Indian medicinal plants Volume-I with anti-snake venom and anti-scorpion venom activity- a review

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ABSTRACT

Goal: Snake bites are a serious public health concern due to their high morbidity and mortality rates. Most snake venoms cause severe local tissue damage, which may leave victims temporarily or permanently disabled. There has been extensive research into complementary and alternative medicine for treating snake bites. The purpose of this review is to provide readers with new medicinal plants. **Materials and methods:** In Indian Medicinal Plants Volume-I, a survey of publications on the anti-snake venom activity of researched and unresearched plants was conducted. **Results:** In Indian medicinal plants, volume-I, 75 are traditionally claimed for the treatment of anti-snake venom activity, but only a few plants are scientifically documented. About 70 plants are new medicinal plants that belong to the 23 families. **Conclusion:** This review has revealed unexplored, traditionally claimed, and new medicinal plants in the Indian medicinal plant's volume-I for the treatment of anti-snake venom and anti-scorpion activity.

Keywords: Anti-snake venom activity; Indian medicinal plants; Traditional medicinal plants; Snakebite;

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INTRODUCTION

One of the most significant health risks with a high fatality rate, particularly in India, is snakebite. The cobra (*Naja naja*), krait (*Bangarus caeruleus*), *Russell's viper* (*Daboia russelli*), and saw-scaled viper are the quatern most prevalent poisonous (noxious) snakes originating in India (*Echis carinatus*)(Bawaskar, 2004). The only proven method of treating envenomation by snake venom is anti-venom immunotherapy. Anti-venom serum can have several adverse consequences, including serum sickness, pyrogen response, and anaphylactic shock(Parikh, 2007). Only 242 of India's many snake species have been recognized, including 57 toxic or deadly species. India boasts a diverse array of snake species.

The "Big-four," or four primary venomous snake species that are common throughout India, are thought to be to blame for life-threatening envenomation. These include the saw-scaled viper (*Daboia russelii*), the communal krait (*Bungarus caeruleus*), the Indian cobra (*Naja naja*), and the common krait (*Echis carinatus*). Numerous other poisonous snake species, such as the Indian Banded Krait (*Bungarus fasciatus*), the *Naja kaouthia*, the *N. oxiana*, the *N. sagittifera*, the *Echis sochureki*, and the *Hypnale hypnale*, are also capable of inflicting deadly or mild envenomation in various regions of Ind (Mukherjee & Maity, 2002; Simpson & Norris, 2007). Utilizing folk and traditional medicines for snake bites is another alternative for treatment. Herbal medicine is a regional tradition with global importance.

Traditional and folk medicine have used various herbs to treat snake bites. Unique plants and their composites are said to have anti-snake venom action in the Ayurvedic medical system. They each have unique toxicities, though, and most herbs used as folk remedies are not supported by science. This study focuses on herbal antagonists, herbal ingredients' current actions against snake bites, and anti-venom treatments for snake bites. Utilizing folk and traditional medicines for snake bites is another alternative for treatment. Herbal medicine is a regional tradition with global importance. Traditional and folk medicine have used various herbs to treat snake bites. Unique plants and their composites are said to have anti-snake venom action in the Ayurvedic medical system. They each have toxicities, though, and science(Gupta & Peshin, 2012) does not support most herbs used as folk remedies. This study focuses on herbal antagonists, herbal ingredients' current actions against snake bites, and anti-venom treatments for snake bites.

Administering bivalent or polyvalent anti-venom as soon as feasible is the most efficient and generally accepted treatment for venomous snakebites (Mukherjee & Mackessy, 2021; Patra & Mukherjee, 2021). However, the anti-venom remedy has more than a few adverse side effects, including pyrogenic response, anaphylaxis, and serum nausea in the treated patient(Makhija & Khamar, 2010). Additionally, due to their high price, remote living locations, and inadequate minimal cold storage facilities, commercial anti-venoms have shown poor immune recognition neutralization of mostly numerous venom toxins, low molecular mass, and less immunogenic, and limited efficacy against local envenoming effects(Chippaux & Goyffon, 1998), raising concerns about the fact that anti-venom is not prophylactic (Senji Laxme et al., 2019). However, according to earlier observations and community experiences, many rely primarily on conventional medical procedures and herbal remedies (Basha & sudarsanam, 2012; Schioldann et al., 2018). chewing on plant materials including leaves and bark, rubbing plant sap on bite wounds, drinking plant extracts, or any decoction made from the extracts are some of the methods for treating snake envenomation(Basha & sudarsanam, 2012). Antidotes for snake envenomation are often made from a single plant or a mix of many plants. However, the effectiveness of the conventional snakebite rehabilitation regimen has not yet been proven scientifically.

All 1,500 species of scorpion that are still alive are poisonous. Most scorpion venom in humans typically causes mild reactions, but about 30 scorpion species are thought to be medically significant(Bawaskar & Bawaskar, 2012). Throughout India, Latin America, North Africa, and the Middle East, the Buthidae, Hemiscorpiidae, and Scorpionidae families have been linked to severe and occasionally fatal envenomation(White, 2016; Reddy, 2013). There are currently 86 species of scorpion known to exist in India, but only two of them— the red scorpion of India (*Mesobuthus tamulus*), a member of the Buthidae family, and the Indian black scorpion (*Heterometrus swammerdami*), a member of the Scorpionidae family—pose a serious threat to people, especially young children, the aged, and immune-compromised personalities(Tiwari & Deshpande, 1993; Badhe et al., 2007; Quintero-Hernández et al., 2013; Ortiz et al., 2015; Santos et al., 2016; Das et al., 2020). A sting may necessitate immediate medical attention since, according to a small number of clinical accounts(Erfati, 1978; Bawaskar & Bawaskar, 1998; Madhavan; Senthilvelan et al., 2015), the venom of the Indian red scorpion is more lethal than the venom of the Indian black scorpion. The plethora of potassium channel poisons that target the cardiovascular systems and central nervous are thought to be the cause of the Indian red scorpion's severe noxiousness.

MATERIALS AND METHODS

Search strategy

Indian medicinal plants volume- The I databank was searched for anti-snake venom activity in medicinal plants and is shown in (Table 1).

Study selection

The revisions that scrutinized the anti-snake venom assets of a specific plant were carefully chosen. All analyses were carefully reviewed, and how many plants are scientifically evaluated and how many plants are unexplored were presented in this article.

RESULTS AND DISCUSSION

Medicinal plants with anti-snake venom activity

Table-I lists seventy-five traditionally claimed medicinal plants reported to have anti-snake venom activity. The active ingredients, dosages, and significance of the anti-snake venom action are listed. As shown in Figure 1 most of the plant species belong to the Fabaceae (nineteen species), Rutaceae (eight species), Malvaceae and Ranuculaceae (seven species), Menispermaceae (six species), Capparaceae (five species), Anacardiaceae (three species), Sapindaceae, Celastraceae, Burseraceae, Zygophyllaceae, Bombacaceae (two species), Moringaceae, Oxalidaceae, Linaceae, Polygalaceae, Flacourtiaceae, Bixaceae, Violaceae, Berberidaceae, Annonaceae and Magnoliaceae (one species) were documented.

Anti-snake venom activity

Aconitum ferox

Aconitum ferox belongs to the family Ranuculaceae. A source root (powder) was utilized to evaluate its antidotal activity. A solitary portion of cobra venom (0.49 mg/kg b.w) was administered intraperitoneally. Oral administration of powdered *Aconitum ferox* at doses of 16.83 mg/kg and 22.5 mg/kg b.w., as well as intraperitoneal administration of anti-serum-containing venom, increased the survival time compared to a high dose. They concluded that these roots of *Aconitum ferox* increased survival time, but they were not the antidote for snake venom. The Indian medicinal plants are mentioned as the whole plant of *Aconitum ferox is* used for anti-snake bites here; only roots are tested(Dhaliya et al., 2018).

Cissampelos pareira

Cissampelos pareira belongs to the family Menispermaceae. Aerial parts of ethanol extract were utilized to evaluate its inhibition of lethality activity. A solitary portion of venom (153µg) was administered intraperitoneally to the mouse. Oral administration of *Cissampelos pareira* 3 mg/kg and 5 mg/kg, associated with the diabetic control mouse, concluded that flavonoids are mainly responsible for the active components, and this drug was utilized for first aid after snake bite(Ricciardi Verrastro et al., 2018).

Fagonia cretica

Fagonia cretica belongs to the family Zygophyllaceae. Leaves and twigs of methanol extract were utilized to evaluate its anti-hemorrhagic test. 0.05-4 µg of *Naja-naja* venom per 1.5 ml of PBS was applied to the disc on the egg embryo. 15 µg of *Fagonia cretica* extract was used compared to the control group, and they concluded that there was an increasing tendency for bleeding, which is scientifically valuable after a snake bite (Razi et al., 2011).

Ruta graveolens

Ruta graveolens belongs to the family Rutaceae. A leaf of ethanol extract was utilized to evaluate its procoagulant, phospholipase, fibrinolytic, and cholinesterase activities. different concentrations of *Naja naja* venom with normal saline. In this study, 10 µl to 50 µl of *Ruta graveolens* extract were used, and they concluded that *Ruta graveolens* was able to reduce the coagulation of blood. In phospholipase A2 activity, the extract was able to reduce the halos to half the diameter of the control. The fibrinogenolytic activity also showed inhibition of venom (King & Balasubramanian, 2015).

Balanites aegyptiaca

Balanites aegyptiaca belongs to the family Zygophyllaceae. Seed oil methanol extract was utilized to evaluate its inhibition of lethality and anti-inflammatory activity. Two different concentrations of viper venom were 0.2 mg/kg intraperitoneal injection to the mice and 0.3 mg/kg. 0.3 mg/kg of *Balanites aegyptiaca* extract was used, and they concluded that *Balanites aegyptiaca* could significantly protect anti-inflammatory responses because of the presence of rutin, an active compound (Mishal et al., 2014).

Mangifera indica

Mangifera indica belongs to the family Anacardiaceae. Stem bark aqueous extract was utilized to evaluate its phospholipase and edema inhibition effect. 5 µg of Indian cobra venom was injected intraperitoneally onto the mice, and 0-50 µg of *Mangifera indica* extract was used, They concluded that *Mangifera indica* had a strong correlation flanked by pro-inflammatory activity inhibition and, lipolytic activity(Dhananjaya et al., 2016).

Spondias pinnata

Spondias pinnata belongs to the familyAnacardiaceae. The bark of *Spondias pinnata*, in combination with the other four drugs of aqueous extract, wasutilized to evaluate its neutralized activity of phospholipase A2 and acetylcholinesterase. 0.625 mg to 4.0 mg of *Naja naja* and *Daboia russelii* venom, respectively. In-vitro studies are included that show inhibition of neutralizing the phospholipase activity(Deshpande et al., 2022).

Moringa oleifera

Moringa oleifera belongs to the family Moringaceae. The leaf ethanol extract was utilized to evaluate neutralizing activity. 1.0 mg/kg of *Naja nigricollis* venom was injected intraperitoneally into rats, and four different concentrations of *Moringa oleifera* extract(100, 200, 300, and 400 mg/kg) were added, and it was concluded that *Moringa oleifera* was able to inhibit hemorrhage, hemolysis, and prolonged clotting time(Adeyi et al., 2020).

Mucuna prurita

Mucuna prurita belongs to the family Fabaceae. Seed aqueous extract was utilized to evaluate neutralizing activity. 1.5 µg *Calloselasma rhodostoma* and *Naja sputatrix* venom were inserted into the caudal veins of the mice, along with 21 mg/kg of *Mucuna prurita* extract. They concluded that *Mucuna prurita* was able to provide adequate protection from deadly effects against *Naja sputatrix*, and moderate protection against *Calloselasma rhodostoma* venom(Tan et al., 2009).

Butea monosperma

Butea monosperma belongs to the family Fabaceae. Stem bark ethanol extract was utilized to evaluate hyaluronidase activity. They concluded that 50 µg of *Viper russelli* venom was injected intraperitoneally in mice along with 80 µg of *Butea monosperma* extract, and they concluded that it significantly reduced venom-induced hemorrhage(Tarannum et al., 2012).

Tephrosia purpurea

Tephrosia purpurea belongs to the family Fabaceae. Aerial parts of ethanol extract were utilized to evaluate neutralization and paw edema inhibition activities. We injected 10 µg of *Naja naja* venom subcutaneously into the suitable paw mice, and 100 µg and 200 ug of *Tephrosia purpurea* extract, and we concluded that it significantly reduced the paw edema (Kavya et al., 2018).

Anti-scorpion

Mangifera indica

Mangifera indica belongs to the family Anacardiaceae. The flowers and leaves of *Mangifera indica* in combination with other drugs of aqueous extract were utilized for anti-scorpion venom activity. 20 mg of scorpion venom intraperitoneally in mice and 1 gm/kg b.w of Mangifera indica extract, and they concluded that in solitary, *Mangifera indica* didn't neutralize the effect of scorpion venom in combination with *Allium cepa*, *Ginko Biloba*, and *Allium aspera* and that in solitary, *Mangifera indica* didn't neutralise the outcome of scorpion venom(Butt et al., 2021) entirely.

People from many tribes have been updating and keeping records of traditional and indigenous knowledge regarding the use of therapeutic plants over the last few decades. But up until today, the modern world has not had access to this knowledge. In this regard, a thorough, practical list of medicinal plants has been developed, together with evidence of the tribes and local uses of particular plants. The list includes the biological source, family, utilized parts, administration route, and reference. Care was taken in this review to accurately identify the natural remedies found in the original (Table 1). Plant roots are reported in *Aconitum ferox*, but above the list of whole plants used as anti-snake venom activity, remaining parts such as leaves, stems, seeds, bark, and flowers are not yet reported. Aerial parts are reported in *Cissampelos pareira*, but above the list of roots used as antisnake venom, activity is not yet reported. Seed oil was reported in *Balanites aegyptiaca,* but above the list of whole plants used as ant-snake venom activity, remaining parts such as roots, stems, leaves, and flowers are not yet reported. Stem barks are reported in *Mangifera indica*, above the list of roots, and leaves are also used as antisnake venom activity is not yet reported. Leaves parts are reported in *Moringa oleifera* and have the above-the-list roots and seeds also useful for antisnake venom. Activity is not yet reported. Seeds are reported in *Mucuna prurita* andhave the above list of stems, roots, and flowers also useful for antisnake venom. Activity is not yet reported. Aerial parts are reported in *Tephrosia purpurea* and have the above list of roots also useful for antisnake venom. Activity is not yet reported. *Fagonia cretica, Spondias pinnata, Butea monosperma and Ruta graveolens were reported as per Indian medicinal plants volume.* Leaves and flowers are reported in *Mangifera indica*, and the list of bark, root, and stems also useful for anti-scorpion venom activity is not yet reported.

The Indian republic, the third-largest nation by area in Asia and the seventh-largest globally, is a multilingual nation with a diversified population and a historical past. India s land border is 151,067 kilometers long. India is home to a wide variety of medicinal plants. Depending on the geographic and biological conditions, they are spread throughout the nation. More than 1500 of these species have been proven to have significant therapeutic potential(Awards P, 2018).

In addition to these main four, the hump-nosed viper poses a threat(Simpson & Norris, 2007). Snakes choose to envenomate as a voluntary action. As a natural form of defense, their bite severs. All poisonous snakes can attack without injection of venom (dry bite)(Young et al., 2002).

Being bitten by a snake is a known job hazard for farmers, field laborers, and outdoor workers. In India's rural areas, it is also a significant issue since poisoning is undoubtedly higher than the estimated 50,000 per year,(Meenatchisundaram, 2008; David, 2005).

Traditional anti-snake and scorpion venom review: Other anti-snake venom treatments can be found in the plant kingdom. Snake bites have been treated using restorative plans in folk medicine. The primary reasons for dependence on medicinal plants are their security, viability, cultural preferences, affordable nature, and dependency on nearby forests(Gupta & Peshin, 2012). Local healers are practicing herbal cures for snake envenomation, although the practice is in no way recognized by modern medicine.

Anaphylactic reactions (difficulty breathing and swallowing; hives; itching, especially of feet or hands; reddening of the skin, especially around the ears; swelling of the eyes, face, or inside of the nose); serum sickness (enlargement of the lymph glands; fever; generalized rash and itching; inflammation of joints); and pyrogen reaction (likely caused by a high concentration of non-immunoglobulin(Devi et al., 2002). As shown in Figure 2, about 32 % of the roots of medicinal plants are used in the treatment of anti-snake venom and anti-scorpion venom. Further investigations can be focused on the isolation of phytocompounds, which can lead to the discovery of newer anti-snake and scorpion agents.

CONCLUSION

The validity of the herbal claims offers great hope for the creation of innovative snake repellents. and anti-scorpion venom drugs in the upcoming. Combining herbal composites with An alternative to anti-venom serum is a good idea and effectively neutralizes the venom of snakes. Furthermost highly, herbs with traditionally claimed properties should be identified, and knowledge should be widely disseminated so that at least first aid treatment can be provided to condense snake bite and scorpion bite mortality. This review demonstrated that according to Sushruta Samhita as suggested, 75 herbs are useful in the Indian medicinal plants volume-I for antisnake venom and anti-scorpion venom activity. It's easy to understand that the researchers are doing future anti-snake and ant-scorpion venom research.

Conflict of interest

There are no conflicts of interest declared by the authors.

Authors' Declaration

As a result of this, the authors declare that the work presented in this article is their original work and that they will be held liable for any claims connected to the content of this article.

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Table 1- List of traditional medicinal plants anti-snake and scorpion venom from the Indian medicinal plants volume-I(Kritikar & Basu, 1993)

S.no	Plant name	Family	Parts to be used	Traditional uses
1	*Clematis triloba*	Ranuculaceae	Whole plants and combination with other drugs	anti-snake venom
2	*Anemone obtusiloba*	Ranuculaceae	Leaves and Bark	anti-snake venom
3	*Nigella sativa*	Ranuculaceae	Seed with other drugs	anti-snake venom
4	*Delphinium denudatum*	Ranuculaceae	Roots	anti-snake venom and anti-scorpion venom
5	*Actaea spicata*	Ranuculaceae	Roots	anti-snake venom
6	*Aconitum heterophyllum*	Ranuculaceae	Roots	anti-snake venom
7	*Aconitum ferox*	Ranuculaceae	Whole plants and combination with other drugs	anti-snake venom
8	*Michelia champaca*	Magnoliaceae	Flower, Fruit, and other drugs	anti-snake venom
9	*Polyalthia simiarum*	Annonaceae	Bark	anti-scorpion venom
10	*Tinospora cardifolia*	Menispermaceae	Roots and stems	anti-snake venom and anti-scorpion venom
11	*Anamirta cocculus*	Menispermaceae	Bark	anti-snake venom
12	*Tiliacora acuminata*	Menispermaceae	Roots	anti-snake venom
13	*Coscinium fenestratum*	Menispermaceae	stems	anti-snake venom
14	*Pericampylus glaucus*	Menispermaceae	Roots	anti-snake venom
15	*Cissampelos pareira*	Menispermaceae	Roots with other drugs	anti-scorpion venom as well as anti-snake venom
16	*Berberis asiatica*	Berberidaceae	Roots and stem	anti-scorpion venom and anti-snake venom
17	*Cleome viscosa*	Capparaceae	Roots and seeds	anti-snake venom
18	*Gynandropsis gynandra*	Capparaceae	Roots, leaves, and seeds	anti-scorpion venom as well as anti-snake venom
19	*Crataeva nurvala*	Capparaceae	Bark and leaves	anti-snake venom
20	*Capparris spinosa*	Capparaceae	Fruits	anti-snake venom
21	*Capparris sepiaria*	Capparaceae	Roots	anti-snake venom
22	*Ionidium enneaspermum*	Violaceae	Fruits	anti-snake venom and anti-scorpion venom
23	*Bixa orellana*	Bixaceae	Roots	anti-snake venom
24	*Flacourtia sepiaria*	Flacourtiaceae	Leaves and roots	anti-snake venom
25	*Polygala crotalarioides*	Polygalaceae	Roots	anti-snake venom

26	*Althaea officinalis*	Malvaceae	Leaves and Flowers	anti-snake venom
27	*Malva sylvestris*	Malvaceae	Whole plants	anti-scorpion venom
28	*Sida acuta*	Malvaceae	Whole plants	anti-scorpion venom as well as anti-snake venom
29	*Hibiscus abelmoschus*	Malvaceae	Seeds	anti-snake venom
30	*Gossypium herbaceum*	Malvaceae	Whole plants	anti-scorpion venom and anti-snake venom
31	*Bombax ceiba*	Bombacaceae	Flower, Fruits with other drugs	anti-scorpion venom as well as anti-snake venom
32	*Ceiba pentandra*	Bombacaceae	Roots	anti-scorpion venom
33	*Helicteres isora*	Malvaceae	Roots	anti-snake venom
34	*Pentapetes phoenicea*	Malvaceae	Whole plants and combination with other drugs	anti-snake venom
35	*Hugonia mystax*	Linaceae	Bark	anti-snake venom
36	*Fagonia cretica*	Zygophyllaceae	Leaves and twigs	anti-snake venom
37	*Biphytum sensitivum*	Oxalidaceae	Leaves	anti-snake venom
38	*Ruta graveolens*	Rutaceae	Leaves	anti-scorpion venom
39	*Zanthoxylum alatum*	Rutaceae	Fruits	anti-snake venom
40	*Glycosmis cochinchinenensis*	Rutaceae	Wood	anti-snake venom
41	*Murraya koeniggi*	Rutaceae	Leaves	anti-snake venom
42	*Paramignya monophylla*	Rutaceae	Leaves	anti-snake venom
43	*Alantia monophylla*	Rutaceae	Leaves	anti-snake venom
44	*Citrus media proper*	Rutaceae	Bark, Leaves, and Fruits	anti-scorpion venom as well as anti-snake venom
45	*Foronia elephantum*	Rutaceae	Bark, Leaves, Root, and Fruits	anti-scorpion venom and anti-snake venom
46	*Balanites aegyptiaca*	Zygophyllaceae	Whole plants	anti-snake venom
47	*Boswellia serrata*	Burseraceae	Gum	anti-scorpion venom as well as anti-snake venom
48	*Commiphora mukul*	Burseraceae	Gum	anti-scorpion venom and anti-snake venom
49	*Gymnosporia spinosa*	Celastraceae	Bark, Leaves, Root, and Stems	anti-snake venom
50	*Elaeodendran glaucum*	Celastraceae	Root	anti-snake venom
51	*Sapindus trifoliatus*	Sapindaceae	Fruit	anti-snake venom
52	*Dodonaea viscosa*	Sapindaceae	Leaves	anti-snake venom
53	*Pistacia integerrima*	Anacardiaceae	Gall with combination with other drugs	anti-scorpion venom and anti-snake venom
54	*Mangifera indica*	Anacardiaceae	Bark, Leaves, Root, and Stems	anti-scorpion venom as well as anti-snake venom
55	*Spondias pinnata*	Anacardiaceae	Bark	anti-snake venom
56	*Moringa oleifera*	Moringaceae	Roots and seeds	anti-scorpion venom and anti-snake venom
57	*Indigofera tinctoria*	Fabaceae	Roots	anti-scorpion venom as well as anti-snake venom

58	*Tephrosia purpurea*	Fabaceae	Roots	anti-snake venom
59	*Glycyrrhiza glabra*	Fabaceae	Roots	anti-snake venom
60	*Sesbania aegyptiaca*	Fabaceae	Roots	anti-scorpion venom
61	*Lens esculenta*	Fabaceae	Leaves	anti-snake venom
62	*Uraria lagopoides*	Fabaceae	Whole plant	anti-snake venom and anti-scorpion venom
63	*Desmodium gangeticum*	Fabaceae	Roots in combination with other drugs	anti-snake venom
64	*Abrus precatorius*	Fabaceae	Roots	anti-snake venom
65	*Cicer arietinum*	Fabaceae	Roots	anti-snake venom
66	*Mucuna prurita*	Fabaceae	Flower, Root, and Stems	anti-scorpion venom & anti-snake venom
67	*Butea monosperma*	Fabaceae	Bark	anti-scorpion venom and anti-snake venom
68	*Butea superba*	Fabaceae	Flower, Root, and Bark	anti-snake venom as well as anti-snake venom
69	*Phaseolus trilobus*	Fabaceae	Fruits	anti-scorpion venom and anti-snake venom
70	*Phaseolus radiatus*	Fabaceae	Fruits	anti-scorpion venom & anti-snake venom
71	*Clitoria ternatea*	Fabaceae	Flower, Root, and Stem	anti-scorpion venom and anti-snake venom
72	*Cajanus indicus*	Fabaceae	Pulse	anti-snake venom
73	*Pterocarpus santalinus*	Fabaceae	Wood	anti-snake venom
74	*Pongamia glabra*	Fabaceae	Whole Plant	anti-snake venom
75	*Derris scandens*	Fabaceae	Bark	anti-snake venom

Figure 1: Percentage of families used in Anti-snake venom activity.

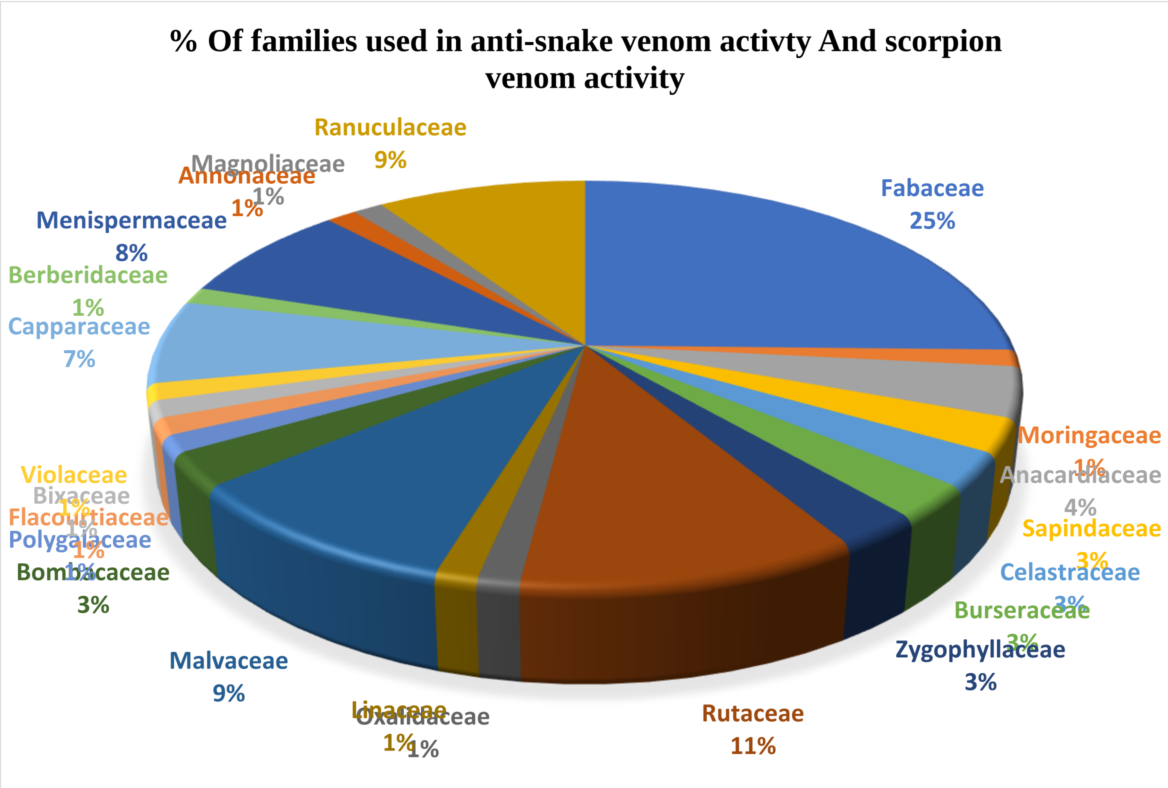

Figure 2: percentage of plant parts used in anti-snake venom and ant-scorpion venom activity.