

Traditional and Herbal remedies for Corona Virus Disease

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ABSTRACT

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the cause of the coronavirus disease 2019 (COVID-19) pandemic. For thousands of years, herbal products and phytonutrients have been used by traditional healers to treat many ailments. Therefore, the purpose of this review is to present the main characteristics, sources, characteristics of plants and their potential benefits against COVID-19-related diseases. As of August 2021, English keywords were used to search for publications on herbal products related to anti-inflammatory drugs from different databases such as Web of Science, Google Scholar, Medline, Scopus and PubMed. According to different studies, there are many important herbs with anti-inflammatory properties that can be used for infection or treatment.

Lack of data on safety profiles and dosages for different diseases are some of the limitations of herbs. Herbs may interact with COVID-19 disease by inhibiting SARS-CoV-2 replication and entry into the host. Some types of anti-inflammatory, Citrus, Orange (*C. Sinensis*), Garlic, Onion, Peppermint and *Nigella* are the best herbs or fruits that show good components in controlling COVID-19.

I. INTRODUCTION TO COVID-19

COVID-19, short for "Coronavirus Disease 2019," is a global pandemic that has had a profound impact on societies, economies, and public health worldwide. Origins and Transmission COVID-19 is caused by a novel coronavirus, named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was first identified in December 2019 in the city of Wuhan, Hubei province, China. The virus is believed to have originated from a seafood market where live animals were sold. It is thought to have jumped from animals to humans, possibly through an intermediate host species.[53]

The primary mode of transmission of the virus is through respiratory droplets when an infected person coughs, sneezes, talks, or breathes

heavily. These droplets can enter the body through the nose, mouth, or eyes of individuals in close proximity to an infected person. The virus can also spread by touching contaminated surfaces or objects and then touching the face. Airborne transmission is also possible in certain situations, particularly in enclosed spaces with poor ventilation.[54]

Symptoms and Health Impact

COVID-19 can cause a wide range of symptoms, ranging from mild to severe. Common symptoms include fever, cough, shortness of breath, fatigue, body aches, sore throat, and loss of taste or smell. Some individuals may also experience gastrointestinal symptoms such as diarrhea or nausea. In severe cases, the infection can lead to pneumonia, acute respiratory distress syndrome (ARDS), organ failure, and even death.[54]

SARS-CoV-2 gains entry into human cells through the interaction of its spike protein with the ACE2 receptor present on the surface of host cells. This interaction facilitates viral attachment and entry, leading to infection.

After entering the host cell, the virus utilizes its RNA genome to produce viral proteins and replicate its genetic material. Key viral proteins involved in replication include RNA-dependent RNA polymerase (RdRp), which is responsible for synthesizing viral RNA, and various proteases, which are crucial for protein processing.

The viral genome encodes several structural and non-structural proteins necessary for viral replication and assembly. These proteins are synthesized through the translation of viral RNA into polypeptides, followed by proteolytic cleavage to generate functional viral proteins.

After infection, the host's immune system is activated to recognize and eliminate the virus. The immune response involves the release of various cytokines, chemokines, and other immune signaling molecules. But, in severe cases, an exaggerated immune response, known as a cytokine storm can occur, leading to tissue damage

and organ dysfunction.

Various potential drug targets have been identified within the pharmacology of SARS-CoV-2. These include viral proteases, RdRp, viral entry inhibitors, and host cell factors involved in viral replication and immune response modulation.[55]

Approach to treatment

Conventional or Western medicine, focuses on using drugs and therapies based on scientific evidence

Antiviral Medications: Several antiviral drugs have been studied for their efficacy against SARS-CoV-2. Remdesivir, originally developed for Ebola, inhibits viral replication and has been authorized or approved for emergency use in many countries. Clinical trials have shown that remdesivir can reduce hospitalization time and improve recovery rates in severe cases. Other antiviral medications like favipiravir and molnupiravir are being investigated for their potential effectiveness against COVID-19.[56]

Monoclonal Antibodies: Monoclonal antibodies have emerged as a promising treatment option for COVID-19. These laboratory-produced antibodies can neutralize the virus and prevent it from infecting host cells. Monoclonal antibody therapies such as bamlanivimab, casirivimab/imdevimab, and sotrovimab have received emergency use authorization or approval. They are administered to high-risk individuals to reduce the severity of the disease and prevent hospitalization.

Corticosteroids: Corticosteroids, such as dexamethasone and prednisone, have been found effective in managing severe COVID-19 cases. They suppress the immune response and mitigate the damaging effects of an overactive immune system. Clinical trials have demonstrated that corticosteroids reduce mortality rates in hospitalized patients requiring supplemental oxygen or mechanical ventilation.[1]

Immunomodulatory Drugs: Immunomodulatory drugs are used to modulate the immune response in COVID-19 patients. Tocilizumab, an anti-inflammatory medication that blocks the interleukin-6 (IL-6) receptor, has shown promise in reducing the risk of intubation or death in severe cases. Another drug, baricitinib, inhibits Janus kinase (JAK) pathways involved in the inflammatory response. When combined with remdesivir, baricitinib has demonstrated improved

recovery rates.

Anticoagulants: COVID-19 has been associated with an increased risk of blood clot formation and related complications. Anticoagulant medications, including heparin and low molecular weight heparins, are used to prevent and treat blood clotting disorders in hospitalized patients. These drugs help reduce the risk of thrombosis and its associated complications, such as deep vein thrombosis and pulmonary embolism.[2]

Oxygen Therapy: For patients with respiratory distress or low blood oxygen levels, supplemental oxygen therapy is a crucial aspect of treatment. Oxygen can be provided through various methods, including nasal cannula, face mask, or high-flow nasal cannula. In severe cases, mechanical ventilation may be required to support breathing.

Supportive Care: Supportive care plays a significant role in managing COVID-19 symptoms and complications. It includes measures such as hydration, fever management, pain relief, and respiratory support. Supportive care also involves monitoring vital signs, oxygen levels, and organ function to ensure timely intervention if complications arise.[3]

Vaccines have been developed to induce an immune response against SARS-CoV-2. Different vaccine platforms, such as mRNA-based vaccines, viral vector vaccines, and protein subunit vaccines, have been utilized to generate protective immunity. Given the urgent need for effective treatments, drug repurposing efforts have been underway to identify existing drugs with potential activity against SARS-CoV-2. Additionally, numerous clinical trials are ongoing to evaluate the safety and efficacy of various therapeutics.[4]

Research efforts have also focused on understanding the virus and its variants, developing antiviral drugs, and improving treatment protocols. aided in predicting disease spread, identifying high-risk populations, and optimizing healthcare resource allocation.

Traditional and herbal approach for treatment of corona virus disease

The urgency to find effective treatments has led to the exploration of various approaches, including traditional and herbal medicine.

Traditional medicine encompasses a broad range of practices and remedies that have been passed down through generations. It often relies on natural ingredients and holistic approaches to restore health and balance in the body. While traditional medicine cannot replace proven medical interventions such as vaccination or critical care, it can play a supportive role in managing symptoms and improving overall well-being.[5]

Herbal remedies have a long history of use in traditional medicine systems such as Traditional Chinese Medicine (TCM) and Ayurveda. Certain herbs, such as *Andrographis paniculata*, licorice root, and ginger, have shown potential antiviral properties and immune-boosting effects. However, it is crucial to note that scientific evidence supporting their efficacy against COVID-19 is limited and further research is needed.

In addition to herbal remedies, traditional practices like acupuncture, moxibustion, and breathing exercises can be employed to manage symptoms associated with COVID-19. Acupuncture, for instance, has been used to alleviate respiratory distress and enhance immune function. These practices may provide symptomatic relief, improve overall well-being, and contribute to stress reduction during the recovery process.[6]

Benefits of Traditional and Herbal Treatments:

Traditional and herbal treatments often emphasize a holistic approach, considering the physical, mental, and emotional aspects of an individual. This approach can promote overall wellness and potentially improve the body's ability to fight against infections.

Certain herbs and traditional practices have demonstrated the ability to alleviate symptoms commonly associated with COVID-19, such as fever, cough, and fatigue. While they may not directly target the virus, they can help manage discomfort and enhance the recovery process.

Traditional and herbal treatments can be used as complementary approaches alongside conventional medical interventions. They may assist in reducing side effects of medications, boosting immune function, and improving general well-being during the recovery period.[7]

II. LIMITATIONS AND CONSIDERATIONS:

Lack of Scientific Evidence: One of the main limitations of traditional and herbal treatments for COVID-19 is the scarcity of robust scientific evidence. The majority of available studies are preliminary and often lack rigorous methodologies. Therefore, it is crucial to interpret the findings with caution and await further research to establish their effectiveness.[9]

Herbal treatments are often derived from plant sources, and their efficacy can vary depending on factors like species, geographic origin, and preparation methods. Ensuring standardization and quality control of herbal products is essential to guarantee their safety and efficacy.

Herbal remedies may interact with conventional medications, leading to unintended consequences. It is essential for individuals to consult healthcare professionals before incorporating traditional or herbal treatments into their COVID-19 management plan. Additionally, some herbs may have side effects or allergic reactions, emphasizing the importance of proper dosage and monitoring.[8]

Traditional Treatment for Corona Virus in India

Traditional Indian medicine, including Ayurveda and Yoga, is being utilized alongside modern medicine and vaccinations for managing COVID-19. These traditional practices, such as siddha, unani, ayurveda, yoga, naturopathy, and homeopathy, have a long-standing history and play a significant role in the healthcare system in India. They employ various natural elements like plants, animal derivatives, and minerals to treat various ailments. Approximately 25,000 herbal-based preparations and extracts have been utilized in traditional medicine in South Asia.[15]

In recent times, a combination of maricha (*Piper nigrum*), lavanga (*Syzygium aromaticum*), and sunthi (*Zingiber officinale*) has been recommended for both healthy individuals and those with COVID-19. This combination is believed to support immune responses and reduce airway hypersensitivity. Another active component, curcumin, found in *Curcuma longa* (turmeric), has been noted for its ability to inhibit the release of cytokines, including pro-inflammatory cytokines

like interleukin-1, interleukin-6, and tumor necrosis factor-alpha. [10]

It is advised to be consumed with milk. This cytokine-blocking property is considered significant in the management of viral infections, including COVID-19, where cytokine storm plays a crucial role in disease progression.

Furthermore, traditional Indian medicine systems recommend the use of rasayana herbs and formulations to promote vitality and enhance the immune system. These include herbs like Amla (Indian gooseberry), Ashwagandha, and Guduchi (*Tinospora cordifolia*). Additionally, practices such as Yoga and Pranayama, which involve physical postures, controlled breathing, and meditation, are recommended for their potential to reduce stress, improve lung function, and support overall well-being.[12]

Tulsi

Holy Basil or Tulsi has medicinal and religious significance in Indian families. It is effective against the common cold.

Research has shown that Tulsi has a unique combination of properties such as: Antimicrobial (including antibacterial, antiviral, antifungal, antiprotozoal, antimalarial, anthelmintic), mosquito repellent, anti-diarrheal, anti-oxidant, anti-cataract, anti-inflammatory, chemopreventive, radioprotective, hepatoprotective, neuro-protective, cardio-protective, anti-diabetic, anti-hypercholesterolemia, anti-hypertensive, anti-carcinogenic, analgesic, antipyretic, anti-allergic, immunomodulatory, central nervous system depressant, memory enhancement, anti-asthmatic, anti-tussive, diaphoretic, anti-thyroid, anti-fertility, anti-ulcer, anti-emetic, anti-spasmodic, anti-arthritis, adaptogenic, anti-stress, anti-cataract, anti-leukodermal and anti-coagulant activities.[11]

if you have phlegm due to cold, 3-4 You can eat one. Tulip leaves per day

Ginger

Ginger and paradols in ginger have anti-inflammatory and antibacterial properties, α -farnenequi makes it a powerful antioxidant and is also responsible for severe pain.

Dried ginger is boiled in 2 glasses of water and slowed daily can be drunk slowly.[13]

Turmeric

The mixture of milk and turmeric is

commonly known as HaldiDoodh and is commonly used in our homes when we have a cold.

To get this benefit, take half a teaspoon of Haldi (Turmeric) powder in 150 ml of hot milk once or twice a day.[14]

Herbal Tea

A kadha is made from Tulsi (Basil), Dalchini (Cinnamon), Kalimirch (Black Pepper), Shunthi (Dried Ginger), and Munakka (Raisin) and taken once or twice a day. Jaggery (natural sugar) and/or fresh lemon juice can be added to taste.[16]

Triphala

Triphala is a combination of three essential herbs: Amla or Indian gooseberry, bhibhitaki or beleric (*Terminalia bellirica*) and Tabloki or black myrobalan.

Triphala, which can be drunk with hot water, is said to aid digestion. It can also be used to make tea. The best way to take Triphala is before going to bed at night.[14]

Trikatu

Another Ayurvedic treatment for cold and sore throat is a mixture of black pepper, bamboo juice and ginger powder.

According to experts, this mixture has anti-inflammatory and anti-inflammatory properties.

Add honey to the mix to soften the pungent taste of black pepper. Experts recommend licking this mixture throughout the day.[14]

Ayurvedic Treatment for Corona Virus

Ayurveda, an ancient medicinal system, is thought to be effective in managing various infections without causing adverse effects. It encompasses a variety of treatment approaches for complex diseases.[17]

Ayurvedic healthcare experts have extensive knowledge about different microorganisms and the infections they can cause. The practices of Ayurveda and Siddha, which originated in India, are widely utilized for the treatment of diverse ailments. The discovery, isolation, and characterization of bioactive compounds in medicinal herbs hold potential in the fight against various infections. Therefore, repurposing ancient medicinal plants could provide a new perspective in combating viral diseases.[18,19]

Ayurvedic Kadha

The utilization of Ayurvedic medicine and its extracts has been observed in the prevention and treatment of viral illnesses. Kadha, a traditional form of medicine, is prepared by blending botanical drugs and spices. It consists of dry or less juicy ingredients, including herbs and spices sourced from various Indian botanical sources.[21]

The practice of preparing and consuming Kadha plays a significant role in Ayurveda as it enhances the pharmacological effects of the active components present in botanical drugs. During the COVID-19 pandemic, the Indian government recommended the consumption of Kadha to support immune response and aid in healing processes.

The phytochemical constituents present in Ayurvedic Kadha exhibit strong binding affinity with both viral and host targets, suggesting their potential antiviral activity by regulating virus replication within host cells. As a result, the Ministry of AYUSH in India has recently advocated the consumption of Kadha as an immunity booster and to alleviate discomfort during the COVID-19 crisis.[22]

Guduchi GhanVati

Guduchi GhanVati is a traditional Indian herb recommended for its antioxidant and immunomodulatory properties. Recent studies have also demonstrated its effectiveness against SARS-CoV-2. This Ayurvedic preparation, Guduchi GhanVati, is listed in the Indian Ayurvedic Pharmacopoeia and is extracted from the aqueous extract of *Tinospora cordifolia*. *T. cordifolia* also known as 'Guduchi' or 'Giloe', is a large climbing plant belonging to the *Defiaceae* family. It is native to the tropical regions of China and India and has a long history of traditional medicinal use.[23]

Tinospora cordifolia and *Piper longum*

Tinospora cordifolia and *Piper longum* is a herbaceous plant native to India and China and belongs to the family *Fangjiceae*. In Ayurvedic medicine, this herb is used in the preparation of GuduchiGhanVati. It can also be used with *Piper longum* L. (*Piperaceae*). *P. Longum* is one of many herbs used in Ayurvedic medicine.

P. longum is commonly known as "Indian long pepper" and "Pippali". Pippali is considered an Ayurvedic supplement that enhances the

absorption and bioavailability of other bioactive ingredients. It also has important anti-inflammatory properties.[24]

AYUSH Kwath

Ministry of Health promotes the use of AYUSH kwath, has prepared plans for public health promotion. This formula is derived from the leaves of *Ocimum sanctum* L., *Cinnamomum verum* J. Presl. Stem bark, *Zingiber officinale* Roscoe rhizome and *Piper nigrum* L. fruits. This formula is sold in the market under different names such as "AYUSH Kwath", "AYUSH Kudineer" or "AYUSH Joshanda". It is available in the market in powder and tablet form. This drug supports the immune system[25]

Anuthayla

Contains about twenty ingredients, including Anuthayla, *Leptadenia reticulata* (Retz.) Wight and Arn. It has been reported to be used in the treatment of anaphylaxis, asthma, pneumonia and sore throat. Similarly, *Ocimum sanctum* L. Sesame oil is recommended for various ailments such as cough, asthma, fever and malaria and sesame oil is used for dry cough, asthma, migraine and respiratory diseases. *S. indicum* seeds and *Tachyspermum ammi* (L.) Sprague seeds have been reported to be effective in the treatment of dry cough, asthma, pneumonia and flu.[27] Based on the above information, Anuthayla recommends its use in the context of the coronavirus pandemic.

AYUSH-64

AYUSH-64 tablets, contains whole grass and seed dregs of *Caesalpinia crista* L. AYUSH-64 is considered beneficial for people suffering from coronavirus due to its anti-malarial properties. All of its ingredients have anti-inflammatory, anti-asthma and immune-boosting benefits, scientists report.

Terpenes

Recently, terpenes have gained special attention for their excellent anti-inflammatory properties. Terpenes can affect the structure of the bacteria by binding to the lipid bilayer. Therefore, terpenoids are considered to be specific anti-inflammatory agents. Some terpenes such as chelidonine B, betulinic acid and ursolic acid have been shown to have potent antibacterial activity. The study also showed that terpenes are closely

related and have a strong inhibitory effect on all coronaviruses and may be potent against COVID-19.

The barbed lipid layer of COVID-19 is important for its attachment to cell membranes. Terpenes can affect the lipid layer of COVID-19 and inhibit its synthesis.

In addition, coronaviruses have single-stranded RNA. This RNA strand acts as a messenger RNA. When it enters the cell, it causes the formation of two polyproteins that are joined by new replication and transport complexes that control RNA synthesis and structural protein formation and increase protease activity.

Proteases play an important role in the degradation of polyproteins. Recent therapeutic strategies include the identification of protease inhibitors from natural products. Among them, terpenes are of particular interest due to their diversity and small IC50s in plants and bacteria.[28]

Unani Approach for treatment of Corona virus Triyaq-e-Car

Triyaq-e-Car is an important Unani formulation used as an antiseptic. It has been reported to be a potent anti-viral agent by many authors, including SARS-CoV.

In addition, *B. ciliata* has been shown to be effective against influenza A and herpes simplex virus 1 (HSV-1), while its antibody bergenin was found to be beneficial. hepatitis C virus (HCV) and HIV.

Based on this information, Triyaq-e-Car can be an effective anti-inflammatory and has been proven effective against COVID-19.[29]

Roghan-e-Baboona

Roghan-e-Baboona is an Unani drug used as an anti-asthma and therapeutic. Flowers of *Matricaria chamomilla* L.

It is the main product in Roghan-e-Baboona. It contains the flowers of *M. chamomilla* and has been shown to be effective against nasopharyngitis and sore throat.[29]

Arq-e-Ajeeb

Arq-e-Ajeeb is a liquid medicine containing thymol, menthol and camphor. Thymol is a promising topical agent as an antiviral agent in herpes infections.

Menthol has been reported as an anti-inflammatory

agent. Unani doctors have a great history of using Arq -e-Ajeeb to treat Nazlawabai (swine flu). These studies support the use of Arq-e-Ajeeb for COVID-19.[29]

Khamira-e-Banafsha

Khamira-e-Banafsha is a semi-solid Unani preparation made from decoction of *viola viola* flowers with sugar or sugar and honey, used as an expectorant for colds and coughs and for the treatment of respiratory diseases. diseases. and chest infections, bronchitis, asthma, fever, expectorant, antipyretic, etc. Also v.

Odorata has been reported to be effective for the effectiveness of topical agents on the polyconalis of the pulmonary bronchioles (Koochek et al., 2003). The above data supports its use in the management of COVID-19.[30]

Laoq-e-Sapistan

Laoq-e-Sapistan is a semi-sweet, multi-herbal Unani preparation widely used in India for colds, asthma and cough. It reduces pain and irritation or infection of the pharynx, tonsils. The jelly-like viscous substance of the ripe fruit of *Cordia myxa* L. is the main component and has been reported to have antibacterial and antifungal properties.

Another important ingredient is jujube, which contains betulinic acid. Betulinic acid has been shown to reduce IFN- γ levels in the lungs of mice, thereby improving immunity, and has been proposed as a therapeutic agent for viral infections.

The aqueous extract has also been reported to increase thymus and spleen indices and increase T lymphocyte proliferation, hemolytic activity, and natural killer (NK) cell activity.

The data support the use of the AYUSH formulation Laoq-e-Sapistan in COVID-19.[30]

Sharbat-e-Sadar

Sharbat-e-Sadar is an Unani multi-syrup formulation commonly used for colds, coughs and respiratory ailments. An important component, *Trachyspermum ammi* Sprague, has been reported to be effective against Japanese encephalitis. it has been used for symptomatic treatment of corona virus.[30]

Traditional Chinese Medicines for the treatment of corona virus

Traditional Chinese Medicine (TCM) is an

important measure in the treatment and/or prevention of certain diseases. TCM achieved the best results during the SARS epidemic in 2003. During the recovery period from COVID-19, TCM activities were involved in the diagnosis and treatment of COVID-19, and TCM specialists were involved in the entire recovery process.

TCM has been shown to be effective in reducing the incidence of mild and/or severe disease, overall mortality, and overall disease reduction. Herbal medicine, when used with modern biomedicine, can be used directly as an antibiotic, immunomodulator, and anti-inflammatory drug, and can also reduce COPD and hypoxemia.[33]

Song et al. reported positive effects of *Sanctellariabaicalensis* extract, baicalin is also one of the main components of traditional Chinese medicine and hesperetin is a substance found in tangerine peel. Two bioactive agents have been used to reduce COVID-19 symptoms.

Another traditional Chinese medicine, Xuebijing Injection, has been widely reported to reduce the damage of community-acquired pneumonia as well as shorten respiratory time in critically ill patients.

In addition, efficacy of Chinese herbal medicine has been reported in the treatment and prevention of COVID-19.

A new approach to Chinese Medicine is a combination therapy that combines centuries-old traditional herbs to create formulas for a variety of ailments.

Additionally, glycyrrhizin, a bioactive ingredient extracted from *Lycoris*, is promising as an anti-SARS-CoV vaccine.[19]

LianhuaQingwen

LianhuaQingwen is a traditional Chinese medicine formulation that has gained attention for its potential use in the treatment of respiratory tract infections, including COVID-19. It is a patented herbal medicine developed by the Chinese Academy of Sciences and other research institutions.

LianhuaQingwen is a combination of several Chinese medicinal herbs, including *Forsythia suspensa*, *Lonicera japonica*, *Ephedra sinica*, *Isatisindigotica*, *Dryopteris crassirhizoma*,

Houttuynia cordata, *Rhodiola rosea*, and *Glycyrrhiza uralensis*. These herbs are believed to possess anti-inflammatory, antiviral, and immune-regulating properties.

The therapeutic effect of LHQW against corona virus is based on its good binding ability to ACE2 and Mpro which are the therapeutic targets of SARS-CoV-2.

Therefore, it has proven effective against COVID-19 for an adjunctive and synergistic treatment.[34]

Herbal Medicines

Individual herbs are useful in herbal research. It is now well known that a plant can have many biochemical properties that complicate the investigation of the pharmacological values of plants.[31]

According to the main evidence of effectiveness, they are usually divided into antibiotics, anti-inflammatory, immunomodulatory and combined with various targets. In addition to the direct antiviral effect of plants, it has been reported that they have antiviral properties that may play an important role in the treatment of COVID-19 according to inflammation symptoms such as interleukin (IL)-6, erythrocyte sedimentation rate (ESR). and C-reactive protein (CRP) is associated with poor disease severity, most likely associated with cytokine storm.[31]

Following are some medicinal herbs which can be potentially used in the treatment of corona virus.

a.)Gymnanthemumamygdalinum



Vernonia amygdalina is distributed mainly in tropical countries of Asia and Africa. It belongs to the Asteraceae family; There are about 1000 species of angiosperms classified as the genus *Vernonia*. It has been shown to increase immunity as a supplement to vaccines. This herb is often used to treat headache, fever, diarrhea and cough. [32]

Aqueous extracts of *G. amygdalina* have shown good results in enhancing the immune system in humans by increasing CD4+ and leukocyte levels.

Since the plant contains different chemical compounds that can perform various functions, ethanol, methanol and acetone extracts have anti-inflammatory properties in experimental animals according to modulated levels of inflammatory cytokines and mediators as well as protective signals. It has the ability to increase CD4+ count, and this extract has been shown to be used as an adjunct to antiretroviral therapy in HIV patients. In addition, antibacterial, hypolipidemic, hepatoprotective and antioxidant properties. Although the potent activity of *G. amygdalina* in the control of immune and inflammatory diseases has been described, the toxicity of this herb is considered.[32]

Although there were no deaths in acute toxicity studies in animals. Currently, there is no measurable evidence of the herb's efficacy in COVID-19 patients, but several studies have shown it to be effective in preventing infection, disease, and immunity.

It can be used for the symptomatic treatment of corona virus.[32]

b.)Azadirachta indica (neem)

This plant has important fruits to reduce fever, which is the main symptom of COVID-19. Neem leaves are traditionally boiled and consumed to treat fever, including COVID-19, and have been reported to have anti-inflammatory properties in animal studies. Animal studies and in silico studies have confirmed that the leaf extract and its metabolites such as flavonoids and polysaccharides have direct anti-inflammatory properties against different diseases such as hepatitis C.[33]

Molecular docking studies for SARS-CoV-2 have shown that neem-derived compounds such as nimrin, nimosin, and cycloartemisinin can bind to the SARS-CoV-2 envelope, membrane, glycoprotein, and also have an inhibiting effect.[34]

Its leaves have positive immunomodulatory effects that promote immunity in animal models

In mice vaccinated against *Brucella* Rev-1, subcutaneous administration of neem seed extract stimulated post-immunization IFN- γ production. [39]

Pregnant women should avoid hazelnuts because animal studies have shown low

constructive effects. Clinical studies have reported the anti-human chorionic gonadotropin effect. Studies have reported that the medicinal purpose of neem is mainly due to the consumption of the leaves, which are boiled in water and then eaten. A major concern is safety, and clinical trials are needed to determine the safety of neem leaves specifically for use formulation before further studies can be conducted.[39]

Although neem leaves have been used traditionally for a long time, its toxicity profile has not been documented. Treatment of acidosis and kidney damage has also been reported by seed oil users. The major challenge in ethnopharmacological research of medical applications is the quality control, identification and modelling of biomolecules in herbal products.[36]

c.)Nigella sativa



N. sativa (*nigella sativa*) seed is one of the herbal products with the best published evidence. The ethanol extract of *N. Sativa* seeds produces anti-inflammatory effects by reducing viral load, alpha-fetoprotein and improving liver dysfunction in hepatitis C patients. In animal studies, seed oil has immunomodulatory and antiviral properties of cytomegalovirus, rendering the virus useless.[37]

It strengthens the immune system by increasing CD3 and CD4 counts and also induces inhibition of interferon- γ (IFN- γ) release by anti-inflammatory T cells and macrophages. In a mouse study, ethanol extract of *Nigella sativa* seeds was shown to reduce the expression of leukocyte transient receptor proteins (TRPs) such as TRPA1, TRPC4, TRPM6,

TRPM7, TRPM8, and TRPV4.

Traditionally, it has had several indications, including reducing asthma symptoms by preventing allergies, including upper respiratory diseases such as asthma, and boosting the immune system. It has immunomodulatory and anti-inflammatory properties. To be safer, prolonged use (up to three months) *N.sativa* in clinical studies, 3 g of alfalfa seeds per day did not show a significant effect on liver and kidney functions. However, caution should be exercised because of hypoglycemia and instability of liver enzymes due to the high dose of 2-3 g/kg thymoquinone.[37]

d.) *Eurycomalongifolia*



Eurycoma longifolia is a popular herb found in Malaysia and traditionally used to improve male health. It is one of the few natural products today with a proven design and safety track record. [36]

The aqueous extract of *Eucalyptus longifolia* has no direct anti-inflammatory properties, but increasing the number of CD4+ cells at 200mg/effective dose has positive effects on disease prevention in adults. day. The same extract also showed low animal mutagenicity and no genotoxic effects.[36]

There is also preclinical evidence for the anti-inflammatory properties of *E. longifolia*. Potent anti-inflammatory bioactive compounds

extracted from *E. longifolia* include eurycomalactone, 1-4-1-5 β -dihydroclaeaneone, and 1-3-2-1 dehydroeurycomanone, which have potent NF- κ B inhibitory effects. Obtaining different phenolic compounds from the roots of *Escherichia coli*. [36]

Longifolia has also been reported to reduce IL-6 expression in LPS-stimulated RAW macrophages. Safety of aqueous extracts of *Eucalyptus longifolia* (acute, subacute and 90-day subchronic general toxicity studies) according to Organization for Economic Co-operation and Development (OECD) guidelines of no hazard to animals. *E. longifolia* has sufficient evidence of safety, further research on the anti-inflammatory properties of *E. longifolia*. [39] *longifolia* can be seen in the context of COVID-19 treatment and prevention methods.

e.) *Mentha piperita*



Peppermint (*M. Piperita*) is the world's oldest herb for many ailments.

Dried mint It has been cultivated since 1000 BC and its importance is described in ancient Egyptian, Greek and Chinese medicine.

Peppermint contains essential oils with significant antibacterial and antifungal properties against Gram-negative and Gram-positive bacteria, yeasts and fungi, mainly due to the presence of the phytochemicals menthol and menthone.

However, as far as we know, a study in

Saudi Arabia found that, everywhere, about 78% of patients not hospitalized for an infection, only 22% of patients who did not use peppermint in the

hospital, therefore. Peppermint when the spread of COVID-19 disease is associated with low number of hospitalizations.[40]

f.) *Allium sativum* and *Allium cepa*



In Ethiopia, garlic (*Allium sativum*) and Onion (*Allium cepa*) are often used as home remedies for different ailments. Onions have long been used in traditional medicine to treat many diseases and infections and have been used to combat avian influenza (H9N2).

However, the method of preparation is important, as boiled or fried onions give negative results. Researchers have reported that onion has anti-inflammatory, anti-inflammatory and anti-inflammatory properties, making it a good candidate for treating COVID-19 patients.[38]

It is used only for immunomodulatory, antibacterial, antioxidant, anti-inflammatory, anticancer, antihypertensive, antithrombotic, antidiabetic, antimutagenic and prebiotic activities.

The active metabolites of garlic can be divided into two groups: sulfur compounds and non-sulfur compounds. Allicin and alliin are the main components of sulfur compounds, while the main components of non-sulfur active compounds are flavonoids and saponins. The ability of garlic to inhibit SARS-CoV-2 was felt *in silico* by forming hydrogen bonds between amino acids and the binding sites of the main structure of SARS-CoV-2 and its biological material responsible for disease production. [40]

In general, the number of T helper cells is reduced in COVID-19 patients, and if we eat garlic, it causes great effect on T helper cells, cytotoxic T cells and NK cells, for leptin reduction, leptin

receptor levels, TNF- α , IL-6 and proliferator activated receptor gamma (PPAR- γ). Therefore, it may be an option to control COVID-19 due to its ability to regulate cytokine secretion, immunoglobulin production, phagocytosis and macrophage activation.[39]

g.) *Malva sylvestris*

Mallow is used to treat respiratory diseases such as dry cough and pharyngeal or oral irritation. The biological properties of mallow include flavonoids (such as delphinidin, apigenin, malvatin, myricetin, genistein and derivatives, and kaempferol); mucilage (mainly galacturonic acid and glucuronic acid, glucose, galactose, fructose and trehalines); hydroxycinnamic acids and their derivatives; benzoic acid and its derivatives like monoterpenes. Preclinical evidence suggests that its preparations have been studied for their anti-cough effects.[33]

All phenolic/flavonoid compounds of European mallow were extracted and isolated according to the bioassay instructions and *in silico* studies. The radical scavenging activity of the extract was further investigated using 1-diphenyl-2-picrylhydrazine (DPPH) and nitric oxide (NO) radical bioassays.[41]

The antioxidant capacity of various products was compared with standard antioxidants such as ascorbic acid and quercetin. Dichloromethane extract has radical protection against DPPH and NO, with radical scavenging

activity (RSA) of 88.52 and 91, respectively. 05% with IC50 values of 22.11 and 19.01 $\mu\text{g/mL}$, respectively.[41]

Biodirected separation of the dichloromethane subfractions yielded twelve phytochemicals. In addition, boundary molecular orbitals (FMOs), various molecular descriptors, electron affinities, ionization potentials and molecular electrostatic potentials (MEPs) are discussed to evaluate the active sites of various phytochemicals.[49]

Extracted drugs were investigated and associated with existing drugs for COVID19 (such as dexamethasone, hydroxychloroquine, favipiravir, and remdesivir), borderline molecular orbital energies, active sites, and molecular characterization character comparison.[52] For the first time, the inhibitory effect of phytochemicals on NADPH was documented with a molecular docking approach for research and antioxidant behavior against SARS-CoV-2 using the core protease (6LU7) protein.[45]

i.) *Psoralea corylifolia*



Psoralea corylifolia L is used in traditional Chinese and Ayurvedic medicine for the treatment of various skin diseases such as vitiligo, psoriasis, and leprosy. This herb is also known for its antibacterial and anti-inflammatory properties. Over time, six aromatic compounds have been isolated from it.

The plant isolate inhibited the enzyme at a dose with an IC50 ranging from 4.2 to 38.4 μM .[48]

Similarly, several natural products have shown antiviral activity against SARS-CoV at nanomolar concentrations (eghomoharringtonin,

h.) *Isatisindigotica*

Radix Isatidis (*I. indigotica*) contains organic acids, lignans, alkaloids, nucleosides, flavonoids, steroids and amino acids. Previous studies have shown that *I. indigotica* has antibacterial, antiviral, immunomodulatory, choleric, and anti-inflammatory properties. More importantly, it can prevent many diseases such as hepatitis B, flu, herpes simplex, mumps, coxsackie and cytomegalovirus.[44]

It is often used medicinally to treat many diseases caused due to viruses such as mumps, viral hepatitis, and the common cold. Therefore, *I. indigotica* may be useful in the management of COVID-19. *I. indigotica* has immunomodulatory properties that enhance its anti-inflammatory properties.[51]

It is not a proven treatment for covid 19 ,however due to it's immunomodulatory, anti-viral and anti-inflammatory activities it has potential to be used as a treatment for corona.[47]



ouabain, lycorin, tyloforin, 7-methoxycryptotin, and silvestro). Clinical trials of some herbal remedies targeting SARS-CoV-2-3CLPro have shown hope for herbal remedies against SARS-CoV-2. Recently, the 3CL protease inhibitor NLC-001, a botanical product taken orally as a dietary supplement, received US FDA approval.[48]

j.)Glycyrrhiza glabra



Glycyrrhizin, also known as glycyrrhizic acid (GLR), is a triterpenoid saponin isolated only from the roots of the Glycyrrhizae Radix plant. GLR is potent against replication of two clinically isolated SARS-associated coronaviruses (FFM-1 and FFM-2). While the drug is not cytotoxic to cells, it has been shown to inhibit the cytopathic action of the virus with an EC₅₀ of 300 mg/ml. GLR inhibits viral replication, but also inhibits infection and adsorption to cells. [49]

The idea to identify the origin of these activities was unclear at the time, but drug-induced production of nitrous oxide synthase suggests that nitrous oxide may be another responsible for inhibition of viral replication.[46]

GLR also showed activity when tested against 10 clinical isolates of SARS-CoV in Vero-E6 strains, but the activity was time-limited. The rapid metabolism of drugs limits exposure to effective concentrations. Modification of the GLR structure, particularly the formation of amino acid conjugates and amide derivatives, could lead to anti-SARS-CoV-2 activity, possibly at the expense of greater cytotoxicity.[50]

h.)Ginseng

Ginseng improves B lymphocyte proliferation and supports the production of inflammatory mediators, including INF- γ and interleukins, which affect the body's activation and regulation.

Additionally, ginseng has anti-inflammatory and anti-inflammatory properties. However, the immunomodulatory effect of ginseng is not clear. Many scientists believe that ginseng can help treat upper respiratory tract infections and reduce colds and flu. And therefore can be a potential treatment of corona.[53]

III. CONCLUSION

The countries were facing several waves of COVID-19 and the healthcare system was failing. Research on herbal treatments, including traditional medicines, bioactive metabolites, and functional foods, to prevent SARS-COV-2 can be a great success in our fight against the spread of COVID-19. The significant past medicinal benefits of plants and/or their active metabolites have led to several recent studies demonstrating their ability to treat positive outcomes for COVID-19. They can be used alone or in combination with other medications to prevent the spread of COVID-19. My review shows that many promising bioactive metabolites, botanical herbal preparations, nutraceuticals and functional foods have been shown to be supportive against COVID-19 and are in various stages of clinical trials to allow their use in the treatment of COVID-19.

Some herbal products such as *Gymnanthemum*, *amygdalinum*, *Azadirachta indica*, *Nigella sativa*, and *Eurycoma longifolia* can be used. On the other hand, numerous herbal drugs such as *G. glabra*, *Thymus vulgaris*, *Allium sativum*, *Althea officinalis*, and ginseng have proved to be effective in the preventive and supportive management of COVID-19 through boosting the immune system

These herbs do not prevent infection, but they can improve the health of patients by supporting the immune system. However, evaluation of the efficacy and safety of phytochemicals and herbal preparations is important for using their therapeutic properties to manage patients with COVID-19. Finally, COVID-19 is a challenge for people all over the world. Responding to this pandemic will require the effort of everyone and the international cooperation of scientists, experts and authorities.

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