Review Article

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Traditional Herbal Plants and Covid-19- A Review

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ABSTRACT

Presently many countries are focused on research to cope with pandemic situations like covid-19, SARS and pandemic influenza. Early knowledge and recent technologies have gotten quite an attention to upgrading the gaps in scientific health-oriented research. Different branches of science have been collaborated to find a suitable approach for better outbreak results. Current efforts are mainly focused on resource-based research so that without disturbing the environment a suitable approach can be offered to develop a better vaccine that would be affordable for developed countries as well as for developing countries. Many available resources can be used against these life-threatening biological agents. Plant resources have been already used for health care purposes from ancient times. Plant resources provide a good and safe approach with long term immunity against various kinds of disease-causing agents. Thus in the present pandemic situation research is mainly oriented to boost the immunity level as well as with suitable precautionary strategies. Upcoming research strategies are mainly focused on the benefits of available resources with a combination of developed technologies so that the gap in early thoughts and present research can be filled up. 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 used for the treatment of COVID-19. The present review discusses some herbal extracts which can be considered for the treatment of COVID-19.

Key-words: Antioxidant activity, Coronaviruses, COVID-19, Traditional Herbal Plants

INTRODUCTION

Coronaviruses (CoVs) has been classified into four genera, namely alpha, beta, gamma, and delta ^[1]. The COVID-19 treatment approach is supplemented by the combination of broad-spectrum antibiotics, antivirals, corticosteroids and convalescent plasma^[2]. Scientists are dedicated to developing effective treatments. Considering the current situation traditional medicine has been widely used including SARS and H1N1 influenza ^[3]. A guideline on traditional regimens for the prevention and management of COVID-19 has been issued by three countries India, China, and South Korea^[4]. Since ancient times various herbal remedies like Ashwagandha, giloe,

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Access this article online https://iijls.com/ ginger, cinnamon, tulsi, black pepper, black cumin, amla, turmeric, garlic, and flax seeds have been used for multiple diseases. In several countries, these plants have been utilized in food preparations and traditional medicines. However, in India, their use is very common as they are a part of the kitchen in every house. At least one plant from these is being used daily by every Indian. Because of their immunomodulatory, antioxidant, and anti-infective properties, the above-mentioned plants have been proved potent scientifically which might be one of the reasons behind the lower death rate of COVID-19^[5].

Cinnamomum verum J. Presl. (Cinnamon)- *C. verum* significantly increased phagocytic activity and also exhibited antioxidant, immunostimulant, and antiviral activity by modulating total protein, globulin, total antioxidant capacity and lysozyme activity ^[6]. Another study reported that when this is blended with other essential oils, it showed effective antiviral potential against H1N1 and HSV1 viruses ^[7].

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Fig. 1: Cinnamon

Allium sativum L. (Garlic)- Various studies have been conducted to highlight the effect of *A. sativum* in immunomodulation using garlic oil extract. *A. sativum* showed an antiviral effect against avian influenza virus_{cov}. H9N2 on Vero cells^[8].



Fig. 2: Allium sativum (Garlic)

Due to the blocking capacity, it has been reported that the concentration of 0.1 ml of garlic clove extract showed in vivo inhibitory effects against SARS-CoV-1 multiplication, possibly of extract towards its structural proteins. Alliin found in *A. sativum* showed the highest binding ability, with the target protein of SARS-CoV- 2 (6LU7)^[9]. Bioactives, which are present in garlic and the serine-type protease found in SARS-CoV-2 form hydrogen bonds in the active site regions suppressing the outbreak of COVID-19, and it can act as a preventive measure against COVID-19 infection ^[10].

Curcuma longa L. (Turmeric)- *Curcuma longa* commonly known as turmeric belongs to the ginger family (Zingiberaceae). Major phytoconstituents of curcuma longa are Demethoxycurcumin, curcumin, Diacetylcurcumin, which are the most effective compounds that may act as potential inhibitors of COV-19 Main Protein (Mpro) ^[11,12].



Fig. 3: Curcuma longa (Turmeric)

Due to curcumin innumerable mechanisms of action, it has been proved that it could serve as a supplementary drug in COVID-19 treatment ^[13,14]. This natural compound is easily tolerated in humans, even at high concentrations also ^[15]. Various studies also reported anti-inflammatory effects of *C. longa* either alone or in combination ^[16].

Nigella sativa L. (Black Cumin)- Nigella sativa L. have been observed as potential inhibitors of COVID-19 in molecular docking studies. According to earlier studies, Nigellidine gave energy complex at active site (6LU7) with energy scores closest to chloroquine and better than hydroxychloroquine and favipiravir whereas, αhederin gave energy complex at the active site (2GTB) scores than with energy better chloroquine, hydroxychloroquine, and favipiravir ^[17]. Studies have shown that TQ has an inhibitory property on SARS-CoV-2 protease, and has shown good antagonism to ACE 2 receptors ^[18]. It has been reported that at least eight in silico studies have demonstrated that compounds of N. sativa have moderate to the high affinity with SARS-CoV-2 enzymes and proteins ^[19].



Fig. 4: Nigella sativa (Black Cumin)

Ocimum sanctum L. (Tulsi)- Common name of Ocimum sanctumis Tulsi and it belongs to family Lamilaceae. Extract of *O. sanctum* can be included as a preventive measure against coronavirus due to its potential to inhibit replication of COVID-19 supported by its immunemodulatory feature and ACE II blocking properties. O. sanctum containing Tulsinol (A, B, C, D, E, F, & G) and dihydrodieuginol-B inhibit COVID-19 Main Protease and Papain-like Protease ^[20]. The plant is also being used in the management of common symptoms of COV-19 like pain, diarrhoea, cough and fever ^[21]. Tulsi boosts immunity and helps to defend against the threatening virus and bacteria ^[22]. It has been studied that intracellular multiplication of virus inhibited by Hydro-alcoholic extract of O. sanctum. It also inhibits non-specific interference with virus-cellov-2 interactions in H9N2 viruses ^[23]. Organization



Fig. 5: Ocimum sanctum (Tulsi)

Phyllanthus emblica L. (Amla)- An isolated compound (1, 2, 4, 6-tetra-O-galloyl- β -d-glucose) of *P. emblica* have antiviral potential against HSV by HSV-1 inactivation, which leads to inhibition of early infection indulging attachment and penetration of virus, suppression of intracellular growth and inhibited gene expression of HSV-1 E and L along with DNA replication ^{[24].}



Fig. 6: Phyllanthusemblica L. (Amla)

The plant has a high binding affinity to the Spike Protein of COVID-19 ^[25]. Several studies suggested that *Phyllanthus emblica* have immunomodulatory properties and also have the potential to boost immunity against COV-19 infection ^[26].

Azadirachta indica- Commonly known as neem (Family-Meliaceae), native to the Indian subcontinent, is another promising plant having active component azadirachtin and other constituents such as nimbidol, sodium nimbinate, gedunin, salannin, quercetin, nimbolinin, nimbin and nimbidin, and holds a long history of use in traditional medicines throughout the world ^[27]. Extracts of neem have shown antiviral activity on viruses such as vaccinia, Buffalo pox, chikunguniya, herpes, measles etc ^[28].



Fig. 7: Azadirachta indica (Neem)

Zingiber officinale Roscoe (Ginger)- Ginger has therapeutic properties, such as antibacterial, antioxidant, [29] antipyretic The antiviral, analgesic and phytocompound 6-gingerol, which is present in ginger is very useful for drug discovery against COVID-19, as it proved to have the highest binding affinity with multiple targets of SARS-CoV-2, such as viral protease, RNA binding proteins and viral proteases through DFT (Density Functional Theory) ^[30].



Fig. 8: Zingiber officinale Roscoe (Ginger)

Ginger enhances the body's defence mechanism by improving the antioxidant property. 6-Shogaol, an important compound obtained from ginger, helps the patient in relieving respiratory issues ^[31].

CONCLUSIONS

The review concluded the status of medicinal plants and herbs and their various therapeutic benefits. The use of herbal medicines is not only safe and cost-effective, but it is also free from side effects. 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 the wide variety of phytoconstituents. Still, there are many unknown herbal medicines waiting for their identification and purification and pharmaceutical evaluation.

Efforts should be made to explore and promote the knowledge of healing through such medicinal plants. The proper use of medicinal plants against COVID-19 could safeguard the lives of several people reducing the risks of infection, thereby minimizing the rate of mortality.

CONTRIBUTION OF AUTHORS

One author is only contributed to this article.

REFERENCES

- [1] Li G, FanY, LaiY, Han T, LiZ, et al. Coronavirus infections and immune responses. J Med Virol., 2020; 92(4): 424–32. doi: 10.1002/jmv.25685.
- [2] Yang Y, Islam, MS, Wang J, Li Y, et al. Traditional Chinese medicine in the treatment of patients infected with 2019-new coronavirus (SARS-CoV-2): a review and perspective. Int J Biol Sci., 2020; 16(10): 1708–17. doi: 10.7150/ijbs.45538.
- [3] Luo H, Tang Q, Shang Y, Liang S, Yang M, et al. Can Chinese medicine Be used for prevention of corona virus disease 2019 (COVID-19)? A review of historical classics, research evidence and current prevention programs. Chin J Integr Med., 2020; 26(4): 243–50. doi: 10.1007/s11655-020-3192-6.
- [4] Ang L, Lee HW, Choi JY, Zhang J, Lee MS. Herbal medicine and pattern identification for treating COVID-19: a rapid review of guidelines. Integr Med Res., 2020; 9(2): 100407. doi: 10.1016/j.imr.2020.100407.
- [5] Ahmad S, Zahiruddin S, Parveen B, Basist P, Parveen A, et al. Indian Medicinal Plants and Formulations and Their Potential against COVID-19-Preclinical and

Clinical Research. Front Pharmacol., 2021; 2(11): 578970. doi: 10.3389/fphar.2020.578970.

- [6] Islam MR, Oomah DB, Diarra MS. Potential immunomodulatory effects of non-dialyzable materials of cranberry extract in poultry production. Poultry Sci., 2017; 96(2): 341–50. doi:10.3382/ps/pew302.
- [7] Brochot A, Guilbot A, Haddioui L, Roques, C. Antibacterial, antifungal, and antiviral effects of three essential oil blends. Microbiologyopen., 2017; 6(4): e00459. doi: 10.1002/mbo3.459.
- [8] Rasool A, Khan MUR, Ali MA, Anjum AA, Ahmed I, et al. Anti-Avian influenza virus H9N2 activity of aqueous extracts of *Zingiberofficinalis* (Ginger) and *Allium sativum* (Garlic) in chick embryos. Pak J Pharm Sci., 2017; 30(4): 1341–44.
- [9] Mohajer ST, Ghalyanchi LA, Karimi V, Barin A, Sadri N. The effect of *Allium sativum* (Garlic) extract on infectious bronchitis virus in specific pathogen free embryonic egg. Avicenna J Phytomedicine., 2016; 6(4): 458-67.
- [10]Pandey P, Khan F, Kumar A, Srivastava A, Jha NK. Screening of potent inhibitors against 2019 novel coronavirus (Covid-19) from *Allium sativum* and allium cepa: an in silico approach. Biointerface Res Appl Chem., 2021; 11 (1): 7981-93.
- [11]Dosoky N, Setzer W. Chemical composition and biological activities of essential oils of Curcuma species. Nutr., 2018; 10 (9): 1196.
- [12]Khaerunnisa S, Kurniawan H. Potential inhibitor of COVID-19 main protease (Mpro) from several medicinal plant compounds by molecular docking study. Preprints, 2020. doi: 10.20944/preprints202003.0226.v1.
- [13]Saeedi-Boroujeni A, Mahmoudian-Sani MR. Antiinflammatory potential of Quercetin in COVID-19 treatment. J Inflamm., 2021; 18(1): 1-9.
- [14]Thimmulappa RK, Mudnakudu NK, Kumar SC, Subramaniam K, Radhakrishnan A, et al. Antiviral and immunomodulatory activity of curcumin: A case for prophylactic therapy for COVID-19. Heliyon, 2021; 7(2): e06350.
- [15]Gupta M, Kaur G. Withania somnifera (L.) dunal ameliorates neurodegeneration and cognitive impairments associated with systemic inflammation. BMC Complement Altern Med., 2019; 19(1): 217.

- [16]Lee SY, Cho SS, LiY C, Bae CS, Park KM, et al. Antiinflammatory effect of curcuma longa and allium hookeri Co-treatment via NF- κB and COX-2 pathways. Sci Rep., 2020; 10(1): 5718.
- [17]Salim B, Noureddine M. Identification of compounds from *Nigella sativa* as new potential inhibitors of 2019 novel coronasvirus (Covid-19): molecular docking study. Chem., 2020; doi: 10.26434/chemrxiv.12055716.v1.
- [18]Badary OA, Hamza MS, Tikamdas R. Thymoquinone: A Promising Natural Compound with Potential Benefits for COVID-19 Prevention and Cure. Drug Des Dev Ther., 2021; 15: 1819-33.
- [19]Koshak DA, Koshak PE. Nigella sativa L as a potential phytotherapy for coronavirus disease 2019: A mini review of in silico studies. Curr Ther Res Clin Exp:, CV-2 2020; 93: 100602.
- [20]Varshney K, Varshney M, Nath B. A text book. Molecular modeling of isolated phytochemicals from Ocimum sanctum towards exploring potential inhibitors of SARS coronavirus main protease and papain-like protease to treat COVID-19. SSRN, 2020; 98: 1.
- [21]Goothy SSK, Goothy S, Choudhary A. COVID-19 lockdown impact on the mental health of students: need to start a mental health cell. MOJ Anat Physiol., 2020; 7(2): 51–52.
- [22]Mondal S, Varma S, Bamola D, Naik N, Mirdha R. Double-blinded randomized controlled trial for immunomodulatory effects of Tulsi (Ocimum sanctum Linn.) leaf extract on healthy volunteers. J Ethnopharmacol., 2011; 136(3): 452-56.
- [23]Ghoke SS, Sood R, Kumar N, Pateriya AK, Bhatia S. Evaluation of antiviral activity of *Ocimum sanctum*

and Acacia Arabica leaves extracts against H9N2 virus using embryonated chicken egg model. BMC Complementary Altern Med., 2018; 18(1): 174. doi: 10.1186/s12906-018-2238-1.

- [24]Xiang Y, Pei Y, Qu C, Lai Z, Ren Z. *In vitro* anti-herpes simplex virus activity of 1,2,4,6-tetra-O-galloyl- β-D-glucose from *Phyllanthus emblica* L. (Euphorbiaceae). Phyther Res., 2011; 25(7): 975–82. doi: 10.1002/ptr.3368.
- [25]Wu C, Liu Y, Yang Y, Zhang P, Zhong W, et al. Analysis of therapeutic targets for SARS-CoV-2 and discovery of potential drugs by computational methods. Acta Pharma Sin B., 2020; 10(5): 766-88.
- [26]Patwardhan B, Chavan-Gautam P, Gautam M, Tillu G, Chopra A. Ayurveda rasayanain prophylaxis of COVID-19. Current Sci., 2020; 118(8): 1158-60.
- Organization [27] Alzohairy MA. Therapeutics Role of Azadirachtabook.indica (Neem) and Their Active Constituents inls fromDiseases Prevention and Treatment. Evid BasedotentialComplementary Altern Med., 2016; 2016: 7382506.
 - [28]Dhawan BN. Anti-Viral Activity of Indian Plants. Proceedings of the National Academy of Sciences. India. Section B, Biol Sci., 2012; 82 (1): 209-24.
 - [29]O'Hara M, Kiefer D, Farrell K, Kemper K. A review of 12 commonly used medicinal herbs. Arch Family Med., 1998; 7(6): 523-36.
 - [30]Rathinavel T, Palanisamy M, Srinivasan P, Subramanian A, Thangaswamy S. Phytochemical 6-Gingerol-A promising Drug of choice for COVID-19. Int J Adv Sci Eng., 2020; 06(04): 1482-89.
 - [31]Logeswari J, Shankar S, Biswas PG, Muninathan N.Role of Medicinal Plants in the Prevention of Covid-19 Pandemic. Medico-Legal Update, 2020; 20(4): 2303-06.

RNA-dependent RNA Polymerase

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