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A Review on Pharmacological Activity and Phytochemical Properties of Ginger (*Zingiber officinale Roscoe*)

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Abstract -

Ginger most widely used as well-known herb. “*Zingiber officinale*” scientific name of Ginger contains several bioactive constituents extensively used for a number of medicinal purposes. Zingiber is belonging to Zingiberaceae family which includes more than 1200 species in 53 genera. Due to the variety of its active components in the treatment of various diseases, Ginger is used in the treatment of various diseases rheumatism, cramps, asthma, nausea, vomiting, hypertension, dementia, fever and infection. The pharmacological actions of Ginger include antioxidant, anti-tumor, anti-apoptosis, anti-inflammation, anti hyperglycemia, anti cough and anti colds effects. Number of bioactive constituents of plants was isolate are alkaloids, tannins, flavonoids and phenolic compounds. Main purpose of this study was to review of recent investigation, research on the pharmacological and phytochemical properties of Ginger and its biological active components.

Keywords: Ginger, Zingiberaceae, Phytochemistry, Bioactive, Medicine.

Introduction -

Traditional and Indian Chinese has been using ginger as medicine for over 25 centuries¹.

Ginger (*Zingiber officinale roscoe*) is morphologically classified into three types, including the red, gajah or elephant and emprit ginger. Ginger is horizontal rhizome, branched and its size is near about 5 to 15 cm in length, width is 3 to 6 cm and 0.5 to 1.5 cm thickness. Ginger grown in most Indian states namely Meghalaya, Maharashtra, Kerala, Arunachal Pradesh, Sikkim, Nagaland Mizoram and Orissa¹⁻⁵.

Taxonomy of ginger plant

Taxonomy

Kingdom : Plantae
Division : Magnoliophyta
Order : Zingiberales
Family : Zingiberaceae
Genus : Zingiber
Species : *Z. officinale*

Names of *Zingiber officinale* in different languages⁶

Name	Language	Name	Language
Ginger	English	Imbirlekariski	Polish
Sheng jiang	Chinese	Jahe	Indonesian
Aduwa, sutho	Nepali	Khing	Thai
Gember	Dutch	Saenggang	Korean
Gemeiner ginger/in gwer	German	Shokyo	Japanese
Gengibre/jengibre	Spanish	Katubhadra, Srngavera	Sanskrit
Gingembre	French	Adarakha	Hindi
Gingimbre	Caribbean	Ada	Bengali
Adu	Gujarati	Alla, Hasishunti	Kannada
Inchi	Malayalam	Ardrak, Ale	Marathi
Adi, Adrak	Punjabi	Injee, Allam, lakottai, Inji	Tamil
Allamu, Allam	Telugu	Adrak	Urdu

The Ginger plants can grow to about 1 m tall. Rhizomes are thick lobed, aromatic, protuberant and fleshy, covered in ring-like scars⁷⁻⁸. The rhizome develop underground and its colour appears pale yellow. Leaves are green in colour, long and 2-3 cm broad with coating bases, the blade gradually tapering to a point¹¹⁻¹³.

Traditional uses of *Z. officinale*-

In Ayurveda Ginger is used for different

purpose to cure a many of the disease such as loss of appetite, indigestion, tastelessness, intestinal, symptomatic, intestinal gas, nausea, vomiting, allergic reactions, acute and chronic cough, fever, allergic rhinitis, common cold, sinusitis, acute and chronic bronchitis, respiratory troubles, pain, headache, backache or any kind of muscular catch, painful tooth and swelled gum¹⁴⁻¹⁸.

Ginger uses in Siddha-

Several important medicinal properties shown by Ginger and extensively used in Siddha for the treatment of nausea, pain, cough and diarrhea. Ginger in combination with other herbal products used to cure several diseases such as vomiting, pitha diseases, indigestion etc.¹⁹⁻²¹.

Zingiber officinale phytochemical composition

Phytochemicals include all the chemical compounds that occurs naturally in plants. This chemical compounds contributes to the colour, flavor and smell of plants. The phytochemical composition of the Z. officinale is reported to possess essential oils, alkaloids, terpenoids, carbohydrates, phenolic compounds, flavonoids, proteins, glycosides, steroids and tannin as the major phytochemical groups²²⁻²³. In the field of medicinal property these phytochemicals study of this plant plays an important role²⁴⁻²⁵. Some of the major chemical constituent of Ginger as follows.

Structure of compound drawn by ChemSketch Software

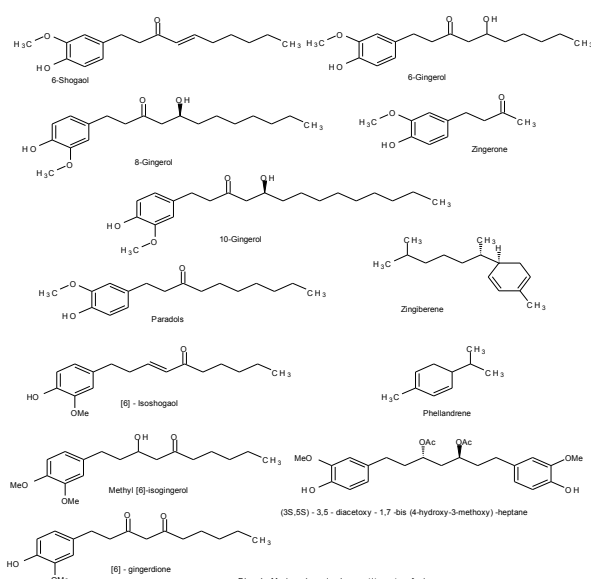


Fig. 1. Major chemical constituents of ginger.

Ginger Pharmacological Activity-

Ginger is widely used as medicinal plant. Ginger shows various pharmacological properties like analgesic, antimicrobial, antibacterial, antidiabetic, antiemetic, antifungal, anthelmintic, anti-inflammatory, antithrombic, antitumor, antitussive, antiulcer, antiviral, etc. Worldwide Ginger was used as cooking spice and food preservation. All this medicinal properties of ginger is due to presence of bioactive components alkaloids, tannins, polyphenolic compound, flavonoids etc. Some chemical constituents of ginger such as 8 Gingerol and 10 Gingerol are significantly active against COVID 19²⁶⁻²⁸.

Antimicrobial activity - For throat infection treatment Ginger has been used and been reported to inhibit the broad range of pathogenic microorganisms included gram positive, gram negative bacteria and fungi²⁶⁻³⁰.

Antibacterial activity - Antibacterial activity of the different organic extracts in combination with honey exhibited efficient antimicrobial activity against Staphylococcus aureus, Escherichia coli, Salmonella typhi, Bacillus cereus, Klebsiella pneumoniae and Pseudomonas aeruginosa²⁶⁻³⁰.

Anti-diabetic activity - In traditional medicinal system to control diabetes Z. officinale is used. Different organic extracts and fresh juice of Z. officinale show ant-diabetic activity conducted on animal model²⁸⁻³¹.

Antifungal Activity - Extract of ginger powder is effective against several antifungal diseases. Gingerols and Gingerdiol are the principle antifungals in the ginger²⁸⁻³¹.

Anthelmintic Activity -The shoot extract (e.g., in methanol solvent) of Z. officinale was studied for antihelmintic activity against the earthworm Pheretima posthuma. The tested extract (100mg/ml) has shown significant antihelmintic activity²⁸⁻³¹.

Antiviral Activity - The dried rootstalk of ginger possesses anti-rhino-viral potential. Isolation of many sesquiterpenes done by fractionation from solvent extraction, solvent partition and

radiocontrolled by bioassay which have anti-rhino-viral activity²⁹⁻³¹.

Anticancer Activity-This properties shown by compound vallinoids, like [6]-gingerol and [6]-paradol and other constituents like shogaols, zingerone etc. [6]- gingerol sometimes useful for preventing or cure angiogenesis-dependent human diseases such as cancer³¹⁻³⁴.

Antioxidant - Ginger contain a strong anti-oxidant substance and prevent generation of free radicals. Ginger, which is the underground stem or rhizome of the plant *Zingiber officinale* Roscoe, contains polyphenol compounds (6-gingerol and its derivatives), which have a high antioxidant activity³¹⁻³⁴.

CONCLUSION -

From all this findings it was proved that Ginger is a significant herb that shows many medicinal and ethno-medicinal properties. Numbers of bioactive compounds extracted from Ginger (*Z. officinale*) is consumed worldwide as a spice and flavoring agent and that show many medicinal properties such as antiinflammatory, antimicrobial, antioxidant, antiulcer, anticlotting and anticancer properties etc. Ginger (*Z. officinale*) is one of the most important medicinal herb and extensively used in Ayurveda. Pharmacological screenings of *Z. officinale* prove its medicinal potential with several medicinal properties. Ginger (*Z. officinale*) can be show up for the control of various diseases. For the development of new products for their better economic and therapeutic uses a systemic research work should be undertaken.

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Assessment of Physico-chemical Properties of Farmland Soil From Different Village of Arni, Dist. Yavatmal (Maharashtra) India

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ABSTRACTS

Soil is a main source of nutrients needed to plants for growth. Soil provides structural stability for plants and retains and relinquishes water and the nutrients necessary for plant growth. Soil analysis provides information which is important for maximizing nutrient use efficiency and agricultural productivity. Soil properties that are sensitive to change in the management can be used as indicator. In the present study it was preferred to analyze the nutrients contain in soil sample of Arni Tehsil. The five samples were collected from different sites of the study area of Arni Tehsil in January 2022. The analysis of soil was carried out for the study of various parameters like Nitrogen, Potassium, Phosphorous, Magnesium, Calcium, Moisture, pH, EC, & Organic Carbon.

The study revealed that all the five samples of selected area of Arni Tehsil are medium to high in mineral content. The pH of the soil samples were on slightly alkaline side, ranged from 7.8 to 8.18 but within the limit of 6.5-8.5 which is optimum for