2 activities of *Naja naja* [56]. Root extract of *Acorus calamus* has been shown to neutralize the effects of pharmacological complications such as edema forming activity, hemorrhagic activity and phospholipase activity (PLA2) and pro-coagulant due to *Echis carinatus* bite [17]. Although the exact mechanism of anti-snake venom action of *Amaranthus viridis* is yet to be studied, the plant extract may also inhibit phospholipase activity (PLA2), since the plant is used against *Naja naja* bites [57]. Anti-cobra venom activity and anti-acetylcholinesterase activity has
been found in extract of *Aegle marmelos* leaves; 81 phytochemicals have been reported from the plant with activities against 14 toxic proteins of cobra [42]. The various ethnomedical and pharmacological reports suggest that different snake venoms can give diversified toxic effects; the same applies to anti-snake bite plants, which act in diverse manners to neutralize these toxic effects.

Plants are in use in various countries of the world for treatment of snake bites. Bangladesh and India are no exceptions to this traditional treatment method. Even in Bangladesh, where the number of floral species is much lower than that of India, various plants have been reported for treatment of bites from venomous snakes. Besides the plants mentioned in this review, some other plants used to treat snake bites in Bangladesh include *Abelmoschus moschatus* and *Achyranthes aspera* [58] and *Andrographis paniculata* [59].

**Conclusion**

A list of 87 venomous snakes of India is shown in table 1, including their zoological and English names. It is not always possible to recognize the snake responsible for biting or to get the necessary anti-venom within a short time frame. As a result, numerous medicinal plants are being used as anti-venom against snake bite by conventional healers and snake-bitten people in different areas all over the world. These plants possess phytochemicals, which have been shown scientifically to neutralize various snake venom toxins and proteins. So medicinal plants could be a vital source for discovering both novel anti-venom drugs as well as can provide a readily available mean for treating snake-bitten patients, who for various reasons may not be able to get modern treatment.

| 1) Bungarus andamanensis | Andaman Krait, South Andaman Krait |
| 2) Bungarus bungaroides | Northeastern Hill Krait, Himalayan Krait, Cantor’s Krait |
| 3) Bungarus caeruleus | Common Krait, Indian Krait, Blue Krait, Common Indian Krait |
| 4) Bungarus fasciatus | Banded Krait, Golden Banded Snake |
| 5) Bungarus lividus | Lesser Black Krait |
| 6) Bungarus niger | Greater Black Krait, Black Krait |
| 7) Bungarus sindanus walli | Sind Krait, |
| 8) Bungarus s. walli | Wall’s Krait |
| 9) Bungarus s. razai | Razai Sind Krait |
| 10) Bungarus s. sindanus | Common Sind Krait |
| 11) Calliophis beddomei | Beddome’s Coral Snake |
| 12) Calliophis bibroni | Bibron’s Coral Snake |
| 13) Calliophis castoe | Castoe’s Coral Snake |
| 14) Calliophis melanurus | Black-tailed Coral Snake |
| 15) C. m. sinhaleys | Sri Lankan Coral Snake |
| 16) C. m. melanurus | Indian Coral Snake |
| 17) C. m. sinhaleys | Ceylon Coral Snake |
| 18) Calliophis nigrescens | Common Coral Snake, Indian Coral Snake, Striped Coral Snake, Black Coral Snake |
| 19) Daboia russelli | Russell’s Viper, Chain Viper, Tc: Polonga |
| 20) Echis carinatus | Indian Saw-scaled Viper, Phero, Little Indian Viper, Saw-Scaled Viper |
| 21) Echis sochureki | Sochurek’s Saw-scaled Viper, Sochurek’s Carpet Viper, Astola Saw-scaled Viper (E. s. astolae) |
| 22) Gloydius himalayanus | Himalayan Pit Viper |
| 23) Enhydrina schistosa | Beaked Sea Snake, Hook-nosed Sea Snake, Common Sea Snake, Valakadyn Sea Snake |
| 24) Hydrophis caeruleus | Dwarf Sea Snake, Merrem’s Sea Snake, Dark Blue-banded Sea Snake, Many-toothed Sea Snake, Malacca Sea Snake, Blue-grey Sea Snake, Blue Sea Snake |
| 25) Hydrophis cantoris | Cantor’s Sea Snake, Cantor’s Narrow-headed Sea Snake, Barred Small-headed Sea Snake |
| 26) Hydrophis cyanocinctus | Asian Annulated Sea Snake, Banded Sea Snake, Annulated Sea Snake, Blue-banded Sea Snake, Dusky-chinned Giant Sea Snake |
| 27) Hydrophis fasciatus | Banded Small-headed Sea Snake, Striped Sea Snake, Banded Sea Snake, Blunt-banded Sea Snake |
| 28) Hydrophis gracilis | Graceful Small-headed Sea Snake, Slender Sea Snake, Common Narrow-headed Snake, Small-headed Sea Snake, Common Small-headed Sea Snake, Narrow-headed Snake, Spotted Small-headed Sea Snake |

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29) Hydrophis jerdonii - Jerdon's Sea Snake, Saddle-backed Sea Snake
30) Hydrophis lapemoides - Persian Gulf Sea Snake, Arabian Gulf Sea Snake, Persian Sea Snake
31) Hydrophis mambilirius - Broad-banded Sea Snake, Bombay Sea Snake, Bombay Gulf Sea Snake, Bombay Broad-banded Sea Snake
32) Hydrophis melanoma - Black-banded Sea Snake, Robust Sea Snake, Lesser Dusky Sea Snake
33) Hydrophis nigricinctus - Daudin's Sea Snake, Black-banded Sea Snake
34) Hydrophis obscurus - Estuarine Sea Snake
35) Hydrophis ornatus - Reef Sea Snake, Ornate Sea Snake, Cochin Banded Sea Snake, Ryukyu Ornate Sea Snake, Spotted Sea Snake
36) Hydrophis spiralis - Yellow Sea Snake, Narrow-banded Sea Snake, Giant Sea Snake, Blotch-backed Giant Sea Snake
37) Hydrophis stricticollis - Bengal Sea Snake, Collared Sea Snake, Narrow-necked Sea Snake
39) Hydrophis vipherina - Olive Sea Snake, Schmidt's Sea Snake, Viperine Sea Snake, Grey Sea Snake
40) Hypnale hypnale - Merrem's Hump-nosed Viper, Hump-nosed Pit Viper, Hump-nosed Moccasin
41) Lapemis curtus - Shaw's Sea Snake, Short Sea Snake, Malabar Sea Snake
42) Lapemis hardwickii - Hardwicke's Sea Snake, Spine-bellied Sea Snake
44) Laticauda laticaudata - Black-banded Sea Krait, Large-scaled Sea Krait, Common Sea Krait, Common Amphibious Sea Snake, Banded Amphibious Snake
45) Macrooviperidae turanicus - Levantine Viper, East Asian Blunt-nosed Viper, Levant Viper, Lebetine Viper, Gorzeh Snake
46) Naja kaouthia - Monocellate Cobra, Thailand Cobra, Monocled Cobra, Bengal Cobra, Monocled Cobra
47) Naja naja - Indian Spectacled Cobra, Asiatic Cobra, Binocellate Cobra, Indian Cobra, Spectacled Cobra
48) Naja oxiana - Oxyx Cobra, Trans-Caspian Cobra, Central Asian Cobra, Acellate Cobra, Black Cobra, Ladle Snake, Brown Cobra
49) Naja sagittifera - Andaman Cobra
50) Ophiophagus hannah - King Cobra, Hamadryad, Jungle Cobra
51) Ovophis monticolata - Mountain Pit Viper, Blotched Mountain Pit Viper, Mountain Iron-head Snake, Chinese Mountain Pit Viper
52) Ovophis m. monticolata - Western Mountain Pit Viper
53) Ovophis m. convictus - Indo-Malayan Mountain Pit Viper
54) Ovophis m. makazayazaya - Taiwan Mountain Pit Viper
55) Ovophis m. orientalis - Oriental Mountain Pit Viper
56) Ovophis m. zhaokentangzi - Gaoligong Mountain Pit Viper
57) Pelamis platurus - Yellow Bellied Sea Snake, Pelagic Sea Snake, Black and Yellow Sea Snake, Yellow and Black Sea Snake, Black-backed Sea Snake
58) Protobothrops jerdonii - Jerdon's Pit Viper
59) Protobothrops borei - Bourret's Pit Viper
60) Protobothrops xanthomelas - Red Spotted Pit Viper
61) Protobothrops muroquamatus - Chinese Habu, Taiwanese Pit Viper, Formosan Habu, Brown-spotted Pit Viper, Taiwan Habu
62) Sinomicrurus macclellandi - Macclelland's Coral Snake
63) Sinomicrurus m. iwakai - Iwasaki's Coral Snake
64) Sinomicrurus m. swinoei - Taiwan Coral Snake
65) Sinomicrurus m. univirgatus - Single-banded Coral Snake
66) Sinomicrurus m. univirgatus - Single-banded Coral Snake
67) Trimeresurus albolabris - White-lipped Green Pit Viper, White-lipped Pit Viper, White-lipped Tree Viper
68) Trimeresurus anderseni - Andaman Pit Viper, Anderson's Pit Viper
69) Trimeresurus cantor - Cantor's Pit Viper

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Table 1: A list of some poisonous snakes of India [https://www.thailandsnakes.com/india-venomous-dangerous-snakes/].

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