

The Content Effectiveness in Red Ginger (*Zingiber officinale* Rosc.) Variety to Increase Immunity

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Abstract

Coronavirus Disease 2019 (Covid-19) has become a very worrying disease outbreak in several countries, one of which is Indonesia. Covid-19 is an infectious disease caused by a newly discovered type of coronavirus and has been an epidemic since December 2019 in Wuhan, China. This coronavirus can cause respiratory tract infections in humans. Based on data analysis from the COVID19 Handling Committee and the National Economic Recovery, stated that confirmed cases of the corona virus in Indonesia as of April 9, 2021 reached 1,558,145 people, of which 1,405,659 people were declared cured and 42,348 people were declared dead (Covid19.go, 2021). Cases infected with COVID-19 will continue to increase if people do not orderly comply with health protocols. In addition, it is necessary to increase the community's immune system so that it is not easily infected. The immune system is very important to be improved and maintained during the COVID19 pandemic. One of the efforts to improve the body's immune system is to take vitamin c supplements. However, during this pandemic, vitamin C supplement products are limited and prices have skyrocketed. So that other alternative materials are needed that are cheap, easy to obtain, and most importantly have a fairly high antioxidant content. One alternative material that can be used according to these criteria is red ginger (*Zingiber officinale* Rosc.). The purpose of this activity is to find out more about the effectiveness of red ginger as an alternative immune-boosting ingredient. This research was conducted by means of a literature study by reviewing articles related to the effectiveness of red ginger to increase immunity. The results obtained indicate that red ginger is effective in increasing the body's immunity because red ginger contain vitamin A, vitamin E, vitamin C, selenium, iron and zinc. The plant is one of them red ginger (*Zingiber officinale*). The compounds in red ginger are reported to have properties as antibacterial, antioxidant, anti-inflammatory, analgesic, diuretic, antifungal, anticancer, and antiviral..

Keywords: red ginger, immune system, pandemic, Covid-19

1. Introduction

At the end of 2019, a new type of virus that shook the world, namely Coronavirus which caused Coronavirus Disease 2019 (Covid-19). It was known that the virus first appeared in Wuhan, China. It was discovered after several cases of pneumonia with unknown cause were discovered on December 30, 2019. Coronavirus disease (Covid-19) was growing rapidly in 2019 and had spread in 188 countries in the world. The World Health Organization (World Health Organization) reported that as of 9 January 2021, the global data had confirmed 87,589,206 cases of Covid-19 virus and a total of 1,906,606 deaths (World Health Organization, 2021). In Indonesia, the Health Ministry of the Republic of Indonesia reported data as of January 9, 2021. In 510 affected areas / cities, there were 818,386 positive cases and 23,947 of whom had died (Indonesian Ministry of Health, 2021).

The outbreak of Corona virus disease (Covid-19) in 2019, it was because the spread of the virus occurred through the contact between humans. Therefore, within a short period of time, the number of confirmed positive cases increased dramatically. However, the Ministry of Health showed that if a person's immune system is strong because the virus can treat itself, then there is no special treatment is needed to recover from this virus infection (Syahrir et al., 2020). Generally, the diseases caused by viruses are diseases that rely on the strength of the body's defense (self-limiting-disease). Immunity is the human body's mechanism in protecting the attack of foreign substances from outside and inside the human body. To prevent the transmission of the virus, the immune system needs to be improved in order to the immunity runs well.

During the current covid-19 pandemic, maintaining body immunity is very important, in addition to exercising, consuming nutritious food, getting enough rest and taking vitamin C supplements as a

good source of antioxidants for our bodies. Antioxidant properties have benefits for increasing immunity and anti-inflammatory because this causes a surge in the use of vitamin C supplements, resulting in a shortage of vitamin C supplement stocks and high prices. Because of this, there is a need for alternative natural ingredients that have high antioxidant properties, are affordable and easily available. One of the natural resources that meet these criteria is red ginger (*Zingiber officinale*). Red ginger (*Zingiber officinale*) has benefits in the body's defense system because it is an antioxidant nutrient (Student et al, 2013).

Ginger (*Zingiber officinale*) is a spice plant originally from South Asia and now spread throughout the world. Then, the Chinese community introduced the various spices to Europe in the form of recipes (Aryanta, 2019). According to reports, the compounds in red ginger have antibacterial, antioxidant, anti-inflammatory, analgesic, diuretic, antifungal, anticancer and antiviral properties (Kaushik et al., 2020; Ukeh et al., 2009). According to computational studies (molecular docking), it was reported that the compounds in red ginger have the ability to inhibit viral infections such as the SARSCoV-2 virus (Das et al., 2020; Dhanasekaran & Pradeep, 2020; Ahkam et al., 2020; Rajapaksa et al., 2020).

The purpose of this article is to determine the effectiveness of red ginger content to increase immunity during this pandemic.

2. Research Methods

This research is a literature study, studied 6 articles which are related to the content of red ginger. The results of various literature reviews will be used to determine the effectiveness of red ginger in increasing immunity during the pandemic

3. Result and Discussion

The following is a table containing several references that show a statement of the content contained in red ginger so that it can increase the body's immunity. The table shows that some literature has mentioned the ingredients contained in red ginger that can increase immunity. Some even say that consuming red ginger every day will not get influenza because red ginger is proven to strengthen immunity.

Tabel 1 Some literature has mentioned the ingredients contained in red ginger that can increase immunity

No.	References	Statement
1.	Efficacy of ginger as an adjunctive anti emetic in acute chemotherapy-induced nausea and vomiting. ASHP Midyear Clinical Meeting	Ginger also contains crude fiber, vitamins and minerals. Ginger also contains adamantaldehyde, para-indole, gingerdiol, ginger diacetate, gingerenone, 6-gingersulfonic acid, triterpenes, ginger glycolipids A, B and C (Qianand Liu 1992; Huang et al., 1991; Pecoraro et al., 1998; Anonymous 1997; Frisch et al. Et al. (1995).
2.	Ginger: Health Benefits and Dietary Tips. https://www.medicalnewstoday.com/articles/265990.php .	Ginger also contains active anti-inflammatory and antioxidant chemicals, including gingerol, beta-carotene, capsaicin, caffeic acid, curcumin, and salicylic (Ware, 2017). Vitamin C contained in red ginger is an important antioxidant compound that can interact against free radical reactions. Other types of nutrients in ginger rhizome are low, including magnesium, phosphorus, zinc, folic acid, vitamin B6, vitamin A, riboflavin and niacin (Ware, 2017).
3.	a ginger product, modulates neuroinflammation: a new approach to neuroprotection. Neuropharmacology 63(2):211-23.	Ginger exhibits antiviral effects; however, more public literature is needed to prove its efficacy (Gong et al., 1989; Ernst and Pittler, 2004; Anonymous, 1997; Ha et al., 2012; Lantz et al., 2007).
4.	Virtual prediction of antiviral	Therefore, red ginger is expected to inhibit the infection process of

potential of ginger (<i>Zingiber officinale</i>) bioactive compounds against spike and MPro of SARSCoV2. <i>Journal of Biological Researches</i> , Vol. 25, No. 2: 52–57.	the SARS-CoV-2 virus in human host cells, and is expected to be a good oral medicinal drink (Ahkam et al., 2020).
5. Profil GC-MS Senyawa Metabolit Sekunder dari Jahe Merah (<i>Zingiber officinale</i>) dengan Metode Ekstraksi Etil Asetat, Etanol dan Destilasi. <i>Jurnal Sains dan Kesehatan</i> , Vol.2, No.3 : 198- 204.	A study proved that the use of GC-MS (gas chromatography-mass spectrometry) to measure 100 grams of red ginger showed the presence of gingerene compounds. This compound has the highest content in red ginger, which is 35.6%. Then, the second compound that is mainly contained in the ethanol extract of red ginger is gingerone, which is a compound found in the root of the ginger plant and can be used as a natural antioxidant. (Nur, 2020).
6. Life Style Guideline of Ginger (<i>Zingiber officinale</i>) as Prophylaxis and Treatment for Coronaviruses (SARS CoV-2) Infection (COVID-19). <i>Saudi Journal of Biomedical Research</i> , Vol 5, No. 6 : 125-127.	According to the research, Magzoub, a Sudanese who often drinks red ginger, will not catch influenza / COVID-19. This is because red ginger has been shown to strengthen immunity, increase IgM levels and reduce circulating pro-inflammatory cytokines (Magzoub, 2020).
7. The influence of red ginger extract in menopause climacterium period of total cholesterols in covid-19 pandemic period in east java. <i>Systematic Reviews in Pharmacy</i> , 11(6), 831–835.	Red Ginger with essential oil will be used as the active ingredient, this will remove LDL from the body and stimulate hormones and produce more HDL in the body, which is good cholesterol. This helps our body improve immunity. (Mudrikatin, 2020)
8. Quantitation of gingerols in human plasma by newly developed stable isotope dilution assays and assessment of their immunomodulatory potential. 2016;64(11):2269-79.	Ginger inhibits Th1 responses that contribute to the development of certain autoimmune diseases (Schoenknecht et al., 2016).

Ginger is a medicinal plant that is quite used as traditional medicine in Indonesia. Ginger is very popularly used to warm the body. The warmth that appears in ginger is caused by the presence of zingerone compounds. In addition, there are other compounds contained in ginger that are useful for health. Ginger standards have been well documented in the USP (United State Pharmacopoeia) and National formularials. This study has further classified more than 400 different compounds in ginger and the main constituents:

1. Carbohydrates - about 70%
2. Lipids-about 8% which includes free fatty acids.
3. Volatile oil - about 3% consist of sesquiterpenes, beta-bisabolene4.

Ginger also contains active anti-inflammatory and antioxidant chemicals, including gingerol, beta-carotene, capsaicin, caffeic acid, curcumin, and salicylic (Ware, 2017). Because of its phenolic compounds, ginger has extraordinary antibacterial properties, which can effectively control viral, bacterial and fungal diseases. In many countries, ginger is used to preserve food (Ernst and Pittler, 2004; Liao et al., 2012; Chen et al., 2009). Ginger exhibits antiviral effects; however, more public literature is needed to prove its efficacy (Gong et al., 1989; Ernst and Pittler, 2004; Anonymous, 1997; Ha et al., 2012; Lantz et al., 2007). The following is a table of ginger content according to Ware (2017).

Table 1. Types of nutrients and nutritional value of raw ginger.

Types of nutrients	Nutritional value per 100 g
Energy	79 kkal
Carbohydrate	17,86 g
Fiber	3,60 g
Protein	3,57 g
Sodium	14 mg
Zinc Substance	1,15 g
Potassium	33 mg
Vitamin C	7,7 mg

Source: Ware (2017).

From the data, 100 g of red ginger contains vitamin C. Vitamin C contained in red ginger is an important antioxidant compound that can interact against free radical reactions. Other types of nutrients in ginger rhizome are low, including magnesium, phosphorus, zinc, folic acid, vitamin B6, vitamin A, riboflavin and niacin (Ware, 2017). Vitamin A is also a natural antioxidant that can fight free radicals. Therefore, vitamins C and A contained in red ginger play a positive role in boosting immunity.

The docking molecular results show that compared to other compounds in red ginger, gingerone has the lowest binding energy with S and Mpro proteins. Ginger oil, geraniol, cattailol, gingerene, gingerol and gingerol can interact with the main residue responsible for MPro's catalytic domain, whereas geraniol, stilbene, gingerene, and gingerene can interact with the main residue which have a responsibility for MPro's catalytic domain. Alcohol and ginger can interfere with protein S and ACE2. Therefore, red ginger is expected to inhibit the infection process of the SARS-CoV-2 virus in human host cells, and is expected to be a good oral medicinal drink (Ahkam et al., 2020).

A study proved that the use of GC-MS (gas chromatography-mass spectrometry) to measure 100 grams of red ginger showed the presence of gingerene compounds. This compound has the highest content in red ginger, which is 35.6%. Then, the second compound that is mainly contained in the ethanol extract of red ginger is gingerone, which is a compound found in the root of the ginger plant and can be used as a natural antioxidant. (Nur, 2020). Antioxidants can help strengthen the immune system against free radicals.

According to the research, Magzoub, a Sudanese who often drinks red ginger, will not catch influenza / COVID-19. For those who show symptoms of corona virus infection, the symptoms are mild and can recover quickly. This is because red ginger has been shown to strengthen immunity, increase IgM levels and reduce circulating pro-inflammatory cytokines (Magzoub, 2020).

4. Conclusion

Red ginger (*Zingiber officinale*) is able to increase immunity and inhibit the infection process because it contains good substances such as vitamin C, vitamin A, Zingiberene compounds and zingerone compounds which have high antioxidant properties. Red ginger can be used as an herbal supplement to maintain the immune system in the midst of the COVID-19 pandemic at a relatively cheaper price and easy to obtain.

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