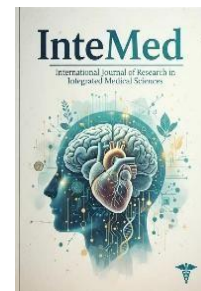




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Review Article

Haridra as a Vishaghna and Immunomodulatory Drug: Bridging Classical Ayurvedic Concepts with Contemporary Evidence

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Abstract:

Background

Haridra (*Curcuma longa* L.), commonly known as turmeric, is an important medicinal plant described extensively in the Ayurvedic materia medica. In the Charaka Samhita, Haridra is included among the ten drugs of Vishaghna Mahakashaya, a pharmacological group described in the fourth chapter of Sutra Sthana. The classical designation of Haridra as Vishaghna provides an important conceptual basis for investigating its contemporary biological activities, particularly antioxidant, anti-inflammatory and immunomodulatory effects.

Objective

This narrative review aims to critically examine the classical Ayurvedic basis of Haridra as a member of Vishaghna Mahakashaya and to correlate this concept with contemporary evidence concerning its immunomodulatory, anti-inflammatory and antioxidant activities.

Materials and Methods

A narrative literature review was undertaken using classical Ayurvedic references and contemporary biomedical literature. Relevant publications concerning *Curcuma longa*, curcumin, immunomodulation, inflammation, oxidative stress, pharmacokinetics, bioavailability and safety were considered. Classical Ayurvedic concepts were interpreted separately from modern pharmacological findings to avoid inappropriate equivalence between traditional terminology and contemporary molecular mechanisms.

Results

Charaka places Haridra within Vishaghna Mahakashaya. Its Ayurvedic pharmacological profile includes Tikta and Katu Rasa, Ruksha Guna, Ushna Virya and Katu Vipaka. Contemporary research indicates that *C. longa* and curcuminoids possess antioxidant, anti-inflammatory and immunomodulatory activities. Experimental literature suggests modulation of inflammatory signalling pathways, including NF- κ B-related pathways, and effects on inflammatory mediators. Human clinical evidence has demonstrated effects on selected inflammatory and oxidative biomarkers; however, substantial heterogeneity exists regarding formulations, doses, duration and clinical populations. A major limitation is the poor systemic bioavailability of conventional curcumin, leading to development of multiple enhanced-bioavailability formulations.

Conclusion

The classical inclusion of Haridra in Vishaghna Mahakashaya provides a valuable Ayurvedic framework for studying its biological effects. Contemporary evidence supports the characterization of Haridra/curcumin as an immunomodulatory rather than simply an “immune-boosting” agent. The Vishaghna concept should not be considered synonymous with a modern antidote or proven detoxification therapy. Well-designed clinical studies using standardized Haridra preparations and clearly defined immune and inflammatory outcomes are required to establish its clinical relevance.

Keywords

Haridra; Curcuma longa; Vishaghna Mahakashaya; Charaka Samhita; curcumin; immunomodulation; inflammation; oxidative stress; Ayurveda; Agada Tantra.

1. Introduction

Ayurveda describes a systematic approach to the maintenance of health and management of disease through the appropriate use of diet, lifestyle, therapeutic procedures and medicinal substances. Within this framework, the pharmacological classification of medicinal plants according to specific therapeutic actions is an important feature of Ayurvedic materia medica.

In Charaka Samhita, Sutra Sthana, Chapter 4, the Mahakashaya classification describes groups of ten medicinal substances according to their principal therapeutic activities. One such group is Vishaghna Mahakashaya, consisting of ten substances traditionally associated with counteracting the effects of Visha.

Haridra (*Curcuma longa* L.) is the first drug mentioned in this group. The classical inclusion of Haridra within Vishaghna Mahakashaya is of particular interest in the context of contemporary research because turmeric and its major constituents, especially curcuminoids, have been extensively investigated for antioxidant, anti-inflammatory and immunomodulatory activities.

The modern scientific literature, however, requires careful interpretation. "Immune boosting" is a broad popular expression and does not adequately describe the complex actions of immunologically active substances. Immune regulation may involve enhancement of selected immune functions, suppression of excessive inflammatory responses, or restoration of immune homeostasis. Therefore, immunomodulation is a more scientifically appropriate term for discussing the contemporary pharmacology of Haridra.

This review attempts to establish a scholarly bridge between the classical Ayurvedic concept of Vishaghna and contemporary evidence concerning inflammation, oxidative stress and immune regulation.

2. Classical basis of Vishaghna Mahakashaya

The fourth chapter of Sutra Sthana of Charaka Samhita, Shadvirechanashatashritiya Adhyaya, describes the Mahakashaya groups.

Vishaghna Mahakashaya consists of:

3. Concept of Visha and Vishaghna

Ayurvedic descriptions of Visha emphasize characteristics such as:

Laghu; Ruksha; Ashu; Vishada; Vyavayi; Tikshna; Vikasi; Sukshma; Ushna; Anirdeshya Rasa.

Vishaghna drugs are understood in the classical framework as substances capable of counteracting or mitigating the pathological effects associated with Visha.

This concept should be interpreted carefully in contemporary scientific terminology.

Vishaghna should not automatically be translated as "antidote."

A modern antidote generally has a defined mechanism against a particular poison, toxin or toxic pathway. The classical Vishaghna concept is broader and may include drugs used to counteract manifestations associated with poisoning and toxic states.

4. Haridra: Botanical and pharmacological identity

Botanical name: *Curcuma longa* L.

Family: Zingiberaceae

Common name: Turmeric

Part commonly used: Rhizome

Haridra is characterized in Ayurvedic pharmacology by its Rasa, Guna, Virya and Vipaka. The rhizome contains several biologically active constituents, with curcuminoids, particularly curcumin, being among the most extensively studied.

However, whole Haridra and purified curcumin should not be considered pharmacologically interchangeable. Their chemical composition, bioavailability and biological activity may differ substantially.

5. Why Haridra may be relevant to the Vishaghna concept

The classical rationale for Vishaghna activity should be understood within the Ayurvedic framework of opposing pathological qualities and restoring physiological balance.

Haridra possesses Tikta + Katu Rasa, Ruksha Guna, Ushna Virya and Katu Vipaka.

Traditional interpretations associate these characteristics with effects on Kapha, metabolic processes and pathological accumulation.

Some Ayurvedic literature also describes Haridra in relation to Rakta Prasadana/Rakta Shodhana concepts. These terms should not be directly equated with modern blood purification or detoxification.

A more scientifically cautious interpretation is that the classical description provides a conceptual framework that can be explored through contemporary pharmacological endpoints such as oxidative stress, inflammatory signalling, cytokine regulation, cellular antioxidant responses and tissue inflammatory injury.

6. From "immune booster" to "immunomodulator"

The phrase "immune booster" is commonly used in public health and commercial communication but is scientifically imprecise.

The immune system is a highly regulated network involving innate immunity, adaptive immunity, inflammatory mediators, cellular signalling, regulatory mechanisms and antioxidant systems.

Increasing immune activity indiscriminately would not necessarily be beneficial. An agent that regulates inflammatory signalling may be more appropriately described as an immunomodulator rather than an immune booster.

Current reviews of *C. longa* and curcumin describe antioxidant, anti-inflammatory and immunomodulatory activities across experimental models. However, translation from experimental observations to clinical outcomes requires caution.

7. Contemporary evidence for immunomodulatory activity

Curcumin has been investigated for effects on multiple inflammatory and cellular signalling pathways.

Proposed mechanisms include modulation of NF- κ B signalling, MAPK pathways, oxidative stress pathways, inflammatory cytokine signalling, transcriptional regulation and cellular antioxidant defence mechanisms.

Experimental literature has reported effects involving TNF- α , IL-1 β , IL-6, inflammatory enzymes and reactive oxygen species.

These findings provide a possible biological basis for investigating whether some aspects of the traditional Vishaghna concept correspond to modulation of inflammatory and oxidative processes.

Nevertheless, such a correlation remains interpretative rather than demonstrative.

8. Antioxidant activity and its possible relevance

Oxidative stress represents an imbalance between reactive oxygen species and antioxidant defence mechanisms.

A simplified contemporary model is: toxic/inflammatory insult $\rightarrow$ reactive oxygen species increase $\rightarrow$ oxidative stress $\rightarrow$ cellular and tissue injury.

Curcuminoids have demonstrated antioxidant-related activities in experimental models, including effects on endogenous antioxidant systems.

This provides a possible modern framework for investigating part of the biological rationale behind traditional Vishaghna applications.

However: Antioxidant activity is not equivalent to proven antidotal activity.

9. Anti-inflammatory activity

Inflammation is a major component of many toxic, infectious and chronic pathological processes.

Experimental studies of *C. longa* and curcumin have reported anti-inflammatory activity involving multiple pathways and mediators.

Human studies have also investigated inflammatory biomarkers, including C-reactive protein and cytokines.

A 2024 systematic review and meta-analysis of 103 randomized controlled trials involving 7,216 participants reported effects of curcumin supplementation across 42 health outcomes. The certainty of evidence varied considerably between outcomes, and the authors emphasized the need for larger and better-designed long-term trials.

This evidence supports further investigation of curcumin as a biological modulator but does not establish Haridra as a universal immune-enhancing therapy.

10. Bioavailability: an important limitation

One of the major challenges in translating curcumin research into clinical practice is its pharmacokinetic profile.

Conventional curcumin has low aqueous solubility, limited intestinal absorption, extensive metabolism and relatively low systemic exposure.

Several formulations have been developed to improve bioavailability, including micronized preparations, phospholipid complexes, phytosomal preparations, micellar formulations, nanoparticle-based preparations and formulations combined with absorption-enhancing agents.

Importantly, results obtained with a highly bioavailable curcumin formulation cannot automatically be generalized to ordinary turmeric powder.

11. Human clinical evidence

Clinical evidence for curcumin has expanded considerably, but important limitations remain.

A large 2024 systematic review and meta-analysis of randomized controlled trials identified 103 RCTs involving 7,216 participants. Statistically significant effects were observed for several outcomes, including selected inflammatory and oxidative parameters. However, the certainty of evidence ranged from high to very low depending on the outcome.

Several factors contribute to heterogeneity: different curcumin preparations, doses, treatment durations, patient populations, outcome measures, variable bioavailability and small sample sizes in individual studies.

Therefore, evidence for biomarker modulation should not automatically be interpreted as evidence for prevention or treatment of infectious or toxic diseases.

12. Safety considerations

Turmeric and curcumin have generally demonstrated relatively favorable short-term safety profiles in clinical studies.

Reported adverse effects may include gastrointestinal discomfort, nausea, dyspepsia and diarrhoea.

However, safety is formulation- and dose-dependent. Recent literature also emphasizes that concentrated supplements and high-dose or prolonged use require greater scrutiny than culinary use.

The statement “Natural means completely safe” is scientifically inappropriate. Safety evaluation should consider dose, duration, formulation, patient characteristics and concomitant medication.

13. Ayurvedic–modern correlation model

A conceptual model may be proposed:

Classical model:

Visha → Dosha/Dhatu disturbance → Pathological manifestations → Vishaghna Dravya

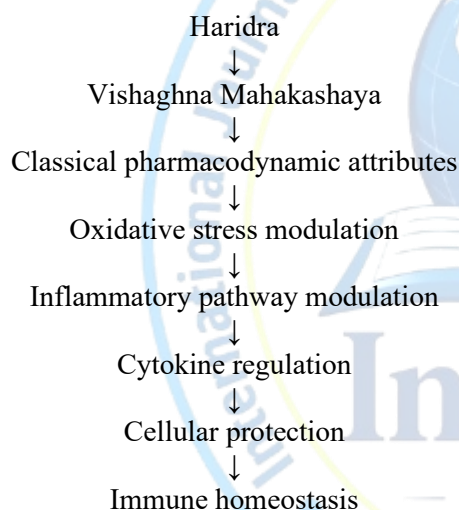
Contemporary research model:

Toxic/inflammatory stimulus → oxidative stress + inflammatory signalling → cellular/tissue injury → Haridra/Curcuminoids → antioxidant + inflammatory pathway modulation → potential modulation of immune homeostasis

The two models may be studied alongside each other, but they should not be described as scientifically identical.

14. Proposed conceptual framework

“Vishaghna–Immunomodulatory Axis”



This framework can serve as a hypothesis-generating model for future translational research.

15. Research gaps

Despite extensive literature on turmeric and curcumin, several important research gaps remain.

15.1 Standardization

Future studies should clearly specify botanical authentication, plant part, extraction method, curcuminoid content, marker compounds, contaminants and batch-to-batch variation.

15.2 Whole Haridra versus purified curcumin

A major research question is whether the biological effects of whole Haridra are equivalent to those of purified curcumin. They should not be assumed to be equivalent.

15.3 Vishaghna-specific clinical research

Very limited modern clinical research directly evaluates Haridra against defined toxicological conditions. Future

research could investigate biomarkers of oxidative stress following controlled toxicological exposure, inflammatory markers, hepatoprotective endpoints, cellular antioxidant responses and experimentally validated toxin models.

15.4 Immunological endpoints

Future trials should include clearly defined endpoints such as CRP, IL-6, TNF- α , IL-1 β , oxidative stress markers, antioxidant enzymes and selected innate/adaptive immune parameters.

15.5 Pharmacokinetics

Standardized pharmacokinetic studies are required to establish the relationship between dose, systemic exposure, biological effect and clinical outcome.

16. Limitations of the present review

This article is a narrative review and does not constitute a systematic review or meta-analysis.

The available literature is heterogeneous, particularly regarding formulation, dose, duration, patient population, outcome measures and bioavailability.

Furthermore, classical Ayurvedic terminology and modern biomedical terminology arise from different conceptual frameworks. Therefore, correlations proposed in this review should be considered hypothesis-generating rather than proof of equivalence.

17. Future research direction

A translational research programme could be structured in four stages:

Stage I — Classical pharmacology: Document Charaka references, Chakrapani commentary, Rasa Panchaka, Vishaghna rationale and traditional indications.

Stage II — Phytochemical standardization: Characterize curcuminoids, essential oils, marker compounds, contaminants and batch consistency.

Stage III — Experimental pharmacology: Study oxidative stress, inflammatory pathways, cytokine modulation, hepatoprotection and cellular toxicity.

Stage IV — Clinical research: Conduct standardized, randomized, controlled clinical trials with predefined immunological and inflammatory endpoints.

18. Conclusion

Haridra occupies a distinctive position in Ayurvedic pharmacology because of its inclusion in Vishaghna Mahakashaya of Charaka Samhita. The classical classification provides an important historical and conceptual basis for investigating the biological effects of *Curcuma longa*.

Contemporary evidence supports antioxidant, anti-inflammatory and immunomodulatory activities of turmeric-derived preparations and curcuminoids. However, these effects should not be interpreted as proof that Haridra

functions as a universal antidote or as an uncomplicated “immune booster.”

The scientifically preferable interpretation is that Haridra may possess immunomodulatory potential, with its effects potentially involving regulation of inflammatory and oxidative pathways. The relationship between the classical Vishaghna concept and modern immunology is therefore best regarded as a translational research hypothesis rather than a demonstrated one-to-one equivalence.

Future research should prioritize authenticated and standardized Haridra preparations, clearly defined formulations, pharmacokinetic characterization, validated immunological endpoints and adequately powered randomized controlled trials.

The study of Haridra thus offers an opportunity to develop a scientifically rigorous bridge between Ayurvedic Agada Tantra and contemporary pharmacology, while preserving the conceptual integrity of both systems.

Vishaghna Mahakashaya — Classical List

No.	Drug
1	Haridra
2	Manjishtha
3	Suvaha
4	Sukshma Ela
5	Palindi
6	Chandana
7	Kataka
8	Shirisha
9	Sindhuvara
10	Shleshmantaka

Haridra: Classical Pharmacological Profile

Parameter	Classical description
Rasa	Tikta, Katu
Guna	Ruksha, Laghu
Virya	Ushna
Vipaka	Katu
Major therapeutic associations	Vishaghna, Kusthaghna, Kandughna, Lekhaniya and others

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