

Alpinia galanga or Lengkuas (Zingiberaceae): A Possible Treatment for COVID-19

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Abstract

Alpinia galanga (Zingiberaceae) or lengkuas is one type of herbal plant that is widely grown in Southeast Asia. Various countries cultivate this medicinal plant, including Indonesia. This medicinal plant has a variety of benefits and also be used as a treatment for many diseases. Although the lengkuas rhizome is the most widely used and studied part of the plant, the flower on the lengkuas can also provide additional advantages, such as antioxidant and antimicrobial properties. Therefore, this study aimed to demonstrate lengkuas for the future prospects against SARS-CoV-2. In summary, this study suggests that lengkuas might be useful as a treatment for COVID-19, although further studies could be conducted to confirm the results of computational studies.

Keywords: *Alpinia galanga*, COVID-19, Medicinal Plant, Phytochemistry, SARS-CoV-2

Introduction

Alpinia galanga (Zingiberaceae) or lengkuas is one type of medicinal plant that is widely grown in Asia. Many developing countries cultivate this plant, including Indonesia. This plant has a variety of benefits, ranging from being used as spices. lengkuas can also be used as a treatment for many diseases¹.

Lengkuas is widely used to treat breathing diseases, stomach diseases, and diarrhea. Lengkuas can also use as an antimicrobial replacement for antibiotics^{2,3}. Lengkuas rhizome began to be used in several formulations to prevent cancer and is also used for the treatment of other diseases such as diabetes, neurological disorders, and so on^{4,5,6,7,8}.

In addition, there are various components in the lengkuas rhizome, such as flavonoids, phenolic acids, and terpenoids^{9,10}, while there are main active compounds found in the lengkuas rhizome, namely kaempferol, galangin, and etc^{8,11,12,13,14,15}. Therefore,

this study aimed to demonstrate lengkuas for the future prospects against SARS-CoV-2.

Plant Taxonomy

The lengkuas taxonomy as described: Kingdom (Plantae), Division (Magnoliophyta), Class (Liliopsida), Order (Zingiberales), Family (Alpinoideae), Genus (*Alpinia*), and Species (*Alpinia galanga*)¹⁶.

Plant Description

Lengkuas is herb that can grow up to 3.5 cm, with underground rhizomes and minor adventitious roots. The flowers are compound and 3-4 long with a pleasant smell, with flower crowns green at the base and white buds. The rhizomes have a red-brown color on the surface, while the inside of the rhizome is brown-orange. Size and shape of the leaves are 3.8-11.5 cm, oblong-lanceolate, glabrous, distichous, and acute¹⁷.

Geographical Distribution

Lengkuas grows in many Asian countries such as Indonesia (especially in Java)¹⁸, Arabia, China, India, Malaysia, and Sri Lanka. It favors hot places exposed to extensive sun light, but it can also grow in forests¹⁹.

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Traditional Use

Lengkuas rhizome is effectively used as a therapeutic treatment for various diseases, because it contains anti-inflammatory, antioxidant, anti-bacterial, anti-tumor, and etc²⁰. It can be used to treat stomach pain, diabetes, and so on²¹. The tuber of the lengkuas is often used as a cough therapy, fever, and diabetes mellitus²².

Phytochemistry

Lengkuas is one of the most common and widely studied galangal species because lengkuas has ethnobotany and medicinal benefits. Lengkuas has contains pharmacological attributes that are linked to phytochemical constituents in different galangal species. Phytochemicals in the lengkuas mostly are comprised of phenolic compounds and terpenes^{23,24}.

Biological and Pharmacological Actions

Lengkuas has recently become a popular medicinal plant for many studies. Therefore, lengkuas has been studied for its pharmacological effects. Various medicinal benefits of lengkuas are described below, including antiviral activity against SARS-CoV-2.

Antibacterial Activity

Lengkuas have shown significant results against *P. aeruginosa*, *S. aureus*, *E. coli*, and so on²⁵. Essential oil compounds of lengkuas rhizome have significant activity against *P. aeruginosa*, *S. aureus*, *E. coli*, and etc^{26,27}.

Anti-inflammatory Activity

Lengkuas rhizome plays an important role in

inhibiting the release of beta-hexominidase and also play a role in RBL-2H3 cells²⁸. Additionally, lengkuas rhizome has anti-inflammatory potential in various animal models²⁹.

Antioxidant Activity

Lengkuas extract has antioxidant activity. Antioxidant activity was calculated using DPPH and ORAC^{30,31}.

Immunostimulatory Activity

In vivo study reported immunostimulatory activity of lengkuas³².

Anti-Retrovirus Activity

The lengkuas rhizome extract contains the active compound which plays an important role againts HIV-1 (*Retroviridae*)³³.

Antiviral Activity against SARS-CoV-2

Medicinal plants in the Zingiberaceae family include *Alpinia*, *Kaempferia*, *Curcuma*, and so on, which contain compounds often used as herbal treatments³⁴. The use of herbal treatments increased rapidly during the COVID-19 pandemic. In Indonesia, a study reported the potential inhibitory effect of *Alpinia*, *Caesalpinia*, *Citrus*, and *Curcuma* against SARS-CoV-2, so that the development may provide novel treatment and prevention strategies for COVID-19 treatment. One of the phytocomponents of lengkuas has been predicted as a possible potent antiviral agent against SARS-CoV-2³⁵ (Figure 1).

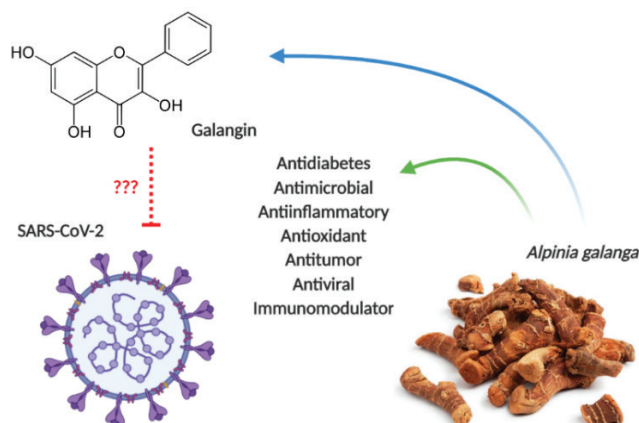


Figure 1. *Alpinia galanga* and its phytomedicine benefits.

Conclusion

In summary, lengkuas is commonly used as a medication for many illnesses. This study suggests that lengkuas might be useful as a treatment for COVID-19, although further studies could be conducted to confirm the results of computational studies.

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