

Ginger From Ancient Times to the New Outlook

Laleh Khodaie^{1,*}; Omid Sadeghpour²

¹Medical Philosophy and History Research Center, Tabriz University of Medical Sciences, Tabriz, IR Iran

²Department of Traditional Medicine, School of Traditional Medicine, Tehran University of Medical Sciences, Tehran, IR Iran

*Corresponding author: Laleh Khodaie, Medical Philosophy and History Research Center, Tabriz University of Medical Sciences, Tabriz, IR Iran. Tel: +98-4113379527, Fax: +98-4113379527, E-mail: khodaie@gmail.com

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Context: Ginger is the rhizome of *Zingiber officinale*, a perennial plant, used alone or in compounds as a spice or remedy in ancient recipes of Iranian traditional medicine (ITM) as an effective tonic for the memory and digestive system, the opener of hepatic obstructions, aphrodisiac, for expelling compact wind from stomach and intestines, diluting, desiccating and emollient of phlegmatic and compact humor sticking to body organs, stomach, intestine, brain and throat. The ITM scholars believed that ginger was a vermifuge as well as a remedy for paralysis and obstructive jaundice. They also revealed that this phytomedicine cures diarrhea due to corrupted food. This study aimed to compare the medicinal properties (*afaal*) of ginger in ITM with those indicated in modern research.

Results: Results of this study showed that the modern phytotherapy confirmed some of the properties of ginger. In addition, some of the properties of this phytomedicine have not been studied yet.

Conclusions: By studying the ITM literature, herb elements or in other words ITM keywords, researchers can predict and state some unknown or less known potential pharmacologic effects of medicinal plants.

Keywords: Ginger; Iranian Traditional Medicine; Plant

1. Context

Zingiber officinale, with commonly known name of ginger, named "zangabil" in Persian (1), belonging to Zingiberaceae family, has been used alone or in compounds as a spice or remedy in ancient recipes of Iranian Traditional Medicine (ITM) manuscripts. This plant is endemic to India and cultivated in South and South-East Asia, Africa, Latin America and Australia (2). Some of the important applications of ginger in ITM manuscripts are as follows: a tonic for the memory and digestive system, the hepatic obstructions opener, aphrodisiac, for expelling compact wind from stomach and intestine, diluting, desiccating and emollient of phlegmatic and compact humor sticking to stomach, intestine, brain and throat. According to the ITM literature, ginger is a vermifuge and a remedy for paralysis and obstructive jaundice. This phytomedicine also cures diarrhea due to corrupted food (1, 3-7). So far, there have been lots of discussion about phytochemicals and pharmacologic effects of ginger in modern phytotherapy, while too little attention has been paid to application of this plant in ITM; therefore, this study aimed to determine the confirmed medicinal properties of ginger declared in ITM and indicate that studying the elements of herbs (according to ITM doctrine) would be helpful to describe medicinal properties of the herbs. To the best of our knowledge, this is the first study on ITM information of ginger which would guide us to understand the potential medicinal activities of this valuable phytomedicine.

2. Evidence Acquisition

2.1. Botanical Characteristics of Ginger

Ginger or ginger root is the rhizome of *Z. officinale*, a perennial plant with annual leafy stems, grass-like and bright green leaves, yellowish green flowers, tuberous and fleshy rhizomes (8).

2.2. Modern Phytotherapy Information on Ginger

Phytochemicals of ginger vary depending on its growing place, freshness and dryness of it (9). This part of article will focus on major components of ginger indicating pharmacological effects. Light yellow volatile oil of ginger with its pleasant odor, varying yield of 1-3%, is mainly consisted of monoterpenes and sesquiterpenoids (10). Prior studies showed that a solution consisted of 5% ginger essential oil in grape seed oil, applying nasocutaneously could prevent postoperative nausea (11). Anti-inflammatory, immunomodulatory, analgesic and antibacterial activity of volatile oil of ginger has been studied as well (12-14). Pungent taste of fresh ginger is mainly due to gingerols, especially (6)-gingerol, a phenolic alkanone and pungent compound found in fresh ginger (10). Pungency of dry ginger is caused by shogaols, which were dehydrated form of gingerols formed when ginger is dried or cooked (15). Minor pungent phenolic compounds of this medicinal plant are paradols or 5-deoxygingerols. Isogingerol,

Isoshogaol, gingerdiones, 3-dihydroshogaols, Dihydroparadol, Acetyl gingerols, gingerdiols, mono- and di-acetyl gingerdiols, dehydrogingerdiones, diarylheptanoids, beta-sesquiphellandrene, beta-bisabolene, ar-curcumene and diarylheptanoids have also been isolated from ginger rhizomes (10, 16-21). Previous studies demonstrated the radio protective activity of ginger extract protecting tissue against tumoricidal effects of radiation (10, 22-24). cytotoxic, apoptotic (25-31), anticancer (28, 30, 32, 33), antithrombotic (10, 34-36), antitussive, congestion, cold and flu (37-40), antiemetic, flatulence, abdominal spasm, morning and motion sickness and vomiting caused by chemotherapy (28, 32), anti-inflammatory and rheumatoid arthritis (10, 32, 34, 36, 41), antipyretic (24, 42-44), antidiabetes (10, 32, 45, 46), anthelmintic (47) and antihyperlipidemic activities of this valuable herb have been reported in previous studies. Ginger is also useful to weight loss as well (10, 32, 34, 36, 48). Anti-arthrosclerosis (49, 50), anti-oxidant (22, 27, 31, 36, 50, 51), antimigraine (52, 53), antidermatitis (53, 54), antidizziness (55), antiviral and antimicrobial activities of ginger have been indicated in prior studies (51, 55). Moreover, previous researches demonstrated the beneficial efficacy of ginger on improvement of stroke implications and neurological diseases (54, 56-58). Ginger is also active against helicobacter pylori (10). It is aphrodisiac by increasing sperm percent, viability, motility and serum total testosterone (61-63). Ginger is a sialagogue (57), increases and stimulates peripheral circulation (59), it is also useful to gingivitis (60), depression in cardiovascular system (10, 34, 36, 54), dementia (66-68) and prevention of constipation (10, 61).

2.3. ITM Information on Ginger

Facility deficiency for analysis of foods and medicinal plants functions caused ancient scientists to use some principals based on quadratic elements (air, water, soil and fire). As it is mentioned in ancient manuscripts, one way of assessment of Materia medica functions was evaluation and determination of their taste and elements. Followers of this doctrine believed that each herb had its own temperament (midzaj) and taste made-up of combination of 4 elements (4, 7). Ancient phytotherapists also believed that activities of ginger with its hot and dry nature on body systems were mainly based on its structure's dominant elements. Due to the fiery properties of ginger, as a hot remedy it exsiccates brain humor, the most harmful for mind and memorizing power; thus, the result is strengthening memorizing power and amnesia perish (3, 4). Based on its fiery properties, it is also useful to brain cold disease such as epilepsy, lethargy, paralysis and infarct (6). As collyria, it reinforces and improves blurred vision owing to lyses of extra humor and residues of head descending to throat; thus, ginger is helpful to cure spasmodic croup. Chewing of ginger with mastic is very useful to excretion of phlegmatic humor as well (4). In respiratory system ginger is diluting, desiccating and emollient of phlegmatic and compact humor stick-

ing to throat. Since its elements pass from pores between esophagus and respiratory tracts, ginger cannot show potent effect on respiratory system. Unlike, majority of ginger elements which are not quickly metabolized, gather in the digesting system so the result is stomach and liver warming, acceleration and reinforcement of digestion as well as coction (nozj) of digestion system excreta. Ginger not only dries and cleans extra moisture of stomach and liver but also is very helpful to cold stomach, as a result of resolution of stomach and intestine gas causing abdomen pains. This herb is useful for hepatic obstruction and purgative of moisture from joints. It is mild laxative of atrabile and phlegmatic humor; thus, it prevents constipation. Unlike, it is astringent, because of exsiccation of intestine moisture. In addition, this phyto-medicine is a vermifuge. Two grams of ginger extract can excrete phlegmatic humor and atrabile in body (4, 6, 7). As a hot remedy, ginger can increase sexual energy, semen volume and ejections as well as reinforcement of bladder (6). Suitable doses of this medicinal plant are very useful to aged people as well as patients with acute dominance of phlegmatic humor. Ginger with hot water, as a temperament heat strengthening, can remove disadvantages of cold weather (4, 6, 7). Furthermore, fresh and soft pound plaster of ginger is beneficial to alopecia, lyses of gaseousness, swelling and pain. Eating ground cooked and dusted ginger on broth could help to relieve joint pain. Mixture of fresh ginger with salt and lemon juice after meals causes digestion reinforcement and changes the taste of mouth (4, 7).

2.4. Confirmed Pharmacologic Properties of Ginger Mentioned in ITM

Studying the pharmacologic effects and properties of ginger according to modern and traditional medicine respectively revealed that some cases were confirmed by modern phytotherapists whereas traditional phytotherapists could explain the properties of ginger according to its elements or ITM keywords. In table 1 pharmacological effects of ginger confirmed by modern medicine were shown.

3. Results

Medicinal plants are Gods package and easy accessible alternatives for human beings health. One way of achieving fruitful outcome on medicinal plants research is referring to the ITM manuscripts as separate academy with its long and prolific history on using the variety of medicinal plants with different bases, believes and theories. Ginger rhizome is a best known and universally used phytomedicine for its health benefits. Although therapeutic effects of ginger as a natural supplement have been validated by modern research, there was a scientific gap on studying ITM information about ginger which showed similarities and connection between ancient findings and modern research. As it can be seen in table 1, the efficacy of ginger has been indicated on improvement of stroke implications

Table 1. Pharmacologic Properties of Ginger Confirmed by Modern Research ^a

Body systems	ITM	Modern Research
Nervous system	useful to cold disease of brain such as epilepsy, lethargy, paralysis, infarct etc.	improvement of stroke implications and neurological diseases
	reinforcement of memorizing power as well as amnesia perish	removal of dementia
Immune system	joint pain relief	relieving rheumatoid arthritis and inflammation
Respiratory system	diluting, desiccating and emollient of phlegmatic and compact humor sticking to throat	Antitussive, preventing a cold, sore throat, laryngitis, congestion, inflammation of mucosal layer, on the whole prevention of respiratory disease and decreasing of asthmatic symptoms
Digesting system	prevention of nausea and vomiting	Reliving nausea and vomiting caused by pregnancy and chemotherapy as well as motion sickness
	acceleration and reinforcement of digestion	treating abdominal cramps, intestinal spasms and dyspepsia
	fracture of flatulence and gases of stomach and intestines	treating flatulence
	Prevention of constipation	Treatment of constipation
	vermifuge	anthelmintic
Genital system	increasing sexual energy, semen volume and ejections	increasing sperm percent, viability, motility and serum total testosterones

^a Abbreviation: ITM, Iranian traditional medicine.

and neurological disease (54, 56-58), introduced as cold disease in ITM (6) and the fiery properties of ginger as a hot remedy is responsible to this effect. Iranian traditional medicine scholars suggest that ginger is cathartic of joint moisture (4, 7), causing joint pain relief which was confirmed by modern researches due to anti-inflammatory effect of this herb (10, 32, 34, 36, 41). According to ITM literature, the properties of ginger on digestive system are the acceleration and reinforcement of digestion, fracture of flatulence and gases of stomach and intestine, prevention of nausea, vomiting and constipation as well as vermifuge (4, 6, 7), which were confirmed by modern phytotherapists (28, 32). Ancient scholars believed that ginger was diluter, desiccator and emollient of phlegmatic and compact humor sticking to throat, identified by modern researchers as gingers efficacy on prevention of inflammation in respiratory system (37-40). According to TIM manuscripts, ginger could enhance sexual energy, semen volume and erection because it was a hot remedy and contains special kind of moisture in it (rotubate fazlieh) (4, 6, 7), confirmed by modern researches (62-64). In addition, the effect of ginger on curing spasmodic croup, bladder and vision reinforcement has not been studied in modern medicine yet (4, 6).

4. Conclusions

This paper has argued connections between pharmacological properties and properties of ginger discussed by modern research and ITM keywords, respectively. Unlike modern phytotherapy that proves pharmacological activities of medicinal plants by biological or pharmacological tests (65-67), ancient phytotherapists could cure patients, explain and use this medicinal plant without

performing phytochemical studies, biological tests, creating high costs and time consuming elements. These findings further support the idea of survey on ITM manuscripts, a good way to predict and state some unknown or less known pharmacologic effects of herbs. However, more research on this topic needs to be undertaken to study elements and properties of some other herbs to provide data on clinical applications of medicinal plants, which should lead to future opportunities to investigate their potential medicinal uses. If the debate moved forward, better understanding of elements and properties of medicinal herbs would be developed in future.

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Authors' Contributions

Dr. Khodaie abstracted and analyzed data, wrote and prepared the manuscript, and is a guarantor. Dr. Sadeghpour developed the original idea.

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