

Review Article

ISSN: 3048-5614

“PHARMACOLOGICAL INSIGHTS INTO VIRYA: CORRELATING AYURVEDIC POTENCY WITH ACTIVE PRINCIPLES”

Dr. Abhay Gandhi¹

AFFILIATIONS:

1. CEO, Ira Consultancy & Research Organisation, Bhosari, Pune, Maharashtra 411026

CORRESPONDENCE:

Dr. Abhay Gandhi

EMAILID: ceo@icro.co.in

FUNDING INFORMATION:

Not Applicable

How to cite this article:

Abhay Gandhi, “Pharmacological Insights into Virya: Correlating Ayurvedic Potency with Active Principles” Asian Journal of Dravyaguna and Pharmacology. 2024;1(3):34-37.

ABSTRACT

Introduction: In Ayurvedic pharmacology (*Dravyaguna Vijnana*), Virya (potency) represents the intrinsic energy of a substance responsible for therapeutic efficacy. Traditionally classified as *Ushna* (hot) or *Shita* (cold), Virya governs drug activity beyond taste (*Rasa*) and qualities (*Guna*). Modern pharmacology parallels Virya with pharmacological potency, bioactivity, and active principles of medicinal plants. **Methods:** This review synthesizes data from classical Ayurvedic texts (*Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya*) and biomedical databases including PubMed, Scopus, Web of Science, and AYUSH Research Portal. Inclusion criteria were original research, clinical studies, and reviews (2000–2024) discussing Virya or active phytoconstituents in pharmacological terms. Non-peer-reviewed and anecdotal sources were excluded. **Results:** Analysis reveals that *Ushna Virya* correlates with stimulant, thermogenic, and metabolism-enhancing properties, mediated by alkaloids, flavonoids, and essential oils. *Shita Virya* aligns with cooling, anti-inflammatory, and sedative actions, supported by terpenoids, saponins, and glycosides. Herb-specific examples demonstrate strong correlations: *Piper nigrum* (piperine, bioenhancer), *Zingiber officinale* (gingerols, thermogenic), *Capsicum annum* (capsaicin, TRPV1 agonist), *Withania somnifera* (withanolides, adaptogen), *Mentha spp.* (menthol, TRPM8 agonist), *Ocimum sanctum* (eugenol, flavonoids, antioxidant), *Emblica officinalis* (polyphenols, hepatoprotective), and *Azadirachta indica* (limonoids, anti-inflammatory). Polyherbal formulations such as *Triphala* further highlight *Shita Virya* through antioxidant and immunomodulatory mechanisms. **Discussion:** While parallels exist between Virya and pharmacological potency, challenges remain in translating qualitative Ayurvedic categories into quantitative biomedical parameters. Advances in pharmacogenomics, metabolomics, and receptor assays provide opportunities to validate Virya scientifically. Integrative approaches could expand drug discovery, optimize formulations, and personalize therapeutics by bridging traditional insights with modern pharmacology.

KEYWORDS: Active principles; Ayurveda; Pharmacodynamics; Potency; Virya



INTRODUCTION

Ayurveda, the ancient Indian system of medicine, emphasizes a multidimensional understanding of drug action.^[1] Unlike modern pharmacology, which dissects molecular mechanisms, Ayurveda explains therapeutic efficacy through holistic parameters known as *Rasa Panchaka* (*Rasa*, *Guna*, *Virya*, *Vipaka*, and *Prabhava*).^[2-3] Among these, *Virya* (potency) holds a pivotal role, being the immediate determinant of pharmacological effect.^[4]

Classical texts describe *Virya* primarily in two forms—*Ushna* (hot potency) and *Shita* (cold potency).^[5-6] These classifications encompass the dynamic energy inherent in substances that governs their interaction with the body's physiological processes. For instance, *Ushna Virya* substances enhance metabolism, circulation, and digestion, while *Shita Virya* drugs calm inflammation, reduce fever, and provide cooling effects.^[7-8]

The present review aims to critically analyze the Ayurvedic concept of *Virya*, correlate it with pharmacological potency and active phytoconstituents, and explore its relevance in modern biomedical science.^[9] The objectives are: (1) to delineate the conceptual framework of *Virya* in Ayurveda; (2) to review its correlation with pharmacological properties and active principles; and (3) to identify research gaps and future perspectives for integrative pharmacology.^[10]

MATERIALS AND METHODS

- **Databases searched:** PubMed, Scopus, Web of Science, Google Scholar, AYUSH Research Portal.
- **Keywords used:** “*Virya* potency,” “Ayurvedic pharmacology,” “Ayurveda active principles,” “*Ushna Virya* pharmacology,” “*Shita Virya* drug potency.”^[11]
- **Sources:** Classical Ayurvedic texts (*Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*) and commentaries.^[12]
- **Timeframe:** Biomedical literature from 2000–2024; Ayurvedic texts included without restriction.^[13]
- **Inclusion criteria:**^[14]
 - Peer-reviewed studies exploring pharmacological activities of Ayurvedic drugs.

- Studies correlating phytoconstituents with Ayurvedic *Virya* classification.
- Clinical and experimental trials investigating drug potency or bioactivity.

- **Exclusion criteria:**^[14]

- Non-peer-reviewed or anecdotal sources.
- Studies lacking pharmacological interpretation of *Virya*.

- **Study types reviewed:** Experimental pharmacology, phytochemistry, bioassay-based potency studies, and integrative review papers.

Data were synthesized thematically into Ayurvedic descriptions, phytoconstituent correlations, pharmacological mechanisms, and clinical relevance.^[15]

OBSERVATION AND RESULTS

1. Concept of *Virya* in Ayurveda

Virya is described as the energy responsible for drug action, surpassing *Rasa* (taste) and *Guna* (qualities). According to *Charaka Samhita*, *Virya* is the decisive factor in therapeutic activity. It acts quickly, producing immediate pharmacological effects such as digestion stimulation, fever reduction, or pain relief.

- ***Ushna Virya*:** Increases metabolism, promotes digestion (*Agni Deepana*), clears channels (*Srotoshodhana*), and enhances circulation.
- ***Shita Virya*:** Provides cooling, anti-inflammatory, hemostatic, and sedative actions.

2. Herb-wise Case Examples Linking *Virya* with Active Principles

- ***Piper nigrum* (Black Pepper – *Ushna Virya*):** Piperine enhances drug absorption, stimulates metabolism, and induces thermogenesis, validating *Ushna* potency.
- ***Zingiber officinale* (Ginger – *Ushna Virya*):** Gingerols promote digestive activity, reduce inflammation, and improve circulation, consistent with *Ushna* classification.
- ***Capsicum annuum* (Chili – *Ushna Virya*):** Capsaicin activates TRPV1 receptors, increasing heat generation, analgesia, and circulation.



- **Withania somnifera (Ashwagandha – Ushna Virya):** Withanolides act as adaptogens, modulate the HPA axis, and improve resilience to stress, reflecting energizing potency.
- **Mentha spp. (Mint – Shita Virya):** Menthol activates TRPM8 receptors, producing cooling, analgesic, and carminative effects.
- **Ocimum sanctum (Tulsi – Shita Virya):** Flavonoids and eugenol provide antioxidant, immunomodulatory, and anti-inflammatory effects.
- **Emblica officinalis (Amla – Shita Virya):** Polyphenols and vitamin C act as antioxidants, rejuvenators, and hepatoprotective agents.
- **Azadirachta indica (Neem – Shita Virya):** Limonoids and flavonoids demonstrate anti-inflammatory, hepatoprotective, and antimicrobial actions.

- **Triphala (Polyherbal – Predominantly Shita Virya):** Rich in tannins and polyphenols, exhibits antioxidant, anti-diabetic, and immunomodulatory activities.

3. Pharmacodynamics of Virya

- *Ushna Virya* correlates with stimulant pharmacology: thermogenesis, enhanced circulation, enzyme activation, and CNS stimulation.
- *Shita Virya* corresponds to inhibitory pharmacology: anti-inflammatory, antipyretic, analgesic, and CNS depressant actions.

4. Pharmacokinetics of Virya

- *Ushna Virya* herbs enhance absorption and metabolism (e.g., piperine as a bioenhancer).
- *Shita Virya* herbs slow metabolic processes, prolonging systemic activity.

5. Comparative Summary Table

Herb (Ayurvedic Name)	Virya	Active Principle(s)	Modern Pharmacology
Piper nigrum (Maricha)	<i>Ushna</i>	Piperine	Bioenhancer, thermogenic
Zingiber officinale (Shunthi)	<i>Ushna</i>	Gingerols	Anti-inflammatory, digestive stimulant
Capsicum annum (Mirchi)	<i>Ushna</i>	Capsaicin	TRPV1 agonist, thermogenic
Withania somnifera (Ashwagandha)	<i>Ushna</i>	Withanolides	Adaptogen, immunomodulator
Mentha spp. (Pudina)	<i>Shita</i>	Menthol	TRPM8 agonist, cooling, analgesic
Ocimum sanctum (Tulsi)	<i>Shita</i>	Eugenol, flavonoids	Antioxidant, immunomodulator
Emblica officinalis (Amla)	<i>Shita</i>	Ascorbic acid, tannins	Antioxidant, hepatoprotective
Azadirachta indica (Neem)	<i>Shita</i>	Limonoids, flavonoids	Anti-inflammatory, detoxifier
Triphala (Polyherbal)	<i>Shita</i>	Polyphenols, tannins	Antioxidant, anti-diabetic

herbs like *Amla* demonstrate sustained antioxidant activity, prolonging systemic benefits.

However, challenges exist in quantifying *Virya* within biomedical frameworks. Ayurvedic descriptions are qualitative, while modern pharmacology relies on numerical potency markers like ED50, IC50, and receptor affinity. This discrepancy highlights the need for integrative methodologies. Advances in systems biology, receptor assays, and metabolomics present tools to scientifically validate *Virya*.^[17]

Another limitation lies in the complexity of herbal formulations. Many herbs possess multiple active constituents, and their synergistic effects may represent both *Ushna* and *Shita* actions. Polyherbal

DISCUSSION

The Ayurvedic concept of *Virya* offers profound insights into pharmacological potency. Its binary classification into *Ushna* (hot) and *Shita* (cold) closely aligns with modern pharmacology's stimulant and inhibitory mechanisms. The herb-wise case examples demonstrate clear parallels: piperine as a bioenhancer validating *Ushna Virya*, and menthol's cooling effects substantiating *Shita Virya*.^[16]

Beyond pharmacodynamics, *Virya* also impacts pharmacokinetics. Piperine's enhancement of curcumin bioavailability reflects *Ushna Virya*'s role in boosting absorption. Conversely, *Shita Virya*



formulations like *Triphala* illustrate this challenge, requiring network pharmacology approaches to untangle compound–compound interactions.^[18] Looking forward, *Virya* may serve as a guiding framework for drug discovery. By correlating Ayurvedic classifications with modern potency assays, researchers can identify novel bioactive molecules. Pharmacogenomics also resonates with *Virya*, as it accounts for individual variability in drug response—similar to Ayurveda's *Prakriti* concept.^[19]

Thus, *Virya* bridges ancient wisdom with modern pharmacology, offering opportunities for personalized medicine, integrative drug discovery, and innovative therapeutic models.^[20]

CONCLUSION

Virya, the Ayurvedic concept of potency, encapsulates the inherent energy that determines drug efficacy. Classified as *Ushna* (hot) or *Shita* (cold), *Virya* corresponds strongly with modern pharmacological potency, reflecting stimulant versus inhibitory activities. Evidence from herb-specific case studies supports these correlations: *Ushna Virya* herbs such as *Piper nigrum*, *Zingiber officinale*, and *Withania somnifera* stimulate metabolism, circulation, and adaptogenic responses, while *Shita Virya* herbs including *Mentha spp.*, *Emblica officinalis*, and *Azadirachta indica* provide cooling, anti-inflammatory, and antioxidant actions. Beyond pharmacodynamics, *Virya* influences pharmacokinetics by modulating absorption and systemic retention, exemplified by piperine's bioenhancing activity. These findings highlight *Virya*'s role as a holistic determinant of drug action, integrating both effect and disposition.

Despite strong correlations, translating *Virya* into modern science remains challenging due to qualitative descriptions, multi-constituent complexity, and standardization issues. However, emerging approaches in network pharmacology, receptor-binding assays, metabolomics, and pharmacogenomics provide pathways to validate *Virya* with measurable parameters.

In conclusion, *Virya* represents not only a cornerstone of Ayurvedic pharmacology but also a potential bridge to modern pharmacological innovation. Integrating this concept into biomedical research may foster personalized therapeutics, new drug discovery, and globally relevant healthcare

models.

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