

**A VIEW ON HERBAL MEDICINES AND FOOD HABITS OF INDIANS AND IT'S
EFFECTS ON COVID-19 AND MORTALITY RATE**Divya R.¹, Dr. Gururaj S. Kulkarni*¹, Dr. Padma M. Paarakh²¹Department of Pharmaceutics The Oxford College of Pharmacy, Bangalore, Karnataka-560068, India.²Department of Pharmacognosy The Oxford College of Pharmacy, Bangalore, Karnataka-560068, India.

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*Corresponding Author

Dr. Gururaj S. Kulkarni

Department of Pharmaceutics

The Oxford College of

Pharmacy, Bangalore,

Karnataka-560068, India.

ABSTRACT

Since last decade the most of new infections which are causing panic effects in humans are viral infections. Many viral infections have attacked on humans and cause numerous losses of human lives. Despite of this scientists and health professional are struggling to find a right therapy to treat or eradicate completely these viral infections. There are various reasons for this delaying getting right medicines or vaccines. In such difficult situation the Indian herbal medicines and spices used in the regular food preparations proved savior to treat or control these viral infections particularly in this pandemic COVID-19. Indian herbs and spices have enormous medicinal and antioxidant properties, this prevents the effects of viral infections either by killing them by its anti-viral properties or boost the immunity to minimize the effects of viruses. The best example for herbal medicines is turmeric curcumin, which has both anti-viral, antioxidant and prophylactic properties. Such herbs or spices helping in combating the pandemic COVID-19.

KEYWORDS: COVID-19, Herbal, Curcumin, Anti-viral.**INTRODUCTION**

- Many viral infections are still causing tremendous threat to human being such as HIV, coronavirus, SARS, avian influenza, swine flu, Dengue virus, Ebola virus, etc. There are no efficient conventional medications or vaccines for most of these viruses. Consequently, alternative natural medications are an urgent requirement to fill the gap of unavailability of conventional therapies or vaccines. Complementary and alternative medicine has been used for centuries in many societies to treat various illnesses, including viral infections. Herbal, dietary, complementary, and natural therapies have been used widely for prevention and treatment of viral infections.^[1]
- A viral disease (infection) occurs when an organism's body is invaded by pathogenic viruses and infectious virus particles (virions) attach and enter susceptible cells. Basic structural characters of the same family are same such as genome type, shape of virus replication site. There are 21 families which cause disease in humans. 5 families are dsDNA, 3 are nonenveloped (Adenoviridae, Papillomaviridae and Polyomaviridae) and 2 are enveloped (Herpesviridae and Poxviridae). 1 family is partly dsDNA Hepadnaviridae, enveloped. 7 families are ssRNA of which 3 are nonenveloped (Astroviridae, Caliciviridae and Picornaviridae) and 4 enveloped (Coronaviridae, Flaviviridae, Retroviridae and Togaviridae). All nonenveloped families have icosahedral nucleocapsids. 6 negative ssRNA families (Arenaviridae, Bunyaviridae, Filoviridae, Orthomyxoviridae, Paramyxoviridae, Rhabdoviridae, enveloped with helical nucleocapsid, 1 dsRNA Reoviridae and 1 add (Hepatitis D) not assigned.^[2]
- Among these viruses, the pandemic of Corona Virus (COVID-19) hit India recently. The coronavirus disease (Covid-19) first appeared in the Wuhan district of Hubei province of China in early December 2019. The first case was reported by China on January 7, 2020, and this aroused variable interest worldwide, with most countries initially ignoring the novel infection. Fortunately, Indian health authorities sensed the danger, largely because the country has always been alert to new infections. The scientific think-tank at the Indian council of Medical Research (ICMR) became active immediately and the first laboratory confirmed case was identified at ICMR's National Institute of Virology (NIV), Pune, sometime towards the end of January 2020.^[3]
- Corona is a single stranded RNA virus that had its roots into the world from almost 60 years since its discovery in late 1960s. Corona viruses belong to the Corona viridae family in the Nidovirales order. The nomenclature of the Corona virus is named after the crown-like spikes on the outer surface of the virus structure. The virus has been infecting animals like chickens and pigs but there was no major human contraction to humans. Earlier, the allied viruses of the same family like the Severe acute

respiratory syndrome coronavirus SARS-CoV in 2003, Human corona virus HCoV NL63 in 2004, HKU1 in 2005, Middle east respiratory (MERS) in 2012, have shown their outbreaks and now the novel version of this virus has presented a threat of unmatched severity. According to the classification of International Taxonomy of Viruses (ICTV) has referred this novel pathogen as SARS-CoV-2 (formerly known as 2019-nCoV) in 2019. The first case was identified in the city of Wuhan, a Chinese seafood market and since then it has been exponentially increasing with an evident human to human contact via respiratory droplets while sneezing and coughing. In Indian subcontinent, as of 30 March 2020, according to the Ministry of Health & Family Welfare (MoHFW), COVID-19 positive cases were reported.^[4]

Indian Covid 19 Mortality Rate

- There appear to be numerous reasons, both natural and man-made, which could soften the “COVID-19 blow” on India. This is something that has not been addressed previously, and our manuscript critically analyses the reasons why India could still come out of the COVID-19 pandemic relatively unscathed, thereby providing new insights into an aspect of the pandemic and lessons for the future. It is a bit of a mystery how the world’s second-most-populous nation, with 1.3 billion people, has remained relatively less affected with decreased mortality rate while the number of deaths explode to its east and west.^[5]
- Epigenetic factors that include environment and food habits may play a beneficial role for countries such as India; much literature is already available in Ayurveda and other Indian systems of medicine on the definitive beneficial effects of Indian spices in augmenting immunity.^[6]
- SARS-CoV-2, directly and indirectly, affects the immune system. The immune system which is affected by the virus tries to respond via a cytokine storm and hyperinflammation, which itself leads to further multi-organ damage and even death.^[7]
- The prophylactic and therapeutic potential of traditional and complementary medicine systems such as Ayurveda and Yoga is not really being considered during this crisis and global hunt for effective preventive and treatment measures. In this commentary, we have attempted to highlight the

knowledge and practices from Ayurveda and Yoga that might be effectively utilized in the prophylaxis and adjuvant therapy of COVID-19. Ayurveda and Yoga as an add-on therapy may support patients of COVID-19 by improving the quality of standard care. Research and therapeutic strategies for COVID-19 have focused on agents to attack the virus or immunize against it. This leaves aside the consideration of the host—one of the most important factors in disease dynamics. Ayurveda pays particular attention to the host and recommends measures for a healthy lifestyle rather than the mere prescription of medicine. Charaka Samhita, the classic of Ayurveda, describes epidemic management and defines immunity as the ability to prevent disease and arrest its progress to maintain homeostasis.^[8]

Indian traditional medicine in covid 19

- The WHO said: "There is no specific vaccine or medicine recommended to prevent or treat the novel coronavirus till now. Natural products and their derivatives have potential activities in the treatment of viral infections. Until now, several herbal extracts or their derivatives have shown potential antiviral efficacy. However, there are no adequate studies on the development of anti-COVID-19 agents from herbal extracts. Such herbal extracts are important to prevent and combat COVID-19. Indian traditional medicine, suggests some herbs for prevention, treatment and rehabilitation of the diseases including COVID-19. Although, inhibition of viral replication is considered as general mechanism of herbal extracts, however some studies demonstrated that traditional herbal extracts can interact with key viral proteins which are associated with virus virulence.
- Indian medicinal plants are a promising field for treatment of several diseases. Ayurveda and Siddha practices originated in India and are still widely used among the Indian population. In addition, identification of phyto-components of medicinal plants may be helpful for alleviate the infection. Hence, Indian medicinal plants can be considered as new option for their role to overcome viral transmission. In the current study, we have discussed about traditional herbal medicine for possible treatment of COVID-19.^[9]

Traditional Herbal Medicine For Possible Treatment Of Covid-19^[10,11,12,13,14]

S.NO	HERB	Botanical name	Active constituent	ACTIVITY
1.	HALDI (TURMERIC) RHIZOME	<i>Curcuma longa</i>	Curcumin	Immunity Booster, Anti-inflammatory effects.
2.	KALI MIRCH (BLACK PEPPER) SEEDS	<i>Piper amides</i>	Piperine	Antioxidants, Anti-inflammatory, Antibacterial properties, Cleanses the body of harmful toxins.
3.	TULSI (HOLY BASIL)	<i>Ocimum tenuiflorum</i>	Oleanolic acid, Ursolic acid, Rosmarinic acid	Best antibiotic, Antiviral and antibacterial properties, Boosts immunity.

	LEAVES			
4.	AMLA (INDIAN GOOSEBERRY) FRUIT	<i>Emblica officinalis</i>	Gallic acid, Ellagic acid	Boosts immunity by increasing the body's white blood cell count, Rich source of Vitamin C, Prevents viral infections.
5.	DARCHINI (CINNAMON) BARK	<i>Cinnamomum verum, C.cassia, C. zeylanicum, C.loureiri</i>	Cinnamaldehyde, cinnamic acid	Antiviral, Antioxidants, Strong immunity booster, Anti-inflammatory, reduce the risk of infections and diseases.
6.	NEEM (LEAVES)	<i>Azadirachta indica</i>	Azadirachtin, Nimbolinin, Nimbin.	Immune Booster
7.	BLACK CUMIN (SEEDS)	<i>Nigella sativa</i>	Nigellone, Thymoquinones, Hydro thymoquinones	Potent antioxidant
8.	GARLIC (BULB)	<i>Allium sativum</i>	Allicin	Antiviral, Antioxidant property, Antibacterial activity
9.	GINGER (RHIZOME)	<i>Zingiber officinale</i>	Geranyl, zingiberene	Antiviral, Used in the treatment of cold, nausea etc
10.	CORIANDER (SEEDS/LEAVES)	<i>Coriandrum sativum</i>	Linalool	Immune Booster, Antioxidant, Fights against infection.
11.	MUSTARD (SEEDS)	<i>Brassica nigra</i>	Sinapic acid and sinapoyl conjugates	Emetic, Diuretic and Anti-inflammatory
12.	CLOVES (BUDS)	<i>Syzygium aromaticum</i>	Eugenol	Antioxidant, and antiparasitic
13.	NUTMEG (SEEDS)	<i>Myristica fragrans</i>	Argenteane (lignans)	Strong antioxidant activity
14.	STAR ANISE (FLOWER)	<i>Illicium verum</i>	Anethole	Antioxidant, Antifungal and Antibacterial
15.	FENNEL (SEED)	<i>Foeniculum vulgare</i>	Anethole, Fenchone	Antioxidant
16.	PEPPERMINT (LEAVES)	<i>Mentha piperita</i>	Menthol and Rosmarinic acid	Have powerful antiviral qualities
17.	LEMON (FRUIT)	<i>Citrus limon</i>	Citric acid and Ascorbic acid	Antiviral

These are the various traditional herbs which are commonly used in the Indian food as spices and condiments. Spices and condiments have been consumed since the prehistoric times to enhance the flavor and taste of the cooked food. Spices are aromatic, pungent, seasoning agents generally used in small quantities. Condiments are the herbs used for complimenting foods and usually added in more quantities compared to spices. Unlike spices, they have no toxic effect on the human body. Herbs were recognized to be of medicinal value since ancient times and were recorded by the earliest writers as elixirs of life. Though scientific reasons of diseases were not known, spices and condiments were traditionally utilized as curative and preventive agents. Several metabolic diseases and developmental or age-related degenerative disorders are known to be associated with oxidative processes within the body. As stated by scientists these herbs can combat oxidative damages and prevent the occurrence of a number of diseases by developing innate immunity if consumed appropriately.^[14]

Ayurveda for Covid Prophylaxis

Several general measures described below may be useful to reduce the risk of SARS-COV-2 infection and complement therapeutic management as add-on treatment.

Local Prophylaxis

Consumption of hot water, hot food, and herbal decoctions, gargling with medicated water, steam inhalation, and local applications may be helpful for symptomatic relief in mild cases.

1) Medicated water

Drinking hot or warm water is a popular home remedy for many ailments. Several spices that are popularly used in the kitchen are added as single or multiple agents to the boiling water and consumed as medication throughout the day. These spices include dry ginger (*Zingiber officinale*), yashtimadhu (*Glycyrrhiza glabra*), and nut-grass (*Cyperus rotundus*) rhizomes; khus (*Vetiveria zizanioides*) and Indian sarsaparilla (*Hemidesmus indicus*) roots; coriander (*Coriandrum*

sativum) and fennel (*Foeniculum vulgare*) seeds; and cinnamon (*Cinnamomum verum*) and catechu (*Acacia catechu*) barks.

2) Mouth rinse and gargle

Warm liquids and oils are used as gargles (gandusha) or mouth rinses (kavala) to cleanse the mouth and throat thoroughly. This can also have a systemic effect. The oils or oily decoctions clean the oral cavity, pharynx, and tonsillar area and are likely to coat the mucosa as biofilm and induce additional immunomodulatory, antioxidant, and antimicrobial benefits. The paramount role of host mucosal immunity in controlling infectious agents is well known. Turmeric (*Curcuma longa*) rhizome, yashtimadhu or liquorice (*Glycyrrhiza glabra*) stem, neem (*Azadirachta indica*) and catechu (*Acacia arabica*) barks, and natural salt may be used to prepare medicated water/solutions for gargles/mouth rinse.

Glycyrrhizin, an active component in liquorice was found to be more effective than common antivirals in inhibiting the replication of SARS virus and inhibited its adsorption and penetration.

3) Nasal oil application

Ayurveda recommends the application of medicated oils made from butter oil (Ghee) and vegetable oils such as sesame or coconut in the nostrils. This may protect the respiratory tract from pathogen entry. This procedure known as nasya is well described in Ayurveda. Traditional Chinese Medicine have already proposed the use of nasal oil application for preventing SARS-COV-2 infection.

4) Steam inhalation

Steam inhalation and hot fomentation (with aromatic oils such as menthol) provide satisfactory clinical relief in nasal and throat congestion, bronchoconstriction, headache, and sinusitis. Its role in improving nasal conditioning, improving nasal mucus velocity, and reducing congestion and inflammation.

5) Systemic Prophylaxis

Ayurveda advocates several non-pharmacological measures that are critical to overall health, including diet, sleep, mental relaxation, lifestyle behavior, and Yoga. Several studies have endorsed the role of Yoga breathing techniques (pranayama), postures (asanas), and procedures (yogic kriya) in improving lung health and exercise tolerance. The recommended daily diet includes fresh hot soups of vegetables (radish, trigonella leaves, drum stick vegetable pods) and pulses (lentils, green gram/mung beans, chickpeas) seasoned with spices such as ginger (*Zingiber officinale*), garlic (*Allium sativum*), cumin seeds (*Cuminum cyminum*), and mustard (*Brassica nigra*) seeds (black whole mustard).

6) Rasayanas as Immunomodulators

- Rasayana, a specialty of Ayurveda, deals with measures for rejuvenation. Rasayana therapy

comprises lifestyle, diet, and medicine that have properties to enhance growth, retard aging, induce tissue regeneration, and stimulate immunity. Due to its effects on improving immunity, Rasayana therapy may have direct relevance to the prophylaxis and management of SARS-COV-2 infection.

- Several Rasayana botanicals described in Ayurveda are used in clinical practice for strengthening immunity. Based on the research data, we find *Withania somnifera* (Ashwagandha), *Tinospora cordifolia* (Guduchi), *Asparagus racemosus* (Shatavari), *Phyllanthus embelica* (Amalaki), and *Glycyrrhiza glabra* (Yashtimadhu) are potential immunomodulators.^[8,15]

YOGA FOR COVID-19

- Poor mental health conditions, including stress and depression, are known to increase the risk of acute respiratory infections. Rising numbers of COVID-19 cases and deaths possibly raise stress and anxiety, while loneliness and depressive feelings are likely due to mandatory social distancing measures. Consideration of the mind is another distinction of Ayurveda and Yoga. Several measures for mental health are described, including pranayama and meditation. Pranayama is known to improve lung function. Meditation is found to reduce inflammation markers and influence markers of virus-specific immune response. Yoga including meditation could be a simple and useful home-based practice for the prevention and post-recovery management of COVID-19^[8].
- Several yoga techniques are available to develop mastery over the mind by enhancing the willpower that keeps the immune system strong. These include asana, pranayama, meditation with or without using Mantras, and detoxification through kiyas. Along with these practices, a mental attitude known as Pratipaksha Bhavana (contrary attitude) is recommended in the yoga literature. Yoga recognizes the emotionally charged state of stress response, wherein the mind is in a state of violent spinning speed of thoughts and hence, becomes unmanageable. The techniques train the mind to let go of all violent reactions and replace them by positive thoughts of love and acceptance (prashamana). Such an attitude of love and trust sends signals between the brain and the heart which start working in unison, not letting the stress destabilize the person's biochemistry.
- The upper respiratory tract being the portal of entry for the SARS-CoV-2 virus infection, the health of the respiratory system is very important in preventing fatality. There are several reports of clinical trials that suggest an overall effect of yoga training toward improved pulmonary function in patients with chronic obstructive pulmonary disease.
- All yoga practices utilize deep relaxation which could release all tensions and stresses to prevent immune suppression that would otherwise have

weakened the responses to the onslaught of infectious bacteria and viruses.^[16]

DISCUSSION

- Modern medical care and health systems are being tested to the hilt for effective management of COVID-19. However, there are several gaps. We must remember the basic principle in medicine that “prevention is better than cure.” The simple and feasible measures based on Ayurveda and Yoga could be quickly advertised in public-health campaigns through electronic and print media and information brochures for public distribution and display at prominent locations.
- The Ministry of AYUSH, Government of India, has already issued a very useful advisory in this context. People are overstressed by the compulsions of social distancing and physical barrier methods. They are likely to find comfort and support in some of the deeply rooted traditional practices that may protect them from the infection and its associated debilitating conditions.
- Noticeably, these interventions have the advantages of simplicity, affordability, and acceptability and appear promising as feasible measures for large-scale implementation.
- Ayurveda, Yoga, and meditation have a potential role to engage the community in creating a more positive health environment. Admittedly, there is need for more research.

CONCLUSION

- Since December 2019, a respiratory pandemic named as coronavirus disease 2019 (Covid-19) caused by a new coronavirus named as SARS-CoV-2, has taken the world by storm. The symptoms are fever, malaise, and cough which resolve in a few days in most cases; but may progress to respiratory distress and organ failure. Transmission is through droplet infection or fomites, but other modes such as airborne transmission and orofecal transmission are also speculated.
- The present control strategies of the disease include the reduction of secondary infections by early diagnosis and isolation of cases, providing optimal care to infected patients, and the development of effective diagnostic, preventive and therapeutic strategies, including vaccines (WHO, 2020). In the absence of any proven treatment option, many drugs are under investigation to control this disease with a potentially fatal outcome.
- Traditional systems of medicine are being explored for providing preventive, supportive and rehabilitative care to patients. Although no direct evidence is available, some uncontrolled studies on traditional medicines suggest that they may have a direct efficacy on the virus.
- Some of these traditional drugs have been demonstrated to have specific antiviral and

immunomodulatory activity. As these traditional drugs/herbs are used in Indian foods as Spices in common, and as yoga and meditation has become part of the life of Indians, these three factors become one of the reasons for decreased rate of covid 19 infection and decreased mortality rate in India.

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