Chapter 10
Therapeutic Potential of Medicinal Plants in the Management and Treatment of Severe Acute Respiratory Syndrome 2 (SARS CoV-2 [COVID-19]): COVID-19 and CAM

Sarika Daulatrao Towarane
Savitribai Phule Pune University, India

Sapana Prabhakar Ahirrao
METs Institute of Pharmacy, India

ABSTRACT

Severe Acute Respiratory Syndrome 2 (SARS CoV-2 [COVID-19]) is a single-strand RNA virus with numerous structural proteins that facilitate entry into the host and assist in virus replication. The rapid transmission of COVID-19 amongst disparate demographics in the world is alarming and of immediate global concern. As of November 2022, COVID-19 mortality and morbidity stood at 6.6 million and 638 million persons, respectively. Literature expounds the promise of medicinal plants in the prevention, management, and treatment of certain diseases and comorbidities. Natural products may find utility in providing relief to COVID-19 patients exhibiting

DOI: 10.4018/978-1-7998-4120-3.ch010

mild to severe symptomatology. Natural remedies are safe and possess a low toxicity profile when compared to synthetic drugs. Tinospora cordifolia (Giloy), Withania somnifera (Ashwagandha), and Dashamula, etc. are some of the medicinal plants believed to be safe and effective in the treatment of COVID-19. Phytochemical compounds isolated from these plants show promising therapeutic indications against coronavirus by inhibiting Mpro or 3CLpro proteins.

INTRODUCTION

Severe Acute Respiratory Syndrome 2 (SARS CoV-2 [COVID-19] is a highly transmittable and pathogenic viral infection that has caused a global pandemic resulting in tremendous loss of human life. Towards the end of 2019, Wuhan, the capital of Hubei province and an emerging business hub in the People's Republic of China, experienced an outbreak of a novel coronavirus disease tagged "COVID-19." Empirical evidence indicates that COVID is directly responsible for the infection of over seventy thousand individuals and is the precursor to the unfortunate demise of more than eighteen hundred persons within the first fifty days of presentation (Freni et al., 2020). Coronaviruses (CoVs) are relatively large viruses containing single-strand positive-sense RNA genomes encapsulated within a membrane envelope. The viral membrane is studded with glycoprotein spikes which give coronaviruses their crown like appearance. The virus contains four structural proteins i.e., envelope protein (E), membrane protein (M), spike protein (S) and nucleocapsid protein (N) (Figure 1). There are four classes of coronaviruses: alpha (α), beta (β), gamma (γ), and delta (δ). The beta coronavirus class includes: i) severe acute respiratory syndrome (SARS) virus (SARS-CoV); ii) Middle East respiratory syndrome (MERS) virus (MERS-CoV); and iii) COVID-19 causative agent, SARS-CoV-2. Extant literature suggests that SARS-CoV-2 is more transmissible and/or contagious than SARS-CoV (Noor, 2021). This virus was named 2019-nCoV by Chinese researchers (Wang et al., 2020). The International Committee on Taxonomy of Viruses (ICTV) named the virus "SARS-CoV-2" and the disease "COVID-19" (Wang et al., 2020).

Presently, a trifecta of established nomenclature systems: GISAID, Nextstrain and Pango are used in naming and tracking SARS-CoV-2. The more common symptoms of COVID-19 are outlined in Figure 2.

Mechanism of virus entry into host cell: Scientific investigations suggest that subgroups of coronaviruses α and β can infect humans. The daily consumption of infected animals as a source of food is a major cause of animal-to-human transmission of the virus. Moreover, when a healthy individual comes in close contact with an infected person, there is a strong likelihood for a person-to-person transmission of the virus (Noor, 2021). Figure 3 outlines virus-host cell interaction and disease severity.

Multimodality Medical Image Fusion Using M-Band Wavelet and Daubechies Complex Wavelet Transform for Radiation Therapy