Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Microbial Pathogenesis 148 (2020) 104277

Contents lists available at ScienceDirect

Microbial Pathogenesis

journal homepage: www.elsevier.com/locate/micpath

South Indian medicinal plants can combat deadly viruses along with COVID-19? - A review

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ARTICLE INFO

Keywords:
COVID-19
Pandemic
Prevention
South indian medicinal plants

ABSTRACT

SARS-CoV-2 is a causative agent of Coronavirus disease-19 (COVID-19), which is considered as a fatal disease for public health apprehension worldwide. This pathogenic virus can present everywhere. As it is a virus it can extend easily and cause severe illness to humans. Hence, an efficient international attentiveness of plan is necessary to cure and prevent. In this review, epidemic outbreak, clinical findings, prevention recommendations of COVID-19 and suggestive medicinal value of south Indian plant sources have been discussed. Though the varieties of improved approaches have been taken in scientific and medicinal concern, we have to pay attention to the medicinal value of the plant-based sources to prevent these types of pandemic diseases. This is one of the suggestive and effective ways to control the spreading of viruses. In the future, it is required to provide medicinal plant-based clinical products (Masks, sanitizers, soap, etc.,) with better techniques by clinicians to contend the scarcity and expose towards the nature-based medicine rather than chemical drugs. This may be a benchmark for the economical clinical trials of specific plant material to treat the viral diseases in the future.

1. COVID-19

A novel coronavirus (nCoV) is identified as a pathogen and causes some illness which leads to death cause of massive alveolar injure and progressive respiratory stoppage [1]. From the time of when 2019 month of December, the novel coronavirus disease (**nCoV**) has to turn out to be a major pandemic threat in china and all over the world [2]. It is named as 2019-nCoV through World health organization (WHO) formally. 2019-nCoV recognized as etiological representative of the disease and phylogenetic testing of the virus was differs from formerly acknowledged corona viruses [3]. Recently, information regarding the epidemiology and medical features of pneumonia originated with 2019-nCoV is very scanty. The patients of 2019-nCoV pneumonia was confirmed and admitted headed for Jinyintan hospital, Wuhan; first patient with 2019-nCoV to be reported resting on [4].

Coronavirus is the source of multiple system infection in the range of animals and severe respiratory tract infections among humans including severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS). On the root of phylogenetic analysis linked with coronaviruses, the International committee on virus taxonomy published a script on bioRxiv. Jiang et al. [5], suggested an assigned 2019-nCoV severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) like WHO renamed a disease of coronavirus (COVID-19). The Middle East respiratory syndrome is originated with 2019-nCoV (MERS-CoV), which has been isolated at first in the Saudi in 2012 from respiratory tract discharge, a person who died from as of viral pneumonia [6]. COVID-19 that cause respiratory, enteric and central nervous system in many species as in humans too. These are noted as enveloped, positive-sense, single-stranded RNA viruses with a genus of Coronaviridae family. These genomic RNA is 27–32 kb in size and

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https://doi.org/10.1016/j.micpath.2020.104277
Received 31 March 2020; Received in revised form 25 May 2020; Accepted 26 May 2020
Available online 28 May 2020

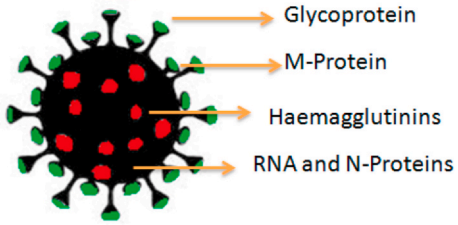

Fig. 1. Model structure of the nCoV.

polyadenylated [7] (Fig. 1).

2. Epidemic outbreak

The nCoV belongs to the linkage B of genus Beta *coronavirus* which is phylogenetically related with close enough to bat SARS- alike coronaviruses [8]. In history, nCoV is one another exceedingly pathogenic coronavirus enroute for human. The virus has its own high transmission ability as well as towering mobility and transience and so it has lift up world apprehension [9]. Hence, it is very hard in management for public health care and physician in this outbreak. Earlier categorization of patients is an essential way to take control measures of these pandemics while urgent situation management has to be accomplishing in some outbreaks as like SARS and 2019-nCoV [10]. Hospital based outbreaks are notorious to involving human to human transmission of spread can be arrested by some of the control measures [11]. China has determined on habitual public health outburst with; quarantine, isolation and social hostility [12]. Likewise the current outbreak of nCoV gives many provinces of china in concern China medicine (CM) with managing and preventing events are mainly to know about Oral Chinese herbal medicine formulae. This is in need to provide regulation for the prevention of the virus outbreak [13]. At present, the decisive effect of this outbreak is indistinct as it growing rapidly. For this problematic condition, it can be clear with prevention steps are much important to take by public, before the eruption must be defeated; yet another viral pathogen emerging in role with a challenge to humans (Table 1).

3. Sign and clinical outcomes

3.1. Symptoms

For nCoV the symptoms of infection become visible approximately after an incubation period of 5.2 days [14]. The inceptions of nCoV with most common symptoms are cough, fever, headache, sore throat, diarrhea, rhinorrhoea, sneezing, hypoxemia [9,15,16], and recently anosmia (Fig. 2).

Table 1
At the time of preparing this manuscript as on 25th May 2020 a tabular data accurate with the following information of affected people with COVID-19.

S. No	Country	Affected	Death	Recovered
1.	United states	1,689,618	99,381	451,745
2.	Spain	282,852	28,752	196,958
3.	Italy	229,858	32,785	140,479
4.	France	182,584	28,367	64,617
5.	India	141,228	4057	58,727
6.	Iran	137,724	7451	107,713
7.	China	82,985	4634	78,268
8.	Singapore	31,960	23	14,876
9.	Southkorea	11,206	267	10,226
10.	Thailand	3042	57	2928

Fig. 2. Illustrative representation of the nCoV symptoms.

3.2. Diagnosis

For diagnosis, Wang et al. (2020) [17] described the majority of 41 patients confirmed with diagnosis of lower respiratory tract sample to detect the RNA viral detection. Adding up with nucleic acid tests as the diagnosis (Collection of blood, nasal and throat swabs) of COVID-19 pneumonia; it undergoes several clinical examinations such as chest CT, blood counts, medical history of the affected person and exposure to the specific symptoms. Besides, Remdesivir (RDV), this could inhibit corona infection *invitro*. RDV is a novel nucleotide analogue proved to be an effective Pan-CoV [18,19] antiviral. Recently, a phase 3 clinical trial of secure and protective effect of RDV is ongoing in Wuhan [20]. Real time reverse transcriptase (RT-PCR) detection is advantages as specific detecting methods of coronavirus, which has been diagnosed as helpful in the way of early infections [21]. This assay is still leading method to be applied for detecting coronavirus (All type) [22-24]. The broad spectrum of an antiviral medicine such as nucleoside analogues and HIV protease inhibitors could attenuated these infectious virus in anticipation of specific antiviral befall accessible [25]. Further, the clinical agent EIDD-2801 has high therapeutic efficiency against pandemic viral infection as it to be considered for the treatment of COVID-19 [26]. Preclinical basis effectiveness of chloroquine for to treat COVID-19, it is safety from long term usage medical proven customs [27]. According to Cortegiani et al. [28], high quality clinical trials from various locations are needed in emergency worldwide for COVID-19.

4. Prevention recommends for 2019-nCoV

WHO is subjecting counsel on preventing the spread of COVID-19 [29]. They advise to avoid travel at highly risk areas as well as to prevent the entry of the people who are from closely affected region, consuming meat from known nCoV affected province and contact with symptomatic individuals [30]. Personal hygiene can be determining the self as well as society health. Cleaning hands with soap than using sanitizer can reduce the risk of viruses on hand and washed out when it's

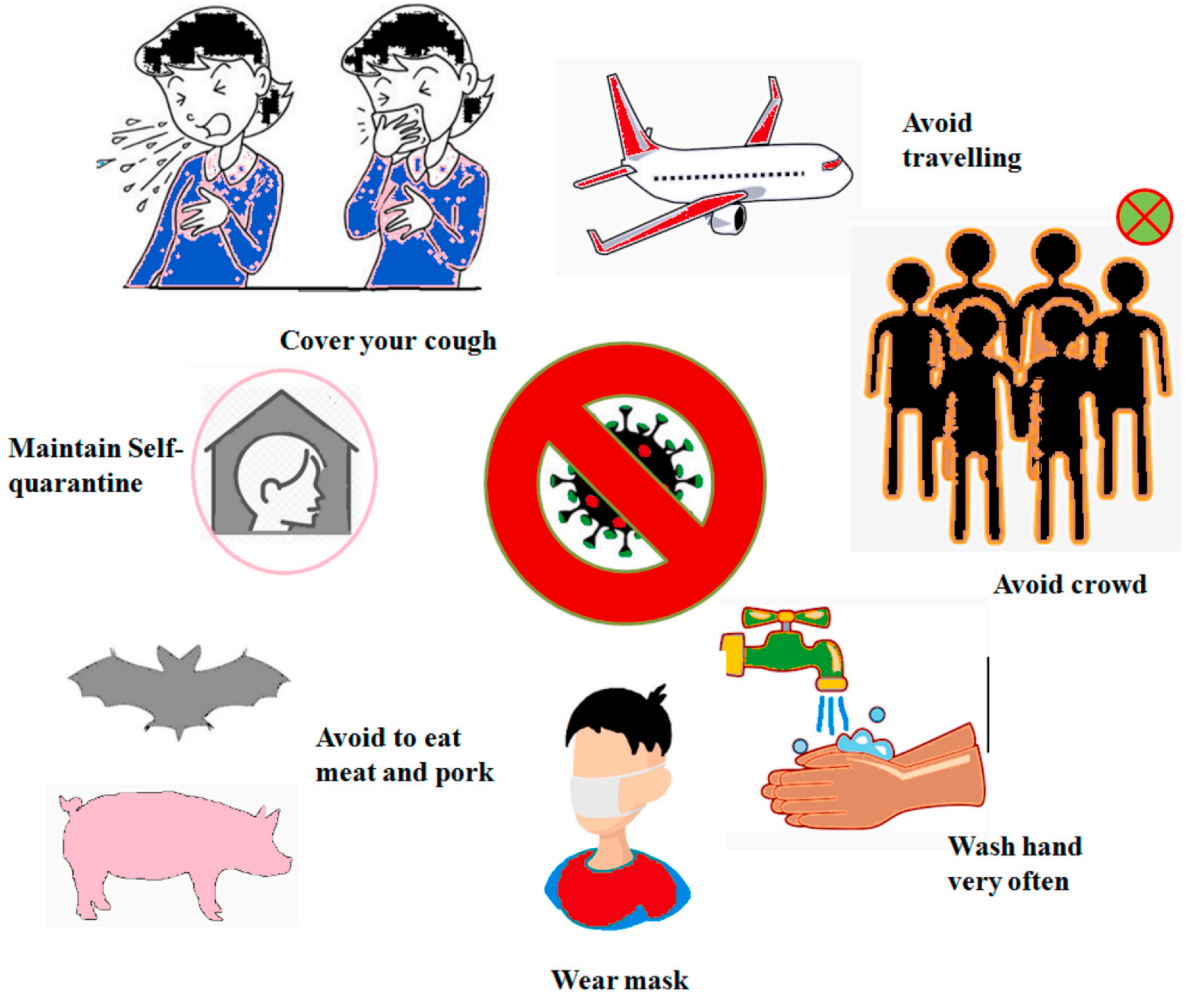

Fig. 3. Preventive measures to stop spreading nCoV.

used frequently as specific after using the bathroom, coughing, and sneezing [31]. Using of face masks is also important to prevent the entry of pathogens via the respiratory system [32]. For huge community social distancing could be maintained to reduce the interaction of the public [33]. Symptom checker is used for the preventive channel for the 2019-nCoV outbreak [34] (Fig. 3).

5. Natural medicine to control virus

5.1. South Indian medicine for the control of virus

Spread of infection while epidemic can be controlled with persuasive antiviral herbal interference. India has prosperous and unique collection of plants an estimated 45,000 species of plants have been used in traditional medicine systems [35]. Tamilnadu is one of the mainly botanized zones of south India. The medicinal properties of plants were analyzed with various types of researchers in Tamilnadu. It is for the documentation and provides wide information concerning the medicinal plant from traditional healers to protect the fact of plant usage [36]. Traditional plants used in India in relation to 4000 years getting on. Herbal plants have been used by all cultures throughout history. A mainstream of global population in developing and squat earning countries relies for primary health care using traditional medicine [37]. An extensive assortment of pharmaceutical attention has been expressed in plants widely. Plant based vaccines are being evaluated in clinical trials for influenza, hepatitis B etc., [38]. People have been used medicinal plants to cure severe disease habitually and also Indian medicinal plants have been examined for antiviral properties [39]. Only some reported on plants from Tamilnadu in spite of the plants used by many tribal people throughout for the management of viral infections [40]. More than 85% of individuals in developing countries use these medicines for health concern [41]. It is stressed necessitate for further investigation and incorporation towards modern plant based medicines (Table 2).

6. Conclusion

The impression of plant based medicine constitutes an applicable way for the expansion of vaccines with attractive features. Seeing as noteworthy add up to plant extracts have capitulate positive outcomes it seems reasonable potential antiviral agents so far reported. The pharmacological characteristic of major south Indian medicinal plants further needs to investigate the exploration of producing vaccines to treat several viral diseases. It is very important these plant based concern not only focused on vaccines and medicines but also the plant based coated clinical equipments like masks, soap and sanitizers etc., As the review concluded the plant based sources has may have the ability to kill the viral based diseases so far, hence it is proven that variety of plant compounds yet to be examined for future invention for the control of COVID-19 like deadly diseases. The unknown fact and formulae about the effectiveness of some plants may be there, therefore medicinal plant and its compound may have the ability to fight against 19-nCoV.

Table 2
List of south Indian medicinal plants inhibits several types of viruses.

Indian Medicinal plants (South)	Virus	Effectiveness	Reference
Azadirachta indica	Dengue virus	Leaf extract (Aqueous) inhibits DEN-2 *in vivo*	Parida et al., 2002 [42]
Hippophae rhamnoides	Dengue virus	Leaf extract has significant anti-dengue activity	Monika et al., 2008 [43]
Andrographis paniculata Nilavembu kudineer (NVK)	Dengue virus Chikungunya virus (CHIKV)	NVK provides protection against DENV and CHIKV	Jain et al., 2019 [44]
Glycine max (black)	Human adenovirus (type 1)	Inhibits human ADV-1 in dose dependant manner	Yamai et al., 2003 [45]
Ficus religiosa	Human rhino virus (HRV) & Respiratory syncytial virus (RSV)	Bark extract endowed with antivirus activity against HRV & RSV	Cagno et al., 2015 [46]
Sesbania grandiflora	Herpes simplex virus	Extract possess strong antiviral against HSV	Arthanari et al., 2012 [47]
Carissa edulis	Herpes simplex virus	Exhibits anti HSV-1&2 *invitro* and *in vivo* strongly	Tolo et al., 2006 [48]
Achyranthus aspera	Herpes simplex virus	Inhibits earlier stages of HSV multiplications	Mukerjee et al., 2013 [49]
Guazuma ulmifolia Lam	Polio virus	Extracts inhibits polio replications	DeFelipe et al., 2006 [50]
Punica granatum L	Human herpes virus-3	Phytochemical extract exhibits potential anti viral activity	Angamuthu et al., 2019 [51]
Phyllanthus amarus	Human immuno deficiency virus	Inhibits HIV replication	Notka et al., 2004 [52]
	Hepatitis B virus	Plant extract had lost HBV antigen surface	Thyagarajan et al., 1988 [53]
Avicennia marina	Hepatitis B virus	Inhibits HBV antigen	Beula et al., 2012 [54]
Terminalia bellerica	HIV-1 Pseudo viruses	Plant extract against HIV-1	Jayasundar et al., 2019 [55]
Canthium coromandelicum	HIV	Leaf extract control HIV infections	Chinnaiyan et al., 2013 [56]
Moringa oleifera	HIV	Leaves used to inhibit viral replication	Eze et al., 2014 [57]
	Epstein bar virus (EBV)	Leaves and seeds inhibits activity against EBV activation	Murakami et al., 1998 [58]

Declaration of competing interest

Authors declares no conflict of interest.

Acknowledgements

The Corresponding author Dr. Sekar Vijayakumar thanks to Shandong University, Weihai, P.R. China., for providing the Post Doctoral Research Fellowship.

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