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ADRAKA (*ZINGIBER OFFICINALE* ROSE.) A MULTIDIMENSIONAL DRUG IN AYURVEDA– A REVIEW

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ABSTRACT

Adraka is said as best wholesome rhizome in *Charaka Samhita*. *Adraka* has botanical name as Zingiber officinale Rose. and belongs to Zingiberaceae family, in English it is called as Zinger. *Sunthi* is processed and dried rhizome of *Zingiber officinale Rose.* Zinger is very commonly used spice in every home in India. *Adraka* is having *Katu Rasa* (pungent teste), *Guru*(heaviness), *Ruksha*(dryness), *Tikshna*(penetrating) *Guna* and *Ushna Veerya*(hot potency). It is commonly used home remedy in different conditions like cough, cold, indigestion etc. It's useful part is rhizome. It acts as *Ruchikar*(appetizer), *Amapachaka*(digestive), *Vrishya*(aphrodisiac), *Swarya*(beneficial for throat) and useful in *Vibandha*(constipation), *Chhardi*(vomiting), *Shwasa*(dyspnoea), *Shoola*(pain), *Kasa*(cough), *Anaha*(abdominal distension), *Shopha*(inflammation), *Arsha*(piles). It has having Anti-oxidant, anti-inflammatory, cytotoxic, antidiabetic, anti-microbial, cardioprotective, anti-nausea and anti-emetic activity.

Key Words: *Zinger, Zingiber officinale,* Aphrodisiac, Cardio-protective, Anti-inflammatory

INTRODUCTION: *Adraka* is quoated as *best* wholesome rhizome (*kanda*) in *Charaka Samhita*[1]. *Adraka* has Botanical name as *Zingiber officinale Rose.* and belongs to *Zingiberaceae* family, in English it is called as Zinger[2]. *Sunthi* is processed and dried rhizome of *Zingiber officinale Rose. Zinger* is prevalent in India and has significant medicinal use as an appetizer, digestive, anti-emetic, and anti-inflammatory, aphrodisiac. Moreover it has extensively used in Ayurveda for digestion of *Ama* (undigested *Ahararasa*), Cough, Inflammation, Piles[3].The Rhizome of *Zingiber officinale Rose.* is one of the constituent of famous *Ayurvedic* preparations like *Trikatu, Chaturushana, Panchakola, Shadushana* which is useful in case of Indigestion, loss of appetite, cold and cough, obesity etc. In Traditional medicine, it is used in Fever, Bronchial asthma, indigestion, diarrhea, Anorexia, Plies, Oedema, *Vatavyadhi* (neuromuscular disorders), Urticaria. *Sunthi* is useful in *Grahani rog* (IBS), *Amlapitta*(hyperacidity), *Gulma* (Abdominal tumor), *Amavata*(Rheumatoid arthritis), *Stanyadushti* (vitiated milk), *Shlipada*(Elephantitis), *Kshatakshina, Kamala*(Jaundice), *Visuchika* (Cholera), *Vrishchikadamsha*(Scorpion bite)[4].

MATERIAL & METHOD:

Ayurvedic literature was collected from all Samhitas, commentaries and Nighantus. Modern literature was collected from Modern books, journals and internet. All information was collected, analyzed and interpreted.

OBSERVATION & RESULT:

Table no.1- Scientific classification

Kingdom- Plantae
Clade- Traceophytes
Clade- Angiosperms
Clade- Mnocots-
Clade- Commelineids
Order- Zingiberales
Familly- Zingiberaceae
Genus- Zingiber
Species- Z. officinalis

Table no. 2: Ayurvedic Classification of *Adraka/Sunthi*

Sr.No	Text	Classification
1.	*Charaka samhita*	*Triptighna Mahakashaya, Arshoghna Mahakashaya, Deepaniya Mahakashaya, Shoolaprashamana Mahakashaya, Trishnanigrahana*
2.	*Sushruta samhita*	*Pippalyadi gana, Trikatu*
3.	*Ashtanga sangraha*	*Deepaniya mahakashaya, Triptighna mahakashaya, Arshoghna mahakashaya, Stanyashudhikar mahakashaya, Trishnanigrahana mahakashaya, Shitaprashamana mahakashaya, Shoolaprashamana mahakashaya, Pippalyadi gana*
4.	*Dhanvantari Nighantu*	*Shatapushpadi varga*
5.	*Shodhala Nighantu*	*Shatapushpadi varga*
6.	*Madanpala Nighantu*	*Shunthyadi varga*
7.	*Kaiyadeva Nighantu*	*Aushadhi varga*
8.	*Bhavaprakasha Nighantu*	*Haritakyadi varga*
9.	*Raj Nighantu*	*Pippalyadi varga*
10.	*Priya Nighantu*	*Pippalyadi varga*
11.	*Nighantu Adarsha*	*Adrakadi varga*

Synonyms with Interpretation:

1. *Sunthi*- As used in dry form
2. *Nagara*- As sold in markets in cities
3. *Mahaushadha*- as best medicine
4. *Vishvabhaishaja*- As used in many diseases
5. *Ushana*- having hot potency
6. *Katubhadra*- having Pungent taste, but still useful in many conditions
7. *Shringavera*- As rhizome looks like horns.
8. *Adraka*- As used in fresh conditions

Rasapanchaka (Attributes)-

Guna(properties)- *Sunthi* - *Laghu, Snigdha,*
Adraka- Guru, Ruksha, Tikshna
Rasa(taste)- *Katu*

Vipaka(post digestive changes)- *Sunthi-Madhura, Adraka- Katu*
Veerya(potency)- *Ushna*
Doshghnata (Action on Humurs)- *Vatakaphashamaka*
Karma (Pharmacological Actions)- *Ruchikara, Pachana, Vibandhanut, Vrishya, Swarya*
Rogaghnata (Diseases specific action/ uses)- *Amavata, Vibandha, Chhardi, Shwasa, Shoola, Kasa, Hridamaya*(heart diseases), *Shlipada*(Elephantitis), *Shopha, Arsha, Anaha, Vatavyadhi*
Contraindications- *Kushtha*(Skin diseases), *Pandu*(anemia), *Mutrakrichha*(dysuria), *Raktapitta*(epistataxis), *Vrana*(wound),, *Jwara, Daha*(burning sensation), *Grishma*(summer) and *Sharada ritu*[5]
Dose 1-3gms/day

Distribution- Hot and humid region Kerala, West Bangal, Odisha, Karnataka, Madhyapradesh and rest of India

Parts Used: Rhizome

Bioactive Components of Ginger

Ginger is abundant in active constituents, such as phenolic and terpene compounds[6]. The phenolic compounds in ginger are mainly gingerols, shogaols, and paradols. In fresh ginger, gingerols are the major polyphenols, such as 6-gingerol, 8-gingerol, and 10-gingerol. With heat treatment or long-time storage, gingerols can be transformed into corresponding shogaols. After hydrogenation, shogaols can be transformed into paradols[7]. There are also many other phenolic compounds in ginger, such as quercetin, zingerone, gingerenone-A, and 6-dehydrogingerdione[8], [9]. Moreover, there are several terpene components in ginger, such as β-bisabolene, α-curcumene, zingiberene, α-farnesene, and β-sesquiphellandrene, which are considered to be the main constituents of ginger essential oils [10]. Besides these, polysaccharides, lipids, organic acids, and raw fibers, Vit.B, Vit.C, Vit.D, Iron, Calcium, Magnesium, Cobalamine are also present in ginger[6,11].

Formulation and Preparations: *Trikatu churna, Panchakola churna, Panchasama churna, Samasharkara churna, Trisama churna, Rasnadi kwath, Saubhagya sunthi paka*

Modern studies to prove Ayurvedic properties-

1. Antioxidant Activity

Several studies have found that ginger also has high antioxidant activity[8, 12]. A fraction of the dried ginger powder abundant in polyphenols showed high antioxidant activity based on data from FRAP, oxygen radical absorbance capacity, and cellular antioxidant activity assays[13]. An ethanolic extract of ginger showed high Trolox-equivalent antioxidant capacity and ferric-reducing ability, and an aqueous extract of ginger exhibited strong free radical scavenging activity and chelating ability[11].

2. Anti-Inflammatory Activity

Ginger and its active constituents possessed anti-inflammatory activity, which could protect against inflammation-related diseases such as colitis[14]. The anti-inflammatory effects were mainly related to phoshatidylinositol-3-kinase (PI3K), protein kinase B (Akt), and the nuclear factor kappa light chain-enhancer of activated B cells (NF-κB). In addition, 6-shogaol showed protective effects against tumor necrosis factor α (TNF-α)-induced intestinal barrier dysfunction in human intestinal cell models. It also prevented the up regulation of Claudin-2 and the disassembly of Claudin-1 via the suppression of signaling pathways involved with PI3K/Akt and NF-κB[15].

3. Antimicrobial Activity

Biofilm formation is an important part of infection and antimicrobial resistance. One result found that ginger inhibited the growth of a multidrug-resistant strain of *Pseudomonas aeruginosa* by affecting membrane integrity and inhibiting biofilm formation [16]. In addition, treatment with ginger extract blocked biofilm formation via a reduction in the level of bis-(3′-5′)-cyclic dimeric guanosine monophosphate (c-di-GMP) in *Pseudomonas aeruginosa* PA14 [17]. Moreover, a crude extract and methanolic fraction of ginger inhibited biofilm formation, glucan synthesis, and the adherence of *Streptococcus mutans* by downregulating virulence genes. Consistent with the in vitro study, a reduction in caries development caused by *Streptococcus mutans* was found in a treated group of rats[18]. Furthermore, an in vitro study revealed that gingerenone-A and 6-shogaol exhibited an inhibitory effect on *Staphylococcus aureus* by inhibiting the activity of 6-hydroxymethyl-7, 8-dihydropterin pyrophosphokinase in the pathogen[19].

4. Cytotoxic Activity

Several investigations have demonstrated that ginger and its bioactive compounds can interfere with the carcinogenic processes of colorectal cancer. It was observed in an in vitro study that a fraction rich in the polyphenols of dried ginger powder suppressed the proliferation of colorectal cancer cells and gastric adenocarcinoma cells[13]. Besides, treatment with ginger extract promoted apoptosis by decreasing the expression of genes involved with the Ras/extracellular signal-regulated kinase (ERK) and PI3K/Akt pathways, such as the v-Ki-ras2 Kirsten rat sarcoma viral oncogene homolog (*KRAS*), *ERK*, *Akt*, and B-cell lymphoma-extralarge (*Bcl-xL*). It also increased the expression of caspase 9, which promoted apoptosis in HT-29 colorectal cancer cells [20]. In rats with 1,2-dimethylhydrazine-induced colon cancer, ginger extract loading with coated alginate beads increased the activities of NADH dehydrogenase and succinate dehydrogenase[21].

5. Neuroprotective Activity

Recently, many investigations have revealed that ginger positively affects memory function and exhibits anti-neuroinflammatory activity, which might contribute to the management and prevention of neurodegenerative diseases[22],[23].

6. Cardiovascular Protective Activity

Ginger extract reduced the body weight of rats fed a high-fat diet and enhanced the level of serum high-density lipoprotein-cholesterol (HDL-C), a protective factor against coronary heart disease. Besides, ginger extract increased the levels of apolipoprotein A-1 and lecithin-cholesterol acyltransferase mRNA in the liver, which was related to high-density lipoprotein (HDL) formation [24]. Additionally, total cholesterol (TC) and LDL concentrations were decreased by ginger extract in rats fed a high-fat diet, and the level of HDL increased through the combined application of aerobic exercise and ginger extract[25].

7. Antiobesity Activity

In a randomized, double-blind, and placebo-controlled study, obese women receiving 2 g of ginger powder daily had a decreased body mass index (BMI) [26]. Moreover, the intake of dried ginger powder could reduce respiratory exchange ratios and promote fat utilization by increasing fat oxidation in humans[27].

8. Antidiabetic Activity

An in vitro experiment resulted in both 6-shogaol and 6-gingerol preventing the progression of diabetic complications, and they inhibited the production of AGEs by trapping methylglyoxal (MGO), the precursor of AGEs [28]. Additionally, 6-gingerol reduced the levels of plasma glucose and insulin in mice with high-fat diet-induced obesity. Nε-carboxymethyl-lysine (CML), a marker of AGEs, was decreased by 6-gingerol through Nrf2 activation [29]. In a randomized, double-blind, and placebo-controlled trial, the ingestion of ginger decreased the levels of insulin, low-density lipoprotein cholesterol (LDL-C), and TG; decreased the homeostasis model assessment index; and increased the quantitative insulin sensitivity check index in patients with DM2[30].

9. Antinausea and Antiemetic Activities

Ginger has been traditionally used to treat gastrointestinal symptoms, and recent research has demonstrated that ginger could effectively alleviate nausea and emesis [31], [32]. In a clinical trial, inhaling ginger essence could attenuate nausea intensity and decrease emesis episodes two and six hours after a nephrectomy in patients[33]. In addition, dried ginger powder treatment reduced episodes of intraoperative nausea in elective cesarean section patients[34].

10. Protective Effects against Respiratory Disorders

Ginger induced significant and rapid relaxation in the isolated human airway smooth muscle. In results from guinea pig and human tracheas models, 6-gingerol, 8-gingerol, and 6-shogaol could lead to the rapid relaxation of precontracted airway smooth muscle.The nebulization of 8-gingerol attenuated airway resistance via a reduction in Ca^{2+} influx in mice [35]. In another study, 6-gingerol, 8-gingerol, and 6-shogaol promoted β-agonist-induced relaxation in human airway smooth muscle via the suppression of phosphodiesterase 4D[36].

CONCLUSION:

Adraka is a very famous drug in *Ayurveda* which is used as spices in food and in many diseases of Gastrointestinal tract, Respiratory disorders, Neuromuscular diseases. Its rhizome can be used in fresh as *Adraka* and in dried form as *Sunthi* having pungent taste and hot potency. It has medicinal as well as nutritional value, it contains organic acids, raw fibers, Vit.B, Vit.C, Vit.D, Iron, Calcium, Magnesium and Cobalamine. It is indicated in many diseases as Fever, Bronchial asthama, indigestion, diarrhea, Anorexia, Plies, Oedema, *Vatavyadhi* (neuromuscular disorders), Urticaria, *Grahani rog* (IBS), *Amlapitta*(hyperacidity), *Gulma* (Abdominal tumor), *Amavata*(Rheumatoid arthritis).

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