

# Chemical and Medicinal Study of Ginger (*Zingiber Offinale*)

Dr. Sheeba Shafi

Assistant Professor, Department of Nursing  
College of Applied Medical Science, King Faisal University  
Hofuf-Al-Hassa, Saudi Arabia

**Abstract:** Ginger is the underground rhizome of the ginger plant with a firm, striated texture. The flesh of the ginger rhizome can be yellow, white or red in color, depending upon the variety. It is covered with a brownish skin that may either be thick or thin, depending upon whether the plant was harvested when it was mature or young. Aromatic, pungent and spicy, ginger adds a special flavor and zest to stir fries and many fruit and vegetable dishes. Fresh ginger root is available year round. The present study was intended to study the chemical composition and medicinal uses of ginger.

**Index Terms:** Ginger, shogaols, zingerone, and paradol,

## I. INTRODUCTION

Ginger (*Zingiber officinale* Roscoe) is a member of the Zingiberaceae family of plants. The plant is native to Asia but is now cultivated in the West Indies, Africa, India, and other tropical regions. The underground stem (rhizome) is used for preparation of ginger and can be obtained in colors varying from white to brown, depending on whether the exterior is scraped off and how it is initially treated. This rhizome can be processed into a powder, syrup, volatile oil, and oleoresin. Its use in culinary applications dates as far back as the 13th century.[1] Among all spices, it exhibits one of the greatest diversity of uses, such as in dietary supplements, beverages (such as ginger ales), and food products (such as in curry powder, confectionaries, soups, jams, and baked goods). [1,2 ] It has been a part of healing strategies in Asia, India, Europe, and the Middle East for centuries for treatment of such disorders as arthritis, stomach upset, asthma, diabetes, and menstrual irregularities, to name a few. [1,3-5]

The rhizome contains fats, carbohydrates, protein, fiber, water, and volatile oil. The quality and quantity of biologically active constituents of ginger depend on its cultivation practices and postharvest treatment. The chemical components of the ginger rhizome can vary considerably, depending on the location of cultivation and whether the product is fresh, dried, or processed.[5] The pungency of fresh ginger results from a group of phenols, the gingerols, of which [6]-gingerol is most abundant.

Fresh ginger also may contain a 5-deoxy derivative of ginger called paradol. Dry ginger, on the other hand, exhibits a pungency due to the shogaols, which are dehydrated forms of gingerols resulting from thermal processing. Ginger also contains about 1% to 3% volatile oil that imparts a distinctive odor to ginger and which is composed mainly of monoterpenoids and sesquiterpenoids, including camphene, borneol, zingiberene, sesquiphellandrene, and isabolene. 1,5,6 Monoterpenes are compounds that contain 10-carbon skeleton often arranged in a ring. Sesquiterpenoids have a 15-carbon skeleton. Besides the pungent phenolic compounds (gingerols and shogaols), there are also bioactive diarylheptanoids and zingerone that are believed to contribute to its purported health benefits. 2,5-8

The scientific literature provides evidence that ginger has a number of potential health benefits.1,6,16 This evidence suggests that ginger may help alleviate nausea, both during pregnancy and from other causes. Some research suggests positive benefits of ginger in alleviating inflammation, especially that contributing to osteoarthritis. Preliminary evidence is also available on ginger and relief of hypertension 18 and that ginger intake may have a role in cancer prevention.19 Finally, initial preclinical research demonstrates that ginger lowers blood cholesterol and blood glucose levels.20 In general, the preclinical data and preliminary findings suggest a variety of potential health benefits of ginger.

## II. BOTONICAL DESCRIPTION

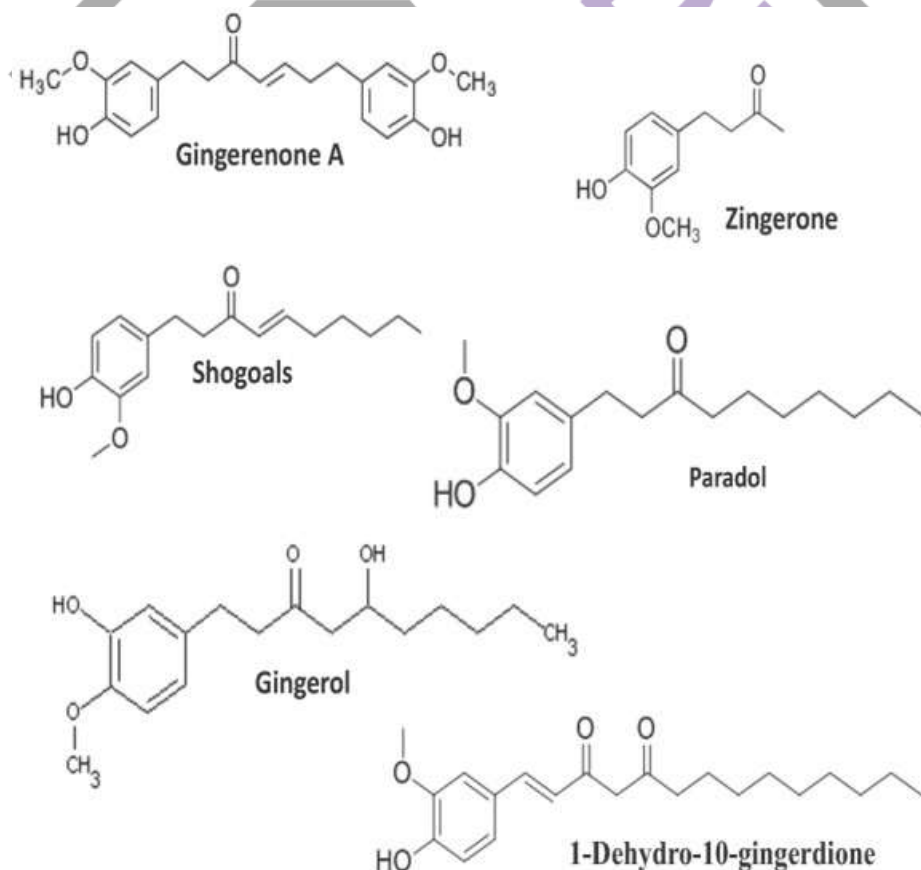
**Ginger** (*Zingiber officinale*) is a flowering plant whose rhizome, ginger root or ginger, is widely used as a spice and a folk medicine. It is a herbaceous perennial which grows annual pseudostems (false stems made of the rolled bases of leaves) about a meter tall bearing narrow leaf blades.



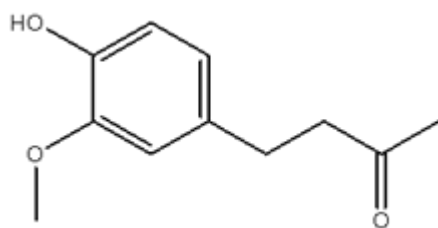
Ginger plant

### III. CHEMICAL COMPOSITION

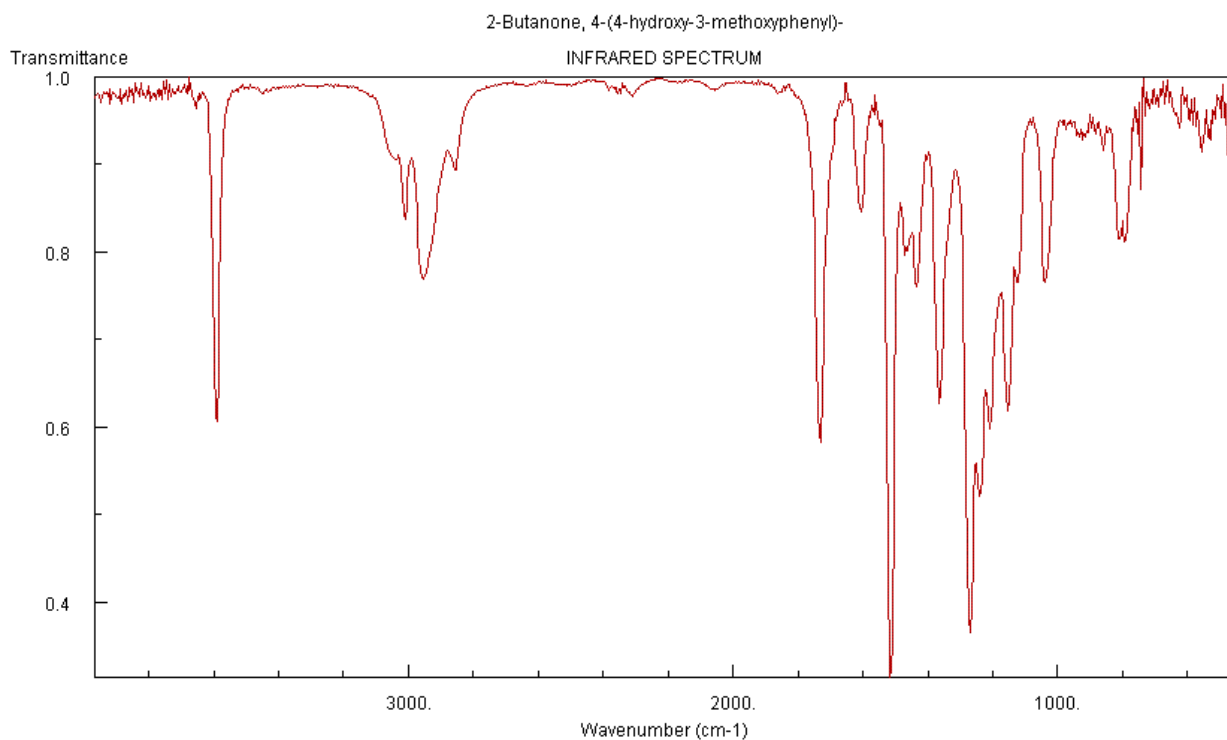
Numerous active ingredients are present in ginger including terpenes and oleoresin which called ginger oil. Ginger also constitutes volatile oils approximately 1% to 3% and non-volatile pungent components oleoresin [7]. The major identified components from terpene are sesquiterpene hydrocarbons and phenolic compounds which are gingerol and shogaol [8] and lipophilic rhizome extracts, yielded potentially active gingerols, which can be converted to shogaols, zingerone, and paradol [9]



Formula of Zingerone ( 4-(4-hydroxy-3-methoxy-phenyl)-butan-2-one )



#### IV. SPECTRAL STUDY PG GINGER OIL



Frequency (cm <sup>-1</sup> )	Bond
3410	O-H (Hydroxyl Group)
1710	C=O (Carbonyl Group)

#### V. HEALTH BENEFITS OF GINGER

Ginger is among the healthiest (and most delicious) spices on the planet. It is loaded with nutrients and bioactive compounds that have powerful benefits for your body and brain. Ginger Contains Gingerol, a Substance with Powerful Medicinal Properties.

1. Ginger Can Treat Many Forms of Nausea, Especially Morning Sickness
2. Ginger may Reduce Muscle Pain and Soreness
3. Ginger has Anti-Inflammatory Effects Can Help With Osteoarthritis
4. Ginger May Drastically Lower Blood Sugars and Improve Heart Disease Risk Factors
5. Ginger Can Help Treat Chronic Indigestion
6. Ginger May Lower Cholesterol Levels

7. Ginger Contains a Substance that May Help Prevent Cancer
8. Ginger May Improve Brain Function and Protect Against Alzheimer's
9. The Active ingredient in ginger can Help to fight Infections

## VI. INTERACTION OF GINGER WITH MEDICINES .

The main concern with taking ginger in supplemental doses is its possibility of interacting with anticoagulant drugs like warfarin (Coumadin). Both can slow blood clotting; taken together they may increase the danger of bleeding and bruising. Other drugs that incidentally lower clotting, like aspirin, can also lead to bleeding when taken with large amounts of ginger. Ginger is also thought to lower blood sugar, which can lead to hypoglycemia in people who take medications for diabetes; and ginger may lower blood pressure dangerously for those who take medications to lower blood pressure. Note that these interactions require supplemental doses, much larger than the amount of ginger one normally might eat as a seasoning.

## VII . CONCLUSION

Ginger is not only an extremely popular dietary condiment used for flavoring food but also an herb that has been used for thousands of years as a medicinal herb to treat a variety of ailments. Chemical and metabolic analyses have revealed that ginger comprises hundreds of compounds and metabolites. Research interest in determining the role of natural compounds in preventing disease has increased markedly over the last few years. Therefore we concluded that ginger is highly beneficial to human health .

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