



# **Review: Medicinal uses of ZINGIBER OFFICINALIS (Ginger)**

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B. PHARMACY FINAL YEAR

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## **ABSTRACT**

The ginger, Zingiber officinale, is widely used for medical purposes. Ayurvedic literature emphasises the use of ginger in diseases that are not communicable as well as those that are. Recent developments in the fields of analytical chemistry, cytology, and microbiology support the use of ginger in a variety of medical problems, corroborated by Ayurvedic literature. With particular reference to Ayurvedic prescriptions, the current study reviewed the ethno medicinal potential of Z. officinale, including its antiviral, radioprotective, anti-inflammatory, anticancer,

and antioxidant properties. The study goes on to say that, in accordance with both Ayurvedic and contemporary theories, ginger is beneficial in treating viral infections and rejuvenating the body in sickness situations. It does this by boosting immunity, increasing hunger, and reviving the body's compromised physiological systems. Ginger contains active components, including 6-gingerole, Zingerole and zerumbone revitalise the body by physically re-strengthening it, which improves enzyme functions and balances circulation.

**Key words:** antioxidant, antipyretic, anti-inflammatory, and anticancer

## **INTRODUCTION**

Because of its nutritional richness and traditional therapeutic uses, the rhizome of *Zingiber officinale* is widely utilised for both culinary and medicinal purposes worldwide. The majority of conventional and alternative medical systems, including Ayurveda, Siddha, Unani, homoeopathy, Tibetan, Chinese, and others, recommend *Z. officinale* either singly or in combination for both infectious and non-communicable illnesses. Antimicrobial, anticancer, antioxidant, antidiabetic, nephroprotective, hepatoprotective, larvicidal, analgesic, anti-inflammatory, and immunomodulatory properties of the plant are the main areas of research. The goal of the current study is to review the ethnomedical properties of *Z. Officinale*, such as its antiviral, radioprotective, anti-inflammatory, and anticancer properties.

**Synonyms-** Ginger root, Black Ginger, Zingiberic rhizome, Zingiber, Zingiberis

**Biological source-**Ginger consist of the dried rhizomes of *Zingiber officinale* Roscoe.

## Botanical Classification-

Kingdom: Plantae

Subkingdom: Tracheobionta

Superdivision: Spermatophyta

Division: Magnoliophyta

Class: Liliopsida-Monocotyledons

Subclass: Zingiberidae

Order: Zingiberales

Family: Zingiberaceae

Genus: Zingiber P. Mill

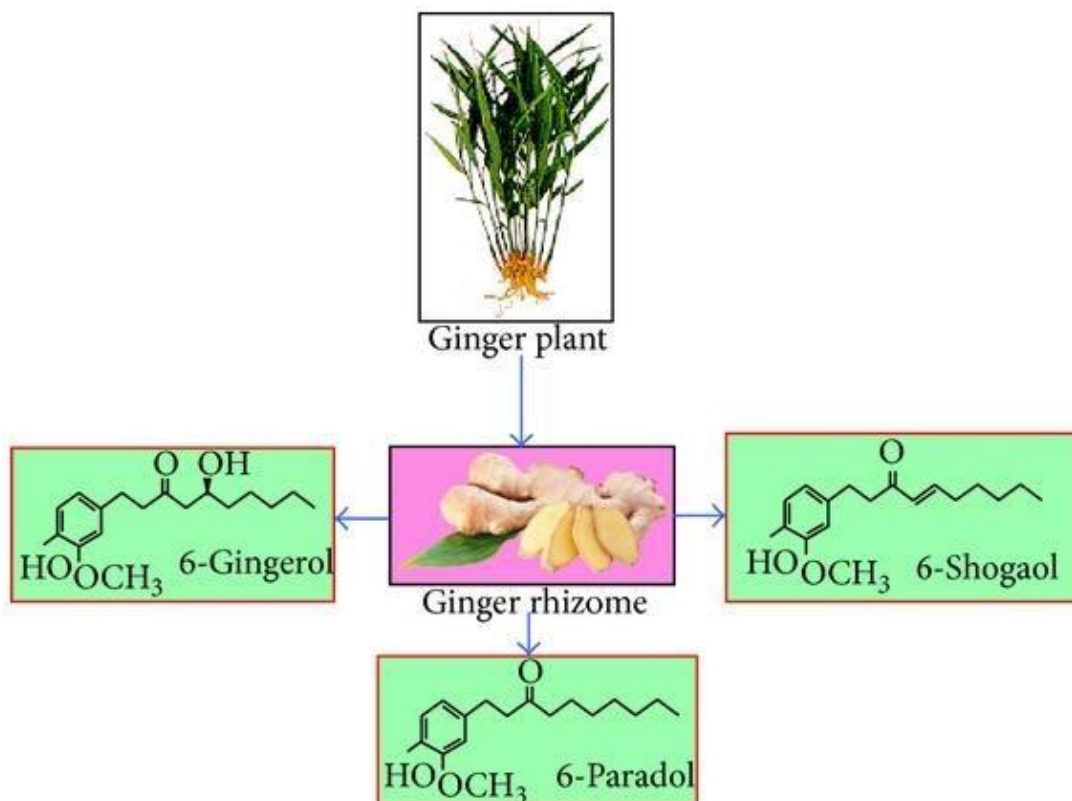
Species: Zingiberofficinale Roscoe.

**Fig- Ginger (*Zingiber officinale*)**



## Chemical Composition-

Ginger's chemical analysis reveals that it contains more than 400 distinct substances. .. Rhizome of ginger, ginger, and its principal 6-gingerol, 6-shogaol, and 6-paradol are the active ingredients. Zingiberene and bisabolene are two of the aromatic components, while the Shabuols and gingerols are the names of the aromatic components. Many bacteria, including some Gram-positive (such as *Staphylococcus aureus* and *Bacillus megaterium*) and Gram-negative bacteria, have lessened their ability to build biofilms when exposed to ginger extract. (for instance, *Pseudomonas aeruginosa* and *Escherichia coli*)(6,11). Many bacteria, including some Gram-positive ones like *Staphylococcus aureus*, have less tendency to develop biofilms when exposed to ginger extract. and *Bacillus megaterium*) as well as Gram-negative bacteria (such *Pseudomonas aeruginosa* and *Escherichia coli*). Ginger rhizomes are mostly composed of lipids(38%), phenolic chemicals, terpenes, and carbohydrates(50-70%)



Zingiberene,  $\beta$ -bisabolene,  $\alpha$ -farnesene,  $\beta$ -sesquiphellandrene, and  $\alpha$ -curcumene are among the terpene components of ginger, whereas gingerol, paradols, and shogaol are among the phenolic chemicals. The oil made from ginger includes a variety of ingredients, including some aliphatic aldehydes and alcohols as well as monoterpenes like phellandrene, camphene, cineole, linalool, limonene, citral, geraniol, citronellol, and borneol and sesquiterpenes like  $\alpha$ -zingiberene,  $\alpha$ -curcumene,  $\beta$ -bisabolene,  $\beta$ -sesquiphellandrene, zingiberol, and zingiberenol. Ginger's distinctive flavour and scent are caused by volatile oils. that make up between 1 to 3 percent of the weight of fresh ginger; the main pungent component is [6]-gingerol, which is mainly composed of zingerone, shogaols, and gingerols. Zingibain, a cysteine protease with characteristics akin to rennet, is another enzyme found in fresh ginger.

## 8 FANTASTIC HEALTH BENEFITS OF GINGER



## Therapeutic effects

### Antiviral effect

It has been demonstrated that fresh *Z. officinale* rhizome has an antiviral effect towards Human Respiratory Syncytial Virus (HRSV) infection by reducing the production of HRSV-induced plaque in respiratory mucosal cells lines. Consequently, a high *Z. officinale* concentration may induce mucosal cells to release interferon- $\beta$  (IFN- $\beta$ ), which works to prevent viral infections by inhibiting the adhesion and internalisation of viruses. This effect is quite helpful in managing symptoms of the common cold (pratishya), fever related to mucous secretions, and difficulties from asthma and cough. It is believed that *Z. officinale*'s lyophilized juice extract has

antiviral properties against the Hepatitis C virus. In this specific study, it has been demonstrated that *Z. officinale* effectively inhibits the replication of the virus within Hepatitis C virus-infected Hep G2 cells by influencing viral RNA. Additionally, a different study explains that *Z. officinale* effectively reduces Hepatitis C virus loads,  $\alpha$ -fetoprotein levels, and liver function-related markers like aspartate In Egyptian HCV patients, aminotransferases (AST) and alanine aminotransferases (ALT) were measured. The foregoing finding clarifies the usage of ginger in liver problems and infectious conditions related with the liver, as Ayurveda advises using ginger in conditions known as "udara roga" (liver associated diseases). *Z. officinale* aqueous extract was shown to have antiviral properties against Feline Calicivirus, a stand-in for Human Norovirus in alimentary canal infections brought on by foodborne pathogens.

### **Radioprotective Effect**

administering *Z.*'s hydroalcoholic extract orally. Because of phytochemicals like dehydrogingerone and zingerone, *officinale* rhizomes for mice effectively prevent gamma radiation-induced illness and death. Furthermore, zingerone specifically shields the healthy tissues from radiation's tumor-killing actions in mice with tumours. Rats with radiation-induced conditioned taste aversion show gastro-protective activity against *Z. officinale* rhizome hydro-alcoholic extract. Rats' saccharine response was significantly blocked when *Z. officinale* hydro-alcoholic extract was administered one hour prior to 2-Gy gamma radiation. Additionally, Sharma et al. suggest that the hydro-alcoholic extract of *Z. officinale*'s antioxidant properties and neurobehavioral efficacy may modulate radiation-induced taste aversion with radioprotective properties because of lipid peroxidation and superoxide-anion scavenging ability. Ayurvedic medicine attributes a significant portion of ginger's benefits to its ability to stimulate appetite and mitigate appetite loss.

## Anti-inflammatory Effect

Z. officinale has a significant impact on gastrointestinal tract inflammations like colitis. The plant that produces PI3K (phosphatidylinositol-3-kinase), Akt (protein kinase B), NF- $\kappa$ B (nuclear factor kappa light chain enhancer of activated B cells), and 6-shogaol (which has antitumor properties)

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## Anti-cancer Effect

Owing to the anti-inflammatory and anti-tumorigenic properties of its bioactive compounds, including 6-gingerole, 6-shogaol, 6-paradol, and zerumbone, Z. officinale can prevent or control malignancies of the colon, stomach, ovary, liver, breast, and prostate. Z. officinale suppresses the development of colon cancer via activating enzymes that include glutathione reductase, glutathione transferase, and glutathione peroxidase. Zerumbone taken orally reduces the number of colonic adenocarcinomas by suppressing colonic inflammation by apoptosis induction, NF- $\kappa$ B and heme oxygenase (HO)-1 expression suppression, and proliferation inhibition.

## CONCLUSION

Owing to the anti-inflammatory and anti-tumorigenic properties of its bioactive compounds, including 6-gingerole, 6-shogaol, 6-paradol, and zerumbone, Z. officinale can prevent or control malignancies of the colon, stomach, ovary, liver, breast, and prostate. Z. officinale suppresses the development of colon cancer via activating enzymes that include glutathione reductase, glutathione



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Throughout history, ginger has been utilised extensively for its several natural medical benefits, most notably its ability to prevent vomiting. Based on the most reliable research, ginger is a safe, affordable, and effective medication for nausea and vomiting. The lack of seed set severely restricts this wonderful spice and medicinal plant called ginger, leaving the breeder with no choice but to use clonal selection or induced mutations, both of which have risks and drawbacks.

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