

# Potential of Ayurveda Therapeutic in Prophylaxis of COVID-19 Pandemic

## ABSTRACT

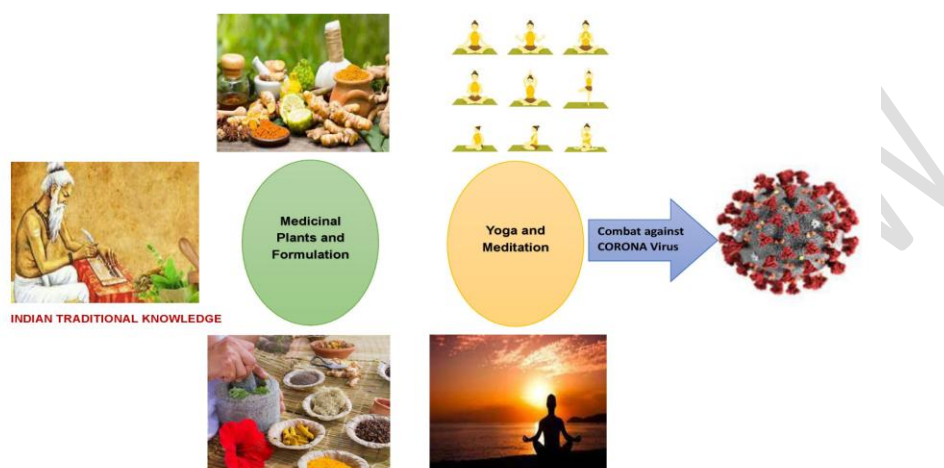
Now a day the world is go under slightly safe zone of imminent Corona virus (COVID-19) pandemic situation that cause the highly acute respiratory syndrome Corona virus 2 (SARS-CoV-2). Several COVID-19 variants, like Alpha, Delta, Gama, OMICRON and PIROLA, is also causing serious health problems in the world. The diseases have spread throughout the world, with over 774 million confirmed cases and 7.03 million deaths as on March 21, 2024. The pandemic continues to propagate due to the absence of a scientifically validated prophylaxis and therapeutic plan, despite global attempts to eliminate it. The elements of the pandemic require the immediate manipulation of all information system that is globally available. In the treatment of COVID-19 cases, the use of conventional Chinese Medicine in Wuhan provides an indication that conventional health facility will contribute successfully to the cure of these patients. A practical intervention strategy in India is suggested here, based on the Ayurveda classic, recent scientific study and experimental experience in parallel clinical environments. We give a graded response plan, based on the process of infection in a population of individuals. Clinical care is required, despite that's the fact that no medical frame work also has evidence-based therapy for COVID-19 yet. For the Ayurveda medicine process, therefore, the practical solution proposed here requires immediate implementation. This will temporary learning; it will produce evidence and it will be being a way forward.

**Keywords:** Ayurveda, COVID-19, OMICRON, PIROLA, Pandemic, Respiratory Disease

## 1. INTRODUCTION

A new coronavirus has been identified as the source of a pneumonia outbreak in Wuhan, China, in December 2019. Coronavirus 2 is the name of this virus (SARSCoV- 2) Acute Respiratory Syndrome with severe exacerbation [1, 2]. Since then, disease have spread in 252 countries and territories around the world, with more than 774 million confirmed cases and 7.03 million deaths as on March 21, 2024, have since spread the disease [3]. The pandemic continues to spread due to the lack of a scientifically proven prophylaxis and therapeutic method, although globally attempts to encompass it [4]. It is therefore important for the science community to relay a globally open pluralist knowledge system. Based on the original classics of Ayurveda, current scientific research in similar clinical contexts and our experimentally experience, we suggest a realistic intervention strategy here [5]. Based on the stage of infection between individual in a population and to their proximity to diseases, we provide graded responses. Despite the fact that no medical structure has any confirmation COVID-19 treatment yet, research efforts are underway worldwide. Ayurveda theory of medicine needs to adopt similar strategy. Ayurvedic interventions become even more important because in Ayurveda, existent extensive definition of diseases causation and management [6]. During the COVID-19 pandemic, Traditional knowledge play a significant role in the health care system of India with other countries [5]. Although the diseases are nearly controlled in China [7], the new COVID-19 epicentre in Europe and the US are still widespread [8, 9]. There are different explanations for containing the diseases in China, but proof of the importance of conventional cannot be omitted Chinese medicine [10, 11]. Now it is understood that during the epidemic's peak days, more than 3100 Traditional Chinese medicine associated staffs were expanded to Hubei region [10]. Traditional Chinese medicine is now included in the COVID-19 diagnosis and treatment guidelines [12].

**1.1 Traditional Indian Structure of Medicine.** The six Indian traditional Medicine Systems coordinate all health care systems, namely Ayurveda, Siddha, Unani, Homeopathy, Sowa-Rigpa and Folk, organize all health care systems. Ayurveda is a method of conventional medicine originating in the Indian subcontinent, as a type of alternative medicine, practised in other parts of the world [13]. In preserving safe and happy lives, Ayurveda, being the philosophy of creation, impregnate the benefit of nature. The vast preventive care knowledge base of Ayurveda stems from the principles of "Dinacharya"-regular administration and "Ritucharya"- administration of seasonal for vigorous activity management (figure 1).



**Fig. 1. Indian Traditional Knowledge System usefulness to the new formulation for the clinical management of COVID-19**

**1.2 Therapeutic potential of Ayurveda.** A significant part of therapy is also fascinating evolution of COVID-19 as it evolves. Ayurveda may provide many herbal formulations and dietary steps that can be useful for pre and post infection prophylaxis with immunomodulatory capacity. Depending on the existence and severity of the symptoms, the clinical presentation of COVID-19 may be asymptomatic, mild, moderate and extreme. In addition to the use of empirical antiviral drugs or immunomodulators, modern medicine like hydroxychloroquine and remdesivir has even less to give for the cure of COVID-19 [14]. Ayurveda has many possible drug candidates that could be used in COVID-19 management as an odd-on therapy with observational modern medicine therapy. This is an at a time to take this brave step and explore the immense promise that could potentially be provided by these Ayurvedic drugs. This integrative method can be initiated in a systematic manner in many hospitals throughout the country under the guidance of modern medicine experts with experts in Ayurveda. This will also help generate the scientific evidence for such an approach to Ayurveda. More than 50 on-going studies are now underway in India for the treatment of COVID-19 by Ayurveda [15].

## 2. MATERIA MEDICA OF INDIAN TRADITIONAL MEDICINE SYSTEM

The ancient Indian systems of Medicine (IST) are one of the oldest medicine methods in the world. Plants have long been a major source of medicinal products. In India, the medicinal properties of plants can be traced back to the Vedas (2500 BCE to 1600 CE). Traditional herbal medicinal products have been used for centuries to treat various infectious diseases. The properties of traditional herbal medicinal products include anti-bacterial, anti-viral, anti-inflammatories, immunomodulators and immunosuppressants, which enable them to effectively treat a wide range of diseases [10]. The material of old Medicine is very large in comparison with other traditional medicine systems. It is widely used in the production of herbal products like plant bark, stems, flowers, seeds, resins, bulbs, leaves, roots, rhizomes etc (Table-1). The full formulation is derived from the plants and extracts found in the forests.

**Table 1. List of some common medicinal plants used in treatment of various diseases**

Local Name	English Name	Botanical Name	Parts used	Applications
Tulsi	Holy basil	<i>Ocimum sanctum</i>	Leaves	antiallergic, antidiabetic
Methi	Fenugreek	<i>Trigonella foenum</i>	Seeds	constipation, diabetes
Dalchini	Bark Cinnamon	<i>Cinnamomum zeylanicum</i>		antibacterial, antiseptic
Amla	Indian gooseberry	<i>Embilica officinalis</i>	Fruit	constipation, antioxidant, fever, diabetes, hyperacidity
Mulethi	Licorice	<i>Glycyrrhiza glabra</i>	Roots	digestive disorders, ulcers, bronchitis
Ghritkumari	Aloe	<i>Aloe barbadensis</i>	Leaves	laxative, wound healing, skin burns, ulcers
Ashwagandha	Indian ginseng	<i>Withania somnifera</i>	Roots, leaves	restorative tonic, stress, nerves disorders, aphrodisiac
Elaichi	Lesser Cardamom	<i>Elettaria cardomomum</i>	Pod and seeds	nausea, vomiting, dry cough
Babool	Gum arabic tree	<i>Acacia arabica</i>	Bark, root, gum, leaves, pods, seeds	oral care, bleeding gums, wounds
Lehsun	Garlic	<i>Allium sativum</i>	Bulb	ringworm, dysentery, wounds, heart diseases
Neem	Margosa tree	<i>Azadirachta indica</i>	Root, bark, flower	cough, diabetes, skin diseases, arthritis, bronchitis
Chirayata	Bitter stick, East Indian Balmony,	<i>Andrographis paniculata</i>	Whole plant	fever and jaundice
Harad	Chebulic Myrobalan	<i>Terminalia chebula</i>	Fruits, roots, bark	digestive disorders, eye and skin diseases
Doob	Bermuda grass	<i>Cynodon dactylon</i>	Leaves	jaundice, antidiarrheal
Adrak	Ginger	<i>Zingiber officinale</i> Rosc.	Rhizome	antioxidant and anti-arthritis
Giloe/Guduchi	Heart-leaved moonseed	<i>Tinospora cordifolia</i>	Stem	fever, urinary diseases, dyspepsia
Sadabahar	Madagascar Periwinkle	<i>Catharanthus roseus</i>	Whole plant	leukaemia, hypertension, antispasmodic
Sarp Gandha	Indian snakeroot	<i>Ranwolfia serpentina</i>	Root	hypertension, insomnia
Jyotishmati	Staff tree	<i>Celastru spaniculatus</i>	Seeds	gout, neurological disorders, rheumatism
Laung	Clove	<i>Syzygium aromaticum</i>	Dried flower buds, leaves, and stems	analgesic, antioxidant, antitumor, antiviral, antifungal, anti-inflammatory and antibacterial activity
Haldi	Turmeric	<i>Curcuma longa</i>	Rhizome	anti-inflammatory, hematuria, hemorrhage, flatulence, jaundice, menstrual difficulties
Guggul	Indian bdellium-tree	<i>Commiphora wightii</i>	Bark	urinary infections, ascites, piles, arthritis, swellings ulcers and in skin diseases
Bhringaraj	False daisy	<i>Eclipta</i>	Whole plant	hepatotoxicity

Paan	Betel	<i>prostrata</i> L. <i>Piper betle</i>	Leaf	anti-inflammatory, anti-apoptotic, anti-oxidant, anticancer and antibacterial activity
Peepal	Sacred fig	<i>Ficus religiosa</i>	Bark, leaves, fruit, seeds, latex	constipation, gynecological diseases and skin diseases
Datura	Thorn apples	<i>Dhatura</i> <i>stramonium</i>	Leaves and fruits	asthma, cardiac pains

**2.2 Yoga and Wellness.** Yoga is a sacred practice that promotes physical strength, mental equilibrium, and spiritual development. Yoga involves physical activity and mental relaxation. Yoga encompasses a wide range of techniques and practices, including yoga poses (asanas), breathing (inhalations or breathing exercises), meditation, mantras chanting, lifestyle modifications, and some spiritual beliefs [16]. So far, scientific evidence from extensive studies of yoga and meditation has shown that yoga and meditation are effective in reducing stress and anxiety [17, 18, 19, 20, 21 22]. In addition to improving mental health, researchers have also confirmed that regular yogic practices can improve metabolic and vascular functions in the body [23, 24, 25, 26, 27, 28]. In addition to the wide-ranging benefits of yoga in terms of overall health and well-being, the practice of yoga and meditation has also become popular for improving immunity through improved circulation, elimination of toxins, modulation of inflammatory mediators and immunological enhancement [29, 30, 20].

**2.3 During Asymptomatic condition of COVID-19.** This category will include persons who do not have any relevant symptoms at present and do not have underlying risk factor or commodity these apparently stable individuals could be most appropriate for building immunity, so that it is possible to counteract infection-related pathogenesis to keep them stable [31]. Here Preventive approaches, can include both pharmacological and nonpharmacological strategies. Among the safe lifestyles of non-pharmacological intervention, appropriate physical activity, ample sleep, treatment for retainable and unretainable impulses, sadvritta, and the prevention and isolation of infected persons are essential [32]. Nutrition herbs such as turmeric (*curcuma longa*) powder, garlic (*Allium sativum*) peel, Carom or Ajwain (*Trachyspermum ammi*) seeds and Loban (resin of the species Boswellia and Styra benzoin) may also be a useful in home, shelter and living space disinfection technique [33]. In addition, the predominant effect on the respiratory tract may be helpful in providing community based Swarna Prashana [34] and mass prophylaxis by rasayana [35]. Chyavanprasha or Amrit Bhallataka, Brahma Rasayana, can include Rasayana [35, 33, 3]. Rasayana function as an antimicrobial, antioxidant, anti-inflammatory, adjuvant vaccine, and gives immunity of diseases (Brown *et al*, 2020; Hotchkiss *et al*, 2020) [36, 37]. In addition, rasayana therapy [38], along with physical and social separation from infected persons [39], is, according to the Ayurvedic classic, a primary tool for addressing epidemics and infectious diseases, immunity building calls for time. It could have been possible for certain asymptomatic carrier to transmit the virus to other otherwise healthy individuals. In order to avoid any transmission, physical and social distance would therefore be appropriate for everyone [40].

**2.4 Clinical management of COVID-19 during minor symptoms.** This group applies to people who have been found SARS-CoV-2 positive and who have moderate symptoms for are URTI. Formulations such as pippali rasayana, Lakshmi Vilas Rasa and Sanjeevani vati [41, 42, 43]. In an integrative model, the most powerful drugs to be used at this point like C. vati, Kantakaari Avaleha, Dashamul kwath, Go jihvaadi Kashaya, Vyaghri haritaki, Sitopaladi [44], Talishadi, and Yashtimadhu. This patient showing progression of diseases may need to immediately switch to ICU [39].

**2.5 Clinical management of COVID-19 during sensible to severe symptoms.** This group may be the population in which there are already mild to serious symptoms and the patient still to belong the risk categories. These patients must be treated from the start, but may be co-prescribed with Ayurvedic medicine to reduce the pathology's effect and to acquisition many times to provide compressive authority [45]. Rasayana, Sanjeevani vati, Tribhuvan keerti rasa Laghu Vasant Malati

[41], Mrityunjaya rasa, and Siddha makardhvaja rasa and Brihata Vata Chintamni rasa may be the suggested formulation here. The primary criterion for the selection of Rasa aushadhi in categories third and fourth, as state aloft, is the exigency to undertake therapeutic steps. It has been demonstrated that Rasa aushadhi is better better bioavailable and absorbed by oral pathways [46]. Suvarna bhasma has been shown to be well absorbed by sublingual administration when combined with black pepper powder and ghee (GOI, 2020). Strong networking between AYUSH health authorities and local health authorities during the current crisis may help to make efficient use of individual capital in the AYUSH centre amid the instant crunch [47]. Note a caveat here is also relevant. Following the proactive action plan outlined here, Ayurveda physicians can determine the projection and advice on proper guides to secondary or tertiary treatment propensity according to the emergency needs. The handling of COVID-19 patients suspected of having contracted SARS-CoV-2 infection should be taken with extra and utmost consideration. If adopted, this action plan has immense potential to provide learning and creative perspectives. If adopted, this action plan has immense potential to provide learning and creative perspectives. So, it is important to have correct documentation. Therefore, it is suggested that each case should be properly recorded with key variables that are important. There should also be recorded follow-up guidance on the discharge or discontinuation of medications. Therefore, instead of using a Western method alone to determine the effectiveness of a western diagnostic procedure, Ayurveda should, as mentioned above, adopt its own diagnostic wisdom and the subsequent choice of treatment is based roga and rogi bala. In the nation, 3598 AYUSH hospitals, including 2818 Ayurveda hospitals, are open. 25,723 dispensaries of AYUSH, including 15,291 dispensaries of Ayurveda, can be obtained. 7.73 lakh practitioners of AYUSH have enrolled, of whom 4.28 are lakh practicers of Ayurveda [48]. There are 8954 AYUSH (licenced pharmacies) drug manufacturing units in the country. 7718 of these are Ayurvedic pharmacies [49]. The recommended operation projects imply to deeply achievably with this framework and related human resources.

### 3. RECOMMENDATIONS OF AYURVEDA FOR COVID-19 ACTION

Ayurveda has full scope and opportunities to be used for both COVID-19 prevention and treatment. This will provide a major opportunity to learn and to produce reliable information. It is important to recapitulate that Ayurveda's role in remit the challenge of COVID-19 in India should not prevail confined and should be seen as an expansion of treatment facilities and support for the bio-medical system. Certainly, with proper tracking and data preservation amid implementation, major practices and recommendations for research managing more and more chronic and virulent communicable diseases are likely to be emerge. Implementing the planned action is likely to include proof facts-based perspectives supporting Ayurveda's research beyond wellness preventive treatment and non-communicable diseases care. The AYUSH framework has been placed on alert across the country anytime. Health equipment at AYUSH is also being planned to be converted in times of need into quarantine facilities. From this viewpoint, Ayurveda's workforce will significantly support the nation by implementing the intervention strategy proposed inside AYUSH healthcare equipment. India is the nation where the longest living health care system in the world started and is thus being closely monitored by the world community and how it uses and its own resources to tackle the crisis. It has been achieved by China and it is now India's turn to demonstrate its conventional potential in health care [50].

**3.2 Ayurvedic Rasayana used in COVID-19 clinical management.** Some of the Rasayana botanicals mentioned in Ayurveda are used in clinical practices for improving the immunity. The possible immunomodulators are a variety of botanical from Rasayana, such as *Withania somnifera* (Ashwa-gandha), *Tinospora cordofolia* (Guduchi), *Phyllanthus embelica* (Amalaki), *Adhatoda vasica* (Kala Bassa) and *Asparagus race-mosus* (Shatavari) Table 2. It is possible to suggest these Rasayana botanicals for COVID-19 prophylaxis and as an add on- to treatment. Alternative diseases modifying drugs such as HCQ could be safe and more effective in extracting these medicinal plants.

**Table 2.** Ayurvedic Rasayana used in COVID-19 prophylaxis

S. No.	Grade of people	The planned Interference
1	An asymptomatic category without exposure	Ayurvedic popular health approaches such as a healthy diet (excessive cold, and exposure to pollutant) Chyavanprasha, Amri Bhallataka, Brahma Rasayana, Sanjeevani vati, Swarna prashan and the retaining or non-retainable drives of health and dieastic factor avoidance are normal.
2	Asympomatic exposure revealed (Being Quarantined)	<i>Ocimum sanctum, Glycyrrhiza glabra, Adhatoda vasica, Andrographis paniculata, Swertia chirata, Triphala and Trikatu, Moringa oleifera, Chitrakatdi vati, Sanjeevani vati, Chyavanprasha, Brahma Rasayana, and Herbal decoction, Tinospora cordifolia, urcuma longa, Zingiber officinale.</i>
3	With mild symptoms of COVID-19	<i>Kantakari Avaleha, Chitrakadi vati, Vyaghri haritaki, Dashamul kwath, Sitopaladi, Talishadi, and Yashtimadhu Pippali rasayan, Go Jihvadi Quath, etc.</i>
4	Moderate to serious with symptoms of COVID-19	<i>Siddha Makardhvaja Pippali rasayan Mrityunjaya rasa, Brihata Vata Chintamni rasa, Laghu Vasant Malati, Sanjeevani vati, Tribhuvan Keerti rasa, etc.</i>

**3.3 Ministry of AYUSH guidelines during COVID-19 pandemic.** We all recognise that prevention is better than cure. Although there are no COVID-19 medicines at present, it's going to be nice in these times to take precautionary steps that improve our immunity. Some major recommendation of AYUSH as follows [47].

#### I General Actions

1. Drink warm water all day long.
2. Regular Yogasana practise, pranayama and meditation, as suggested by AYUSH Ministry for a minimum of 30 minutes. (#YOGAatHome #StayHome #StaySafe).
3. It is recommended to cook spices such as Jeera (*Cumin*), Haldi (*Turmeric*), Coriander (*Koriander*) and Lahsun (*Garlic*).

#### II Ayurvedic Immunity Endorsing Measures

1. Take 10gm (1tsf) of Chyavanprash in the daytime. Sugar free Chyavanprash should be taken by diabetics.
2. Tulsi, Dalchini, Cinnamon, Kalimirch, Sunthi, Dry Ginger, and Munakka are herbs / decoktion, made of Tulsi (Basil), Dalchini, once, or twice daily. If required, add jaggery (natural sugar) and/or fresh citrus juice to your taste.
3. Half Tea Spoon Haldi (Turmeric) powder in hot milk 150 mL-once or twice daily (Golden milk).

#### III Simple Ayurvedic Procedures

1. Application of the nostril, add both morning and evening, sesame oil / coconut oil or ghee.
2. Take 1 spoons table of sesame or coconut oil in the mouth. Oil pulling therapy. Do not drink Swish 2 to 3 minutes in the mouth and spit it out and then rinse it with warm water. You can do this once or twice a day.

#### IV During dry cough / sore throat

1. Steam inhalation can be performed once a day with fresh Pudina (Mint) or Ajwain (Caraway seeds).
2. In case of pain in the cough or throat irritation, Lavang (Clove) powder mixed with natural sugar / honey can be taken 2-3 times a day.
3. In general, these steps treat ordinary dry cough and sore neck. But if these symptoms continue, you can contact the physicians.

#### 4. CONCLUSION

At this time, conservation and maintain ecological equilibrium have become the key problems for both the world and India. India's medical system has very deep roots; in ancient times these medicinal plants in the Himalayas were not only traded internally but also shipped back. It is closely related to Ayurveda and may be related to the other Indian system of medicine as well. The evidence submitted should draw the stakeholder's attention, including the WHO, to the unexplored potential of the conventional medicine system, and to the adaptation of integrative approaches in the quest for solution to the COVID-19 crisis.

Medicinal plants are the critical source of potentially useful structures for the production of new chemotherapeutic agents. Plants have traditionally been a source of development for novel medicines and plant-based medicines that have made a major contribution to human health and well-being. We know that approximately 90 percent of medicinal drugs are extracted from the crude extract of medicinal plants used to treat various human diseases. Until now, numerous researchers have scientifically evaluated a few plants for their medicinal effectiveness but the therapeutic ability of large quantities of plant is still unknown. The revival of the medicinal potential of these plants is thus very much needed. For antimicrobial activities Several researchers conducted bioassay of the different extracts from several plants. These works are to be placed in the hands of concern of every man. The conclusion specifies that experimental research on medicinal plants that have conventional efficacy rights will warrant fruitful results.

#### COMPLIANCE WITH ETHICAL STANDARDS

This article does not contain any studies with human participants performed by any of the authors.

#### REFERENCES

1. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, Xiang J, Wang Y, Song B, Gu X, Guan L, Wei Y, Li H, Wu X, Xu J, Tu S, Zhang Y, Chen H, Cao B. (2020) Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet*. 2020;395:1054–1062. [https://doi.org/10.1016/S0140-6736\(20\)30566-3](https://doi.org/10.1016/S0140-6736(20)30566-3)
2. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, Qiu Y, Wang J, Liu Y, Wei Y, Xia J, Yu T, Zhang X and Zhang L. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan China: a descriptive study. *Lancet*. 2020;395:507–513. [https://doi.org/10.1016/S0140-6736\(20\)30211-7](https://doi.org/10.1016/S0140-6736(20)30211-7)
3. World Health Organization. Clinical management of severe acute respiratory infection (SARI) when covid-19 disease is suspected: interim guidance, 13 march 2020. No. Who/2019-ncov/clinical/2020.4.
4. Xu B, Gutierrez B, Mekaru S, Sewalk K, Goodwin L, Loskill A, Cohn E L, Hsuen Y, Hill S C, Cobo M M, Zarebski A E, Li S, Wu C H, Hurland E, Morgan J D, Wang, L, O'Brien K, Scarpino S V V, Brownstein J S, Pybus O G, Pigott D M, Kraemer M U G. Epidemiological data from the COVID-19 outbreak, real-time case information. *Sci. Data* 2020;7:1–6. <https://doi.org/10.1038/s41597-020-0448-0>

5. Arya P, Swami N and Mehta JP. Role of Traditional knowledge in health care system of India including COVID-19 Pandemic situation. COVID-19 A Drill Down Analysis Volume-I. INSC Publishing House (IPH) Chikkamagaluru Karnataka pP142-147.
6. Goyal M. Threats and challenges of emerging viral diseases and scope of Ayurveda in its prevention. *Ayush*. 2019; 40:67-68.
7. Salzberger B, Gluck T and Ehrenstein B. Successful containment of COVID-19: the WHO-Report on the COVID-19 outbreak in China. *Infection*. 2020;48:151–153. <https://doi.org/10.1007/s15010-020-01409-4>
8. Grasselli G, Pesenti A and Cecconi M. Critical care utilization for the covid-19 outbreak in Lombardy, Italy: early experience and forecast during an emergency response. *J Am Med Assoc*. 2020;78:112- 129. <https://doi.org/10.1001/jama.2020.4031>.
9. Onder G, Rezza G and Brusaferro S. Case-Fatality Rate and Characteristics of Patients Dying in Relation to COVID-19 in Italy. *Jn Am Med Assoc*. 2020;323:1775–1776. <https://doi.org/10.1001/jama.2020.4683>
10. Ren J, ling Zhang AH and Wang XJ. Traditional Chinese medicine for COVID-19 treatment. *Pharmacol. Res*. 2020;155:104743. <https://doi.org/10.1016/j.phrs.2020.104743>
11. Cui H T, Li Y T, Guo L Y, Liu X G, Wang L S, Jia J W, Liao J B, Miao J, Zhang Z Y, Wang L, Wang H W and Wen W B. Traditional Chinese Medicine Traditional Chinese medicine for treatment of coronavirus disease 2019: a review 2020;5. <https://doi.org/10.12032/TMR20200222165>
12. Kaushik P and Dhiman AK. Medicinal Plants and Raw Drugs of India. Bishen Singh Mahendra Pal Singh Dehradun India. 2000;1:79-90. <https://doi.org/10.4236/jct.2010.120148,288>
13. Girish Tillu, Sundeep Salvi and Bhushan P. AYUSH for COVID-19 management. *Journal of Ayurveda and Integrative Medicine*. 2020;11:95-96. DOI <https://doi.org/10.1016/j.jaim.2020.06.012>
14. Rastogi S. Building bridges between Ayurveda and Modern Science. *Int. J. Ayurveda Res*. 2010;1:41-49 <https://doi.org/10.4103/0974-7788.59943>
15. G.S. Birdee, A.T. Legedza, R.B. Saper, S.M. Bertisch, D.M. Eisenberg, R.S. Phillips (2008) Characteristics of yoga users: results of a national survey. *Journal of General Internal Medicine*. 2008;23(10):1653-1658
16. J.J.F. Breedvelt, Y. Amanvermez, M. Harrer, E. Karyotaki, S. Gilbody, C.L.H. Bockting, D.D. Ebert. The effects of meditation, yoga, and mindfulness on depression, anxiety, and stress in tertiary education students: a meta-analysis *Frontiers in Psychiatry*. 2019;10:193-198.
17. H. Cramer, R. Lauche, G. Dobos. Characteristics of randomized controlled trials of yoga: a bibliometric analysis *BMC Complementary Medicine and Therapies*. 2014;14 (1):328-333.
18. R. Manocha, D. Black, J. Sarris, C. Stough. A randomized, controlled trial of meditation for work stress, anxiety and depressed mood in full-time workers. *Evidence-Based Complementary and Alternative Medicine*. 2011;20(11):560-583
19. S. Sarkar, B. Sa, K. Singh, U. Gaur, A. Bharatha, V. Victor, M.A.A. Majumder. Psychophysiological effects of yoga on stress management among medical and allied health professional students during COVID-19 pandemic: a narrative review. *Advance Human Biology*. 2021;11(4):3-11.
20. M. Shohani, G. Badfar, M.P. Nasirkandy, S. Kaikhavani, S. Rahmati, Y. Modmeli, M. Azami. The effect of yoga on stress, anxiety, and depression in women. *International Journal of Preventive Medicine*. 2018;9:21-21
21. C. Smith, H. Hancock, J. Blake-Mortimer, K. Eckert. A randomised comparative trial of yoga and relaxation to reduce stress and anxiety. *Complementary Therapies in Medicine*. 2007;15 (2):77-83.

22. M. Erogul, G. Singer, T. McIntyre, D.G. Stefanov. Abridged mindfulness intervention to support wellness in first-year medical students, *Teaching and Learning in Medicine*. 2014;26 (4):350-356
23. N. Falsafi. A randomized controlled trial of mindfulness versus yoga: effects on depression and/or anxiety in college students. *Journal of the American Psychiatric Nurses Association*. 2016;22 (6):483-497
24. S.-D. Kim. Effects of yogic eye exercises on eye fatigue in undergraduate nursing students. *Journal of Physical Therapy Science*. 2016;28 (6)1813-1815
25. A. Nemati. The effect of pranayama on test anxiety and test performance. *International Journal of Yoga*. 2013;6 (1):55
26. D. Oman, S.L. Shapiro, C.E. Thoresen, T.G. Plante, T. Flinders. Meditation lowers stress and supports forgiveness among college students: a randomized controlled trial. *Journal of American College Health*. 2008;56 (5):569-578
27. Ross, L. Williams, M. Pappas-Sandonas, K. Touchton-Leonard, D. Fogel. Incorporating yoga therapy into primary care: the Casey Health Institute, *International Journal of Yoga Therapy*. 2015; 25 (1):43-49.
28. Gopal, S. Mondal, A. Gandhi, S. Arora, J. Bhattacharjee. Effect of integrated yoga practices on immune responses in examination stress - a preliminary study. *International Journal of Yoga*. 2011;4 (1):26-32
29. H.N. Venkatesh, H. Ravish, C.R. Wilma Delphine Silvia, H. Srinivas. Molecular signature of the immune response to yoga therapy in stress-related chronic disease conditions: an insight. *International Journal of Yoga*. 2020; 13 (1): 9-17.
30. Patwardhan B and Tillu G. Universal health coverage and AYUSH systems. *J Ayurveda Integr Med*. 2018; 9:1001-1003. <https://doi.org/10.1016/j.jaim.2018>.
31. Patwardhan B, Chavan Gautam, P, Gautam M, Tillu G, Chopra A, Gairola S and Jadhav S. Ayurveda rasayana in prophylaxis of COVID-19. *Current Sci*. 2020;118:1158–1160. <https://doi.org/10.1016/j.jaim.2020.1003.1001>.
32. Tillu G, Chaturvedi S, Chopra A and Patwardhan B. Public health approach of Ayurveda and Yoga for COVID-19 prophylaxis. *J Altern Complement Med*. 2020. <https://doi.org/10.1089/acm.2020.0129>.
33. Zhou P, Yang X Lou, Wang X G, Hu B, Zhang L, Zhang W, Si H R, Zhu Y, Li B, Huang C L, Chen H D, Chen J, Luo Y, Guo H, Jiang R Di, Liu M Q, Chen Y, Shen X R, Wang X, Zheng X S, Zhao K, Chen Q J, Deng F, Liu L L, Yan B, Zhan F X, Wang Y Y, Xiao G F, Shi Z L. A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature*. 2020;579: 270–273. <https://doi.org/10.1038/s41586-020-2012-7>
34. Wu Z, McGoogan J M. Characteristics of and Important Lessons from the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72314 Cases from the Chinese Center for Disease Control and Prevention. *Journal of American Medical Association*. 2020;323:1239–1242. <https://doi.org/10.1001/jama.2020.2648>
35. Brown P. Studying COVID-19 in light of critical approaches to risk and uncertainty: research pathways, conceptual tools, and some magic from mary douglas. *Health Risk Soc*. 2020;22:10-14. <https://doi.org/10.1080/>
36. Hotchkiss RS and Opal SM. Activating immunity to fight a foe d a new path. *N Engl J Med*. 2020;382:1270-1272. <https://doi.org/10.1056/NEJMcibr1917242>
37. Bhatwalkar SB, Shukla P, Srivastava RK, Mondal R and Anupam R. Validation of environmental disinfection efficiency of traditional Ayurvedic fumigation practices. *J. Ayurveda Integr. Med*. 2019;10:203–206. <https://doi.org/10.1016/j.jaim.2019.05.002>
38. Patil Bhole T, Patil S and Wele AA. Assessment of bioavailability of gold bhasma in human participants e a pilot study. *J Ayurveda Integr Med*. 2018;9:294-297. <https://doi.org/10.1016/j.jaim.2018.04.002>.

39. Rastogi S and Srivastav P. Ayurveda in critical care: Illustrating Ayurvedic intervention in a case of hepatic encephalopathy. *AYU (An Int. Q. J. Res. Ayurveda)*. 2011;32:345-352. <https://doi.org/10.4103/0974-8520.93911>
40. Sharma R, Martins N, Kuca K, Chaudhary A, Kabra A, Rao MM and Prajapati PK. Chyawanprash: A traditional indian bioactive health supplement. *Biomolecules*. 2019;9:1–24. <https://doi.org/10.3390/biom9050161>
41. Rastogi S. Viral Epidemics and traditional health care systems: It's time to act honestly, proactively and collectively. *Ann. Ayurvedic Med.* 2020; 8:9-21. <https://doi.org/10.5455/aam.95594>
42. Rege NN, Thatte UM and Dahanukar SA. Adaptogenic properties of six rasayana herbs used in Ayurvedic medicine. *Phytother Res.* 1999;13:275-291.
43. Sharma R and Prajapati PK. Nanotechnology in medicine: Leads from Ayurveda. *J. Pharm. Bioallied Sci.* 2016;8:80–81. <https://doi.org/10.4103/0975-7406.171730>
44. Rekha PS, Kuttan G and Kuttan R. Antioxidant activity of brahma rasayana. *Indian J. Exp. Biol.* 2001;39:447–452.
45. Rastogi S, Rastogi R and Singh RH. Adverse effects of Ayurvedic drugs: an overview of causes and possibilities in reference to a case of Vatsanabha (Aconite) overdosing. *Int J Risk Saf Med.* 2007;19 (3):117-125.
46. Ministry of AYUSH Guidelines for COVID-19 crises, 2021
47. Math SB, Moirangthem S and Kumar CN. Public health perspectives in cross system practice: past, present and future. *Ind J Medical Ethics.* 2015;12:131-136. <https://doi.org/10.20529/IJME.2015.041>.
48. Bisht D, Sharma Y and Mehra BA. Clinical study to evaluate the efficacy of pippali rasayana in certain respiratory disorders. *AYU.* 2009;30:337-341.
49. Makhija IK, Shreedhara CS and Ram HN. Mast cell stabilization potential of sitopaladi churna: an Ayurvedic formulation. *Pharmacogn Res.* 2013;5:306-308. <https://doi.org/10.4103/0974-8490.118824>.
50. Yi Y, Lagniton P, Ye S, Li E, Xu R H. Covid-19: what has been learned and to be learned about the novel coronavirus disease. *Int J Biol Sci.* 2020;16:1753-1766. <https://doi.org/10.7150/ijbs.45134>.