

Research Article

Shunthi (*Zingiber officinale* Rosc.): A Miraculous Medicinal Plant

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A B S T R A C T

Shunthi (*Zingiber officinale* Rosc.) is medicinal plant widely used in Ayurvedic formulations, since antiquity, for a number of diseases such as Agnimandya, Amavata, Grahani, Arsha, VibandhaJvara etc. Also, it has been using in Indian foods as a spice since ages thus it acquires both nutritional and medicinal importance, termed to be a nutraceutical plant. Ayurvedic classics explained various factors regarding Shunthi such as synonyms of identification, Rasa panchaka, Karma, therapeutic uses, dose and contraindications. It possesses Katu rasa, Laghu Snigdha guna, Ushnaviryaya, Madhura Vipaka and Kaphavatahara karma. Presently there is renewed interest in ginger aimed at identification and isolation of its chemical constituents, scientific validation of its pharmacological actions on various systems. This article aimed at exploring shunthi in ayurvedic literature and validating through recent investigations. Current researches on ginger confirms its action in several diseases acting as Radical scavenging and Antioxidant, Anti-arthritis, Anti-inflammatory and Analgesic, Anti-microbial, Anti-bacterial, cardiogenic, digestive stimulant and sialagogue, Glucose, cholesterol and lipid lowering agent. Researches provide an example to explain the action of ayurvedic medicine (shunthi) in terms of conventional biochemistry and pharmacology.

Keywords: Shunthi (*Zingiber officinale* Rosc.), Chemical

Introduction

Nutraceuticals is defined as a substance which can be considered a food or its part which, in addition to its normal nutritional value provides health benefits including

prevention of disease or promotion of health. It is the link between food and health.¹ Every plant in the universe possesses medicinal properties likewise spices used in Indian foods acquire functional components to benefit

the body in therapeutic ways. *Shunthi* is one among them possessing both nutritive and pharmacological properties, hence regarded as nutraceutical. Concept of current trends regarding nutraceuticals dated back to *samhita* in *Ayurveda*. There is concept of class of corns or monocotyledons (*Shukadhanyavarga*), pulses (*Shamidhanyavarga*), fleshes (*Mamsavarga*), vegetables (*Shakavarga*), fruits (*Phalavarga*), greens (*Haritavarga*) etc in the context of *Annapanavidhiadhyaya* of *Charakasamhita* where acharya dealt medicinal use along with properties of various monocotyledons, dicotyledons, fruits, spices, milk & milk products, meat, green vegetables and tubers. Above reference validate the nutraceutical concept back to ancestral period who were used food as medicine too. *Shringavera/ Ardraka* is the fresh Ginger explained in *Haritavarga* (class of greens) as a food product beside its use in various ayurvedic formulations by *Charaka*.²

Zingiber officinale Rosc. derived its name from *Shringaber* (*Zingiber*) and Sold in shops or used as medicine (*officinale*). It is a perennial herb, stout tuberous rhizome with erect leafy stems 0.6 to 1.2 m. high. Leaves narrow, distichous, subsessile on the sheaths, linear-lanceolate, 1-2 cm. wide, glabrous. Flowers greenish with a small dark purple or purplish black lip, in radical spikes 3.8-7.5 cm. long and 2.5 cm. diam. On peduncles 15-30 cm. long. Stamen dark purple, as long as the lip, rather shorter than the corolla. It is cultivated throughout the Sub-Himalayan tracts of Uttar Pradesh, occasionally cultivated in Bihar and Orissa, West Bengal, Himachal Pradesh, Madhya Pradesh, Gujarat, Deccan, Karnataka and Kerala and run wild in some places in Western Ghats.³

Table 1, represents synonyms of *Shunthi* based on various factors which help in identifying the plant, revealing morphology, validate the actions and use of the drug.⁴

Taxonomical Classification:¹⁷

Kingdom	: Plantae
Division	: Tracheophyta
Class	: Liliopsida
Order	: Zingiberales
Family	: Zingiberaceae
Genus	: Zingiber Mill
Species	: Officinale

Curing of Ginger

Ginger is marketed both in the peeled and in the unpeeled condition. In scraped (peeled) Ginger the epidermal layer of the rhizome is scraped off with the help of a sharpened bamboo-splinter and then washed in water and dried in the sunlight for 7-10 days.

Table 1.Synonyms

S. No.	Name	Synonym as feature for identification
1.	<i>Shunthi</i>	Subsides <i>Kapha</i> and <i>Vatadosha</i> , dries away <i>Kapha</i> and <i>Ama</i> and itself is dried product, hence the name <i>Shunthi</i>
2.	<i>Nagara</i>	Commercial drug commonly available in shops
3.	<i>Avakchatra</i>	Leaves spread out like Umbrella
5.	<i>Ahicchatraka</i>	Flowers are in radical spikes on long peduncles like serpents hood
6.	<i>Shringavera</i>	Rhizome simulates horn shape
7.	<i>Katubhadra</i>	One of the best <i>Katudravya</i>
8.	<i>Utkatam</i>	Rhizome is <i>tikshna</i>
9.	<i>Ushanam</i>	It causes burning sensation
10.	<i>Mahaushada</i>	It is very efficacious drug because of its robust actions
11.	<i>Vishva-bheshajam</i>	Commonly used by public because of its quality and easy availability
12.	<i>Vishva</i>	Quickly enters circulation because of its vigorous potency

Table 2.Classification of *Dravya*

S. No.	<i>Samhita/ Nighantu</i>	<i>Gana/ Varga</i>
1.	<i>Charaka</i>	<i>Triptighna Varga, Arshoghna Varga, Dipaniya Varga, Shulaprashamana Varga, Shitaprashamana Varga, Trishnanigrahana Varga</i>
2.	<i>Sushruta</i>	<i>Pippalyadigana, Trikatu</i>
3.	<i>Saushruta Ni. Asthanga Ni</i>	<i>Pippalyadigana</i>
4.	<i>Dhanvantari Ni. Shodhala Ni</i>	<i>Shatapushpadivarga, Mishrakavarga</i>
5.	<i>Abhidhana Ratnamala</i>	<i>Katuskandha</i>
6.	<i>Madanapala Ni.</i>	<i>Shunthyadivarga</i>
7.	<i>Saraswati Ni.</i>	<i>Chandanadivarga</i>
8.	<i>Kaiyadeva Ni.</i>	<i>Aushadhi, Kritanna and Mishrakavarga</i>
9.	<i>Bhava Prakash</i>	<i>Haritakyadivarga</i>
10.	<i>Raja Ni.</i>	<i>Pippalyadivarga, Mishrakadivarga</i>

Chemical Composition:¹⁸

Constituents Present In Major Amount are:

- Oleoresin (~5.3-8.6%) comprising of nonvolatile pungent principles (gingerols), non-pungent substances (fats and waxes) and volatile oils
- Volatile oil (~1.5-2.2%) containing sesquiterpene hydrocarbons viz. α -zingiberene, β -sesquiphellandrene and ar-curcumene
- Lipids (~6-8%)
- Proteins (~10%)
- Starch (~40-60%)

Constituents Present In Minor Amount are:

Numerous Monoterpene and Sesquiterpene hydrocarbons and their oxygenated derivatives in volatile oil, other pungent principles viz. Shogaols, Paradols, Gingerdiols, Gingerdiacetates, Gingerdiones, 6-gingersulfonic acid, Gingerenones and a number of Diarylheptanoids, Diterpenes, Gingerglycolipids A, B & C.

Rasa panchaka (Ayurvedic pharmacology)¹⁹

Rasa - Katu

Guna - Laghu, Snigdha

Virya - Ushna

Vipaka - Madhura

Doshakarma - Kaphavatahara (Vatahara because of Ushnavirya and Madhura vipaka. Kaphaharabeacause of Ushnavirya and Katu Rasa)

Karma (Actions)

Ardraka: Dipana, Pachana, Bhedana, Rocana, Vrishya, Swarya, Vibandahara, Shulahara, Jihwa Shodhaka, Kanthashodhaka.

Shunthi: Dipana, Pachana, Vrishya, Swarya, Kasahara Shwasahara, Shulahara, Grahi.

Ruchya, Hridya, Vibandahara.

Therapeutic Indications

Aruchi: Keeping Luke warm ginger juice and rock salt in mouth is beneficial in Aruchi.²⁰

Agnimandya: Consuming a piece of fresh ginger with a pinch of salt before having food is very useful in increasing depleted digestive power.²¹

Arshas: Kwatha of Ardraka and Kulattha (*Dolichos biflorus*) is beneficial in Kaphaja Arsha.²²

Shitapitta: Consuming Ardrakaswarasa with Purana guda (old Jaggery) is useful in Shitapitta (Urticaria) and Agnimandya.²³

Parinama shola: Paste of Shunthi, Tila (*Seasamum indicum*)

and Guda (Jaggery), when consumed with milk is beneficial in Parinama Shula and Amavata (Rheumatoid arthritis).²⁴

Shotha: Consuming equal quantity of Shunthi and jaggery with Punarnava (*Boerhaviadiffusa*) Kashaya (Decoction) is beneficial in Shotha.²⁵

Shirashoola: Nasya of Guda (Jaggery) and Shunthikalkais beneficial in Shirashula (Headache).²⁶

Visuchika: Kwatha (Decoction) prepared from Shunthi and Bilva (*Aegle marmelos*) is useful in Visuchikaand Chardi (Vomitting).²⁷

Matra (Dose)¹⁹

Swarasa (Juice): 3-10WW ml

Churna (Powder): 750 mg-1.5 g

Contraindications²⁸

Fresh ginger is contraindicated in Kushtha, Pandu, Mutrakrichhra, Raktapitta, Vrana, Jwara, Daha, Greeshma and Sharad Ritu.

Current Researches

Radical scavenging and Antioxidant activity: Ginger extract shows presence of high polyphenols manifesting good radical scavenging of DPPH and decreased its reducing capacity. It exhibits Anti-oxidant activity by inhibiting lipid peroxidation at the stage of formation of secondary products of the auto-oxidation of fats. Hence, the extract can be used as an antioxidant at earlier stage of fat oxidation. The polyphenols in the CO₂ extract of ginger shows inhibiting effect on hydroxyl radicals(inducers of lipid peroxidation) because of its higher chelatoforming capacity.²⁹

Anti-arthritis activity: Eugenol from Ginger suppressed joint and paw swelling in rats with mycobacterial arthritis. The anti-arthritis and anti-inflammatory effects could be due to inhibition of oxygen free radicals and prostaglandin release.³⁰ Srivastava et al., carried out trial on RA patients suggesting the ameliorative effect of ginger consumption in arthritis and musculoskeletal disorders is due to inhibition of cyclooxygenase and lipoxigenase pathways, and may act by inhibiting PGE2 and leukotriene B4 synthesis.³¹ 6-Gingerol, 8-Gingerol and 10-Gingerol acts as strong DPPH, super oxide and hydroxyl radical scavenging agents, among them 8-Gingerol showed highest interaction with RA targets of COX-II, TNF- α , MCSF, IL-1 β and MMP9.³² Z. officinale injected intraperitoneally can effectively and dose-dependently ameliorate clinical scores, disease incidence, joint temperature and swelling, and cartilage destruction in rats with collagen-induced arthritis. It also suppressed the overproduction of pro-inflammatory cytokines consistent with joint inflammation and reduced the production of arthritogenic antibodies in serum of arthritic rats. The extract might lower autoantibody production in RA.³³

Extract of Ginger helps in inflammation due to arthritis by suppressing pro-inflammatory cytokines and chemokines produced by synoviocytes, chondrocytes, and leukocytes.³⁴

Anti-inflammatory and Analgesic effect: Study on ginger essential oil demonstrated its inhibitory actions on leukocyte-endothelial cell interactions. Also ginger essential oil inhibits leukocytes chemotaxis *in vitro* and leukocytes migration *in vivo* could be due to inhibition of prostaglandin release.³⁵ Gingerols actively inhibit both prostaglandins and leukotrienes in RBL-1 cells.³⁶ They are potent inhibitors of COX-1 and COX-2 acting as non-selective COX inhibitors. Non-selective NSAIDs are known for their gastrointestinal and renal side effects but ginger is useful in gastrointestinal disorders.³⁷ It has been shown that ginger is effective against cytokines synthesized and secreted at sites of inflammation.³⁸ The analgesic and anti-inflammatory effect of ginger ethanolic extract could be due to [6]-gingerol constituent.³⁹ It has been speculated that the anti-inflammatory effects are due to the inhibition of inflammatory mediators such as serotonin, kinins, eicosanoids and other cytokines involved in the process of inflammation.⁴⁰ Ginger extract shows analgesic activity in mice by inhibiting acetic acid induced writhing.⁴¹ Ginger for 5 days with a dose of 500 mg thrice a day reduced intensity and duration of pain in primary dysmenorrhoea students probably due to the prostaglandin synthesis inhibition.⁴²

Anti-microbial activity: ginger essential oil and oleoresins contain considerable number of phenolic compounds such as eugenol, shogaols, zingerone, gingerdiols, gingerols, etc. which are responsible for its anti-microbial activity against *F. moniliforme*, *Aspergillus species*.⁴³ Several studies confirm its action against *E. coli*, *Proteus species*, *Staphylococci*, *Streptococci* and *Salmonella*.⁴⁴

Glucose, cholesterol and lipid lowering effects: Juice of ginger decreased blood glucose level in streptozotocin induced diabetic rats possibly due to involvement 5-HT receptors. It may consist of 5-HT receptor antagonists. Besides it also decreases serum cholesterol, serum triglyceride and blood pressure in diabetic rats.⁴⁵ It significantly reduced serum total cholesterol, LDL, VLDL, triglycerides and phospholipids, atherosclerotic lesions and effectively raised serum HDL in diabetes, apolipoprotein E gene deficient and high lipid diet fed animals. Ginger acting on cholesterol decreased its biosynthesis by acting on liver and stimulated its conversion into bile acids, also increased cholesterol faecal excretion.⁴⁶⁻⁴⁸ Ethanolic ginger extract given in cholesterol fed rabbits for 70 days showed less marked hyperlipidaemia and comparatively lower grades of atherosclerosis in the aorta compared to control group for which cholesterol fed alone.⁴⁹

Cardiotonic activity: Methanolic extract of ginger rhizome exhibited dose dependant positive inotropic activity

on guinea pig isolated atria. The identified cardiotonic constituents of ginger are,⁶⁻¹⁰ gingerols.⁵⁰

Anti-platelet effect: Ginger significantly inhibit AA-induced platelet aggregation, COX-derived thromboxanes and prostaglandins and prostacyclin synthesis and increases fibrinolytic activity, *in-vitro* and in animal models.^{46,51-54}

Among healthy individuals and coronary artery disease patients who ate high fat meals ginger significantly reduced platelet aggregation with different doses.⁵¹

Anti-bacterial activity: Hexane, ethyl acetate & Soxhlet extracts of ginger shows anti-bacterial activity against *colliform bacillus*, *staphylococcus epidermidis* and *streptococcus viridians* dose dependently.⁵⁵ Ginger extract shows inhibition of bacterial growth (extracted from the throat/ nostril swabs of patient) such as *Staphylococcus aureus*, *Streptococcus pyogenes*, *Streptococcus pneumoniae* and *Haemophilus influenzae*.⁵⁶

Effect on Gastro intestinal tract: It acts as digestive stimulant and sialagogue. It is used in many ayurvedic formulations to cure digestive disorders. The mechanism of action as digestive stimulant is best understood by animal studies below. It stimulates bile acid production in the liver and its secretion in the bile duct.⁵⁷ Also, it significantly provokes the activity of various digestive enzymes such as pancreatic lipase, amylase and proteases like trypsin, chymotrypsin and carboxy peptidase.⁵⁸ Acting on small intestinal mucosa it stimulates terminal digestive enzymes.⁵⁹ By increasing the secretion of bile salts and activity of pancreatic lipase it improves digestion and absorption of dietary fat in high fat fed animal.⁶⁰ A study conducted in rats suggests reduction of food transit time in the gastro intestinal tract.⁶¹ It is evidenced that ginger alters fluidity and permeability of the intestinal brush border membrane with increased microvilli length and perimeter resulting in broader area for absorption.

Conclusion

Zingiber officinale is natural nutraceutical spice, used in food and medicine. On complete scrutiny of all the literature it can be summarized that Shunthi acquires *Katu rasa*, *Laghu Snigdha guna*, *Ushnavirya*, *Madhura Vipaka* and *Kaphavatahara karma*. Hence it acts as *Vrishya*, *Svarya*, *Ruchya*, *Grahi*, *Vibandha Bhedini* and indicated in *Amavata*, *Vami*, *Shwasa*, *kasa*, *Hridamaya*, *Slipada*, *Shotha*, *Arsha*, *Anaha*, *Udara maruta* and *Vibandha*. Current researches provide an example of how it may be possible to explain the action of ayurvedic medicine (shunthi) in terms of conventional biochemistry and pharmacology. Ginger and its constituents show strong antioxidant potential. Many metabolic disorders and age-related diseases are associated with oxidative stress, use of ginger either in food or as medicine combat or delay the associated

oxidative stress. Studies confirm its digestive stimulant and sialagogue action so that one can use it along with food to sustain digestive process. Because of its anti-microbial effect, it keeps gut healthy. As it possesses glucose and cholesterol lowering effect it is indicated to diabetic as well as cardiac patients. Further it also dominates as a best anti-inflammatory, analgesic and anti-platelet drug. Further clinical trials are necessary to find pharmacodynamics and kinetics of ginger. However, double blind studies are difficult to carry out, as odour and taste of ginger is pronounced.

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