International Journal of Homoeopathic Sciences

E-ISSN: 2616-4493
P-ISSN: 2616-4485
Impact Factor (RJIF): 5.96
www.homoeopathicjournal.com
IJHS 2025; 9(3): 719-722
Received: 28-06-2025
Accepted: 29-07-2025

Angelin Ajitha M
Intern, Sarada Krishna Homoeopathic Medical College, (Affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai), Kulasekharam, Kanyakumari, Tamil Nadu, India

Anie Jasmine A
Intern, Sarada Krishna Homoeopathic Medical College, (Affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai), Kulasekharam, Kanyakumari, Tamil Nadu, India,

Anshif K
Intern, Sarada Krishna Homoeopathic Medical College, (Affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai), Kulasekharam, Kanyakumari, Tamil Nadu, India

Dr. Sibin RA
Assistant Professor, Department of Organon of Medicine and Homoeopathic Philosophy, Sarada Krishna Homoeopathic Medical College, (Affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai), Kulasekharam, Kanyakumari, Tamil Nadu, India

Corresponding Author:
Angelin Ajitha M
Intern, Sarada Krishna Homoeopathic Medical College, (Affiliated to The Tamil Nadu Dr. M.G.R. Medical University, Chennai), Kulasekharam, Kanyakumari District, Tamil Nadu, India

Toxicological action and utility of *Lachesis mutans*: A homeopathic perspective

Angelin Ajitha M, Anie Jasmine A, Anshif K and Sibin RA

DOI: https://www.doi.org/10.33545/26164485.2025.v9.i3.K.1733

Abstract
Background: *Lachesis muta*, commonly known as the bushmaster snake, is a venomous species found predominantly in the rainforests of Central and South America. It belongs to the Kingdom Animalia under Viperidae family, Genus Lachesis, and Species muta. It is the largest pit viper in the Western Hemisphere and is notable for its potent venom and elusive behavior.
The venom of *Lachesis muta* is a complex biochemical mixture that includes SVMPs, serine proteases, PLA_2, and LAAOs. These components act synergistically to produce local tissue necrosis, hemorrhage, coagulopathy, and inflammatory responses. The venom's systemic effects on cardiovascular and immune systems make it an object of interest in toxicological research.
In homeopathy, *Lachesis muta* has been transformed from a toxic substance to a polychrest remedy, extensively used for a broad range of ailments. Introduced into the homeopathic materia medica by Dr. Constantine Hering.
Objective: To explore the toxicological composition of *Lachesis muta* venom, its clinical utility in homeopathy using the similia principle and their action.
Methods: This article integrates data from toxicological research, classical homeopathic materia medica, and clinical literature accessed through PubMed, Google Scholar, and Homeopathy360.
Results: Lachesis venom contains enzymatic proteins causing hemorrhage, inflammation, and neurotoxicity. Potentized forms are used homeopathically in conditions with similar presentations, especially those with left-sided affinity. *Lachesis muta* demonstrates a powerful convergence of toxicity and therapeutic utility, providing a foundation for integrative research.

Keywords: *Lachesis muta*, homeopathy, snake venom, toxicology, similia, left-sided symptoms.

Introduction
The Homoeopathic system of medicine stands as the second most widely practiced medical system globally. It utilizes a broad spectrum of natural sources including plants, minerals, chemicals, microbes, and animal derivatives for the preparation of remedies. Among these, medicines derived from animal venoms, secretions, and fluids hold a distinct and significant place within Homoeopathic pharmacology. Notably, several potent remedies are prepared from the venomous products of snakes, spiders, bees, and scorpions. Although these substances are highly toxic in their crude form, they are rendered safe and therapeutically effective through a specialized process known as potentisation. This process, fundamental to Homoeopathic pharmacy, eliminates the toxic properties while enhancing the dynamic healing potential of the original substance. Rooted in the law of similars, potentisation enables these remedies to stimulate the body's vital force and promote healing, as extensively described in classical Homoeopathic literature and the foundational texts of Dr. Samuel Hahnemann [1]. In Aphorism 269 of the Organon of Medicine (6th edition), Hahnemann states: "In order to develop the medicinal powers of crude substances, particularly those of animal and mineral origin, a peculiar mechanical process was required, which I call potentisation." [2] This clearly illustrates how Homoeopathy transforms even the most poisonous substances into safe, deep acting therapeutic agents, capable of restoring health.
Snake venoms, such as that of *Lachesis muta*, contain potent enzymes and proteins that exert profound effects on biological tissues and systems, particularly the vascular and coagulation systems [1]. Homeopathy, a system of alternative medicine founded by Dr. Samuel Hahnemann, operates on the principle that "like cures like."[4] Medicines are derived from natural sources including plants, minerals, and animals. One such medicine is *Lachesis muta*,

a snake venom remedy derived from the bushmaster, known for its powerful systemic effects in its crude form and its curative potential in potentized form. The homeopathic approach includes drug proving, potentization, and repertorization, which guides the physician in matching a remedy to the totality of symptoms [4-6].

Materials and Methods

A structured literature review was performed using data from Google Scholar, PubMed, and homeopathy-specific resources such as Homeopathy360. Data collection included classical materia medica, toxicology databases, and homeopathic repertories. Both clinical reports and pharmacological studies were cross-referenced to support the dual perspective.

Results

Lachesis in Toxicology

After a bushmaster snakebite, the venom spreads via the lymphatic and circulatory systems. The synergistic action of its components leads to: Shock, Coagulopathy, Tissue Necrosis, Neurotoxic symptoms, Systemic inflammation. Lachesis venom contains potent proteolytic enzymes that begin acting locally and within lymphatic tissues: Causing tissue necrosis, edema, and lymphatic damage at the bite site.Frequently resulting in regional lymphadenopathy, due to venom accumulation in draining lymph nodes [24].

Venom Composition of *Lachesis muta*

The venom of *Lachesis muta* contains several key biochemical agents. Snake venom metalloproteinases (SVMPs) constitute around 30-40% and are responsible for breaking down vascular endothelium, causing hemorrhage. Serine proteases (15-25%) modulate coagulation pathways leading to thrombosis or bleeding tendencies. Phospholipase A2 enzymes (10-20%) disrupt cell membranes, resulting in inflammation and neurotoxicity. L-amino acid oxidases (LAAOs) generate reactive oxygen species that damage cells. C-type lectins (5-8%) interfere with platelet aggregation, and minor components like bradykinin-potentiating peptides, natriuretic peptides, and disintegrins contribute to hypotension and anticoagulant effects [1-3].

Mechanism of lachesis venom

Lachesis venom like most high-molecular weight snake venoms primarily enters the lymphatic system before reaching the bloodstream [21, 22].

1. Injection Site and Molecular Size

Lachesis venom is injected into subcutaneous or muscular tissues, where blood capillaries are less permeable to large molecules. Its active components including metalloproteinases, serine proteases, and phospholipase A2 are too large to immediately enter the bloodstream and instead enter through lymphatic capillaries, which have greater permeability and no tight endothelial junctions [2, 3].

2. Lymphatic Transport Pathway

The venom is absorbed into the initial lymphatic vessels, flows through regional lymph nodes, and enters the thoracic duct, eventually draining into the left subclavian vein, bringing the venom into systemic circulation[21, 22].This process causes a delay of 15-60 minutes before systemic symptoms arise, depending on the efficiency of lymphatic flow and the movement of nearby muscles [23].The venom of *Lachesis muta* is a complex cocktail of biologically active proteins, enzymes, and peptides. The major constituents include:

1. Snake Venom Metalloproteinases (SVMPs)

SVMPs cleave ECM proteins, especially those forming the basal lamina of blood vessels. This leads to: Increased vascular permeability, Hemorrhage, Interstitial edema SVMPs also activate pro-inflammatory mediators like IL-6 and TNF-α, enhancing tissue destruction. The loss of vascular integrity initiates local and systemic bleeding. This mechanism is a key contributor to venom-induced systemic hemorrhage and hypovolemic shock [1-3].

2. Phospholipase A2 (PLA2)

PLA2 disrupts cell membrane integrity by cleaving the sn-2 position of phospholipids, releasing:
Lysophospholipids which disrupt cell signaling and Arachidonic acid which leads to inflammatory mediators. This triggers: Severe inflammation, Muscle necrosis, Neurotoxicity via inhibition of neuromuscular transmission. PLA2 can indirectly inhibit mitochondrial function, leading to energy depletion and cell death [4-6].

3. Serine Proteases

Some act as procoagulants, activating factor V and X leading to clot formation.
Others exhibit fibrinolytic activity, degrading fibrinogen and fibrin, causing bleeding.
This dual behavior leads to Venom Induced Consumption Coagulopathy: Coagulation factors are consumed rapidly. Followed by hypocoagulability, prolonged PT, and spontaneous hemorrhages [7-9].

4. L-Amino Acid Oxidases (LAAOs)

LAAOs generate H_2O_2 as a byproduct which may lead to: Oxidative stress, Lipid peroxidation, DNA fragmentation, Apoptosis of local tissue cells. LAAOs also have antimicrobial properties but contribute significantly to tissue necrosis and inflammation at the bite site [10-12].

5. Bradykinin Potentiating Peptides (BPPs)

Potentiate bradykinin activity in which BPP causes, Vasodilation, Hypotension, Pain and vascular leakage These effects exacerbate the symptoms of shock and capillary leakage [13].

6. C-type Lectin-like Proteins (CTLs)

This modifies platelet aggregation and adhesion, which Bind to platelet surface glycoproteins, Inhibit or stimulate aggregation, leading to thrombocytopenia or platelet dysfunction. This contributes to bleeding diathesis and poor clot formation [14].

Action of homoeopathic medicine *Lachesis mutans*

In homeopathy, the action of Lachesis does not stem from its crude toxicity, but from its ability to induce similar symptoms in a healthy individual. The potentized form stimulates the body's defense mechanisms. For example, if

a venom component causes hemorrhage, the potentized remedy may be used in conditions characterized by spontaneous bleeding. This is consistent with Hahnemann's principle of similia [4]. The venom's initial path through the thoracic duct (which drains lymph from 75% of the body into the left venous angle) may explain why some effects, both clinical and homeopathic, manifest predominantly on the left side [25]. The pathway begins with the recognition of a functional disturbance such as left-sided inflammation, congestion, or hemorrhage. When Lachesis is administered in a potentized form, the energetic blueprint of the remedy is believed to stimulate the organism's vital force to correct the imbalance. Clinically, patients report relief from symptoms such as left-sided sore throats, hormonal flushes, and pulsatile vascular headaches, which align with the left-dominant nature of the remedy [7-9].

Lachesis mutans in homoeopathy

Homeopathically, Lachesis is used in various conditions that reflect its toxicological profile. In hormonal disorders, such as menopause, it addresses symptoms like hot flushes, irritability, and palpitations. In cardiovascular conditions, it is prescribed for varicosities and cyanosis. In infections and septic states, it helps when symptoms worsen after sleep and improve with discharge. Mentally, the patient is loquacious, jealous, and oversensitive [10-12].

Conclusion

Lachesis mutans stands as a remarkable example of the homeopathic principle "Similia Similibus Curentur"that which causes symptoms in the healthy can cure similar symptoms in the sick. The venom's capacity to disrupt vascular, neurological, and immune systems mirrors the remedy's curative power in pathologies involving those systems. Its left-sided affinity and characteristic modalities (worse after sleep, better from discharge) make it a unique remedy. Continued research into venom proteomics and neuroimmune pathways may offer further insights into its mechanism of action. The vivid and peculiar nature of its proving symptoms makes it a well-individualized remedy in cases where conventional treatments may fall short.Through potentisation, the harmful effects of the crude venom are transformed into a dynamic healing agent, rendering it safe and effective even at high dilutions.

Thus, the mechanism of action of *Lachesis mutans* spans both pharmacological and energetic dimensions. In its crude form, the venom exerts a complex effect on the nervous and immune systems through direct molecular interactions. In homeopathic dilution, the remedy is believed to act dynamically, stimulating the organism's innate ability to restore equilibrium, particularly in conditions marked by restlessness, hypersensitivity, and have hormonal flushes. This dual understanding grounded in toxicology and refined by homeopathic principles forms the foundation for its continued relevance in clinical practice.

Acknowledgement

We collectively express our sincere gratitude to our faculty and institution for their guidance and support throughout the preparation of this article. We also thank the authors of standard textbooks and previous research studies that served as valuable references. This work is the result of collaborative effort, and we acknowledge the contributions of every group member involved.

Conflict of Interest

Not available

Financial Support

Not available

References

1. Gutiérrez JM, Rucavado A. Snake venom metalloproteinases: Their role in the pathogenesis of local tissue damage. Biochimie. 2000;82(9-10):841-50.
2. Fox JW, Serrano SM. Structural considerations of the snake venom metalloproteinases, key members of the M12 reprolysin family of metalloproteinases. Toxicon. 2005;45(8):969-85.
3. Escalante T, *et al*. Role of PLA2s in inflammation and pain. Toxicon. 2006;48(8):934-52.
4. Hahnemann S. Organon of Medicine. 6th ed. New Delhi: B Jain Publishers; 2002.
5. Hering C. Guiding Symptoms of Our Materia Medica. New Delhi: B Jain Publishers; 2004.
6. Allen TF. Encyclopedia of Pure Materia Medica. Vol. 5. New Delhi: B Jain Publishers; 2003.
7. Clarke JH. A Dictionary of Practical Materia Medica. New Delhi: B Jain Publishers; 2005.
8. Vermeulen F. Concordant Materia Medica. Haarlem: Merlijn Publishers; 2002.
9. Kent JT. Lectures on Homeopathic Materia Medica. New Delhi: B Jain Publishers; 2003.
10. Boericke W. Pocket Manual of Homeopathic Materia Medica. New Delhi: B Jain Publishers; 2002.
11. Schroyens F. Synthesis Repertory. New Delhi: B Jain Publishers; 2009.
12. Banerjea SK. Miasmatic Prescribing. Kolkata: B. Jain Publishers; 2010.
13. Diniz CR, *et al*. Pharmacological studies of *Lachesis muta* snake venom. Toxicon. 1999;37(11):1689-701.
14. Chippaux JP. Snake Venoms and Envenomations. Malabar, FL: Krieger Publishing; 2006.
15. Mebs D. Toxicology of Animal Venoms. Boca Raton, FL: CRC Press; 2002.
16. Arias AS, *et al*. Diversity of snake venoms: Proteomic and toxicological insights. J Proteomics. 2017;150:3-19.
17. Homeopathy 360. Lachesis in menopausal disorders. https://www.homeopathy360.com.
18. PubMed. Homeopathic action of snake venoms. https://pubmed.ncbi.nlm.nih.gov.
19. Google Scholar. *Lachesis muta* venom proteomics. https://scholar.google.com.
20. Sankaran R. The Soul of Remedies. Mumbai: Homoeopathic Medical Publishers; 2005.
21. Warrell DA. Oxford Handbook of Tropical Medicine. 3rd ed. 2004.
22. Barnes JM, *et al*. Lymphatic transport determines systemic venom spread. Clin Toxicol. 2013.
23. Sutherland SK, *et al*. First aid for snakebite: pressure-immobilization method. Med J Aust. 1981.
24. Lira-da-Silva RM, *et al*. Clinical and epidemiological features of snakebites caused by *Lachesis muta*. Rev

Inst Med Trop São Paulo. 2000.
25. Remien C, *et al*. The Lymphatic System: An Osteopathic Review. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2024.

How to Cite This Article
Ajitha AM, Jasmine AA, Anshif K, Sibin RA. Toxicological action and utility of *Lachesis mutans*: A homeopathic perspective. International Journal of Homoeopathic Sciences. 2025;9(3):719-722.