



POISON DETECTION AND DIAGNOSIS IN AYURVEDA: A HISTORICAL AND SCIENTIFIC PERSPECTIVE

Dr.Mohit Saini^{1*}, Dr. Ramkanwari Jakhar², Prof. (Dr.) Ritu Kapoor³, Dr. Manoj Kumar Adlakha⁴,

^{1*}PG Scholar, PG Dept. Of Agadatantra evum vidhi vaidhyka, Post Graduate Institute of Ayurveda, DSRRAU Jodhpur Rajasthan

²PG Scholar, PG Dept. Of Agadatantra evum vidhi vaidhyka, Post Graduate Institute of Ayurveda, DSRRAU Jodhpur Rajasthan

³Professor and HoD PG Dept. Of Agadatantra evum vidhi vaidhyka, Post Graduate Institute of Ayurveda, DSRRAU Jodhpur Rajasthan

⁴ Associate Professor PG Dept. Dravyaguna Vighyan, Post Graduate Institute of Ayurveda, DSRRAU Jodhpur Rajasthan

***Corresponding Author;** Dr.Mohit Saini
(sainim8854@gmail.com)

Abstract

Agadatantra, the specialized branch of Ashtanga Ayurveda dedicated to toxicology, offers a profound historical framework for the detection and management of poisons (Visha). This paper provides a scientific redrafting of Ayurvedic toxicological principles, evaluating them through the lens of modern forensic science and molecular biology. The study analyzes the classification of toxins into *Sthavara* (inanimate), *Jangama* (animate), and *Krutrima* (artificial) categories, alongside the unique latent toxicity concept of *Dushi Visha*. We detail diagnostic methodologies such as *Agni Pariksha* (fire testing) and biological indicators, comparing them with contemporary Gas Chromatography-Mass Spectrometry (GC-MS) and clinical toxidromes. The pathophysiology is examined via *Visha Vega* (toxic impulses) and its molecular correlation with enzymatic degradation and systemic inflammatory responses. Finally, we evaluate the *Chaturvimshati Upakrama* (24 therapeutic modalities) against modern Advanced Cardiac Life Support (ACLS) and gastric decontamination protocols. The findings suggest that integrating Ayurvedic observational clinical skills with modern analytical precision offers a holistic and sustainable model for contemporary toxicology and medical jurisprudence.ⁱ

Keywords: Agadatantra, Visha, Forensic Toxicology, Visha Vega, Chaturvimshati Upakrama, Dushi Visha, Molecular Biomarkers.

1. Introduction

Agadatantra is recognized as one of the eight essential clinical branches of Ayurveda, specifically focusing on the diagnosis, prognosis, and treatment of toxic exposure. Etymologically, *Visha* (poison) is derived from the root *vis* (vyaptau), signifying a substance that rapidly encompasses or pervades the entire biological system immediately upon entry. Classical texts describe *Visha* as an agent that vitiates the healthy tissues (*Dhatus*) and leads to the despair of the world (*Vishada*).ⁱⁱ

The historical importance of poison detection in ancient India was primarily driven by royal security, leading to the development of sophisticated protocols for the royal physician (*Rajavaidya*) to test food, drink, and personal items. This paper seeks to harmonize these ancient observational protocols with modern forensic standards to create a comprehensive diagnostic and therapeutic framework.

2. Methodology

This research utilizes a systematic literature review methodology. Primary data was extracted from the *Brihatrayi* (Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya), specifically focusing on the *Kalpa Sthana* of Sushruta and *Chikitsa Sthana* Chapter 23 of Charaka. Modern scientific data was sourced from Scopus and PubMed-indexed articles, focusing on forensic toxicology, molecular mechanisms of toxins, and advanced analytical chemistry. Inclusion criteria involved peer-reviewed articles published up to 2024 exploring the interface of traditional and contemporary toxicology.

3. Pathophysiology: The Concept of *Visha Vega* and *Gunas*

The spread of poison in Ayurveda is not considered uniform. It traverses the biological membranes (*Kalas*) in distinct impulses known as *Visha Vega*.

3.1 Molecular Interpretation of *Visha Gunas* (Properties)

Ayurveda attributes 10 specific properties (*Gunas*) to poison that define its lethality.

Ayurvedic Property (Guna)	Definition and Pathological Action	Modern Molecular Correlation ⁱⁱⁱ
<i>Vyavayi</i>	Spreads throughout the body before digestion	High lipophilicity; bypassing first-pass metabolism
<i>Vikasi</i>	Causes structural slackening and destroys Ojas	Proteolytic degradation of cell junctions/collagen
<i>Tikshna</i>	Penetrates deep tissues and vital organs (<i>Marmans</i>)	High affinity for receptors; corrosive cellular damage
<i>Sukshma</i>	Enters minute channels (<i>Srotas</i>)	Low molecular weight; ability to cross Blood-Brain Barrier
<i>Ashu</i>	Extremely fast onset of action	Immediate systemic bioavailability and rapid absorption

3.2 The Mechanism of *Visha Vega*

Visha Vega represents the sequential vitiation of *Dhatus*. Stimulated by *Vata*, the poison moves from one tissue to the next.

"तत्र प्रथमे वेगे रक्तं दूषयति, द्वितीये मांसम्..." (Charaka Samhita Chikitsa sthan 23/18-20)

Acharaya Charak said in the first stage (*Vega*), the nutrient fluid (*Rasa*) is vitiated; in the second, the blood (*Rakta*); in the third, the muscle (*Mamsa*); and so forth, until the eighth stage resulting in death (*Maranam*)^{iv}.

4. Pathophysiology: Modern Vs Ayurveda According to Ayurveda the pathogenesis through the lens of *Dosha-Dhatu-Mala* imbalance, particularly the corruption of *Rakta* (blood) and *Agni* (metabolic fire). Modern science views this through enzymatic inhibition, membrane disruption, and the "cytokine storm".^{v vi}

Table 1: Integrated Pathophysiological Mapping

Ayurvedic Concept ^{vii}	Modern Scientific Correlation	Pathophysiological Mechanism
<i>Ama Visha</i>	Metabolic Endotoxemia	Accumulation of reactive metabolites/oxidative stress
<i>Dushi Visha</i>	Bioaccumulation / Latent Toxicity	Sequestration of toxins in adipose/bone (e.g., Heavy Metals)
<i>Gara Visha</i>	Cumulative Toxicity / Drug Interactions	Hapten-carrier adduct formation; Type IV hypersensitivity
<i>Hridaya Avarana</i>	Cardiotoxicity / CNS Protection	Interference with myocardial sodium/potassium channels

5. Types of Poison Detection Methods: Comparative Analysis

5.1 Classical Detection (*Panchbhautic Pareeksha*)

Ancient detection focused on sensory and biological assays.

Table 2: Comparison of Detection Methodologies^{viii}

Feature	Ayurvedic Observation ^{ix}	Modern Forensic Technique ^x	Scientific Basis
<i>Combustion</i>	<i>Agni Pariksha</i> : Peacock neck flame color	Flame Atomic Absorption Spectroscopy (FAAS)	Metallic ions (e.g., Arsenic) alter emission spectra
<i>Smell</i>	<i>Gandha</i> : Foul, cadaveric, or pungent fumes	Headspace Gas Chromatography (HS-GC)	Volatile organic compound (VOC) identification
<i>Metals</i>	<i>Sparsha</i> : Burning/Itching on contact	Reinsch Test / ICP-MS	Chemical reaction with copper or plasma ionization
<i>Organic</i>	<i>Animal Behavior</i> : Cuckoo voice change	In-vivo Bioassays / LD50 testing	Neurotoxic effects on laryngeal/motor neurons

6. Types of Poison Diagnosis Methods: Signs and Symptoms

Ayurvedic diagnosis is stage-specific, while modern diagnosis identifies "Toxidromes".

6.1 *Visha Lakshana* (Clinical Features)

Table 3: Clinical Staging and Symptoms Mapping

Stage (Vega)	Ayurvedic Signs (Lakshana) ^{xi}	Modern Toxicidrome / Marker ^{xii}	Pathophysiology
<i>Vega 1 (Rasa)</i>	<i>Praseka, Vamathu</i>	SLUDGE (Cholinergic)	Excessive parasympathetic stimulation
<i>Vega 2 (Rakta)</i>	<i>Vaivarnya, Vepathu</i>	Cyanosis / Coagulopathy	Methemoglobinemia or DIC
<i>Vega 3 (Mamsa)</i>	<i>Kandu, Swayathu</i>	Angioedema / Urticaria	Histamine release; capillary leak
<i>Vega 7 (Majjadi)</i>	<i>Skandha Bhanga</i>	Neuromuscular Blockade	Failure of accessory respiratory muscles

7. Treatment Part: Ancient and Modern Protocols

Ayurveda prescribes *Chaturvimshati Upakrama* (24 modalities), while modern science focuses on stabilization and specific antidotes.^{xiii}

Table 4: Treatment Comparison Table

Ayurvedic Modality (<i>Upakrama</i>) ^{xiv}	Modern Medical Procedure	Therapeutic Rationale
<i>Arishta Bandhana</i>	Venous Tourniquet (Selective)	Retarding systemic lymphatic spread of venom
<i>Vamana / Virechana</i>	Gastric Lavage / Purgation	Mechanical removal of unabsorbed toxic load
<i>Hridayavarana</i>	Cardioprotective Therapy	Use of <i>Ghee/Honey</i> vs. Beta-blockers/Atropine
<i>Prativisha</i>	Specific Antidotes (e.g., Antivenom)	Competitive inhibition at receptor sites
<i>Sanjnanasthapana</i>	Resuscitation / ACLS	Restoration of consciousness and vital functions

8. Discussion

The integration of Agadatantra with modern forensic science reveals a continuity of medical logic across millennia. The *Agni Pariksha* findings of "peacock-neck colored flames" correlate with modern flame tests for inorganic salts. The concept of *Dushi Visha* addresses the modern challenge of chronic environmental bioaccumulation, which often remains undetected by acute screening. However, challenges remain in standardizing Ayurvedic descriptive signs into measurable forensic data. Emerging trends for 2025 include the use of Artificial Intelligence to predict toxicity based on multi-omics data, which could potentially validate the personalized approach of *Prakriti*-based toxicology in Ayurveda.

9. Conclusion

Ayurvedic toxicology provides a sophisticated clinical and historical foundation that complements modern forensic precision. While contemporary chromatography and mass spectrometry offer unmatched quantification, the holistic observations of *Visha Vega* and *Guna* offer a longitudinal understanding of toxic impact. Future research should focus on the standardization of *Agada* formulations and the integration of Ayurvedic diagnostic indicators into preliminary forensic assessments. This dual-perspective approach ensures a robust, culturally sensitive, and scientifically rigorous framework for modern toxicological management.

10. References

- i Sushruta. (1911). *Sushruta Samhita* (K. K. L. Bhishagratna, Trans.; Vol. 5). Kalpa Sthana, Anna-pana-Raksha Adhyaya: Chapter 1, Shloka 8, Page 2. Kaviraj Kunja Lal Bhishagratna. (Original work published c. 600 BCE–400 CE).
- ii Vagbhata. (2002). *Ashtanga Hridaya* (H. S. Paradkar, Ed.). Uttara Sthana, Visha Pratishedha: Chapter 35, Shloka 7, Page 778. Chaukhamba Orientalia. (Original work published c. 7th Century CE).
- iii Aebi, B. (2002). Gas chromatography-mass spectrometry (GC-MS) in today's forensic laboratory. *Chimia*, 56(1-2), 48-50. DOI: 10.2533/000942902777674751.
- iv Charaka. (2020). *Charaka Samhita* (G. Krishna, S. Bhatt, & S. Binorkar, Trans.; Vol. 3). Chikitsa Sthana, Visha Chikitsa Adhyaya: Chapter 23, Shloka 14, Page 814. Charak Samhita Research Centre. (Original work published c. 1000 BCE–200 CE).
- v Sharangadhara. (2003). *Sharangadhara Samhita* (K. R. Murthy, Trans.). Prathama Khanda: Chapter 4, Shloka 22, Page 29. Chaukhamba Orientalia. (Original work published c. 14th Century CE).
- vi Behera, N., et al. (2021). A critical interpretation on Gara Visha and Dushi Visha. *International Journal of Emerging Technologies and Innovative Research*, 10(3), g648-g654. DOI: 10.54060/ahr.2024.22.

- vii Sushruta. (1911). *Sushruta Samhita*. Kalpa Sthana, Anna-pana-Raksha Adhyaya: Chapter 1, Shloka 29, Page 6.
- viii Charaka. (2020). *Charaka Samhita*. Chikitsa Sthana, Visha Chikitsa Adhyaya: Chapter 23, Shloka 18-20, Page 815.
- ix Vagbhata. (2006). *Ashtanga Samgraha* (S. Sharma, Ed.). Uttara Tantra, Visha Bheda Adhyaya: Chapter 40, Shloka 15, Page 914. Chaukhamba Sanskrit Series Office. (Original work published c. 6th Century CE).
- x Sanoop, S., et al. (2023). Conceptual study on action of Visha Gunas with snake venom compounds: A comparison. *International Journal of Ayurveda and Pharma Research*, 11(3), 95-101. DOI: 10.47060/ijapr.v11i3.2751.
- xi Madhava. (2005). *Madhava Nidana* (S. Bhishagacharya, Ed.). Visha Nidana: Chapter 69, Shloka 1-5, Page 350. Chaukhamba Sanskrit Sansthan. (Original work published c. 7th Century CE).
- xii Pathania, P. (2024). A classical and modern view on Visha Pareeksha: Review article. *World Journal of Pharmaceutical Research*, 13(23), 617-625. DOI: 10.20959/wjpr202423-32451.
- xiii Charaka. (2020). *Charaka Samhita*. Chikitsa Sthana, Visha Chikitsa Adhyaya: Chapter 23, Shloka 24-27, Page 816.
- xiv Sushruta. (1911). *Sushruta Samhita*. Kalpa Sthana, Sthavara-visha-vijnaniya Adhyaya: Chapter 2, Shloka 5, Page 15.