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HERBAL IMMUNITY ENHANCER AGAINST COVID-19 INFECTION

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Abstract:

As coronavirus comanly knowns as a COVID-19 has communities around the world, many people have wondered whether there are steps they can take to stay healthy. COVID-19 is usually caused by a virus to which most probably the people with low immunity response are being affected. Being the essence of Ayurvedic medicines, Indian medicinal plants manifest miraculous effects in curing a vast range of diseases and disorders among humans and can be better called “elixirs of life.” Plant-based foods increased intestinal beneficial bacteria which are helpful and makeup up 85% of the immune system. By the use of plenty of water, minerals like magnesium and Zinc, micronutrients, herbs, food rich in vitamins C, D, and E, and a better lifestyle one can promote health and can overcome this infection. Currently, there is much-growing interest in the use of these medicinal plants as modulators of the complex immune system.

Keywords: COVID-19, Plant-based foods, Immune system, Ayurvedic medicines

INTRODUCTION

Today the whole world facing an unprecedented pandemic COVID 19 caused by SARS COV 2. In the present scenario, it's become more important to build our defense system more strong against it as no evidence-based treatment for COVID-19 is developed yet. The outbreak of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or Covid19 was reported for the first time in Wuhan, of Hubei province in China in December 2019. The outbreak was referred to as the outbreak of pneumonia of unknown cause. It was confirmed by Chinese scientists that the disease outbreak was started zoonotic transmission events associated with a large seafood market but soon it also transferred from the person to person and took the face of "Pandemic" all over the world. The standard treatment against COVID-19 is presently lacking. Only a few antiviral agents, some antibiotics, and anti-inflammatory agents are being used for the treatment.[1] As there is no standard treatment against COVID-19 all preventative measures such as hand cleaning with soap and sanitizer, mouth, and nose coverage with mask during sneezing and coughing are being advised to stop the spread of COVID-19. [2] The observation of the death pattern of COVID 19 patients revealed that early deaths were in older people, probably because of the poor immunity, which promotes faster progress of COVID-19. Therefore, it is significant to boost our immune system. It is important to suggest that people should use some supplements to boost their immune systems.[3] Coronaviruses, a genus of the Coronaviridae family, are spherical or pleomorphic enveloped, non-segmented, single-strand positive-sense RNA (ssRNA+) genome. The genomic RNA is 27–32 kb in size, capped, and polyadenylated. They are genetically categorized into four important genera: the Alpha-corona virus, Beta-corona virus, Gamma-corona virus, and Delta-corona virus. The former two genera typically infect mammals, whereas the latter two predominantly infect birds.[4] The novel corona-virus initially named the 2019 novel corona-virus (2019-nCoV) in January 2020 which is responsible for severe acute respiratory syndrome and the current reference name for the virus is severe acute respiratory syndrome coronavirus2(SARS-CoV2), which has a phylogenetic similarity to SARS-CoV. The WHO announced that the official name of the 2019 novel coronavirus a disease (COVID-19) in February 2020.[5] In the last 15 years, we have witnessed the emergence of two zoonotic, highly pathogenic HCoVs: severe acute respiratory syndrome coronavirus (SARS-CoV) pandemic of 2002-2003 and Middle East respiratory syndrome coronavirus (MERS-CoV) outbreak in South Korea in 2015 that have been responsible for regional and global outbreaks. Four

different human CoVs (HCoVs) (HCoV 229E, NL63, OC43, and HKU1) are endemic globally and account for 10% to 30% of upper respiratory tract infections in adults. These are prevalent and typically cause common cold symptoms in immunocompetent individuals. Its origin and its ability to spread among humans remain unknown; nowadays human-to-human transmission has been confirmed.[6] Coronaviruses can infect birds and mammals, including humans, according to the world health organization (WHO). The World Health Organization (WHO) has recently declared coronavirus disease 2019 (Covid-19) a public health emergency of international concern. Knowledge about novel is based on a few months of observation and studies. . It is necessary to understand the correlation among medicinal herbs, immune systems, and COVID-19 in the present times.[7] Plants materials are used in Ayurvedic methods of treatment. Generally, they are non-toxic and without any side effects. Various parts of medicinal plants are popular for their antiviral activities and immunity strengthening capacity. Pandemic such as COVID19 teaches few important lessons to mankind; such as the importance of hygiene and health. In times, when the world is busy fighting the deadly coronavirus, it is necessary to take extra precautions to keep yourself protected from getting infected. Therefore, you need a healthy and strong immune system. The best way is to strengthen our immunity naturally with the help of medicinal plants/herbs. Ayurveda, the ancient medical science had stated long ago that plant extracts could do a lot to strengthen the body.[8]

Sign and Symptoms

Coronavirus naturally causes illnesses in mammals and birds. They may also be responsible for potentially lethal respiratory tract infections (acute and chronic) in humans.COVID-19 can affect anyone, young or old, male or female, in all parts of the world. However, the symptoms shown between individuals are not always the same. It may vary from person-to-person and produce few or no symptoms. However, it can also lead to severe illness and may be fatal.[9]

Coronaviruses will infect people at any stage during their life period.

- These mainly include:
- Young children
- Women who are pregnant
- Elderly People (aged 65 years or above) older

- People with special underlying health conditions such as the presence of certain congenital diseases including chronic lung disease, serious heart conditions, severe obesity, a compromised immune system, or diabetes.[10]

The incubation period of COVID19 varies from 2 to 14 days after you come into contact with the virus. Besides, in some cases, the diseases prevail after 27 days. However, Chinese researchers mentioned 5.2 days as an average incubation period. The duration of the survival of death is 6 to 41 days after infection of the coronavirus. It depends on the age, health, and clinical conditions of the patients.

Complication

- Acute respiratory distress syndrome
- Kidney failure
- Cardiac failure
- Viral sepsis
- Pneumonia

Prevention

The governments should provide facilities for the decontamination of the hands in public places. The guidelines are available for healthcare providers, medical staff, researchers, and public health individuals.[11]

The CDC recommended the following steps to prevent or minimize the spread of COVID-19:

Do's

- Wash your hands thoroughly with soap and water for at least 20 seconds.
- Avoiding touching the nose, mouth, eyes.
- Use hand sanitizers that contain antiseptics such as alcohol with at least a 70% concentration.
- Maintain at least a 1-meter distance from others.
- Practicing quarantine and avoid public places and crowded areas as much as possible.

- Avoid close contact with people who are sick with any disease, especially those who are undergoing treatment at the hospital.
- The drinking of hot water after every hour, eat nutritious food may be helpful.
- If you cough or sneeze, cover your nose and mouth with tissue or mask.
- Keep up to date on the latest information and follow the instructions of trusted sources, such as WHO or your local and national health authorities.
- Take adequate sleep and rest
- A person suspected of Influenza-like illness must consult the doctor.

Don'ts

- Touching eyes, nose, or mouth with unwashed hands while coughing and sneezing
- Hugging, kissing, and shaking hands while greeting
- Spitting in public places
- Taking medicines without consulting a doctor
- Disposal of the used napkin or tissue paper in open areas
- Touching surfaces usually used by the public (Railing, door, gates, etc) [12]

Immunomodulatory effect of medicinal plants

Medicinal herbs with the therapeutic properties of the immune system work to enhance and stimulate the humoral and cellular immune response and also work to enhance and stimulate the innate response by activating the complementary system, granulocytes, macrophages, and natural killer cells. Then the activation of these primary immune cells begins to produce a different effector molecule (such as cytokines) that are involved in modifying and enhancing immune responses.[13] There are several studies through which the effectiveness of antiviral and antimicrobial plants has been proven by enhancing and activating the body's immune system[14] where some spices such as onions, garlic, mustard, red pepper, turmeric, cloves, cinnamon, saffron, curry leaves, fenugreek, and ginger have been identified as medicinal plants, they have antimicrobial, immunomodulatory and antioxidant properties. Also, plant therapy for immunity can be considered as an alternative to traditional chemotherapy for several diseases that are characterized by weak immune response or

selective immune-suppression such as inflammatory diseases, autoimmune disorders, organ transplants, and bone marrow.[15] The use of medicinal plants to stimulate the immune system as an alternative treatment to traditional medications will be according to the active components that have a positive effect on the immune system such as polysaccharides, lectins, peptides, flavonoids, and tannins.[16] Besides these compounds, other phytochemicals including essential oils, stimulants, terpenoids, phenols, pigments, and alkaloids have shown positive effects in stimulating the immune system.[17] On the other hand, a lot of plant extracts that have a positive effect in stimulating the immune system have been identified, such as Coriolus Versicolor extracts contains glucans containing (1,4) backbone with (1,3) and (1,6) glucocytic linkages, which are used as an adjuvant since to the immune system40. Also Ginseng plants rich in saponin and steroid compounds are known to have immune-stimulating properties including cytokine production (IL-2, IL-6, TNF-α, and IFN-γ), macrophage activation, and lymphocyte activity, saponins can stimulate the Cells immune response and enhancing antibody production.[18] There are other plants such as Astragalus root, Isatis root, Achyranthes root, and Chinese Yam is known to have polysaccharides that have wide immunomodulatory effects which considerably improves the antibody production.[19]

Tulsi (Ocimum sanctum)

In the traditional system of medicine, different parts of the Ocimum sanctum have been recommended for the treatment of different diseases. This herb is loaded plenty of with vitamin C, antioxidants, antiseptic and antiviral properties. Tulsi has been used as a natural hand sanitizer due to its anti-microbial activities. One of the most common home remedies for the common cold or sore throat is Tulsi tea. Tulsi can help to strengthen the respiratory system due to the effects it has on the chemical changes in the body. Tulsi has been found to address physical, chemical, metabolic, and psychological stress through a unique combination of pharmacological actions. Also, the crude extract and terpenoid isolated from the leaves of Ocimum sanctum have shown promising antiviral properties against the H9N2 virus.[20]

Fig. 1. Tulsi Plant

Turmeric (Curcuma longa)

Turmeric is a pungent Asian spice with a fascinating heritage. One of the most notable compounds found in turmeric is curcumin and it also shows antimicrobial and antiviral activity. As well as giving turmeric its saffron coloring, curcumin is extracted from turmeric root and sold as a popular dietary supplement. Turmeric is known for its abundance of anti-inflammatory effects. Curcumin is a potent immunomodulatory agent and has been known to be highly effective as a treatment. Curcumin has been shown to inhibit the replication of some types of viruses, including the dengue virus, hepatitis B, and Zika virus. The compound has also been found to have several significant biological effects, including antitumor, anti-inflammatory, and antibacterial activities.[21]

Fig. 2. Turmeric Plant

Drumstick tree (Moringa oleifera)

The most important nutrients we need for immunity are Vitamin C, Vitamin A, and protein – all of which are abundant in Moringa. This is a native Indian vegetable that has antiviral, antifungal, and anti-inflammatory properties. It contains more Vitamin C than oranges. Vitamin C is the chief nutrient that our bodies need to build strong immunity. And during the COVID-19 pandemic, it should be your go-to herb for immunity strengthening. The pods of trees are cooked as food in various states of India. It also shows a protective effect in the prevention of in vitro glucose-induced cataracts.[22]

Fig. 3. Moringa Plant

Amla (Phyllanthus Emblica)

Phyllanthus Emblica L. (Synonym: Emblica Officinalis) is a medium-sized deciduous tree belonging to the family Euphorbiaceae, commonly known as Indian gooseberry, medicinal plants, having great elementary and therapeutic importance. It helps detoxify the entire organ system for better health and immunity. Amla fruits are reputed to contain high amounts of vitamin C (Ascorbic acid). It is also loaded with polyphenols that are known to fight against the development of cancer cells. And that's not all. Amla is also helpful in managing diabetes and reducing cholesterol levels. It also contains numerous phytoconstituents viz. a higher amount of polyphenols like gallic acid, ellagic acid, different tannins, minerals, vitamins, amino acids, fixed oils, flavonoids likerutin, and quercetin.[23]

Fig. 4. Amla Plant

Black pepper (Piper nigrum)

Piper nigrum has been extensively explored for its biological properties and its bio-active Phyto-compounds. It is crammed with antibacterial and anti-inflammatory properties, which keep infections at bay and also provide relief from the discomfort. It is used for both human and veterinary medicine in India for menstrual and ear-nose-throat Patiletal Natural immunity booster for COVID19 disorders in human and gastrointestinal disorders. It is also reported with antioxidant effects and helps in dealing with some throat ailments.[24]

Fig. 5. Piper nigrum seed

Giloy/ Guduchi (Tinospora cordifolia)

Tinospora herb has heart-shaped leaves and is been used and advocated in Indian medicine for ages. Drinking fresh Giloy juice helps to improve immunity. It enhances the activity of macrophages (the cells responsible for fighting foreign bodies as well as microorganisms) and thus helps in early recovery. Giloy is also popularly known for its anti-inflammatory benefits and helps reduce respiratory problems like frequent cough, cold, tonsils. Giloy powder, Kadha (tea) or tablets can also be used for various skin problems as it helps to remove

toxins from the body. It also shows pharmacological properties like immunomodulation,anticancer, hepatoprotective, and hypoglycemic.[25]

Fig. 6. Giloy Plant

Neem (Azadirachta indica)

Neem helps boost your immune system while cooling down your body internally. It possesses both anti-bacterial and anti-fungal properties that help keep your skin clean, radiant, and healthy. Neem also has blood-purifying properties; boosting both the lymphocytic and cell-mediated immune systems. Regular consumption of Neem capsules can also avert high fever, malaria, viral flu, dengue, and other infectious diseases. More than 70 different terpenoids, or terpenes, have been identified in different parts of the Neem tree. One single Neem terpenoid, beta-caryophyllene, has been shown to have anti-inflammatory, antioxidant, and pain-reducing benefits. Over 300 structurally diverse constituents, one-third of which are limonoids including nimbolide, azadirachtin, and gedunin have been identified as modulators of cell signaling pathways.[26]

Fig.7. Neem Plant

Garlic (Allium sativum)

Garlic is from the onion family Allium. It is an essential element of most cuisines around the world. Garlic is loaded with so many health benefits if consumed in the right way. Allium sativum is a functional food well-known for its immunomodulatory, antimicrobial,anti-inflammatory, antimutagenic, antitumor properties. Its antiviral efficiency was also demonstrated. It is a rich source of vitamins and minerals such as Vitamin B1, B2, B3, B6, folate, magnesium, phosphorus, sodium, zinc, iron, manganese, calcium among others. What makes garlic a Patiletal Natural immunity booster for COVID19 magical immunity booster is the presence of Allicin, which helps in fighting several ailments. Garlic is an excellent natural source of bioactive sulfur-containing compounds and has promising applications in the development of functional foods or nutraceuticals for the prevention and management of certain diseases.[27]

Fig. 8. Garlic seed

Ashwagandha (Withania somnifera)

It is a small shrub with pale green flowers, simple leaves, and red berries. More commonly known as ashwagandha, Indian ginseng. Most of the benefits from Ashwagandha are from the root and the leaves. The leaves are most commonly used in tea preparation. The root can be taken in many ways but it's most commonly dried, powdered, and taken as a supplement these days. The extract of Ashwagandha can reduce blood sugar levels, cortisol levels, symptoms of depression, and inflammation. It helps increase strength, muscle mass, and improve brain function as well. Ashwagandha improves the body's defense against disease by improving cell-

mediated immunity. It also possesses potent antioxidant properties that help protect against cellular damage caused by free radicals. It showed inhibitory properties against many cancers, (breast, colon, prostate, colon, ovarian, lung, brain), along with their mechanism of actions and pathways involved.[28]

Fig. 9. Ashwagandha

Cinnamon (Cinnamomum Verum)

Cinnamon has also been used for its medicinal properties for thousands of years. Made from the inner bark of the Cinnamomum tree, its use has been dated as far back as ancient Egypt. Cinnamon is an immune simulator, protecting the body from bacterial or viral attacks. It helps your body fight infections and repair tissue damage. All the antioxidants are super powerful when it comes to bringing those anti-inflammatory properties. Cinnamon also gives us manganese, calcium, fiber, and iron. Cinnamon also fights inflammation and helps ward off infections and heal damaged tissue. Containing large amounts of polyphenol, cinnamon outranked "superfoods" like garlic and oregano in a study comparing the antioxidant activity of 26 spices. Many studies have shown that cinnamon shows antimicrobial, antiviral, antifungal, antioxidant, antitumor, antihypertensive, antilipemic, antidiabetic, gastroprotective, and immunomodulatory effects.[29]

Fig. 10. Cinnamon

Onion (Allium cepa)

Allium is a subfamily of monocotyledonous plants that includes hundreds of species such as garlic, onion, leek, chives, and more.[19] Allium cepa is a naturally derived medication to cure nasal congestion and to improve the immune system. Onion contains vitamin C, sulfur, zinc, selenium, and most important quercetin. These potent nutrients make your immune system healthier and stronger. The flavonoid and antioxidant present in quercetin is loaded with antiviral properties. The vegetable is particularly high in vitamin C, a nutrient involved in regulating immune health. Also, the trace mineral selenium which stimulates immune function is found in higher concentrations in onions than in other veggies. Selenium may play a part in the management of viral inflammatory and allergic conditions.[30]

Fig. 11. Onion

Wild carrot (Daucus maritimus)

The antiviral activities of extracts from Daucus maritimus seeds were investigated against the reverse transcriptase of human immune deficiency virus (HIV) type 1 and a panel of RNA dependent RNA polymerases of dengue virus, West Nile virus (WNV), and hepatitis C virus (HCV). The essential oils from flowers and roots of Daucus carota L. ssp maritimus were obtained by hydro-distillation and analyzed by a combination of Gas chromatography/Mass spectrometry, and Carbon-nuclear magnetic resonance. The antibacterial effect resulted in the inhibition of a series of common human pathogenic bacteria, and some clinically and environmentally isolated strains with significant MIC and MBC values.[31]

Fig. 12. Carrot

CONCLUSION

The insufficiency of the immune system negatively affects the resistance of the COVID-19, which leads to significant complications. Immune systems in the body play an important role to fight against unhealthy environments and microbes such as viruses, bacteria, fungus, etc., and various numbers of alternate diseases. There are lots of allopathic medicines are available to boost our immune system but we also know that there has several side effects and are also costly. For this purpose, we find the alternate source as Ayurvedic product and medicinal plant which not only provided a healthy environment to the body but also boost the immune system without causing any side effect. At this COVID-19 pandemic situation, various studies reveal that those people having strong immunity have a higher recovery rate against COVID-19. Since Ayurvedic products cannot completely cure the COVID-19 but it could be minimizing the risk of viral infection and reduces the mortality rate.

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