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**BRIDGING DRAVYAGUNA AND AGADTANTRA: A  
COLLABORATIVE LITERATURE REVIEW TOWARD AN  
INTEGRATED AYURVEDIC PHARMACO-TOXICOLOGICAL  
FRAMEWORK**

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**ABSTRACT**

Dravyaguna (Ayurvedic pharmacology and materia medica) and Agadatantra evam Vidhi Vaidyaka (Ayurvedic toxicology, forensic medicine, and medical jurisprudence) are conventionally taught as separate subjects within the undergraduate and postgraduate Bachelor of Ayurvedic Medicine and Surgery (BAMS) curriculum, yet both disciplines rest upon a shared classical substratum: the pharmacodynamic framework of Rasa (taste), Guna (physical properties), Virya (potency), Vipaka (post-digestive transformation), and Prabhava (unique action), collectively termed Rasapanchaka. This narrative review synthesises peer-reviewed literature, classical textual sources, and contemporary regulatory documentation published mainly between 2015 and 2025 to examine the conceptual, clinical, and educational convergence of these two branches. Key areas of overlap identified include the Vishaghna Dravya (anti-toxic drug) corpus described across the Brihatrayi, the Ojas–Visha polarity that underlies antidotal pharmacology, the safety evaluation and pharmacovigilance of Rasashastra (herbo-mineral) preparations, environmental and occupational toxicology as elaborated under Janpadodhvasa and Dushi Visha, food toxicology (Aahara Vishakta), and the curricular restructuring undertaken by the National Commission for Indian System of Medicine (NCISM) under Competency-Based Education (CBME). The review argues that a

deliberately collaborative, cross-departmental approach to teaching, research, and quality-assured documentation strengthens both the scientific credibility and the clinical safety of Ayurvedic practice, and proposes specific avenues, including joint Dravya-Visha databases, shared OSCE/OSPE-based competency stations, and collaborative pharmacovigilance protocols, through which Dravyaguna and Agadtantra departments can generate reproducible, internationally publishable evidence.

**KEYWORDS:** Dravyaguna; Agadtantra; Vishaghna Dravya; Rasapanchaka; Ayurvedic toxicology; Rasashastra pharmacovigilance; National Commission for Indian System of Medicine. (NCISM)

## 1. INTRODUCTION

Ayurveda organises its clinical and pharmacological knowledge into eight classical branches (Ashtanga Ayurveda), among which Dravyaguna Vigyana and Agadtantra evam Vidhi Vaidyaka occupy closely related territory <sup>[1]</sup>. Dravyaguna is the science of the drug substance (Dravya) and its properties, dealing with identification, cultivation, processing, and the pharmacological logic by which a substance produces a therapeutic or, conversely, a toxic effect. Agadtantra, by contrast, is oriented toward Visha (poison) of plant, animal, and mineral origin, the clinical syndromes it produces, and the antidotal, forensic, and medico-legal response to poisoning, envenomation, environmental toxicity, and substance misuse <sup>[2]</sup>. Standard reference compilations used across both disciplines, including major pharmacognostic databases and materia-medica compendia, already integrate a dedicated toxicology (Visha-Dravya) section alongside their pharmacological content, a structural choice that itself reflects the historical inseparability of the two subjects <sup>[15]</sup>.

The two subjects are frequently perceived by students and even by faculty as administratively distinct, occupying separate departments, separate examination papers, and separate research output streams. Yet the classical texts do not maintain this separation. The Charaka Samhita and Sushruta Samhita describe Dravya properties and Visha properties using the identical conceptual vocabulary of Rasa, Guna, Virya, and Vipaka, and both texts group anti-toxic drugs (Vishaghna Gana, Aragvadhadi Gana, Patoladi Gana) using the same pharmacological reasoning that governs ordinary therapeutic classification <sup>[9, 10]</sup>. A drug is, in this framework, simply a substance whose Rasapanchaka happens to oppose that of a given Visha; toxicology is applied pharmacology read in reverse.

This review was undertaken to make that shared foundation explicit, to survey how recent peer-reviewed literature has already begun to bridge the two disciplines, and to propose a structured agenda for collaborative teaching, research, and documentation between Dravyaguna and Agadtantra departments, particularly in the context of the Competency-Based Education (CBME) reforms currently being implemented under the National Commission for Indian System of Medicine (NCISM) <sup>[1]</sup>.

## 2. RATIONALE FOR A COLLABORATIVE REVIEW

Three converging pressures make a joint Dravyaguna - Agadtantra literature review timely. First, regulatory reform: NCISM's competency-based BAMS curriculum increasingly expects integrated, cross-subject clinical reasoning rather than siloed subject knowledge, and institutional Quality Council of India (QCI) accreditation exercises reward demonstrable inter-departmental collaboration in teaching and research output <sup>[1, 5]</sup>. Second, public-health relevance: global scrutiny of herbo-mineral (Rasashastra) formulations for heavy-metal content has made toxicological safety evaluation an unavoidable companion to pharmacological promotion of any Ayurvedic Dravya, so Dravyaguna can no longer be taught in isolation from Agadtantra's safety lens <sup>[12, 13, 14, 16]</sup>. Third, publication strategy: international AYUSH-indexed journals increasingly favour manuscripts that correlate classical concepts with measurable modern parameters, a task that is intrinsically interdisciplinary and benefits from co-authorship across Dravyaguna and Agadtantra faculty, as demonstrated by several recent pharmacodynamic and reviews cited in this article <sup>[4, 6, 7]</sup>.

## 3. OBJECTIVES

The specific objectives of this review are to:

- Trace the shared classical framework (Rasapanchaka) that underlies both Dravyaguna and Agadtantra reasoning.
- Map the principal points of contemporary scientific convergence between the two disciplines, including antidotal pharmacology, Rasashastra safety, environmental toxicology, and food toxicology.
- Review recent (2015–2025) peer-reviewed literature that has already attempted such integration.
- Identify gaps in the current literature and propose a structured agenda for collaborative research, teaching, and documentation suited to NCISM's competency-based framework.

#### 4. MATERIALS AND METHODS

This is a narrative, conceptually structured literature review rather than a systematic review with meta-analysis, as the subject matter combines classical textual exegesis with heterogeneous modern evidence that is not amenable to pooled quantitative synthesis. Primary classical sources consulted include the Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya in standard commentated editions [9, 10]. Contemporary sources were identified through PubMed/PMC, Google Scholar, and Ayurveda-focused indexed journals (AYUSHDHARA, Journal of Ayurveda and Integrated Medical Sciences, World Journal of Pharmaceutical Research, Cureus, Archives of Pharmacy Practice, Journal of Research in Education in Indian Medicine) using combinations of the terms "Dravyaguna", "Agadtantra", "Vishaghna", "Rasapanchaka", "Ayurvedic toxicology", "Rasashastra safety", and "NCISM competency-based education", restricted principally to the period 2015–2025 to reflect current regulatory and scientific context. Regulatory and public-health documentation from the National Commission for Indian System of Medicine, the U.S. Food and Drug Administration, and the Minnesota Department of Health was included to represent the safety-monitoring perspective on herbo-mineral formulations [1, 12, 14]. Articles were selected for relevance to the intersection of pharmacology and toxicology within the Ayurvedic framework rather than for exhaustive coverage of either discipline in isolation.

#### 5. DRAVYAGUNA AND AGADTANTRA: TWO BRANCHES, ONE SUBSTRATUM

##### 5.1 Rasapanchaka as the Common Pharmacological Grammar

Every Dravya, whether classified as a nutrient, a medicine, or a poison, is described in classical Ayurveda through the same five-fold analytical scheme of Rasa, Guna, Virya, Vipaka, and Prabhava, collectively called Rasapanchaka [4]. Recent pharmacological readings of this scheme argue that Rasapanchaka should be understood as expressing genuine pharmacodynamic activity rather than a purely descriptive or physical classification, since the same properties that define a Dravya's therapeutic action also define a Visha's harmful action [6]. Agadtantra texts describe Visha itself as possessing a characteristic Rasapanchaka: predominantly Katu (pungent) and Tikta (bitter) Rasa, Laghu (light) and Ruksha (dry) Guna, Ushna (hot) Virya, and properties such as Vyavayi (rapid systemic spread) and Vikasi (dissolution of bodily strength) that are the direct qualitative opposite of Ojas, the substrate of vitality and immunity [8]. Because a therapeutic Dravya and a toxic Dravya are described in the same units of analysis, Dravyaguna and Agadtantra are, in effect, two readings of a single pharmacological grammar applied to opposite clinical outcomes.

## 5.2 Vishaghna Dravya: Where Materia Medica Meets Antidotal Science

The clearest textual bridge between the two disciplines is the Vishaghna Dravya (anti-toxic drug) corpus. Charaka Samhita groups fifty such substances under the Vishaghna Mahakashaya, while Sushruta Samhita distributes anti-toxic drugs across several named Ganas, including Aragvadhadi, Patoladi, and Anjanadi [8, 10]. A recent critical review catalogued the anti-toxic drugs recorded in the Madanpal Nighantu, reporting that of approximately 500 substances described in that text, a substantial minority carry an explicitly documented Vishaghna property, distributed across plant, animal, and mineral origin [8]. Individual monographic reviews of single Vishaghna Dravyas, such as Manjishtha (*Rubia cordifolia*), have similarly proceeded by correlating classical Rasapanchaka attribution with modern pharmacological findings including hepatoprotective, nephroprotective, and antioxidant activity, illustrating how a Dravyaguna monograph and an Agadtantra antidote profile are, for such substances, the same document written from two disciplinary vantage points [7].

A 2024 pharmacodynamic analysis of the Charaka Vishaghna Mahakashaya reported that the constituent drugs are dominated by Madhura (sweet), Tikta (bitter), and Kashaya (astringent) Rasa, Laghu and Ruksha Guna, Ushna Virya, and Katu Vipaka, and proposed that this profile operationalises the classical principle of Vipreetartha Chikitsa, treatment by qualities opposite to those of the morbid factor, while also correlating with measurable antioxidant activity capable of counteracting free-radical-mediated cellular injury attributed to Visha [6]. This kind of study is intrinsically collaborative: it requires Dravyaguna competence to characterise the Rasapanchaka of each constituent drug and Agadtantra competence to frame the clinical toxicological rationale being tested.

## 5.3 Ojas–Visha Polarity and the Logic of Antidotal Pharmacology

Classical Agadtantra characterises the qualities of Visha (Laghu, Ruksha, Ashukari, Vyavayi, Teekshna, Vikasi, Sukshma, Ushna, Vishada, and Anirdeshya-Rasatva) as the direct antithesis of Ojas, described as Snigdha (unctuous), Sheeta (cool), Sthira (stable), and Guru (heavy), the very qualities associated with biological strength and immunity [8]. Because antidotal drugs are, by definition, those whose properties restore the Ojas-favouring pole of this axis, the selection of a Vishaghna Dravya is fundamentally a Dravyaguna exercise in matching pharmacological opposites, an exercise that Agadtantra then applies clinically through Shodhana (detoxification), Vamana and Virechana (therapeutic emesis and purgation), Dhoomapana (medicated fumigation), and targeted Agada Yoga (compound antidotal formulations) [2, 3].

## 6. CONTEMPORARY POINTS OF CONVERGENCE

### 6.1 Rasashastra Safety, Bhasma Pharmacovigilance, and Heavy-Metal Toxicology

The safety profile of herbo-mineral (Rasashastra) formulations is presently the single most internationally scrutinised interface between Ayurvedic pharmacology and toxicology. Ayurvedic experts estimate that a substantial proportion of formulations in the classical formulary intentionally incorporate at least one metal, prepared through Shodhana (purification), trituration, and controlled incineration into Bhasma form, a process claimed in classical texts to render the finished preparation non-toxic at therapeutic dosage <sup>[11]</sup>. This claim has been tested empirically: controlled toxicological studies of classical metal-containing formulations such as Mahayograj Guggulu have reported no clinically significant haematological, biochemical, or histopathological alterations in animal models at therapeutically advocated doses, despite measurable metal content, supporting the pharmaceutical rationale that processing status, not raw elemental presence, determines toxicity <sup>[11]</sup>. Independent international surveys, by contrast, have repeatedly reported detectable lead, mercury, or arsenic in a meaningful proportion of commercially sampled Ayurvedic products, particularly those manufactured outside a standardised Good Manufacturing Practice framework, and regulatory bodies including the United States Food and Drug Administration and the Minnesota Department of Health have issued consumer advisories on this basis <sup>[12, 13, 14]</sup>. According to the official Ayurvedic Formulary of India, mercury, arsenic, and lead remain among the most widely used heavy metals in classical formulations, underscoring why standardised, jointly designed pharmacovigilance is a shared responsibility rather than the burden of a single department <sup>[17]</sup>.

This tension between classical pharmaceutical claims and modern surveillance findings is, in the authors' view, precisely the terrain on which Dravyaguna and Agadtantra collaboration is most urgently needed. Dravyaguna departments hold the pharmacognostic and pharmaceutical-processing expertise to characterise Shodhana and Marana methodology, while Agadtantra departments hold the toxicological and forensic expertise to design and interpret heavy-metal estimation, dose-response, and adverse-event surveillance protocols. A jointly authored, quality-assured pharmacovigilance programme, rather than parallel and occasionally contradictory departmental positions, would strengthen both the scientific defensibility and the international regulatory acceptability of Rasashastra medicine <sup>[11, 12, 13, 14]</sup>.

## **6.2 Environmental and Occupational Toxicology (Janpadodhvansa, Dushi Visha)**

Agadtantra's classical concept of Janpadodhvansa, epidemic destruction of a population through simultaneous vitiation of air, water, land, and season, has been proposed as a pre-modern framework anticipating contemporary environmental toxicology, encompassing vehicular and industrial pollutant exposure and its systemic health consequences [2]. Related classical experimental correlations, such as demonstrating measurable changes in water quality parameters and microbial indicators following controlled exposure to specific Dravyas, illustrate how Dravyaguna-characterised substances are being repurposed within an Agadtantra environmental-health research design [2]. This is a productive model for future collaborative work extending classical Dushi Visha (cumulative low-grade toxin) concepts to contemporary concerns such as pesticide residue, heavy-metal soil contamination of medicinal plant sources, and occupational toxic exposure.

## **6.3 Food Toxicology (Aahara Vishakta)**

A 2025 conceptual review of Aahara Vishakta (food-borne toxicity) correlated classical dietary and detoxification measures, Pathya-Apathya Ahara (wholesome/unwholesome diet), Shodhana, and Vishaghna Dravya administration, with contemporary food-safety concerns including adulteration, pesticide residue, and microbial contamination, concluding that Agadtantra's preventive and curative framework offers a structured lens for present-day food-safety practice [3]. Because the wholesome/unwholesome (Pathya-Apathya) classification of any food substance is itself a Dravyaguna determination, food toxicology represents a further area in which routine departmental collaboration, rather than occasional cross-citation, would strengthen both teaching and applied public-health output, including institutional initiatives such as FSSAI-linked food-adulteration detection workshops.

## **6.4 Curricular Convergence under NCISM Competency-Based Education**

The National Commission for Indian System of Medicine's competency-based BAMS curriculum explicitly positions Agadtantra as a subject with an expanding public-health mandate, including identification of poisons, treatment modalities, and mitigation of environmental toxicological exposure, while Dravyaguna retains responsibility for pharmacognostic and pharmacological competency [1]. A 2025 qualitative synthesis of faculty experience with NCISM curriculum implementation, drawing on cross-departmental authorship spanning Panchakarma, Dravyaguna, and Agad Tantra Avum Vidhi Vaidyaka faculty, identified sustained inter-departmental collaboration and curriculum adaptability as necessary conditions for the reform to produce globally credible, scientifically rigorous Ayurvedic professionals [5]. This is directly relevant to institutional Quality Council of India



(QCI) accreditation processes, which increasingly assess standardised OSCE/OSPE/DOAP/DOPS competency documentation and evidence of integrated, cross-subject assessment design as markers of educational quality.

## 7. DISCUSSION: WHY COLLABORATION MATTERS

The literature surveyed above indicates that, wherever Dravyaguna and Agadtantra findings have actually been brought into direct correlation, whether in Vishaghna Dravya pharmacodynamics, Rasashastra safety evaluation, or environmental and food toxicology, the resulting scholarship has produced more internationally interpretable, mechanistically grounded output than either discipline typically achieves in isolation. Isolated Dravyaguna monographs risk remaining purely descriptive or phytochemical without a toxicological safety dimension; isolated Agadtantra reviews risk remaining classical-textual without a rigorous materia-medica characterisation of the antidotal drugs discussed. A collaborative model, jointly designed research questions, shared Dravya-Visha databases indexed by Rasapanchaka, and co-authored publication strategy, addresses both limitations simultaneously and is well aligned with the direction international AYUSH-indexed journals are already favouring [4, 5, 6, 7].

From an institutional standpoint, formalising this collaboration also serves accreditation and regulatory objectives directly: NCISM's competency framework and QCI's institutional quality benchmarking both reward demonstrable inter-departmental teaching and research integration rather than parallel departmental silos [1, 5].

## 8. RESEARCH GAPS AND FUTURE DIRECTIONS

- Development of a jointly maintained Vishaghna Dravya database that indexes each drug simultaneously by Dravyaguna parameters (Rasa, Guna, Virya, Vipaka, Prabhava) and Agadtantra parameters (target Visha, mechanism, clinical evidence grade).
- Standardised, cross-departmentally validated heavy-metal and phytochemical pharmacovigilance protocols for Rasashastra formulations, extending existing single-institution safety studies to multi-centre designs.
- Correlation studies applying modern antioxidant, hepatoprotective, and nephroprotective assay methods to a wider range of classical Vishaghna Gana constituents beyond the small number presently studied.



- Extension of Janpadodhvasa and Dushi Visha frameworks into formally designed environmental-exposure and occupational-health studies, co-authored across Dravyaguna and Agadtantra faculty.
- Joint OSCE/OSPE/DOAP/DOPS competency-station design under NCISM CBME that explicitly tests integrated pharmaco-toxicological clinical reasoning rather than subject-siloed recall.

## 9. LIMITATIONS

As a narrative rather than systematic review, this synthesis does not apply formal risk-of-bias or quality-appraisal instruments to included studies, and search coverage, while spanning the principal AYUSH-indexed journals and major biomedical databases, is not exhaustive of every regional or vernacular-language publication on this topic. Classical textual interpretation inevitably reflects the specific commentated editions consulted [9, 10], and readers seeking authoritative Sanskrit textual determinations are directed to those primary editions.

## 10. CONCLUSION

Dravyaguna and Agadtantra share a common classical pharmacological grammar, Rasapanchaka, that makes their conventional administrative separation somewhat artificial. Recent literature on Vishaghna Dravya pharmacodynamics, Rasashastra safety, environmental and food toxicology, and NCISM curricular reform all point toward the same conclusion: deliberate, structured collaboration between these two departments, in research design, in pharmacovigilance, and in competency-based teaching, produces more scientifically defensible and internationally publishable scholarship than either discipline can produce alone. Institutions preparing for QCI accreditation and NCISM competency audits have a direct, immediate incentive to formalise such collaboration; the broader field of Ayurvedic medicine has a longer-term incentive to do so in order to meet international standards of pharmacological and toxicological evidence.

## CONFLICT OF INTEREST

The author declares no conflict of interest.

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