Review

Antimicrobial Activity of Ginger Essential Oil

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Abstract: This review surveys the antimicrobial activity of ginger essential oil, against foodborne pathogens. However, these microbes can withstand certain concentrations of ginger essential oil. In herbal medicine, ginger is recommended for a very large number of problems whether it is digestive, energy, vitality or to fight various infections. Ginger oil can cure coughs and kill the bacteria responsible for the infection. The biological activities of ginger essential oil components, disrupts the microbial cytoplasmic membrane. Overall, ginger essential oil, could be used to prolong shelf life and cure foodborne microbes.

Keywords: ginger, microbes

1. Introduction

The first antibiotics, such as penicillin, were of natural origin. However, they have been essentially replaced by synthetic products in the pharmaceutical industry. Certainly, there must be great advances in the process, but our time knows the disenchantment of the resistance of bacteria and it seems wise to focus on alternative solutions (Alio et al., 2013; Almadiy et al., 2016). Our body works very hard to fight against bacteria, germs, and viruses that we can ingest in the air we breathe or in the food we eat. Whether it's a common flu attack, a terrible skin infection, or a stomach ache, bad bacteria can affect your health. Therefore, your internal defense mechanism must always be active to get rid of it. Our immune system is powerful enough, but it needs little help, which can be provided in the form of these antibacterial and antimicrobial foods that naturally fight off harmful bacteria (Da Cunha et al., 2012; Frank et al., 2008; Godoy et al., 2004). Using natural antibiotics, therefore, prevents the production of resistant bacteria in one's own body. According to the researchers, some essential oils are a more than valuable treatment against...
methicillin-resistant staphylococcus, since it is twice as effective as conventional treatments (Bajalan et al., 2017). However, ginger essential oil is very used in the therapeutic, health, and pharmaceutical industries due to their antibacterial, anti-infectious, antioxidant and anti-inflammatory effects. (O’Sullivan et al., 2017; Raei et al., 2015; Zeeb et al., 2014). The objective of this review is to outline the antimicrobial activity of ginger essential oil against foodborne pathogens.

2. Ginger
Ginger is a plant with leafy stems and yellowish green flowers used as medicine in traditional medicine and the roots are used as a spice. Ginger originates from warmer regions of Asia, such as India, China, and Japan, but it's now cultivated in parts of America and Africa. Ginger has several volatile and non-volatile active components which give it a taste, aroma, antioxidant and antimicrobial, anti-cancer, anti-inflammatory activity and also nutritional effects (Karthika et al., 2018). In herbal medicine, ginger is recommended for a very large number of problems whether it is digestive, energy, vitality or to fight various infections. It is also reputed effective to remove any form of nausea and vomiting (Cakir et al., 2018; Karthika et al., 2018). Today, ginger is the subject of different studies, especially for its possible anti-cancer. Ginger is above all an excellent invigorating and invigorating body; it effectively strengthens the person weakened by the disease. Its aphrodisiac properties come to him more from his ability to tone the whole body than direct effects on hormones (Karthika et al., 2018; Yılmaz et al., 2018). The nutrients and bioactive compounds found in this plant have powerful benefits for the body and brain. It’s can be used fresh, dried, powdered, oil or juice. Ginger contains over 100 different components according to chemical analysis. The main components of ginger contain phenolic gingerol, paradols and shogaol and also terpene: β-bisabolene, zingiberene, alpha-curcumene, alpha-farnesene, and β-sesquiphellandrene. However, the phenolic components have approved many virtues on the human body (Hąc-Wydro et al., 2017; Kovács et al., 2008).

3. Antimicrobial activity of the ginger essential oil
The presence of gingerol, sesquiterpenoid, zingiberene and other components in ginger contributes to its antimicrobial activity for the preservation of food by eliminating foodborne pathogens. Its antibacterial properties also help fight the pathogenic bacteria causing urinary tract infections, bronchitis, and pneumonia (Yılmaz et al., 2018). The ginger essential oil had biological activities that are attributable to their main components. However, those components are effective against various foodborne pathogens (Bajalan et al., 2017). The research showed that the action of these components disrupts the microbial cytoplasmic
membrane. Ginger oil can cure coughs and kill the bacteria responsible for the infection (Frassinetti et al., 2011; Furneri et al., 2012). Ginger oil also contains a group of chemical compounds called sesquiterpenes known to kill rhinoviruses, cold agents. Studies have also shown that volatile compounds in ginger essential oil have antibiofilm properties that are unsuitable for the growth of many foodborne bacteria. (Karthika et al., 2018; Mirghafourvand et al., 2016). Ginger is known to inhibit bacterial, viral, and fungal infections. The antibacterial activity and inhibitory activity of ginger extracts could be attributed to the chemical properties of ginger (Espina et al., 2011; Yılmaz et al., 2018). The presence of gingerol, sesquiterpenoid, zingiberene and other components also contributes to food preservation by eliminating foodborne pathogens. Its antibacterial properties also help fight the pathogenic microorganisms causing urinary infections, bronchitis and pneumonia (Cakova et al., 2017; Mirghafourvand et al., 2016). Ginger also fights against diseases and infections like colds and flu at all ages. It can be used in tea form to keep the body warm. By using it like tea, it acts diaphoretic and causes perspiration which eliminates toxins from the body and allows the easy elimination of sputum and felicitates the healing (Cakir et al., 2018; Kumar et al., 2013).

![Fig.1. Chemical structure of ginger active constituents](image)

Fig.1. Chemical structure of ginger active constituents
4. Conclusion
This review demonstrated the antimicrobial activity of ginger essential oil. Ginger essential oil has important volatile compounds having various bioactivities, including an antimicrobial potential. However, the antimicrobial properties of ginger essential oil are mainly related to the individual susceptibility of microbes. Therefore, this review could add scientific knowledge on natural antibiotic effective against food-borne microbes.

5. Acknowledgements
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