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HERBAL MEDICINES USEFUL IN TREATMENT OF COVID-19

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ABSTRACT

The novel corona viral infection is caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), It is a respiratory infection affects the functioning of lungs. It can be spread through physical contact between peoples. Proper care and social distancing are the most important parameter for controlling of COVID-19 infection. The symptomatic relief from cough, cold, fever and soar throat are the only way to treat patients with positive COVID-19. Herbal drugs originated from natural origin having less side effects can prove to be effective in treatment of COVID-19 infections. Immunomodulatory drugs, anti-oxidants can be proved effective for the treatment of COVID-19.

KEYWORDS: Covid-19, Herbal medicine, Treatment, Drugs etc.

1.0 INTRODUCTION

The novel coronavirus disease 2019 (COVID-19), caused by the Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), is in the midst of world wide panic and global health concern since December 2019. As of March 26th, 2020, the World Health Organization (WHO) has reported that 416,686 and 18,589 death cases have been confirmed worldwide, and it has spread to 197 countries.[1] With this emerging battle against this deadly virus, the WHO has strategized to interrupt human-human contact, isolate patients at early stages, identify and reduce transmission from the animal source, address crucial mysteries about the virus and accelerate research, communicate information correctly to the public and minimize the social and economic impact. At this juncture, it is tremendously vital to understand the basic mechanism of the virus to develop specific drugs. Currently, it has been established that SARS-CoV-2 shares sequence homology with the SARS-CoV and a bat coronavirus.[2] Despite its similarity to SARS-CoV, its transmission efficiency and diagnostic

methods are rather different. The distinguishing factor is probably the nucleotide changes in the spike (S) protein and its receptor-binding domain (RBD).[3-5] Currently, the treatments include Lopinavir/Ritonavir and supportive care, as this is primarily dependent on the severity of the illness. From a research standpoint, various drugs are being developed at an extremely quick pace and new targets are being identified every day, and also numerous drugs are also undergoing clinical trials. Researches are very curious about how to provide the best protection to the public before a vaccine can be made available.[6] Indian medicinal herbs are a promising field for treatment of various illnesses . Ayurveda and Siddha practices originated in India and are still widely used among the Indian population. By identifying certain phytocompounds, it is possible to effectively characterize medicinal herbs that could help to alleviate the infection. Hence, by Re purposing the Indian medicinal plants, more innovative treatment options can be penned down for their role in defeating this viral transmission. At a time of worldwide anxiety, it is imperative to find long term solutions to prevent the transmission of such pandemics. So, it's time for all the citizens to join hands together to fight against coronavirus by practicing self-hygiene and social distancing. In this review, the structure, immunological influence, mechanism of action of the SARS-CoV-2 infection in the human host cell, the availability of disease-specific drugs, ongoing clinical trials, recent diagnostics and the potential use of certain Indian medicinal herbs for the effective treatment of COVID-19 has been discussed. Through this review, we suggest that the Indian traditional medicinal herbs may be a beneficial step to combat viruses like the SARS-CoV-2.

2.0 HISTORY

Since the beginning of the 21st century, three coronaviruses have caused disastrous outbreaks of pneumonia in human beings: Severe acute respiratory syndrome coronavirus (SARS-CoV) in 2002–03 and Middle-East respiratory syndrome coronavirus (MERS-CoV) in 2012.[7] The ongoing Covid-19 (Coronavirus disease 2019) is the third coronavirus epidemic of zoonotic origin to occur in the present century[8], which spread from a single city in China to the entire country within 30 days; and spread to nearly 72 countries in less than three months.[9] In essence, it is known to have affected 'all continents except Antarctica'.[10] On 12th March 2020, Covid-19 was declared a pandemic by the World Health Organization (WHO).[11] As of 25th May 2020, there have been 52,06,614 confirmed cases and 3,37,736 deaths worldwide due to Covid-19 as reported by the WHO. In India, the first case of Covid-19 was a student who returned from Wuhan, China on 30th January 2020.[12] In India, from Jan 30 to 7:07pm

CEST, 24 May 2020, there have been 131,868 confirmed cases of COVID-19 with 3,867 deaths. Although community transmission is not reported, clusters of cases have been identified.

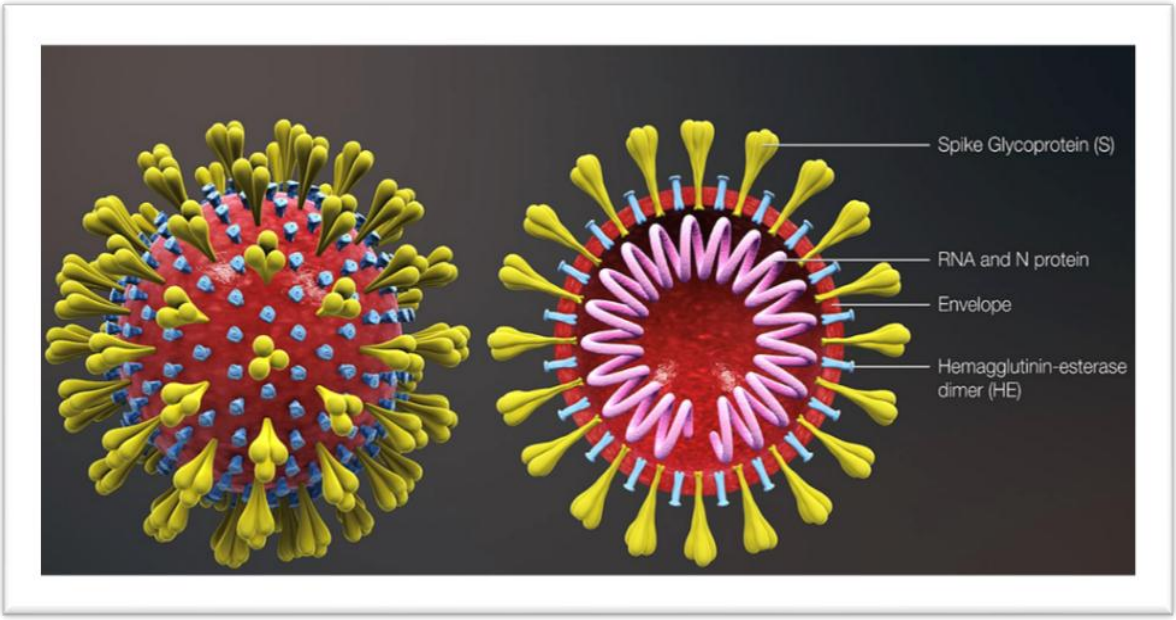

Fig no. 01: Structure of Covid-19 virus.

3.0 INDIAN MEDICINAL PLANTS AND THEIR POSSIBLE EFFECT ON COVID-19

Since long time ago Indian system of medicines proved useful and effective in treatment in various life threatening diseases and disorder. Indian herbs have been used as a treatment and preventive strategy for several diseases, including respiratory viral infections. The benefit of using these herbs in viral respiratory infections is to build immune stimulating and inflammation modulating effects of manage the immune system. Holistic approach of AYUSH systems of medicine gives focus on prevention through lifestyle modification, dietary management, prophylactic interventions for improving the immunity and simple remedies based on presentation of the symptoms (AYUSH, 2020). Indian preventive and prophylactic medicinal plants recommended by AYUSH for COVID-19.

List of Indian medicinal herbs which might inhibit the HCoVs and other Viruses

1. The methanol and water extracts of *Acacia nilotica* were screened for their in vitro inhibitory effects on viral infection and replication using the H9 cell line. The extracts of *Acacia nilotica* exhibited a significant inhibition of the viral enzyme HIV –1.[13]

2. The aqueous and non-aqueous extracts of *Allium sativum* were tested near about seventeen compounds were isolated and screened for their Proteolytic and hemagglutinating activity and viral replication against SARS virus.[14]
3. The plant *Andrographis paniculata* had been recommended by Ayush for the treatment of SARS-COV and shown significant results when tested in-vitro. The chemical constituent of *Andrographis paniculata* shows suppression NLRP3, capase-1, and IL-1β which are used in control of SARS-COV and likely SARS-CoV-2.[15]
4. The plant *Boerhaavia diffusa* had been used from ancient times for its wide application in treatment of various ailments. The aqueous and non-aqueous extracts of *Boerhaavia diffusa* shows inhibition of Angiotensin Converting Enzyme.[16]
5. The constituent of plant *Clerodendrum inerme Gaertn* lecithin shows potential anti-viral activity. Lecithin obtained from *Clerodendrum inerme Gaertn* shows marked potential of Inactivation Ribosome of SARS-CoV-2.[17]
6. The aqueous and non-aqueous extracts of *Clitoria ternatea* shows in-vivo inhibition potential against Metalloproteinase ADAM17.[18]
7. The plant *Coriandrum sativum* had been reported with several biological activities in the view of this facts the aqueous and non-aqueous extracts of *Coriandrum sativum* when screened in-vitro shows marked inhibition of ACE.[19]
8. The combined aqueous and non-aqueous extracts of *Cynara scolymus, Cassia occidentalis, Coscinium fenestratum* shows marked inhibition ACE when screened in-vitro.
9. The plant *Embelia ribes* had been used widely since long time for its various pharmacological activities. The alcoholic extracts of *Embelia ribes* on screening in-vitro shows Inhibition ACE.
10. The plant *Eugenia jambolana* had been reported with various pharmacological activities and also been suggested by Ayush for its effective utilisation in treatment of viral infection. The alcoholic extracts of *Eugenia jambolana* shows inhibition viral Protease.[20]
11. The plant *Euphorbia granulata* had been reported with various pharmacological activities. The alcoholic Extracts of *Euphorbia granulata* shows inhibition of HIV-1 Protease when screened in-vitro.
12. The plant *Glycyrrhiza glabra* possess various biological activities and had been reported for the same in various literature. The plant extracts of *Glycyrrhiza glabra* shows inhibition of viral replication; Modulation of membrane fluidity against SARS; HIV-1 viruses.[21]

13. The phytoconstituents of *Gymnema sylvestre* shows wide range of biological activities. When it had been screened for their anti-viral activity. The plant extracts of *Gymnema sylvestre* shows inhibition of viral DNA synthesis.[22]
14. The plant *Hyoscyamus niger* had been reported with various biological activities. The plant extracts of *Hyoscyamus niger* shows inhibition and Bronchodilator Ca2+.[23]
15. The plant *Ocimum kilimandscharicum* shows various pharmacological activities in past and had been reported in literature. The plant extracts of *Ocimum kilimandscharicum* shows inhibition of HIV-1 when screened in-vitro.[24]
16. The holy plant *Ocimum sanctum* commonly known as Tulsi. This has traditional values also possess lots of biological activities. The alcoholic extracts of *Ocimum sanctum* shows Inhibition of HIV-1.[25]
17. The plant *Punica granatum* had lots of pharmacological activities and also been reported in literature. The plant xtracts of *Punica granatum* shows marked inhibition of ACE –[26]
18. The plant *Salacia oblonga* shows anti-hypertensive activities. The alcoholic extracts of *Salacia oblonga* shows Suppression angiotensin II, AT1 signal when screened for their anti-hypertensive potential.[27]
19. The plant extracts of *Sambucus ebulus* had been reported with anti-viral potentials. The alcoholic extracts of *Sambucus ebulus* shows inhibition of Enveloped virus.[28]
20. The plant *Solanum nigrum* shows various pharmacological activities. The plant extracts of *Solanum nigrum* shows inhibition of HIV-1 when screened for its anti-HIV potential.[29]
21. The plant *Sphaeranthus indicus* had been utilized for treatment of various ailments. The plant extracts of *Sphaeranthus indicus* shows inhibition of Mouse corona virus and Herpes virus when screened for its anti-viral potential.[30]
22. The plant *Strobilanthes callosa* had been reported with various pharmacological activities. The plant extracts of *Strobilanthes callosa* when screened shows blocking of HCoV-NL63.[31]
23. The plant *Strobilanthes cusia* shows various pharmacological activities as mentioned in literature. In the view of that the alcoholic extracts of *Strobilanthes cusia* shows blocking of HCoV-NL63.[31]
24. The plant Extracts *Vitex negundo* shows various pharmacological activities and had been reported in literature for the same. The polar and non-polar extracts of *Vitex negundo* shows inhibition of HIV-1.[32]

25. The plant species of *Vitex negundo Vitex trifolia* also shows significant pharmacological potentials. When Extracts of *Vitex trifolia* screened against SARS-COV shows reduction of SARS-COV.[33]

Where

HIV-1PR: Human Influenza Virus – 1 Protease; SARS: Severe Acute Respiratory Syndrome; SARS-CoV: Severe Acute Respiratory Syndrome – Coranavirus; SARS-CoV-2: Severe Acute Respiratory Syndrome – Coranavirus 2; ACE – Angiotensin converting enzyme; HIV-1: Human Influenza Virus – 1; gp120: Envelope Glycoprotein 120; CD4: Cluster of Differentiation; HCoVNL63: Human coronavirus NL63; RNA: Ribonucleic acid; MHV-A59:Mouse Hepatitis Virus –A59; CA2+: Calciumion; NLRP3: NLR Family Pyrin Domain Containing 3; AT1: Angiotensin 1; HCoV-NL63: Human Coranavirus – NL63.

4.0 CONCLUSION

Herbal drugs can be used in treatment of COVID-19 infection as till date no allopathic drug is available for the treatment and most of the patients are rely on life supportive system for functioning of lungs and other vital body organs. Also there is lack of knowledge about complete replication mechanism of novel corona virus. There must be serous observations regarding effective use of herbal medicines in treatment of novel corona virus by considering its side effects also.

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