

Herbal Plants for COVID-19 Prevention and Management

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Introduction

Significant risks to public health are posed by the rapidly spreading coronavirus illness 2019 (COVID-19), which is brought on by the brand-new coronavirus SARS-CoV-2. Worldwide, the number of confirmed cases and fatalities keeps rising. COVID-19 can quickly progress into acute respiratory distress syndrome, which in some instances can cause multiple organ failure or death (Singhal, 2020). There is a severe lack of medical expertise and resources to completely eradicate the infection. Similar to other newly discovered virus outbreaks, COVID-19 patients are mostly treated with symptomatic therapy such antiviral medications (such as lopinavir/ritonavir), which frequently has unsatisfactory results [1].

About the study

Numerous plants, including herbal tea and natural chemicals, have been studied for the prevention and treatment of -coronavirus-associated disorders since the outbreak of SARS (caused by SARS-CoV). The management of COVID-19 should benefit from understanding the impact of edible and medicinal plants on SARS given the epidemiology, genomics, and pathophysiology similarities between SARS-CoV and SARS-CoV-2. Growing data suggests that, in addition to direct lung injury, cytokine storm, dysfunctional immunity, and other organ injuries, the pathophysiological mechanisms of the viral infections (SARS-CoV and SARS-CoV-2) share many characteristics. Various data-driven strategies and computational chemical biology tools (such molecular docking) have been developed to screen prospective natural chemicals for regulating COVID-19, taking advantage of the present understanding of COVID-19 [2].

Potential plants and compounds

With a lengthy history in antiviral medicine, several herbal plants, plant preparations, and phytoconstituents are crucial in limiting the spread of SARS. Currently, the majority of clinical treatments for COVID-19 patients are symptomatic ones such antiviral medications and ventilators. However, because COVID-19's physiopathologic processes are complex, treating the virus, systemic inflammation, immune response, and organ protection all at once would be more advantageous for patients. Traditional Chinese Medicine views the use of low-toxic, affordable, and easily accessible herbal plants and plant components to treat both the primary and secondary aspects of disease. Many herbal plants have multiple targets and multiple components, which offer hope for the future prevention and treatment of COVID-19 [3].

Studies into beneficial culinary and medicinal herbs for SARS may help manage COVID-19 due to the epidemiology, genomics, and pathophysiology similarities between SARS-CoV and SARS-CoV-2. Screening plants or active substances that target SARS-CoV-2 or the host targets could be a feasible

technique for managing COVID-19 due to their low toxicity and wide availability. The frequently employed plants and naturally occurring chemicals with high binding affinities to COVID-19-related targets are included in this section.

We examined the typical herbal combinations suggested for COVID-19. Radix astragali praeparata cum melle and Glycyrrhizae Radix Et Rhizoma are two of the 54 herbs that make up the herbal formulas. Other herbal plants like *Saposhnikovia divaricata* (Turcz. ex Ledeb.) Schischk, *Atractylodes macrocephala* Koidz, *Lonicera japonica* Thunb, *Forsythia suspensa* (Thunb.) Vahl, *Atractylodes lancea* (Thunb.) DC, *Platycodon grandiflorus* (Jacq.).

The SARS-CoV resistance of numerous vegetables and herbal plants has been investigated. Red spider lily, Rhizoma Cibotii, and an extract of the tender leaf of the vegetable known as Chinese mahogany all prevented SARS-CoV multiplication in vero cells using the SARS-CoV strain infection paradigm. It has been demonstrated that Lianhua Qingwen capsules are effective against influenza A, influenza B, and avian influenza. It has been chosen as a standard therapy for COVID-19 in various phases and was later promoted for usage on a national scale [4].

In order to forecast the potential bioactive component responses from natural products and the prospective action mechanisms, a wide range of studies employed virtual simulation methods (such as network pharmacology and molecular docking). This was due to the limited accessibility of SARS-CoV-2. These research indicate several common constituents and action mechanisms employed by the edible and medicinal plants in treating SARS-CoV-2 illness.

Several flavonoid-related substances have the potential to combat SARS-CoV-2 infection. Many foods, including fruits, vegetables, and other plants, are high in flavonoids. Respiratory distress syndrome, which is linked to SARS coronaviruses, is induced by the production of inflammatory cytokines, which is triggered by the activation of the NLRP3 inflammasome in activated immune cells. Wogonoside, baicalin, kaempferol, luteolin, myricetin, quercetin, and apigenin are only a few flavonoids that have been demonstrated to inhibit NLRP3 inflammasome signalling and reduce the inflammatory response to SARS-CoV infection. Additionally, it has been shown that these substances work against numerous additional viruses via a number of different methods. Thymoquinone, the primary component of *Nigella sativa*, has exceptional antioxidant, anti-inflammatory, anti-tumor, and antibacterial properties. Notably, avian influenza virus (H9N2 AIV) and a mouse model of CMV infection have both been shown to be sensitive to *Nigella sativa* extract and thymoquinone. When infected with a coronavirus, cells that had previously been pre-treated with *Nigella sativa* extract had less virus multiplication. Moreover, *Nigella sativa* treatments reduce virus loads, lowering coronavirus survival inside cells, according to gene expression analyses of the transient receptor potential proteins (TRPs). It has been shown that thymoquinone possesses exceptional anti-sepsis and immunomodulatory properties [5].

Conclusion

Nitric oxide (NO) and reactive oxygen species (ROS) generation are regulated, and multiple organ dysfunction syndrome (MODS) is avoided. It has been demonstrated that thymoquinone prevents lung fibrosis and collagen deposition through controlling the nuclear factor 2 heme oxygenase-1 (Nrf2/HO-1) signalling pathway and NF-B, two antioxidant enzymes. Unique antiviral benefits can be found in edible and medicinal plants. This antiviral activity is due to their multi-component and multi-target pattern, which allows them to directly attack the virus, obstruct its growth, and stimulate IFN secretion. Since ACE2 is a crucial surface receptor that starts SARS-CoV-2 invasion into the

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host, using too much soluble ACE2 or ACE2 inhibitors may be a viable COVID 19 treatment option. The ability of many plant-derived chemicals to bind with ACE2 has been investigated using molecular docking.

Flavonoids, acetoside, glyasperin, isorhamnetin, and ginger are a few attractive options for the creation of dietary supplements or functional foods for the prevention and management of COVID-19 since they have minimal toxicity and are widely available.

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