



Potency of Turmeric (*Curcuma longa L.*) and Temulawak (*Curcuma xanthorrhiza Roxb.*) in Handling Coronavirus Disease 2019 (COVID-19)

Rachmat Hidayat^{1*}, Patricia Wulandari²

¹Department of Biology, Faculty of Medicine, Universitas Sriwijaya, Palembang, Indonesia

²Cattleya Mental Health Center, Palembang, Indonesia

ARTICLE INFO

Keywords:

Curcuma longa

Curcuma xanthorrhiza

COVID-19

Curcuminoids

*Corresponding author:

Rachmat Hidayat

E-mail address:

dr.rachmat.hidayat@gmail.com

All authors have reviewed and approved the final version of the manuscript.

<https://doi.org/10.37275/ehi.v3i2.57>

ABSTRACT

One of the efforts to prevent COVID-19 that can be done is to increase individual immunity. The effort that can be made is to use herbal ingredients as health drinks. *Curcuma longa L.*, or turmeric, has long been known as one of the ingredients used to treat several complaints. Turmeric has a chemical content of carbohydrates (69.4%), curcuminoids, and essential oils (5.8%). Turmeric and curcumin are non-mutagenic, and no reproductive toxicity has been observed. *Curcuma xanthorrhiza Roxb.*, also known as temulawak, contains curcuminoids (1-2%) and essential oils with xanthorrhizol components (31.9%), β -curcumene (17.1%), arcurcumene (13.2%), camphor (5.4%), γ -curcumene (2.6%), (Z)- γ -bisabolene (2.6%), and (E)- β -farnesene (1.2%). Empirically, temulawak has been used for generations in Indonesia to treat various digestive disorders, skin complaints, liver and bile disorders.

1. Introduction

Novel coronavirus (COVID-19) has now become a pandemic and a global health problem. COVID-19 cases started with information from the World Health Organization (WHO) on 31st December 2019, which mentioned cluster pneumonia with unclear etiology in Wuhan City, Hubei Province, China. This case continued to grow until it was finally discovered that the cause cluster was the novel coronavirus. This case continued to grow until there were reports of deaths and imports outside China. On 30th January 2020, WHO declared COVID-19 a public health emergency of international concern (PHEIC). On February 12, 2020, WHO officially declared the novel coronavirus disease. In humans, this is called Coronavirus Disease (COVID-

19). In Indonesia itself, the first case of COVID-19 was reported on 2nd March 2020. The area of spread of COVID-19 in Indonesia is widespread in almost all provinces. The number of patients infected with COVID-19 also continues to grow. A few months next, the Indonesian nation will face major problems caused by COVID-19 if not handled properly.

Facing a situation like this, it is necessary to control and prevent COVID-19. One of the prevention efforts that can be done is to increase community resilience through individual body health. The body's immune system can be maintained and improved, mainly through healthy living habits, including maintaining cleanliness, and good nutrition, coupled

with the use of health supplements and herbal ingredients/traditional medicines. Indonesia is one of the countries with great biodiversity. No less than 30,000 species of plants exist in the tropical forests of Indonesia. Of these, around 9,600 species are known to have medicinal properties, but not all of them are used optimally as herbal medicines.^{1,2} Utilization of herbs as medicine in the form of steeping ingredients, herbs, standardized herbal medicines, and phytopharmaceuticals. Herbal medicine is a cultural heritage of the Indonesian people, which has been traditionally and for generations used to improve health status.

Benefits of turmeric (*Curcuma longa* L.)

Curcuma longa L., or turmeric, has long been known as one of the ingredients used to treat several complaints. Turmeric has a chemical content of carbohydrates (69.4%), curcuminoids (a mixture of curcumin, demethoxycurcumin, and bisdemethoxycurcumin), and essential oil (5.8%). Rhizome mixed with warm milk is used to cure colds, bronchitis, and asthma. Meanwhile, fresh rhizome juice can be applied to skin infections. Turmeric rhizome is also said to have properties to relieve various inflammations, rheumatism, stomach pain, liver disease, kidney stones, and cleanse menstruation.³

Research on immunomodulatory activity in vivo by using poly d,l-lactic-co-glycolic acid entrapped curcumin nanoparticles in albino mice desensitized with goat red blood cells (SRBCs) showed that nano curcumin at doses of 5 mg/kg and 10 mg/kg increased the immune response mediating the response. Baseline cells compared to controls. The same results also occurred in secondary humoral antibodies, where the production of white blood cells and lymphoid organ weight also increased in the group given 10 mg/kg nano curcumin. Other studies have been conducted to determine the effect of post-rum-supply phytonutrients in dairy cows. Phytonutrients such as date palm oleoresin (2 g/beef); onion extract (2 g/beef), and oleoresin capsicum (2 g/beef). From a 23-day study, it

was found that all phytonutrients exert an immunostimulating by activating and inducing CD4 cell expansion.^{4,5}

In vivo study of a combination of 30% ethanol extract of *Artemisia capillaris*, *Sanguisorba officinalis*, and *Curcuma longa* in mice hydrodynamically induced by HBV genome (Hepatitis B Virus) showed that both the combination of the three extracts and those given together with entecavir were able to suppress HBV replication. and production of inflammatory cytokines without showing toxicity.⁶

In vivo anti-inflammatory activity studies of oil-free aqueous extract of turmeric using mice (xylene-induced ear edema) and mice (cotton pellet granuloma model) showed that oil-free aqueous extract of turmeric at three dose levels (Dose for mice: 90, 180 and 360 mg/kg bw; Doses for rats: 45, 90 and 180 mg/kg bw) significantly ($P \leq 0.05$) inhibited inflammation in both study models, as evidenced by a reduction in ear weight and a decrease in wet and dry weight. From cotton pellets, when compared with controls. The oil-free aqueous extract of turmeric showed an anti-inflammatory effect against acute and chronic inflammation comparable to that of curcuminoids and turmerones (essential oils).

Administration of turmeric rhizome extract to rats induced by acute liver stress with CCl₄ showed a significant decrease in membrane lipid peroxidation in the liver. Turmeric rhizome extract and curcumin showed significant protection against liver injury by increasing hepatic superoxide dismutase; glutathione peroxidase activity, and the amount of glutathione in the treatment group, which led to a decrease in lipid peroxidase level. Therefore, turmeric rhizome extract and curcumin are potential antioxidant agents against acute hepatotoxicity.

How to use it is as follows; as much as 25 g of fresh turmeric, washed, grated, squeezed, filtered, plus 1 tablespoon of honey, then taken 2 times a day. Dry matter: 3-9 grams per day; Powder: 1.5- 3.0 g/day; oral infusion: 0.5 – 1 gram three times a day. The powder should be taken 2 to 3 times a day after meals; tea (2 to 3 cups) is consumed between meals. To make

tea, heat 0.5 to 1 gram of the drug in boiling water, cover, and wait 5 minutes.

Turmeric and curcumin are non-mutagenic, and no reproductive toxicity has been observed. FDA classifies turmeric as Generally Recognized As Safe (GRAS). No major side effects were reported in clinical studies using turmeric extract and, similarly, curcumin up to a dose of 8 g/day for 3 months. In another clinical trial, mild side effects such as nausea, diarrhea, headache, fatigue, and drowsiness were reported in the turmeric group at a dose of 2 g/day (turmeric rhizome dry powder). It should not be used concurrently with non-steroidal anti-inflammatory drugs (NSAIDs), antiplatelet, and antihyperlipidemic. Its use in patients with bile duct obstruction, cholangitis, gallstones, or other biliary diseases should consult a doctor. Its use is not recommended in pregnant and lactating women due to the lack of relevant data on the safety of use during pregnancy and lactation.

Benefits of Temulawak (*Curcuma xanthorrhiza* Roxb.)

Curcuma xanthorrhiza Roxb also called temulawak, contains curcuminoids (1-2%) and essential oils with xanthorrhizol components (31.9%), β -curcumene (17.1%), arcurcumene (13.2%), camphor (5.4%), γ -curcumene (2.6%), (Z)- γ -bisabolene (2.6%), and (E)- β -farnesene (1.2%). Empirically, temulawak has been used for generations in Indonesia to treat various stomach complaints and liver disorders, fever and constipation, galactagogue, bloody diarrhea, dysentery, rectal inflammation, hemorrhoids, gastric disorders caused by cold, infected wounds, skin eruptions, acne vulgaris, eczema, smallpox and anorexia and to reduce inflammation of the uterus after childbirth.^{5,6}

Giving 2% temulawak powder to a controlled diet of Sprague Dawley rats for 3 – 5 weeks showed that ginger was able to increase the proportion of spleen T cells during the experimental period but gave a variable effect on B cells and a subset of T cells, namely an increase in the proportion of spleen cells. B

on the administration of temulawak for 3 weeks and helper T cells (Th) on the administration of temulawak for 4 weeks without an increase in the proportion of suppressor T cells (Ts). The effects of these medicinal plants on the proportion of macrophages from the spleen and peripheral blood were inconsistent. Thus, this study shows that temulawak exhibits T-cell and B-cell-mediated immune function activation.^{7,8}

Pretreatment of the hexane fraction of temulawak at a dose of 500 mg/kg body weight orally in male Sprague Dawley rats for 7 consecutive days followed by hepatotoxic induction with CCl₄ can increase levels of *glutathione peroxidase* (GPx), superoxide dismutase (SOD), *glutathione reductase* (GR), catalase (CAT), and total protein (TP) and can reduce levels of *malondialdehyde* (MDA) in the liver compared to controls. This shows that temulawak can act as an antioxidant and can prevent lipid peroxidation caused by CCl₄. Pretreatment of ethanol extract of temulawak at a dose of 500 mg/kgbw orally in male Sprague Dawley rats for 7 consecutive days followed by hepatotoxic induction with ethanol reduced the symptoms of fatty liver and significantly ($p < 0.05$) inhibited the increase in levels of antioxidant enzymes that play a role in the disease. Liver, namely alanine transaminase (ALT), aspartate transaminase (AST), and alkaline phosphatase (ALP).^{9,10}

Pretreatment with 0.1 - 2.0 mol xanthorrhizol/50 l DMSO-acetone applied topically inhibited TPA-induced ear edema in IDR mice (12-O-tetradecanoylphorbol-13-acetate), which had a direct correlation with inflammation. Administration of the hexane fraction of temulawak rhizome at a dose of 75 mg/kg bw to carrageenan-induced edema and mice showed inhibition of edema formation and was associated with the presence of non-phenolic linear diarylheptanoids in temulawak. The administration of temulawak extract (50 and 100 mg/kg bw/day) and xanthorrhizol (10 and 25 mg/kg bw/day) in obese-induced mice with a high-fat diet showed a decrease in the epididymal fat of the soles of the feet, respectively, the extract (25.8% and 22.5%) and xanthorrhizol (26.6% and 20.1%). Extracts and

xanthorrhizol can also inhibit the production of pro-inflammatory cytokines such as TNF- α , IL-6, IL-1 β , and C-reactive protein. (CRP) in adipose tissue (27.8-82.7%), liver (43.9-84.7%), and muscle (65.2-92.5%).

Empirical use in Indonesia, especially to relieve liver function disorders, can be done by boiling 25 g of fresh ginger slices with 500 mL of water until only 300 mL is left, taken for a day. Another way can be done by taking 25 g of fresh rhizome, grated, squeezed, filtered divided into three, and drunk for a day.

European Medicine Agency reported no serious side effects reported to date.^{4,5} Furthermore, the chemical composition of temulawak does not provide a reason for safety concerns. The use of ginger in pregnant women and during lactation is not recommended until there are data that curcumin and/or its metabolites can be transferred through lactation. Use in patients with bile duct blockage, cholangitis, gallstones, or other biliary diseases should consult a doctor.

2. Conclusion

Turmeric and temulawak herbs empirically and scientifically have the potential to increase the body's immunity in dealing with COVID-19.

3. References

1. Bagad AS, Joseph JA, Bhaskaran N, Agarwal A. Comparative evaluation of anti-inflammatory activity of curcuminoids, turmerones, and aqueous extract of *Curcuma longa*. *Adv Pharmacol Sci*. 2013.
2. Devaraj S, Ismail S, Ramanathan S, Yam MF. Investigation of antioxidant and hepatoprotective activity of standardized *Curcuma xanthorrhiza* rhizome in carbon tetrachloride-induced hepatic damaged rats. *The Scientific World Journal*, 2014: 1–8.
3. Devaraj S, Sabariah I, Surash R, Santhini M, Yam MF. Evaluation of the hepatoprotective activity of standardized ethanolic extract of *Curcuma xanthorrhiza* Roxb. *Journal of Medicinal Plants Research*. 2010; 4(23), 2512–7.
4. Van GE, Kroes B. Assessment report on *Curcuma xanthorrhiza* Roxb. (*C. xanthorrhiza* D. Dietrich), rhizome. European Medicines Agency. 2014; 44; 2.
5. Van GE, Kroes B, García-Llrente G. Assessment report on *Curcuma longa* L., rhizoma - EMA/HMPC/749518/2016. European Medicines Agency - Committee on Herbal Medicinal Products (HMPC). 2018: 1–34.
6. Kim MB, Kim C, Song Y, Hwang JK. Antihyperglycemic and anti-inflammatory effects 110 of standardized *Curcuma xanthorrhiza* Roxb. extract and its active compound xanthorrhizol in high-fat diet-induced obese mice. *Evidence-Based Complementary and Alternative Medicine*, 2014; 2014: 1–10.
7. Lee GH, Lee HY, Choi MK, Chung HW, Kim SW, et al. Protective effect of *Curcuma longa* L. extract on CCl₄-induced acute hepatic stress. *BMC Research Notes*. 2017; 10(1):1–9.
8. Ozaki, Y. Anti-inflammatory effect of *Curcuma xanthorrhiza* Roxb. and its active principles. *Chemical & Pharmaceutical Bulletin*. 1990; 38(4):1045–8.
9. Rajkumari S, Sanatombi, K. Nutritional value, phytochemical composition, and biological activities of edible *Curcuma* species: A review. *International Journal of Food Properties*, 2018; 20(3): S2668–S2687.
10. Yasni S, Sugano M, Imaizumi K, Yoshiie K, Oda H. Dietary *Curcuma xanthorrhiza* Roxb. increases mitogenic responses of splenic lymphocytes in rats, and alters populations of the lymphocytes in mice. *Journal of Nutritional Science and Vitaminology*. 1993; 39(4):345–54.