

Antibiotic effects of ginger in pharmacology a review

Savita Garwa

Research Scholar, Department of Biotechnology Mahatma Jyoti Rao Phoole University, Jaipur, Rajasthan, India

Abstract

The present review suggests the utilization of ginger in different pharmacological areas. This would be a benefit for human health in various remedies. This also is economically beneficial, cost effective and has no side effects as compared to general chemical medications. Ginger has been used for thousands of years for the treatment of numerous ailments, such as colds, nausea, arthritis, migraines, and hypertension. Over the last few years, interest in ginger or its various components as valid preventive or therapeutic agents has increased markedly, and scientific studies focusing on verification of ginger's pharmacological and physiological actions have likewise increased.

Keywords: ginger (*Zingiber officinale* Roscoe, Zingiberaceae)

Introduction

Ginger (*Zingiber officinale* Roscoe, Zingiberaceae) is one of the most commonly consumed dietary condiments in the world (Surh *et al.* 1999) ^[10]. The oleoresin (i.e., oily resin) from the rhizomes (i.e., roots) of ginger contains many bioactive components, such as [6]-gingerol (1-[4'-hydroxy-3'-methoxyphenyl]-5-hydroxy-3-decanone), which is the primary pungent ingredient that is believed to exert a variety of remarkable pharmacological and physiological activities. Although ginger is generally considered to be safe (Kaul and Joshi 2001) ^[5], the lack of a complete understanding of its mechanisms of action suggests caution in its therapeutic use (Wilkinson 2000a) ^[12]. Previous reviews (Barrett, Kiefer, and Rabago 1999; Ness, Sherman, and Pan 1999; Talalay and Talalay 2001) ^[2, 8, 11] have emphasized the importance of careful scientific research in establishing the safety and efficacy of potential therapeutic plant remedies and in defining the risks and benefits of herbal medicine. (Ali *et al.* 2008) ^[1]. The primary purpose of this chapter is to comprehensively examine the available scientific evidence regarding ginger's proven effectiveness in preventing or treating a variety of pathologic conditions.

Discussion

At least 115 constituents in fresh and dried ginger varieties have been identified by a variety of analytical processes. Gingerols are the major constituents of fresh ginger and are found slightly reduced in dry ginger, whereas the concentrations of shogaols, which are the major gingerol dehydration products, are more abundant (Jolad *et al.* 2005) in dry ginger than in fresh ginger. At least 31 gingerol-related compounds have been identified from the methanolic crude extracts of fresh ginger rhizome (Jiang, Solyom *et al.* 2005) ^[4]. One of the many health claims attributed to ginger is its purported ability to decrease inflammation, swelling, and pain. [6]-gingerol, a dried ginger extract, and a dried gingerol-enriched extract (Minghetti *et al.* 2007) ^[7] were each reported to exhibit analgesic and potent anti-inflammatory effects. Earlier animal studies suggest that rat hind limbs perfused with [6]-gingerol showed increased heat production that was

associated with increased oxygen consumption and lactate efflux (Eldershaw *et al.* 1992) ^[3]. The most common and well-established use of ginger throughout history is probably its utilization in alleviating symptoms of nausea and vomiting. The benefits and dangers of herbal treatment of liver and gastrointestinal distress have been reviewed (Langmead and Rampton 2001) ^[6], and several controlled studies have reported that ginger is generally effective as an antiemetic. The effectiveness of ginger as an antiemetic has been attributed to its carminative effect, which helps to break up and expel intestinal gas.

The effectiveness of ginger in preventing or suppressing cancer growth has been examined in a variety of cancer types, including lymphoma, hepatoma, colorectal cancer, breast cancer, skin cancer, liver cancer, and bladder cancer. Investigators suggested that the effectiveness of ginger might be related to its ability to inhibit prostaglandin and leukotriene biosynthesis (Srivastava and Mustafa 1992) ^[9]. In addition to its effects in relation to cancer, some evidence supports a protective role for ginger in cardiovascular function and a number of other disease conditions. Ginger has gained interest for its potential to treat various aspects of cardiovascular disease, and the *in vitro* and animal data supporting the anti-inflammatory, antioxidant, antiplatelet, hypotensive, and hypolipidemic effects of this condiment have been reviewed. Dried ginger may have beneficial effects in treating dementia, including Alzheimer's disease. Ulcerative colitis is a chronically recurrent inflammatory bowel disease of unknown origin, and in rats, ginger extract alleviated the symptoms of acetic acid-induced ulcerative colitis.

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. The most extensively studied bioactive components include gingerols and shogaols, especially [6]-gingerol and [6]-shogaol, respectively. The content of each component is

clearly dependent on the source and preparation of the ginger rhizome. Research interest in determining the role of natural compounds in preventing disease has increased markedly over the last few years.

In conclusion, ginger has been reported to possess diverse pharmacological properties, although its specific biological targets are largely unknown and remain to be determined. However, in spite of the lack of specific mechanistic information, use of ginger appears to be safe and its effects are mighty and amazing in its many applications.

References

1. Ali BH, Blunden G, Tanira MO, Nemmar A. Some phytochemical, pharmacological and toxicological properties of ginger (*Zingiber officinale* Roscoe): A review of recent research. *Food Chem Toxicol.* 2008; 46(2):409-20.
2. Barrett B, Kiefer D, Rabago D. Assessing the risks and benefits of herbal medicine: An overview of scientific evidence. *Altern Ther Health Med.* 1999; 5(4):40-9.
3. Eldershaw TP, Colquhoun EQ, Dora KA, Peng ZC, Clark MG. Pungent principles of ginger (*Zingiber officinale*) are thermogenic in the perfused rat hind limb. *Int J Obes Relat Metab Disord.* 1992; 16(10):755-63.
4. Jiang H, Solyom AM, Timmermann BN, Gang DR. Characterization of gingerol-related compounds in ginger rhizome (*Zingiber officinale* Rosc.) by high-performance liquid chromatography/electrospray ionization mass spectrometry. *Rapid Commun Mass Spectrom.* 2005; 19(20):2957-64.
5. Kaul PN, Joshi BS. Alternative medicine: Herbal drugs and their critical appraisal-part II. *Prog Drug Res.* 2001; 57:1-75.
6. Langmead L, Rampton DS. Review article: Herbal treatment in gastrointestinal and liver disease-benefits and dangers. *Aliment Pharmacol Ther* 2001; 15(9):1239-52.
7. Minghetti P, Sosa S, Cilurzo F. editors. Evaluation of the topical anti-inflammatory activity of ginger dry extracts from solutions and plasters. *Planta Med* 2007; 73(15):1525-30.
8. Ness J, Sherman FT, Pan CX. Alternative medicine: What the data say about common herbal therapies. *Geriatrics* 1999; 54(10):33-8, 40-43.
9. Srivastava KC, Mustafa T. Ginger (*Zingiber officinale*) in rheumatism and musculoskeletal disorders. *Med Hypotheses.* 1992; 39(4):342-8.
10. Surh YJ. Molecular mechanisms of chemopreventive effects of selected dietary and medicinal phenolic substances. *Mutat Res.* 1999; 428(1-2):305-27.
11. Talalay P, Talalay P. The importance of using scientific principles in the development of medicinal agents from plants. *Acad Med.* 2001; 76(3):238-47.
12. Wilkinson JM. Effect of ginger tea on the fetal development of Sprague-Dawley rats. *Reprod Toxicol.* 2000a; 14(6):507-12.