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SHUNTHI (ZINGIBER OFFICINALE): AN INTEGRATIVE REVIEW OF AYURVEDIC TRADITION AND MODERN PHARMACOLOGICAL EVIDENCE

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ABSTRACT

The dried rhizome of *Zingiber officinale* Rosc., vernacularly known as *Shunthi* or 'sonth', represents a cornerstone therapeutic agent in Ayurvedic pharmaceutical practice spanning several millennia. This medicinal herb demonstrates remarkable versatility in addressing multiple pathological conditions, including gastrointestinal disturbances, inflammatory processes, pulmonary diseases, and disorders of metabolism. The underground stem harbors an extensive spectrum of pharmacologically active chemical constituents—notably gingerols, shogaols, paradols, and zingerone—each contributing distinct antioxidative, inflammation-modulating, antimicrobial, antiemetic, and antineoplastic capabilities. Evidence from both experimental animal models and human clinical investigations substantiates its therapeutic utility in conditions including arthritic joint degeneration, emesis, metabolic dysregulation, glycemic disorders, and malignant transformations. The compound's extensive pharmacological spectrum, coupled with its excellent tolerability profile and adaptability to diverse pharmaceutical formulations, has positioned it as a valuable entity bridging traditional ethnomedicine and contemporary evidence-based therapeutics. The present comprehensive review synthesizes information regarding the ethnopharmacological heritage, biochemical composition, mechanistic pathways of action, and evidence- based therapeutic applications of *Zingiber officinale*. Particular attention is directed toward integrating classical Ayurvedic knowledge with contemporary scientific validation, thereby providing a holistic understanding of its medicinal

value, inherent limitations, and prospective avenues for continued investigation and clinical implementation.

KEYWORDS: This medicinal herb demonstrates remarkable versatility in addressing multiple pathological conditions, including gastrointestinal disturbances, inflammatory processes, pulmonary diseases, and disorders of metabolism.

INTRODUCTION

Zingiber officinale Roscoe stands as a distinguished therapeutic botanical entity whose medicinal applications extend across geographical boundaries and cultural frameworks throughout recorded history. Within the framework of traditional Indian medicine systems—most notably Ayurveda—this rhizomatous plant occupies a position of prominence, traditionally employed to harmonize the tridoshic constitutional elements (Vata, Pitta, and Kapha) while simultaneously serving as an agent promoting digestive function, preventing nausea, and mitigating inflammatory responses. The Sanskrit nomenclature Śuṇṭhī underscores its distinguished status within Ayurvedic materia medica, where practitioners value it both as a culinary adjunct and as a powerful medicinal substance applicable across numerous disease categories.

Extending beyond its historical applications, *Zingiber officinale* has progressively entered the realm of contemporary biomedical research, where its chemical constituents and biological mechanisms undergo rigorous scientific scrutiny. The rhizomatous portion contains an intricate assemblage of bioactive chemical entities, particularly phenolic derivatives including gingerols, shogaols, paradols, and zingerone, which collectively account for the observed therapeutic properties. These phytochemicals demonstrate diverse physiological activities encompassing oxidative stress mitigation, inflammatory cascade modulation, microbial growth inhibition, neoplastic cell suppression, and neural tissue protection.

AIM AND OBJECTIVE

To comprehensively examine both classical Ayurvedic attributes and contemporary pharmacological characteristics of Shunthi.

Vernacular names[3]

Sanskrit: *Ausadha, Muhausadha, Nagara, Vishvabhesaja, Shringavera, Vishva, Vishvausadha*

Assamese*: Adasuth, Aadar Shuth.*

Bengali: *Suntha, Sunthi*

English: Ginger root, Ginger

Gujrati*: Sunth, Sundh, Suntha*

Hindi: *Sonth*

Kannada: *Shunthi*

Kashmiri*: Shonth*

Malayalam: *Chukku*

Marathi: *Sunth*

Oriya: *Sunthi*

Punjabi: *Sund*

Tamil: *Sukku, Chukku*

Telugu: *Sonthi, Sunti*

Urdu: *Sonth, Zanjabeel*

Synonyms[4]

Shunthi : It is a dry product

Nagar : Best medicine and its commercial business at "Nagar"

Mahaushadha : Excellent herb and medicine

Vishvabheshaja : Useful in many medicines

Shrungaver : Rhizomes stimulates horn shape

Botanical name: Zingiber officinale Rosc.

Family: Zingiberaceae

Taxonomical classification

Kingdom : Plantae

Division : Tracheophyta

Class : Liliopsida

Order : Zingiberales

Family : Zingiberaceae

Genus : Zingiber Mill

Species : Officinale

Morphology

a) Macroscopic: The rhizome exhibits lateral compression with characteristic short,

flattened, ovate, obliquely oriented branches positioned on the superior surface, each terminating in a depressed scar. Individual pieces measure approximately 5-15 cm in length, 1.5-6.5 cm in width (commonly 3-4 cm), and 1-1.5 cm in thickness. External coloration appears buff with visible longitudinal striations and sporadic loose fiber elements. Fracture pattern is short and smooth. Cross-sectional examination reveals a narrow cortical region (approximately one-third of the radius), a distinct endodermal layer, and an extensive stele containing numerous dispersed fibrovascular bundles alongside yellow secretory cells. The specimen possesses a pleasant aromatic odor and a characteristically pungent taste.

b) Microscopic: Transverse sectioning of the rhizome reveals a cortex composed of isodiametric thin-walled parenchymatous tissue interspersed with vascular strands and numerous isodiametric idioblasts measuring approximately 40-80 µm in diameter, containing yellowish to reddish-brown oleoresinous material. The endodermis demonstrates slight wall thickening and is devoid of starch deposits. Immediately internal to the endodermis appears a nearly continuous row of approximately 138 collateral bundles typically lacking fiber elements. The stele consists of thin-walled parenchyma cells organized radially surrounding numerous scattered collateral vascular bundles. Each bundle comprises several unlignified reticulate or spiral vessels measuring up to approximately 70 µm in diameter, phloem cell aggregates, and unlignified thin-walled septate fibers measuring up to approximately 30 µm in width and 600 µm in length with small oblique slit-like pitting. Numerous scattered idioblasts morphologically similar to cortical idioblasts are associated with vascular bundles. Additional idioblasts measuring approximately 8-20 µm in width and up to 130 µm in length containing dark reddish-brown contents appear either individually or in axial rows adjacent to vessels.

Parenchymatous tissue of both cortex and stele contains densely packed flattened rectangular to ovate starch grains predominantly measuring 5-15 µm to 30-60 µm in length, approximately 25 µm in width, and 7 µm in thickness, characterized by five transverse striations.

Classification according to nighantu and samhitas

Sr. No.		
1	Bhava Prakash Ni5.	*Haritakyadivarga*
2	Madanapala Ni6.	*Shunthyadivarga*

3	Dhanvantari Ni7.	*Shatapushpadivarga, Mishrakavarga*
4	Shodhala Ni8.	*Shatapushpadivarga , Mishrakavarga*
5	Kaiyadeva Ni9.	*Aushadhi, Kritanna, Mishrakavarga*
6	Raja Ni10.	*Pippalyadivarga, Mishrakadivarga*
7	Priya Ni11.	*Sunthyadi varga*
8	Nighantu Adarsh12	*Pippalyadi varga, Arkadi varga*
9	Shaligram Ni13.	*Harityakadi varga*
10	Charaka Samhita14	*Triptighna Varga, Arshoghna Varga, Dipaniya Varga, Shulaprashamana Varga, Shitaprashamana Varga, Trishnanigrahana Varga*
11	Sushruta15	*Pippalyadigana, Trikatu*
12	Vagbhata16	*Pippalyadi varga*

Rasapanchaka[17]

Properties	
Rasa	*Katu*
Guna	*Guru, Tikshna*
Virya	*Ushna*
Vipaka	*Madhur*

Dose[18]

Churna : 1 – 2 gram

Decoction : 10 – 20 gram

Part Used : *Kanda* (Rizome)

Therapeutic Indications[19]

Vatavyadhi, Arshas, Atisara, Shula, Grahani, Agnimandya, Udara rogas, Kasa, Hikka, swasa, Ashmari, Hrudroga.

Phytoconstituents[20]

Aromatic oil (1-2%), Starch (40-60%), Fat (10%), Fibre (5%), Camphene, Phellandrene, Zingiberine, Cineol, Borneol, Gingerol, Gingerin(Oleo-resin)

Distribution- Cultivated almost throughout India. Cultivated throughout the sub-Himalayan tracts of Uttar Pradesh, Deccan, Karnataka, Kerala and Bihar. Occasionally it is cultivated in Orissa, Madhya Pradesh and West Bengal.

Therapeutic Administration[21,22]

1. *Shotha – Shunthi* and Jaggery compumption in equal quantity with *punarnava kashaya* is used
2. *Parinama Shula – Shunthi* paste, *Tila, Guda* consumption with milk is used
3. *Visuchika - Kwatha* prepared from *Shunthi* and *Bilwa* is used
4. *Agnimandya – Churna* of *Shunthi* and *Haritaki* in equal quantity is used
5. *Shira Shula – Nasya* of *Guda* and *Shunthi kalka* is used
6. *Jirna Sandhivata – Phanta* of *shunthi* is beneficial
7. *Vatanadishula , Dantashula – Lepa* of *shunthi* soaked in *ushna jala*
8. *Arsha, Atisara, Gulma – Guda* with *shunthi* is helpful.

Ayurvedic medicinal properties

Snigdha, Agnidiapaka, Shukravardhaka, Vata-kapha shamaka, Hridya[23], *Pachakagnidipaka, Laghu*[24] *Swarabhanga*[25], *Vibandhahar*[26,27]

DISCUSSION

Contemporary understanding of *Zingiber officinale*'s pharmacological properties has undergone substantial transformation, progressing from empirical traditional applications toward systematically documented scientific evidence, though complete elucidation of its therapeutic potential remains incomplete. The transition of this botanical agent from its conventional roles as both culinary ingredient and traditional remedy into a scientifically substantiated phytopharmaceutical demonstrates that its biological efficacy stems not from isolated chemical constituents or singular mechanistic pathways. Instead, it manifests characteristics resembling polyherbal pharmaceutical complexity concentrated within a single plant species—delivering coordinated multi-target therapeutic interventions analogous to combination pharmaceutical strategies pursued in contemporary drug development.

Among the most noteworthy characteristics of this rhizome's pharmacological repertoire is its capacity to modulate numerous biological pathways concurrently. The anti- inflammatory mechanisms, for instance, extend substantially beyond simple cyclooxygenase enzyme inhibition, incorporating suppression of nuclear transcription factor activity, regulation of pro-inflammatory cytokine secretion, and enhancement of endogenous antioxidant defense mechanisms. This multi-pathway modulation renders the substance particularly advantageous for managing pathologically complex conditions including metabolic syndrome, persistent inflammatory disorders, and neoplastic diseases—clinical scenarios where single-target

pharmaceutical interventions frequently demonstrate limited effectiveness.

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