Zingiber officinale

TAXONOMICAL CLASSIFICATION:[1]

- *Kingdom : Plantae*
- *Subkingdom :Tracheobionta*
- *Superdivision : Spermatophyta*
- *Division :Magnoliophyta*
- *Class :Liliopsida*
- *Subclass: Zingiberidae*
- *Order :Zingiberales*
- *Family : Zingiberaceae*
- *Genus : Zingiber Mill.*
- *Species: Zingiber officinale*

INTRODUCTION:[2]

Ginger, the rhizome of Zingiber officinale, is one of the most widely used species of the ginger family (Zingiberaceae) and is a common condiment for various foods and beverages. Ginger has a long history of medicinal use dating back 2,500 years in China and India for conditions such as headaches, nausea, rheumatism, and colds. Characterized in traditional Chinese medicine as spicy and hot, ginger is claimed to warm the body and treat cold extremities, improve a weak and tardy pulse, address a pale complexion, and strengthen the body after blood loss. Ginger (Zingiber officinale Roscoe, Zingiberaceae) is widely used around the world in foods as a spice. Native to tropical Asia, ginger is a perennial cultivated in the tropical climates of Australia, Brazil, China, India, Jamaica, West Africa, and parts of the United States.1 Ginger rhizome has a long history of use in Chinese and Ayurvedic medicine as an antiemetic, antipyretic, and anti-inflammatory agent, Here, the aim was to summarize the more recent and common actions and therapeutic application of ginger and its active constituents.

MAJOR CHEMICAL CONSTITUENTS:[5]

The constituents of ginger are numerous and vary depending on the place of origin and whether the rhizomes are fresh or dry but to summarize the major components that have been implicated in the pharmacological activities of the crude drug. The primary pungent agents (phenylalkylketones or vanillyl ketones) of ginger are gingerol, with other gingerol analogues such as the shogoals, paradol and zingerone also found in high levels in rhizome extracts. The major pharmacological activity of ginger appears to be due to gingerol and shogaol (Duke and Beckstrom 1999). Phenylalkylketones or vanillyl ketones of ginger include 6-gingerol 8-

gingerol and 10-gingerol, 6-shogaol, 8- shogaol, 10-shogaol and zingerone. 6-paradol, 6- and 10-dehydrogingerdione and 6- and 10- gingerdione have also been identified.

PROPERTIES AND USES:[5]

- Antiemetic
- Antipyretic
- Analgesic
- Antiarthritic
- Anti Inflammatory Activities

SIDE EFFECTS OF EXCESS CONSUMPTION:[3]

Ginger is LIKELY SAFE when taken appropriately. Ginger can cause mild side effects including heartburn, diarrhea, and general stomach discomfort. Some women have reported extra menstrual bleeding while taking ginger.

When applied to the skin: Ginger is POSSIBLY SAFE when applied to the skin appropriately, short-term. It might cause irritation on the skin for some people.

DOSAGE:[4]

As mentioned in Ayurvedicharmacology, 0.75gm to 1.5 gm of powder and 2-4 cc juice is safe for consumption

RESEARCH:

1. Ginger root and its components can prevent NF-κB activation induced by a variety of agents and down regulation of NF-κB gene products involved in cellular rise and angiogenesis. Dried Z. officinale also shows a role in conquering the expression of LPS-induced IFN-γ and IL-6, which are raised in LPS-induced inflammation. Ginger suppresses prostaglandin production through inhibition of cyclooxygenase-1 and cyclooxygenase-2. It also suppresses leukotriene biosynthesis by inhibiting 5-lipoxygenase. This pharmacological property differentiates ginger from NSAID (Non-Steroidal Anti-Inflammatory Drugs). Dual inhibitors of cyclooxygenase and 5-lipoxygenase may have a better therapeutic profile and have fewer side effects than NSAID.[6]
2. Ginger is one of the most effective natural immunomodulator. In vitro study found that ginger inhibited lymphocyte proliferation; this was mediated by reductions in IL-2 and IL-10 production. Aqueous ginger extract significantly increased the production of IL-1β, IL-6 and TNF-α in activated peritoneal mouse macrophages and splenocyte proliferation and cytokine production. Ginger rhizome diet for 12 weeks showed increased haematocrit, haemoglobin, erythrocyte, MCH, MCHC, WBC values and neutrophils percentage. Ginger essential oil

showed improvement in humoral and cell mediated immune response in immune suppressed mice. The powdered ginger rhizome is capable to improve non-specific immune response in rainbow trouts.[6]

3. In this study, aqueous extracts of six raw food materials (flower buds of clove, fenugreek seeds, garlic and onion bulbs, ginger rhizomes, and jalapeño peppers) were tested for antiviral activity against feline calicivirus (FCV) as a surrogate for human norovirus. The dried rhizomes of Indonesian ginger, Zingiber officinale, were investigated for anti-rhinoviral activity. These data suggested that ZOR itself has no inhibitory effect on the growth of influenza virus, but could exert its effect via macrophage activation leading to production of TNF-alpha. Ginger, thyme, hyssop, and sandalwood oils exhibited high levels of virucidal activity against acyclovir-sensitive strain KOS and acyclovir-resistant HSV-1 clinical isolates and reduced plaque formation significantly. About 15 plant species are known for their use to cure multiple skin diseases. Among these Berberis lyceum, Bergenia ciliata, Melia azedarach, Otostegia limbata, Phyla nodiflora, Prunus persica and Zingiber officinale constitutes major plants Fresh ginger of high concentration could stimulate mucosal cells to secrete IFN-β that possibly contributed to counteracting viral infection[7]
4. In vitro, ginger has been shown to exhibit antioxidant effects.15 (6)-gingerol appears to be the antioxidant constituent present in ginger, as it was shown to protect HL-60 cells from oxidative stress. Ginger oil has dominative protective effects on DNA damage induced by H2O2. Ginger oil might act as a scavenger of oxygen radical and might be used as an antioxidant.[5]

PRECAUTION AND WARNIGS [3]

Pregnancy: Ginger is POSSIBLY SAFE when taken by mouth for medicinal uses during pregnancy. But using ginger during pregnancy is controversial. There is some concern that ginger might affect fetal sex hormones or increase the risk of having a baby that is stillborn. There is also a report of miscarriage during week 12 of pregnancy in a woman who used ginger for morning sickness. However, most studies in pregnant women suggest that ginger can be used safely for morning sickness without harm to the baby. The risk for major malformations in infants of women taking ginger does not appear to be higher than the usual rate of 1% to 3%. Also there doesn't appear to be an increased risk of early labor or low birth weight. There is some concern that ginger might increase the risk of bleeding, so some experts advise against using it close to your delivery date. As with any medication given during pregnancy, it's important to weigh the benefit against the risk. Before using ginger during pregnancy, talk it over with your healthcare provider.

Children: Ginger is POSSIBLY SAFE when taken by mouth for up to 4 days by teenage girls around the start of their period.

Breast-feeding: There is not enough reliable information about the safety of taking ginger if you are breast feeding. Stay on the safe side and avoid use.

Bleeding disorders: Taking ginger might increase your risk of bleeding.

Diabetes: Ginger might increase your insulin levels and/or lower your blood sugar. As a result, your diabetes medications might need to be adjusted by your healthcare provider.

Heart conditions: High doses of ginger might worsen some heart conditions

INTERACTION WITH MEDICATIONS:[3].

- **Medications that slow blood clotting (Anticoagulant / Antiplatelet drugs) :**

Ginger might slow blood clotting. Taking ginger along with medications that also slow clotting might increase the chances of bruising and bleeding.

Some medications that slow blood clotting include aspirin, clopidogrel (Plavix), diclofenac (Voltaren, Cataflam, others), ibuprofen (Advil, Motrin, others), naproxen (Anaprox, Naprosyn, others), dalteparin (Fragmin), enoxaparin (Lovenox), heparin, warfarin (Coumadin), phenprocoumon (an anticlotting medicine available outside the US), and others.

- **Phenprocoumon**

Phenprocoumon is used in Europe to slow blood clotting. Ginger can also slow blood clotting. Taking ginger along with phenprocoumon might increase the chances of bruising and bleeding. Be sure to have your blood checked regularly. The dose of your phenprocoumon might need to be changed.

- **Warfarin (Coumadin)**

Warfarin (Coumadin) is used to slow blood clotting. Ginger can also slow blood clotting. Taking ginger along with warfarin (Coumadin) might increase the chances of bruising and bleeding. Be sure to have your blood checked regularly. The dose of your warfarin (Coumadin) might need to be changed.

Minor Interactions:

- **Medications for diabetes (Antidiabetes drugs) :**

Ginger might decrease blood sugar. Diabetes medications are also used to lower blood sugar. Taking ginger along with diabetes medications might cause your blood sugar to go too low.

Monitor your blood sugar closely. The dose of your diabetes medication might need to be changed.Some medications used for diabetes include glimepiride (Amaryl), glyburide (DiaBeta, Glynase PresTab, Micronase), insulin, pioglitazone (Actos), rosiglitazone (Avandia), chlorpropamide (Diabinese), glipizide (Glucotrol), tolbutamide (Orinase), and others.

- **Medications for high blood pressure (Calcium channel blockers)**

Ginger might reduce blood pressure in a way that is similar to some medications for blood pressure and heart disease. Taking ginger along with these medications might cause your blood pressure to drop too low or an irregular heartbeat.

Some medications for high blood pressure and heart disease include nifedipine (Adalat, Procardia), verapamil (Calan, Isoptin, Verelan), diltiazem (Cardizem), isradipine (DynaCirc), felodipine (Plendil), amlodipine (Norvasc), and other

REFERENCES:

1. https://plants.usda.gov/java/ClassificationServlet?source=display&classid=ZIOF
2. https://naturalingredient.org/wp/wp-content/uploads/331.pdf
3. https://www.webmd.com/vitamins/ai/ingredientmono-961/ginger
4. Gogte, Vishnu Mahadev. *Ayurvedic pharmacology and therapeutic uses of medicinal plants*. Dravyaganvigyan), I Edn. Mumbai: Bhartiya Vidya Bhavan, 2000.
5. Mishra, Rajesh Kumar, Anil Kumar, and Ashok Kumar. "Pharmacological activity of Zingiber officinale." *International Journal of pharmaceutical and chemical sciences* 1.3 (2012): 1073-1078.
6. Singh, Radha, and Kusum Singh. "ZINGIBER OFFICINALE: A SPICE WITH MULTIPLE ROLES." (2019).
7. https://mpkb.org/home/othertreatments/antivirals