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Therapeutic Index of Herbal Medicine in Pandemic COVID-19: A Review

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Abstract: The study of this review focus on effective herbal medicine against COVID-19. There have been many such plants on which a lot of research has been done earlier, and these have been very good for health as we know that the current situation of the whole world is very serious with the novel COVID-19 virus epidemic. Hence, people consume a lot of herbal medicine to increase their immunity, such as kadha (brewing), and it is also very effective against this viral infection. If we take brewing in the proper dose, research should be done from clinical trials. We have been taking many medicines since old times and have been doing research on them which is Antiviral and useful in different types of infection caused by bacteria, viruses, microbes, etc. The plant's diversity included their chemical constituents, showing the promise of their therapeutic level against the antiviral activity, without any toxicity with plasma concentration. Many plants show effectively against viral infections that are Flavonoids, Glycosides, polyphenols, alkaloids, etc.. Still, any clinical trials on humans do not prove their proper research on them, but the Chinese system of medicine claimed that Traditional Chinese medicine improves the COVID-19 patient. According to this review, we aim to collate data of plants the various large in the quantity of natural active constituents from individual medicinal plant species that may have potential therapeutic efficacy. The continuing development of novel antiviral drugs needs to isolate and synthesize more new active constituents.

Keywords: *Solanum species; Solasodine; herbal plants; COVID-19 virus.*

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1. Introduction

At the end of month 2019, new viral pneumonia occurred, and infection cases occurred in Wuhan, China. World Health Organization (WHO) has proven the name of this virus novel COVID-19, this is an infected respiratory pathway, and common symptoms are cough, cold, fever, and sore throat [1]. It has been six months, but there are no clinically approved vaccines for this virus or antiviral drugs available in the market; for the decrease global pandemic disease urgently needed to examine their route of transmission and pathogenic mechanisms in cells and then identify potential drug targets [2].

COVID-19 (SARS-Co) generally affects the respiratory tract system and lungs. They cause pneumonia with complicated symptoms, so the treatment of pneumonia from various therapeutic drugs with research, and these are approved, so there may be a solution somewhere from the therapeutic herbal drugs [3]. China is providing the more effective treatment of viral from the traditional Chinese medicine, that various drugs from china approved by clinical research to these drugs, but there is no clear evidence to stop the coronavirus infection [4].

The author can propose that the test with a combination of 5-Fluorouracil and deoxynucleosides on COVID-19 patients should be effective when properly performed on trial because it is tested on animals [5, 6]. According to various studies of infection of COVID-19, there is cytokine's most important role to direct COVID-19, so there are few herbal drugs that show anti-cytokine agents with the formation of the monoclonal antibodies [7].

The Ministry of Health and Family Welfare, Government of India, suggested that a combination of hydroxychloroquine and azithromycin be given to the patients [8], including evaluating the effect of Ayurveda (mixture of herbs) and homeopathy agents on the prevention of COVID-19 [9].

The herbal drugs with combination it treating virus are infection and lungs injury that infected by a viral infection. It also helps to regulate the immune system of the body example: Xuanfei Baidu Tang is a Chinese herbal medicine prevalent to treat viral infections [10].

2. Holistic Medicine with Faith Healing against SARS-CoV-2

Extract from china *Rheum palmatum* L. positive effect against SARS-3CL protease. The SARS-CoV 3CL gene is developed from RNA of the SARS virus through a polymerase chain reaction. A colon bacillus recombinant strain the SARS-CoV 3CL protease. Extract from *Rheum palmatum* L. and SARS-CoV 3CL protease hatch together. The inhibition rate and IC (50) were calculated according to the absorbance reading. Components from the extract of Chinese *palmatum* L. show a high level of anti-SARS-CoV 3CL protease activity. The IC(50) value 13.76 +/- 0.03 microg/mL with 96% inhibition rate [11].

The Chalcone derivatives are a group of chemical compounds widely distributed in the plant kingdom. Helichrysetin and isobavachalcone inhibit the mechanism action of MERS CoV 3CLpro. Flavonoids are usefully reducing inhibition of the proteolytic activity of MERS CoV 3CLpro [12].

The crude extract of *Toonasinensis* Roem leaf includes kaempferol, (+)-catechin, (-)-epicatechin, beta-sitosterol, quercetin, quercitrin, rutin, methyl gallate, gallic acid, kaempferol-d-glucoside, stigmasterol, beta-sitosteryl-glucoside, stigmasterol-glucoside, phytol, and toosendanin. One of those compounds, quercetin, is highly effective and reported antiviral activity against HIV-luc/SARS, *Toonasinensis* inhibiting SARS-CoV [13].

Small molecules they exist a valuable effect against SARS-CoV; the small isolated molecules are TGG and luteolin; they can inhibit entry of the virus into the host cells with EC50 values of 4.5 and 10.6 μ M, respectively, TGG is an effective component of *Gallachinensis* and Luteolin *Veronica linariifolia* Pall [14].

Lianhuaqingwen was used to treat and inhibit influenza and exist broad-spectrum effects of antiviral on influenza viruses with immune regulatory effects, using CPE and plaque reduction assay with *in vitro* activity, SARS-CoV-2 replication was inhibited in Vero E6 cells, and pro-inflammatory cytokines (TNF-, IL-6, CCL-2/MCP-1, then CXCL-10/IP-10) significantly reduced at the mRNA level. Especially it is effective that is caused by various respiratory virus infections [15].

Corticosteroids are mostly throughout the time of outbreaks of severe acute respiratory syndrome due to (SARS)-CoV and the Middle East respiratory syndrome (MERS)-CoV, it is very extremely admixed with therapeutics and herb doses, but due to the unusual complication, i.e., necrosis, so the Corticosteroids are not any longer want to treat SARS-CoV-2 [16].

Inhibition of SARS-CoV-2 3CLpro by natural products attain from traditional medicines. As the first noncovalent, nonpeptidomimetic inhibitors of SARS-CoV-2 3CLpro,

baicalin, and baicalein from roots of *Scutellaria baicalensis* Georgi showed strong antiviral activity in a cell-based system and enzymatic test. A fluorescence resonance energy transfer (FRET) protease assay is applied to measure the proteolytic activity of the recombinant SARS-CoV-2 3CLpro on a fluorogenic substrate and, therefore, the product found to be natural and therefore, products and phytochemicals from therapeutics plant as novel inhibitors of SARS-CoV-2 3CLpro [17].

Carnosol and Rosmanol investigated against SARS-CoV-2, Coronaviruses contain a positive sense, single-strand RNA genome coding for viral polymerase, RNA synthesis materials, and large non-structural polypeptide, in this case, the Carnosol, Rosmanol, and Arjunglucoside-I. further insights into binding interactions of these compounds with SARS-CoV-2 Mpro were analyzed using ligplot (these are images). These therapeutic molecules are highly hydrogen bond donors and acceptors [18].

Viniferin and myricitrin show the active activity on the site mechanism of SARS-CoV-2; these molecules show antiviral activity. These molecules have an affinity to bind against all targets, and it is a docking study [19].

There are Crocin, Digitoxigenin, and β -Eudesmol to evaluate inhibitors against the coronavirus depending on the energy types of interaction allying these molecules and study of protein. They inhibit the main protease of SARS-CoV-2 through docking studies [20].

SARS-CoV-2 within the world number the third deadliest virus from the coronavirus family. Consistent with the WHO analysis, up to March 11, 2020, there are about 118,319 laboratory-confirmed COVID-19 cases in more than 100 countries worldwide. Although Natural herbal medicine is an effective therapy, the results of this study suggest that natural herbal medicine is effective to play a task in promoting recovery through controlling fever symptoms and capacity for the absorption of lung lesions. In recent research, various results indicate that we should also pay more attention to the possible curative effect of herbal medicines on the gastrointestinal symptoms of COVID-19 [21].

In this review, according to *Scutellariae radix*, *Artemisiae annuae* Herbal, and *Belamcandaerhizoma* mixture, one cluster. These three herbs have a heat-clearing effect and are effectively used together in the herbal formulation. There was no efficacy evidence of the herbal formulae for the treatment of pediatric COVID-19, but due to various research, the herb *Glycyrrhizae Radix* *Belamcandae Rhizoma*, both have antiviral and anti-inflammatory efficacy and are highly used in various new herbal medicine whenever the herb *Armeniacae Semen* is used for respiratory disease and highly used as the severity of disease in children [22].

Herbal medicine in the treatment of SARS was revealed by recent researches positive. Furthermore, the Chinese herbal effective medicine continuations for the treatment of COVID-19 pneumonia [23].

According to this review, the author reveals about Jinhua Qinggan granules. Jinhua Qinggan granules are good formulae as Antiviral and respiratory systems. It's definite study affects the treatment of COVID-19 patients, but it is not regularly evaluated for efficacy and safety. There is various high in quality evidence of Jinhua Qinggan granules for COVID-19 [24].

Table 1. Antiviral chemical constituents.

Chemical constituents	Biological source	Family	Uses	Ref
Helichrysetin	Helichrysum odoratissimum	Sunflower family	Antiviral Neuritogenic effects	[25]
Carnosol	R. officinalis	Lamiaceae	Antiviral	[26]

Chemical constituents	Biological source	Family	Uses	Ref
Rosmol	R. officinalis	Lamiaceae	Antivirals such as antioxidant, anti-inflammatory, analgesic	[27]
Arjunglucoside I	Terminalia chebula	Combretaceae	Antiviral, Diabetes etc.	[28]
Luteolin flavonoid	Reseda Lutolea	Flavonoid family	Antioxidant, antiviral, and heart-protective	[29]
Theaflavin	Camellia sinensis	Theaceae	Antiviral against SARS-CoV-2 by Computer modeling.	[30]
Tetra-O-galloyl- β -D-glucose	Gallachinensis	Anacardeaceae	Preventing entry viral with bind S2 bind	[31]
α -pinene, δ -3-carene, α -cedrol	Thujaorientalis	Cupressaceae	Inhibit the viral replication	[32]
Caffeic acid	Sambucus formosana	Adoxaceae	Inhibit the viral by cell docking	[33]
Tryptanthrin	Strobilanthes cusia leaf	Acanthaceae	Blocking RNA genome	[34]

A mixture of the Indigowoad Root (*Isatis Indigotica*), (*Corydalis Bungeana*) Bunge Corydalis, Mongolian Dandelion (*Taraxacum Mongolicum*), Scutellaria Amoena (*Scutellaria Baicalensis*). These therapeutic agents have strong antiviral and antibacterial activity and are widely used in the treatment of acute bronchitis and respiration diseases.

The researcher evaluated that mixture efficiency against SARS-CoV-2 via *in vitro* and *in vivo* studies because these therapeutic drugs target database of mixture formulation could perhaps have the potential effect on the asthma disorder ($p = 2.41E-03$), chronic obstructive pulmonary disease ($p = 2.45E-03$), which is correlative to COVID-19 which provide the discernment for the treatment of the COVID-19. It needs to constantly exhibit robust anti-SARS-CoV-2 with powerful final results *in vitro* and *in vivo*, which can be clinically used for the prevention and treatment of pneumonia caused by SARS-CoV-2 infection [35, 36].

Further, studies about herbal drugs provide more platforms for the treatment or prevention of COVID-19; tobacco is good for the treatment of COVID-19 because the plant constituents that are NICTABA lectin which is a strong antiviral agent [37].

According to various research on plants, they contain a functional group that Particularly hydroxyl (-OH) group, which is effective because it's a chemical reaction for deactivating the lively additives of the virus through an esterification system. As one case looks at, the usage of one of the herbal resources, for instance, liquorice (*Glycyrrhiza glabra*) which include components of glycyrrhizin, glycyrrhetic acid, liquiritin, and isoliquiritin with useful active molecules that may be used to neutralize the activeness of COVID-19 and it may be further used as an antiviral drug [38].

Herbal plants widely studied and further research ultimate for treating COVID-19 include an extract of glycyrrhiza, ephedra, bitter almond, gypsum, amomum, reed root, and trichosanthes. Herbal medicine primarily functions to lower the heat and remove toxicity to exit heat sense from the lungs to relieve cough and further increase the immunity system of the body [39, 40].

Theaflavin is a potent constituent that is a potential inhibitor against the RNA-dependent RNA polymerase of SARS-CoV-2 [41].

Probably the chance to treat coronavirus in the human body through they include griffithsin, lycorine, and polyphenolic scutellarein, Isobavachalcone is constituted of silvestrol, tryptanthrin, and the lectins quercetin, myricetin, caffeic acid, and psoralidin. There is no need to emphasize that certain quantities of these substances could be hazardous to humans and lead to complications. Hence, each therapeutic chemical's safe and therapeutic levels must be determined through *in vitro* and *in vivo* testing [42, 43].

These medicines are derived from earlier studies on SARS, MERS, and other novel influenza viruses that could be employed as COVID-19 treatment drugs. Further research and addition computer molecular docking show that these active constituents have good binding proper ability and effect to COVID-19 virus and host targets [44, 45].

Chloroquine and hydroxychloroquine inhibit glycosylation of host receptors because viruses enter into these host cells with inhibition endosomal acidification, and as well as proteolytic processing, and also inhibition of autophagy and breakdown of the damaged cells before they cause an issue in host cells [46]. They promote cytokine production and regulate immunity. These drugs also help the absorption of pneumonia in COVID-19 patients. Further, Chloroquine and Hydroxychloroquine have shown anti-SARS-CoV-2 and effective results should have been found both *in vivo* and *in vitro* researches [47].

Andrographispaniculata plant extract isolates the Andrographolide, and it is the main component of this plant; it is highly recommended for antiviral activity [48]. In Docking key targets with andrographolide, it binds spike protein ACE2, 3CLpro, and PLpro, which shows that it has a good antiviral against SARS-CoV-2, with low cytotoxicity [49].

Sesquiterpene compound extracted Patchouli alcohol that shows the binding effect of PA and RdRp in docking study on SARS-CoV-2. It shows an antiviral effect [50].

Many studies from various research and reviews this plant reported that this inhibits Antiviral activities. Glycyrrhizae Radix et Rhizome also has a good anti-inflammatory activity suitable for treating inflammatory lung conditions in COVID-19 [51].

It was also revealed in many researches and review articles that synthetic chemical moieties are found effective against COVID-19 [52, 53], but after completing this review, we can suppose that herbal medicines and drugs are far better effective against it.

3. Conclusions

Naturally occurring phytochemicals provide a valuable chemical modification of structures directed by the computer-based docking simulations method, which may also enhance their potency activity in research. Some of the most important key compounds that show the treatment of coronavirus in humans Further research process is developing safe, effective anti-coronavirus therapeutic agents from naturally occurring compounds.

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Conflicts of Interest

The authors declare no conflict of interest.

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