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The Review on Medicinal Uses of Ginger

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ABSTRACT

Ginger (Zingiber officinale) is extensively used in medicinal purpose. Ayurveda literatures highlight administration of ginger in both of communicable and non-communicable diseases. Recent advances in analytical chemistry, cytology and microbiology recommend application of ginger in various disease conditions as well as recommendations in Ayurveda literature. The current study focused on review ethno medicinal value of Z. officinale including antiviral effect, radioprotective effect, anti-inflammatory effect, anticancer effect and antioxidant effect with special reference to Ayurveda recommendations. The study elaborates; ginger is effective in viral infections and revitalizing the body at disease conditions according to both of Ayurveda and modern concepts through enhancing appetite, immunity and re-boosting weakened physiological functions of the human body. Active ingredients which available in ginger such as 6-gingerole, 6-shogaol, 6-paradol, zingerole and zerumbone are responsible in upgrading enzyme actions and balancing circulation through rejuvenating the body with physical re-strengthening.

KEYWORDS: ginger, antipyretic, anti-inflammatory, anticancer, antioxidant

INTRODUCTION

Zingiber officinale is one of the most widelyused plants in Asia, Australia and other many countries. Empirically, Z. officinale has been used in digestive disorders (indigestion, flatulence, constpation, nausea), headache, rheumatism, cold and cough. In the last few decades, Z. officinale is extensively studied for its medicinal properties advanced scientific techniques and a variety of bioactive compounds had been isolated from different parts of the plant. The plant is reported for antimicrobial activity, anticancer activity, antioxidant activity, antidiabetic activity, nephroprotective activity, hepatoprotective activity, larvicidal activity, analgesic activity, anti-inflammatory activity and immunomodulatory activities. More than seventy pharmacology studies of Z officinale rhizomes have been reported. Most of the secondary metabolites of herbs are commercially important and find use in a number of pharmaceutical compounds. Flavonoids and phenolics are the most important groups of secondary metabolites and bioactive compounds in plants. Shogaol and gingerol are the most common bioactive compounds found in ginger, and have various pharmacological benefits. The present review is focused for the taxonomy, distribution, botanical description, secondary metabolite extraction, chemical constituents, pharmacological activity, side effect and toxicity.

Taxonomy, Distribution, and Botanical Description:
Kingdom : Plantae
Division : Magnoliophyta
Class : Liliopsida
Order : Zingiberales
Family : Zingiberaceae
Genus : Zingiber
Species : Zingiber officinale var. Roscoe

Ginger is a tropical plant, grows well in hot and humid climates. The plant is cultivated in China, Nepal, US, India, Bangladesh, Taiwan, Jamaica, Nigeria and Indonesia. India is the biggest producer of Z. officinale.In Indonesia, Z. officinale is one of the export commodities, with the development area in 2010 reaching 6,053 ha and the requirement of ginger seed is rhizome 12.106 tons/year. In accordance with the requirements of growing ginger, seed production sites

Medical properties of ginger:

Many studies reported several medicinal properties of ginger, which include the following:

Anti-ulcer and anticholinergic:

Ginger acts and protect gastric mucosa against several ulcerogenic agents and is very useful in cases of ulcerogenesis because of its antioxidant properties This has both many benefits and drawbacks, because prostaglandin has been shown to have a housekeeping and gastro-protective function by maintaining gastric mucosal integrity Ginger shows strong antiemetic property by enhancing intestinal motility and inhibiting serotonin receptors. Ginger was reported to stimulate the peripheral anti-cholinergic and anti-histaminic receptors and antagonize 5-hydroxytreptamine receptors in the GIT.

Antioxidant, anti-inflammatory and rheumatologic properties:

Ginger was reported to show anti-inflammatory effect through the suppression of PG synthesis and also to have interference in cytokine signaling Several studies have reported that the oil extracted from ginger had scavenging effects due to volatile oils Ginger is a powerful antineoplastic agent. In some studies, extracts of ginger suppressed cell proliferations and also acted against resistance of cancerous cells Ginger is known to exhibit a powerful antioxidant activity due to its oil which has protective effect on DNA. This effect has been demonstrated in some cell culture. Ginger has preventive effect on lipid peroxidation and also inhibits or breaks its chain. Gingermodulates genetic pathway, acts on tumor suppression of genes and modulates some biological activities Gingerols and Paradol have been reported to have good anti-platelet and COX-I inhibitory propertiesIt was also reported that ginger exerts its anti-inflammatory effects by the mechanisms which explain the role of inhibition of pre-inflammatory factor like prostaglandin and leukotriene biosynthesis

which may reduce pain associated with rheumatoid and osteoarthritis. In history, it has been proven to be used for the treatment of rheumatic conditions.

Analgesic effect:

Gingerols, which are the key ingredients responsible for the activity of ginger have shown important pharmacological effect. It is used to treat nausea after surgery and same has been proved in several randomized clinical trials. This effect is reported to be seen due to its action on the 5-HT3 receptor Ginger is used for the treatment of headache and also have good effect on reducing symptoms of pain. This effect is believed to be due to reduction in prostaglandin synthesis. It has also been reported that ginger help to suppress leukotriene biosynthesis by inhibiting 5-lipoxyganse.

Anti-cancer effect:

Z. officinale exhibits antiinflammatory and anti-tumorigenic effects due to its bio active molecules such as 6-gingerole, 6-shogaol, 6-paradol and zerumbone, as a result prevention or control from colorectal, gastric ovarian, liver, breast and prostate cancers is possible.

Z. officinale activates enzymes such as glutathione peroxidase, glutathione s transferase and glutathione reductase andsuppress colon carcinogenesis.

Oral administration of Zerumbone effects in inhibition of multiplicity of colonicadenocarcinomas through suppression of colonic inflammation due to inhibition of proliferation, induction of apoptosis and suppression of NF-κB and heme oxygenase (HO)-1 expression.In gastric carcinomas, gingerol and shogaol effect in TRAIL induced NF-κB, suppresses cIAP1 expression and increases TRAIL induced caspase-3/7 activation which promotes apoptosis [34]as well gingerol is effect in liver cancers by arresting cell cycle and induction of apoptosis. Growth inhibition of human epidermoid carcinoma cells via reactive oxygen species (ROS) induced apoptosis is exhibited by gingerol with conciderable amount of toxicity.Activecompounds of Z. officinale effect in controlling ovarian cancers via inhibition of NF-κBactivation and diminished the secretion of VEGF and IL-8.Zerumbone is also effect in controlling pancreatic cancers through p53 signal pathwayformation of apoptotic bodies, condensed nuclei and the increased activity of caspase-3.Maintaining, proper circulation, nervous conduction, heart functions and balancing digestive and absorptive disorders through enhancing appetite is beneficial in enhancement of the immunity of the body which supports in alleviate abnormal growths and malfunctions of physiologica.

Blood circulation and anti-cramp effects:

Ginger has been discovered to enhance blood circulation throughout the body by stimulating the heart muscles and by diluting circulating blood. This enhances cellular metabolism and aids to relieve certain conditions such as cramp and tension. The powerful anti-inflammatory actions on prostaglandin synthesis also help in relieving menstrual cramps.

Cholesterol regulation and hypotensive properties:

Ginger extracts interferes with the biosynthesis of cholesterol, thereby leading to decreasing cholesterol levels in animals. Ginger extracts have antilipidemic effects, by reducing thermogenesis and high lipids levels. They also help to increase serum HDL-cholesterol Ginger is very effective in lowering blood glucose level when taken in dried form. It also decreases triglyceride level. Long term usage has been reported to aid the increase of high-density lipoprotein cholesterol concentrations. There is a study which proved the hypotensive effect of ginger when it was given at 0.3-3 mg/kg. It aids the reduction of atrial blood pressure by blocking calcium channel or by acting on muscarinic receptor Studies have suggested that ginger may improve insulin sensitivity in body. The mineral elements contained in ginger make it effective for this same purpose.

Antimicrobial effects:

Due to the presence of some phenolic compounds in it, ginger has shown great antimicrobial activities and effectiveness in controlling certain viral, bacterial and fungal diseases. Ginger is used in many countries for the preservationof foods. Ginger acts as anti-parasitic. Some studies reported the in vivo potential of methanolic extract of Zingiber officinale in the treatment of trypanosomiasis. Gingerols and Gingerdiol are the main anti-fungal principles, and extract of ginger powder is effective against several antifungal diseases . Ginger has shown antiviral effect; however ; Ginger is reported to be effective in management of hepatitis C virus infection where viral clearance is affected. Ginger has also been reported to have shown good antimicrobial effect against both Gram positive and negative bacteria; however, severally, this effect is reduced due to heating.

CONCLUSION:

Ginger is well known as a condiment and spices used for flavoring food and also its use as a therapeutic purpose from a thousand years ago. Ginger and its bioactive components include gingerols, shogaol, and paradols are active/valuable ingredients which use as a novel therapeutic strategy against various degenerative diseases. This review appreciated natural products drugs (ginger), have beneficial effects for cardiovascular disorders, diabetes mellitus and the gastrointestinal health.

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