

The Therapeutic Effects of Important Botanicals and Their Active Phytochemicals Against Covid 19 Virus

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ABSTRACT

The new coronavirus COVID-19 (SARS-CoV-2), which originated in China, has been rapidly spreading throughout the world. For COVID-19 treatment, no conclusive medication or vaccine has yet been discovered. Still, supportive therapy serves as the mainstay of the therapeutic strategy for many infected individuals. This paper suggested gathering potent medicinal herbs and their active components against this serious viral infection. The development, symptoms, and effects of COVID-19 were considered from a clinical perspective. We looked for potent botanicals and their bioactive compounds that might be used in COVID-19 supportive therapy or management. Numerous healing plants, including plants of Lamiaceae and Myrtaceae, can interfere with the pathogenesis of COVID-19 by preventing the virus' entrance into its host cells and multiplication. Additionally, patients with COVID-19 infection get relief after taking NSAIDs and types of herbal medicines. The immune system may be modulated by medicinal plants *Thymus vulgaris* and *Allium sativum* etc. Further research is needed for complete control.

Key Words: Plants, Infection, Treatment, supportive therapy.

Introduction:

In the last twenty years, three new coronaviruses have appeared, with COVID-19 being the third. Middle Eastern respiratory syndrome (MERS-CoV) and severe acute respiratory syndrome (SARS-CoV) have been characterized as serious public health problems [1]. Five patients having an initial diagnosis of pneumonia with an unknown etiology were admitted to the hospital between mid-December and December 29 of 2019. In the days that followed, one of them passed away. The Chinese hospital in Hubei State, China, received an influx of these patients for admission in late December of 2019 and early January 2020 [2]. Epidemiological research suggested that a nearby fish market may have been the source of the disease. According to evolutionary research, bats were thought to be a potential disease reservoir; however, pangolins were later suspected of being the true host that ultimately spread the disease to humans. After infected people coughed or sneezed, the virus spread farther over the world through droplet transmission between humans [3]. The World Health Organization (WHO) announced COVID-19 as a pandemic on March 11, 2020.

On May 11, 2021, there were over 159 million confirmed cases worldwide, and more than three million deaths. The primary preventive method employed globally to stop the spread of the infection which resulted in several changes in lifestyles in people was isolation from society [4]. The passing of family members and neighbors has caused anxiety and depression in a lot of people. Different ways of treatments were increased because of the common propaganda, disinformation, and anti-vaccine sentiments. Governmental entities have been asked to address the widespread situation of misinformation. Numerous studies have demonstrated how the disparate healthcare systems in various nations were ineffective during the COVID-19 epidemic, leading to a high number of physician deaths, constrained governmental policies, and negative consequences on the population's mental health [5].

Pathophysiology of the Covid-19 virus

SARS-CoV-2. Virus is attached to special receptors called ACE 2 receptors (Angiotensin-converting enzyme 2 receptors on pseudostratified epithelium via viral spikes. Infections of the blood (RNAemia), and the vital organs including the heart, the kidney, and the lungs may develop as a result of the attachment and cell invasion [6]. These individuals have high levels of several cytokines and chemokines in their blood, including the proinflammatory cytokines and interleukins. Cytokine storm events in these individuals are thought to be the primary cause of acute respiratory distress syndrome (ARDS). The most fatal through world. The most prevalent signs and symptoms in adults are cough, fever, and exhaustion. Dyspnea, hemoptysis, and headache are other symptoms [7]. While rhinorrhea, abdominal discomfort, and diarrhoea are more frequent in children than in adults, the common symptoms are similar in pediatrics [8]. According to current research, older patients or those who have a variety of comorbidities (such as cardiovascular, pulmonary, cerebrovascular, immunodeficiency, digestive, and endocrine disorders) are more likely to encounter a severe form of the

illness. The predominant imaging modality for diagnosis, CT scans, are based on the radiologic characteristics of pneumonia, such as ground glass ranches with inconsistent association [9].

The current epidemic instills dread in the public as they look for ways to prevent or treat the disease's symptoms since they believe that the only available resources are self-help, self-care, and self-medication [10]. The public feels overwhelmed with fear as a result of the current epidemic as they hunt for treatment to avoid or alleviate the infection since they think the only tools accessible is self-medication.

According to reports, some people turn to self-medication while others turn to the usage of botanicals as a solution but unconfirmed ways to reduce and/or prevent COVID-19-related symptoms. The COVID-19 pharmacological symptomatic treatment alternatives were made public by the World Health Organization to contain the pandemic. Most of the people used hydroxychloroquine and ivermectin when infections were not severe but when infection was severe then azithromycin along with the above-mentioned drugs were used as combined therapy. As fear grows among the populace and they anxiously await good news concerning prevention, treatment, and immunization, this practice has become more prevalent around the world. An antiviral drug called Remdesivir just received FDA approval for treatment in individuals who are only critically sick [12]. However, supportive therapy remains the cornerstone of the treatment strategy for the vast majority of affected people. Numerous articles claim that certain medicinal plants have antiviral properties and have successfully treated many viral diseases in clinical settings. According to research, medicinal plants have been used as supportive therapy or as antiviral medicines to treat viral infections [13]. Because it is crucial to contain the COVID-19 pandemic, this research sought to gather medicinal plants and bioactive substances that could be used in the treatment and supportive therapy of this newly emerging viral infection.

Effective medicinal plant and their active components

It is clearly obvious that since prehistoric times, people from various regions of the world, mainly Asian nations and some portions of Africa, have used plants as herbal medicines. Medicinal plants have been used over the years for the treatment of various infections because they are less toxic, have a high digestibility, and are less expensive. Various chemical ingredients isolated from medicinal plants such as flavonoids, tannins, lignin's, alkaloids, terpenoids, and other phytochemicals are abundant in medicinal plants and have been shown to have the ability to fight against diseases brought on by pathogenic microbes [17].

A well-known pharmacological company in the UK showed interest in developing a particular type of antiviral drug from botanicals and for this, they screened and isolated 288 plants for estimating anti-influenza activity. Previous evidence has suggested that these phytochemicals may exhibit significant potential for treating viral infections [13]

Additionally, various studies on the antiviral activity of botanicals revealed that extracts from plants having secondary metabolites can inhibit the multiplication of a number of extremely harmful viruses. Significant inhibitory effects of plant-based biomolecules were seen against the hepatitis

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B virus, human immunodeficiency virus (HIV), herpes simplex virus type 2, and SARS coronaviruses [13,17]

Selected medicinal plants and their extracted components had a very effective role in controlling upper respiratory tract infections because they are involved in the inhibition of papain-like protease (PLpro), Angiotensin Converting Enzyme (ACE), and chymotrypsin-like (3CLPro) proteins. Research proved that these pro proteins protect the host cell from the entry of SARS-CoV virus [14]. One of the more crucial targets for COVID-19 entrance into host cells is the ACE 2 receptor. A metalloproteinase known as ACE 2 is significantly expressed on enterocytes in the small intestine and lung alveolar epithelial cells. A significant amount of ACE 2 receptors is also found on arterial smooth muscle, venous endothelial cells, and arteries [15]. As a result, COVID-19 infection has the potential to do the most harm to these vital organs. Like other coronaviruses, the SARS CoV-2 also needs proteolytic activity for the maturation phase of replicating polyproteins. Because SARS-CoV-2 encodes 3CLPro and PLpro, these molecules have been identified as a key target for therapeutic research [16]. Since these mechanisms are the focus of medicinal plants and bioactive components, they can prevent coronavirus infection and serve as COVID-19 inhibitory drugs. Different medicinal plants and their ingredients have shown effects. For example, tannic acid, and Epigallocatechin gallate obtained from botanicals have the potential to inhibit SARS-3CLpro activity [17]. The methanol extract of *Equisetum hyemale* plant inhibits ACE receptors and its bioactive component called herbacetin inhibits SARS3CLpro proteins [18]. Additionally, the *S. diglucoside* and herbacetin of *Linum usitatissimum*, inhibit the ACE activity thus suppressing COVID-19 pathology. Flavonoids including hesperidin, hesperidin, neohesperidin, and rhoifolin obtained from the *Citrus species* can interfere with SARS-3CLpro in dose dose-dependent manner [19]. Then, several attractive drinks made from herbs and fruits can stop the pathogenesis of COVID-19.

Conclusion

Botanicals and their natural ingredients are considered as an alternative drug to control various types of viral infections such as the coronavirus infection. As the outbreak began in China in late 2019, traditional therapies were introduced to relieve pain, cough, and fever and slowly these botanical treatments spread globally. In this article, we have discussed the important plants and bioactive elements found in these plant extracts and their special potential on the receptors including inhibition of various pro proteins. However, more research is still required to overcome the difficulties scientists are facing when the condition of the patient becomes severe.

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