

Role of Medicinal Plants against Covid-19- A Review

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ABSTRACT

India, first case of Coronavirus disease was an imported case from Wuhan, China on January 30, 2020. This disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that belongs to the coronavirus family. Disease has become a pandemic. The world is facing tremendous economic loss and health crisis. This disease affects the respiratory system. Since past decades natural and herbal products are using for acute respiratory infection. These products have acceptable toxicity. In pathogenesis of COVID-19 impaired immune regulation play an important role. It has been concluded by several researches that herbal/natural products can prevent or even cure COVID-19. However, to evaluate the effects of these products specific preclinical and clinical trials have not been properly conducted till. According to general concepts from previous studies it has been stated that certain natural/herbal products could be use for the treatment of COVID-19. Present review discusses some herbal extracted including Aloe vera, Withania somnifera Tribulus terrestris, Ocimum sanctum, Phyllanthus emblica and Curcuma longa which can be considered for the treatment of COVID-19.

I. INTRODUCTION

At present, COVID-19 (Coronavirus) has been detected as the third most important disease which is prevailing in almost all the world by getting initiated from a single place by this pernicious virus^[1]. According to the study of the International Committee on Taxonomy of the coronavirus, this virus has been classified under the family Coronaviridae, subfamily Coronavirinae. Subfamily Coronavirinae is divided into 4 genera: Alphacoronavirus, Betacoronavirus, Gammacoronavirus, and Deltacoronavirus as per its genotypic and serological characterization^[2, 3, 4, 5].

ICTV (International Committee on Taxonomy of Viruses) officially named SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus-2) as the causal agent of COVID-19

^[6]. Now it has been stated that SARS-CoV resembles sequence homology with bat coronavirus. Human to human transmission of this virus is possible because of its Spike glycoproteins which have highest affinity for human angiotensin-converting enzyme 2 (ACE2) receptors^[7]. The United States of America (USA), China, Nigeria, World Health Organization - WHO and India are getting significant attention in global health debates due to substantial research investments in traditional herbal medicines^[8]. Since past decades herbal plant products are in a race to develop new medicines, with less or no adverse effects, for therapeutic and preventive application in several health issues^[9]. Certain natural products bind to the active sites of COV-19 proteases, results to hinder viral replication^[10]. Ayurveda is fully equipped with diverse treatment modules for multifaceted noxious diseases and it has been accepted as the world's oldest medical network to treat infections without causing any side effects^[11]. Since the Vedic period (1500-500 BCE), both the Ayurveda and the traditional Chinese medicines are globally treated to lessen the severity of the illnesses caused by several microorganisms^[12].

A number of medicines are now being suggested as potential investigational therapies. Many of them will be studied soon in clinical trials by WHO and participating countries for the treatment of coronavirus.

The present review discusses the general properties and immune-responses of herbal immune-boosters to fight this pandemic. By this review, we suggest that herbal or natural/medicinal plant formulations could be essential alternative strategy to combat this virus.

Medicinal Plants

Aloe vera

The botanical name of Aloe vera is Aloe barbadensis miller belongs to family Liliaceae. Aloe is shrubby or arborescent, perennial, xerophytic, succulent, pea- green color plant. It grows mainly in the dry regions of Africa, Asia, Europe and America.



The Aloe vera plant is well known and used for centuries for health, beauty, medicinal and skin care. The name Aloe vera derives from the Arabic word “Alloeh” meaning “shining bitter substance,” while “vera” in Latin means “true.” Aloe vera has been regarded as the universal panacea by Greek scientists. The Egyptians called Aloe “the plant of immortality”. Several studies shows that the plant has antiviral activity on several types of virus (Haemorrhagic Viral Rhobdavirus Septicaemia, Herpes simplex virus type 1, Herpes simplex virus type 2, Varicella-Zoster virus, human immunodeficiency virus, Influenza virus, poliovirus, Cytomegalovirus, Human papillomavirus) including coronavirus SARS-CoV-1. Orally Consumption of this plant could be in several forms and is totally safe. Zinc which is present in this plant ^[13], have shown an effect on SARS-CoV-1, could be involved in the antiviral effect of Aloe vera ^[14].

Aloe vera also invested with intrinsic antiviral properties like anti-inflammatory and immunomodulatory properties ^[15]. The mortality associated with COVID-19 can be attenuated by Phyto-drug based on Aloe vera extracts while strengthening the immune system. Aloe vera and its major metabolites may play an important role in the management of COVID-19 ^[16].

Withania somnifera

Withania somnifera, commonly known as ashwagandha, Indian ginseng, poison gooseberry, or winter cherry, is an annual evergreen shrub belongs to family Solanaceae or nightshade family that grows in India, the Middle East, and parts of Africa. Withania somnifera (L.) is one of the considerably botanicals in Ayurveda for its multimodal effects ^[17].



Plant contains a variety of phytoconstituents like Withanolide A & B, Withaferin A, Withanone, Withanosides ^[18]. Several pharmacological studies has been carried out of WS including immunomodulatory, anti-

inflammatory, antioxidant, anti-stress, antihypertensive, and antidiabetic along with organ-protective effects by researchers ^[19]. To maintain the immune homeostasis in inflammatory and infectious diseases prophylactic effects of WS

have scientific evidence ^[20]. From *W. somnifera* root tubers *W. somnifera* glycoprotein (WSG) isolated; shows (protease inhibitor) antimicrobial activity against few bacterial and phytopathogenic viruses ^[21].

Tribulus terrestris

Since several years, *Tribulus terrestris* (family Zygophyllaceae), commonly known as Gokshur or Gokharu or puncture vine, has been used for the treatment of various diseases.



Fruits of *Tribulus terrestris* are used in various pharmaceutical preparations and food supplements. The methanol extract of *T. terrestris* fruits showed potent inhibition against the papain-like protease (PLpro) which is an essential proteolytic enzyme for the protection to pathogenic virus and bacteria. Major bioactive compounds of this plant showing inhibition of Papain-like

protease (PLpro), which is major protein target of COVID-19^[22].

Ocimum sanctum

Ocimum sanctum belongs to family Lamiaceae and its common name is tulsi. This plant is popularly known as holy basil and one of the most important plants in India.



Extract of *Ocimum sanctum* can be included as a preventive measure against coronavirus due to its potential to inhibit replication of COVID-19 supported with its immune-modulatory feature and ACE II blocking properties. *Ocimum sanctum* containing Tulsinol (A, B, C, D, E, F, G) and dihydrodieuginol-B inhibit COVID-19 Main Protease and Papain-like Protease ^[23]. Plant is also being used in the management of common symptoms of COV-19 like pain, diarrhea, cough and fever ^[11]. Tulsi

boosts the immunity and helps to defense the threatening virus and bacteria ^[21].

Phyllanthus emblica

Phyllanthus emblica Linn belonging to the family Euphorbiaceae, originally native to India but nowadays also growing in Pakistan, Uzbekistan, Sri Lanka, Southeast Asia, China, and Malaysia. Plant has high binding affinity to the Spike Protein of COVID-19 ^[24].



Several studies suggested that *Phyllanthus emblica* have immunomodulatory properties and also have the potential to boost immunity against COVID-19 infection [25].

The major targets of COVID-19 are helicase protein. Phyllaemblicin G7 from *P. Phyllaemblicin-B* and phyllaemblinol from *P. emblica* showed high binding affinity to helicase protein. The

antioxidative and anti-inflammatory properties of *P. emblica* are the key to its therapeutic effect.

Curcuma longa

Curcuma longa is a yellow rhizome commonly known as turmeric. *Curcuma longa* belongs to the ginger family (*Zingiberaceae*). Its rhizomes (underground stems) are the sources of a bright yellow spice and dye.



Demethoxycurcumin, curcumin, Diacetylcurcumin are the major phytoconstituents of *curcuma longa* which are the most effective compounds that may act as potential inhibitors of COVID-19 Main Protein (Mpro) [26, 27].

It has been concluded by several studies that curcumin could serve as supplementary drug in COVID-19 treatment due to its innumerable mechanisms of action [28, 29]. This natural compound is easily tolerated in humans, even at high concentrations also [30]. Its combination with drugs has been already observed. The first results from the studies regarding the effect of curcumin in patients with COVID-19 are promising.

II. CONCLUSION

It has been proved by several studies that herbal/natural products play an effective and

preventive role in the COVID-19 pandemic. Plants are the main source of wide variety of phytoconstituents. *Aloe vera*, *Withania somnifera*, *Tribulus terrestris*, *Ocimum sanctum*, *Phyllanthus emblica* and *Curcuma longa* are primarily observed as effective against COVID-19. However, there is a need of in-vitro and in-vivo studies to identify efficacy of herbal medicine. All the plants discussed here collectively exhibited antiviral, anti-inflammatory, and immunomodulatory effects in COVID-19 management. Combination therapies of allopathy and herbal medicines lead towards the best treatment options against any pandemic due to microorganism.

Still there are many unknown herbals medicines waiting for their identification and purification and pharmaceutical evaluation.

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