



# Antiviral Effects of Propolis against SARS-COV 2

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Mini Review

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## Abstract

Propolis, which is produced by honey bees from plant exudates, has long been used in traditional herbal medicine and is widely consumed as an immune system enhancer. The COVID-19 pandemic has renewed interest in propolis products worldwide; fortunately, various aspects of the SARS-CoV-2 infection mechanism are potential targets for propolis components. In pre-clinical studies, propolis promoted immunoregulation of pro-inflammatory cytokines, including reduction in IL-6, IL-1 beta and TNF- $\alpha$ . Propolis has also shown promise as an aid in the treatment of several of the comorbidities that are particularly dangerous in COVID-19 patients, including respiratory diseases, hypertension, diabetes, and cancer. In this mini review, we summarize the potential role of COVID-19 treatment and prevention.

**Keywords:** COVID-19; Propolis; Antiviral Activity

**Abbreviations:** ACE2: Angiotensin-Converting Enzyme 2; LOS: Length of Hospital Stay

## Introduction

Natural products, which have historically been widely used to help treat diseases are among the options being considered as an adjuvant treatment for SARS-CoV-2 infection, because they are generally inexpensive, widely available, and rarely have undesirable side effects. Some have proven antiviral activity. An important advantage of using natural remedies is that people who have other health problems or who have mild flu-related symptoms could take simple and inexpensive measures to help reduce the impact of infection with SARS-CoV-2 [1]. Propolis is a mixture of beeswax and resins collected by the honeybee from different plant buds, leaves and exudates. Bees use propolis not only as a building material but also as a means of maintaining low levels of bacterial and fungal concentration in the hive. More than 150 components such as polyphenols, phenolic aldehydes, quinones, coumarins, amino acids, steroids and

inorganic components have been identified in propolis samples [2].

Infection by SARS-CoV-2, the virus that causes COVID-19, is characterized by binding between viral spike proteins and angiotensin-converting enzyme 2 (ACE2) [3]. SARS-CoV-2 infection is associated with increased levels of chemokines and activated pro-inflammatory cytokines that lead to the development of atypical pneumonia, with rapid respiratory impairment and pulmonary failure. Immunological/inflammatory phenomena have been shown to be important in the spectrum of SARS-CoV-2 infection. These mechanisms are associated with organ dysfunction more than the viral load [4].

## Anti-COVID-19 Effects of Propolis

In silico studies have investigated the use of flavonoids as effective therapeutic candidates against COVID-19 by targeting S protein cleavage by host-cell proteases, S protein binding to cell surface receptors such as ACE-II, inhibiting

S protein, and S protein binding to the inflammatory B56 unit in PP2A as well as by interfering with NSPs of SARS-CoV-2 in order to hamper viral replication [5,6]. A Brazilian Randomized control trial reported that treating hospitalized COVID-19 patients with a single oral daily dose of non-alcoholic preparation non-alcoholic preparation was associated with significant reductions in the length of hospital stay (LOS) and renal injury. Propolis treatment was not associated with a decrease in the need for oxygen therapy [7].

Identification of the most potent compounds is necessary for effective drug development; however, it is necessary to note that the pharmacological effects of supercritical extracts of propolis are superior to its single components (e.g., artemillin C and its precursor coumaric acid) indicating synergetic interaction of different compounds in propolis [8].

## Conclusion

The current emergency caused by the COVID-19 pandemic and limited therapeutic options, propolis is presented as a promising and relevant therapeutic option that is safe, easy to administrate orally and is readily available as a natural supplement and functional food.

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