

# A REVIEW ON: ANTIVIRAL ACTIVITY OF MEDICINAL PLANTS AGAINST PANDEMIC COVID 19 IN INDIA

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## Abstract

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus from Wuhan, China. Sharply spreading from Wuhan to all habited continents of the world, the World Health Organisation declared COVID-19 a pandemic on March 11, 2019. Total cases of corona are confirmed in India is about 10.3 M. The war on multidrug resistance (MDR) has resulted in the greatest deficit to the world's economy including India. Antibiotics are the wonder drug of the 20th century have played a central role in treating infectious diseases. However, the irregular, inappropriate, and irrational uses of antibiotics have resulted in the emergence of antimicrobial resistance. This has resulted in an increased interest in medicinal plants since 30–50% of current pharmaceuticals and nutraceuticals are plant-derived. Plant's metabolites are a source of countless medicinal compounds, while the diversity of multiscale chemical structures has made them superior to treat serious diseases. About 242 plants from 96 families found to have antiviral activity and Among them, 149 plants from 71 families were screened for the identification of the major plant secondary metabolites (PSMs) that might be effective for this COVID-19 pandemic. Different traditional medicinal plants, herbs and their bioactive components that help in strengthening our immune system and also play key role in combatting microbial and viral infections including COVID-19. In this article we discussed about the medicinal plants and their extract and will help to the researchers and industries to identify and investigate potential medicinal plants that can meet their interests for various applications including development of herbal/Ayurvedic antiviral drugs, designing antimicrobial/antiviral compound's.

**KEYWORDS:** Covid-19; pandemic; Medicinal plants; Plant's metabolites; Antiviral; Vaccines.

## INTRODUCTION

The WHO afterwards renamed the COVID-19 19-novel Coronavirus as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and also the illness ensuing from the mentioned as Coronavirus illness 2019 (COVID-19).[1] This has resulted in associate degree inflated interest in medicinal plants since 30–50% of current prescription drugs and nutraceuticals square measure plant-derived. The question we tend to address during this review is whether or not plants, that manufacture an upscale diversity of secondary metabolites, could offer novel antibiotics to tackle MDR microbes and novel chemosensitizers to reclaim presently used antibiotics that square measure rendered ineffective by the MDR microbes. Plants synthesize secondary metabolites and phytochemicals and have nice potential to act as medical specialty.[2] Medicinal plants have legendary to be made in antioxidants, vitamins, proteins, carbohydrates, dietary fibres, amino acids, minerals, steroids, alkaloids, antiviral, medicinal drug phytochemicals which is able to facilitate in rejuvenating the system and conjointly helps in killing the invaded viruses.[3] During this state of affairs, our study accentuated some plant secondary metabolites that showed distinguished antiviral activity against coronaviruses through preventive the most machinery employed in their pathologic process and replication cycle.[4] COVID-19 is that the foremost world health disaster these days and thus the supreme challenge whole universe. absentmindedly, COVID-19 is an indoor RNA virus that is clearly gift in people and animals. The virus belongs to the Nidovirales order that consists of families, namely, Arteriviridae, Roniviridae and Coronaviridae.[5]

Coronavirus is one in each of the foremost pathogens that first targets to the human system. Outbreaks of coronaviruses (CoVs) previously embrace the severe acute metastasis syndrome (SARS)-COV and thus the metastasis syndrome (MERS)-CoV that square measure previously defined as agents that square measure a wonderful public health threat.[6] The irruption of COVID-19 has affected over three million patients in 187 countries, areas, or territories with a morbidity of 4.20% and has become a big international health concern. supported the proof of a chop-chop increasing incidence of infections and thus the prospect of transmission by well carriers, SARS-CoV-2 is transmitted effectively among humans and exhibits high potential for a virus.[7] It's quite common for quick and sharp outbreaks to occur in Republic of Asian country every year which may ensue to, lack of sanitation, disease and improper public health system, and natural disasters. Republic of Asian country is flooded with two diseases named Indian cholera and respiratory disease throughout nineteenth and twentieth century that caused devastating impact with increasing death tolls every year.[8]. Charak Vedic literature and Sushruta Vedic literature square measure the two most notable treatises of piece of writing where uses of 700 seasoning medication from plants. variety of them medicinal plants shown to possess antiviral activity.[10]

## ORIGIN AND TRANSMISSION OF COVID-19

The SARS-CoV-2 was found to be a positive-stranded RNA virus happiness to the genus Betacoronavirus with a crown because of the presence of spike glycoproteins on the envelope [7].

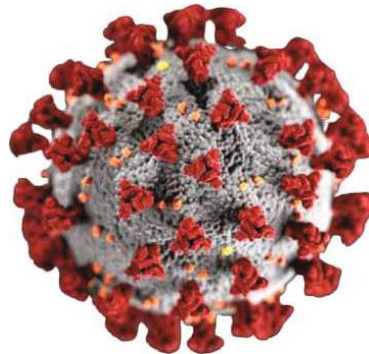


Figure 1: A graphical representation of the ultrastructural morphology of coronavirus (SARS-CoV-2).  
Source: Centres for Disease Control and Prevention—Public Health Image Library.  
Credit: Alissa Eckert, MS, Dan Higgins, MAM (Public Domain).

Based on the big range of infected those that were exposed to the wet animal market in Wuhan town wherever live animals ar habitually sold-out, it's instructed that this is often the probably animal disease origin of the COVID-19[9]. many reports have instructed that person-to-person transmission could be a probably route for spreading COVID-19 infection. The binding of a receptor expressed by host cells is that the opening of virus infection followed by fusion with the cytomembrane. it's reasoned that the respiratory organ animal tissue cells are the first target of the virus. Thus, it's been according that human-to-human transmissions of SARS-COV happens by the binding between the receptor-binding domain of virus spikes and therefore the cellular receptor that has been known as angiotensin- changing protein a pair of (ACE2) receptor [9].

## HYPOTHETICAL PATHOGENESIS

Based on the revealed review literature and clinical observations of COVID-19 patients, we tend to propose affordable hypothesis concerning the pathological process of SARS-CoV-2 infection in humans. The virus would possibly withstand the secretion membranes, particularly nasal and cartilaginous structure tissue layer, then enters the lungs through the tract. the first commonest symptoms of infection square measure fever and cough. The virus could enter the peripheral blood from the lungs, inflicting pathology. Then the virus would attack the targeting organs that specific ACE2, like the lungs, heart, renal, digestive tract. The SARS-CoV-2 detected within the soiled samples is additional possible as a result of the virus enters the blood from the lungs then travels from the blood to the intestines, that supports our hypothesis. The median time from symptom onset to white lung was concerning eight days. we tend to speculate that during this means, the virus begins a second attack, inflicting the patient's condition to irritate around 7–14 days when onset. throughout the infection method, the white somatic cell count in peripheral blood within the early stage of the illness is traditional or slightly low, and blood disease is ascertained in patients. we tend to speculate that lymph cell reduction could occur early within the illness, which can have an effect on protein production within the patient. In severe sort patients,

lymphocytes were considerably reduced. we tend to speculate that lymphocytes in patients with COVID-19 may step by step decrease because the illness progress. The SARS-CoV-2 detected within the feculent samples is additional probably as a result of the virus enters the blood from the lungs and so travels from the blood to the intestines, that supports our hypothesis. The median time from symptom onset to respiratory disease was regarding eight days. we tend to speculate that during this method, the virus begins a second attack, inflicting the patient's condition to worsen around 7–14 days when onset. throughout the infection method, the white blood corpuscle count in peripheral blood within the early stage of the unwellness is traditional or slightly low, and blood disease is discovered in patients. we tend to speculate that B lymphocyte reduction might occur early within the unwellness, which can have an effect on protein production within the patient. In severe sort patients, lymphocytes were considerably reduced. we tend to speculate that lymphocytes in patients with COVID-19 would possibly bit by bit decrease because the unwellness progress. [10,11]

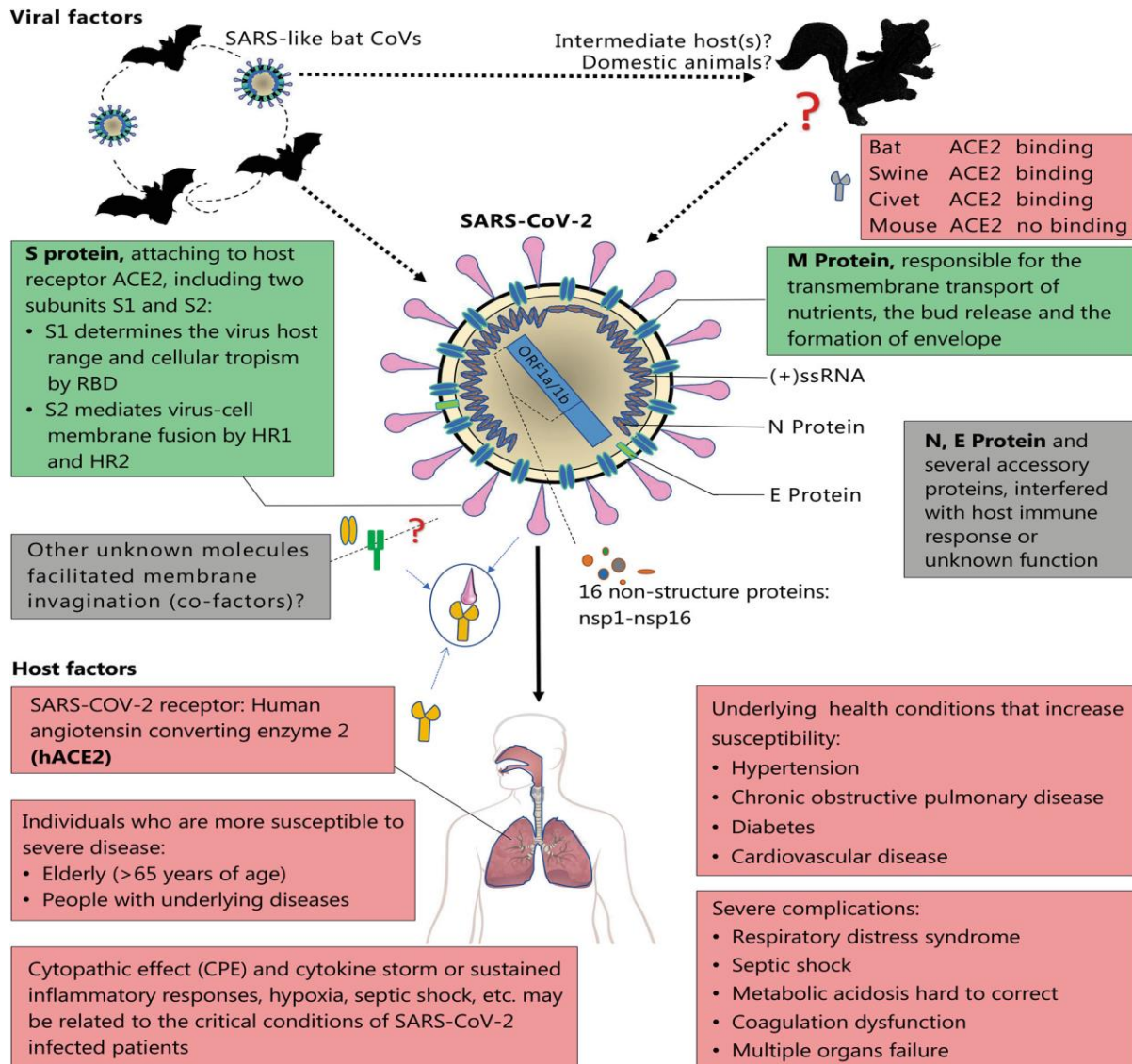


Figure 1. one infective agent and host factors that influence the pathologic process of SARS-CoV-2. daft square measure the reservoir of a good kind of coronaviruses, as well as severe acute metastasis syndrome coronavirus (SARS-CoV) -like viruses. SARS-CoV-2 might originate from daft or unknown intermediate hosts and cross the species barrier into humans. Virus-host interactions have an effect on infective agent entry and replication. higher panel: infective agent issue. SARS-CoV-2 is AN engulfed positive fiber polymer (ssRNA) coronavirus. simple fraction of infective agent polymer, chiefly set within the initial open reading frame (ORF 1a/b), encodes sixteen non-structure proteins (NSPs). the remainder a part of the virus ordering encodes four essential structural proteins, as well as spike (S) conjugated protein, little envelope (E) macromolecule, matrix (M) macromolecule, and nucleocapsid (N) macromolecule, and conjointly many accent proteins. S conjugated

protein of SARS-CoV-2 binds to host cell receptors, angiotensin-converting accelerator two (ACE2), that's a crucial step for virus entry. The doable molecules expedited membrane invagination for SARS-CoV-2 endocytosis square measure still unclear. different virus proteins might contribute to pathologic process. Host factors (Lower panel) also can influence condition to infection and unwellness progression. The senior and other people with underlying unwellness square measure prone to SARS-CoV-2 and have a tendency to transform crucial conditions. RBD, receptor-binding domain; HR1, 7 repeats 1; HR2, 7 repeats 2 accessories [11] proteins. S conjugated protein of SARS-CoV-2 binds to host cell receptors, angiotensin-converting accelerator two (ACE2), that's a crucial step for virus entry. The doable molecules expedited membrane invagination for SARS-CoV-2 endocytosis square measure still unclear. different virus proteins might contribute to pathologic process. Host factors (Lower panel) also can influence condition to infection and unwellness progression. The senior and other people with underlying unwellness square measure prone to SARS-CoV-2 and have a tendency to transform crucial conditions. RBD, receptor-binding domain; HR1, 7 repeats 1; HR2, 7 repeats two.[11]

### ANTIVIRAL ACTIVITY OF MEDICINAL PLANTS AND PLANTS SECONDARY METABOLITES AGAINST CORONAVIRUSES

To this finish, aromatic herbs, flavouring teas, cookery spices, and medicative plants employed in ethnobotanical treatments could represent extremely helpful sources. After the eruption of SARS-COV, initial painted in early 2003, researchers and scientist's area unit dynamically trying to explore wholly completely different antiviral extracts, drugs, and molecules against SARS-COV. This had diode a gaggle of specialists to screen quite 2 hundred medicative healthful plants, cookery spices, and aromatic herbs for his or her antiviral properties against this SARS-COV strain. In fact, once the eruption of respiratory disease, many groups began to appear for anti-coronavirus agents, yet as some natural compounds and phytochemical extracts that exist in ancient seasoning medicines [12]. Indian ancient healthful systems unit of measurement thought of reciprocally of the oldest treatments in human history and it plays a significant role in encountering world health care needs. ancient Indian medicine use plants, minerals and animal material for activity human diseases. About 25,000 plant-based formulations area unit utilised in individuals' remedies in Indian medicine. one herb might contain many phytochemical constituents that perform alone or at the side of completely different compounds to supply the desired medical specialty impact. the planning for brand spanking new compounds with antiviral activity has generally been unacceptable because of agent resistance beside agent latency and perennial infection in immune-compromised patients. The advancements in developing antiviral agents' unit of measurement the foremost necessary focus in medical analysis. The antiviral effects of healthful plants have competed an improbable role at wholly completely different stages of agent growth. Plant derived medical specialty formulations marked a significant contribution for agent infections. instead of artificial antiviral drugs, healthful plants deliver basic raw materials for necessary antiviral drugs. artificial drugs area unit replaced by medicative plants, as life-saving drugs in varied agent diseases. Since many Indian healthful plants exhibit antiviral, medicine and substance properties, it ought to be favourable to suppose them for the treatment of COVID-19. it's clear that customary clinical trials got to be administered to scientifically prove its effectivity. Indian preventive and prophylactic healthful plants instructed by AYUSH for COVID-19 [13]

### POTENTIAL ROLE OF NATURAL PRODUCTS FROM INDIAN TRADITIONAL MEDICINE

Due to the speedy unfold of the illness, it's of general interest to conjointly think about various remedies. There are descriptions of anti-viral treatments, even targeted to the coronavirus family in Chinese ancient drugs. different natural product of Indian origin and Ayurvedic formulations have conjointly been studied and used for his or her potential utility in varied sorts of infective agent infections. However, it ought to be noted that none of such natural product are literally tested to treat COVID-19. Typically, the presence of a spread of phytochemicals like flavonoids, tannins, triterpenes, phenolic resin acids, alkaloids, saponins, lignin's, proteins and peptides give an embarrassment of functions to such natural product and extracts that are incontestable to modulate varied aspects of virus infection as well as virus entry, infective agent organic phenomenon and replication. though there's no evidence of the impact of such extracts, etc., on the SARS-CoV-2, common natural product like curcumin and terpenoids will inhibit the COV-19 respiratory illness whereas *Withania somnifera* (Ashwagandha) are incontestable to inhibit different ribonucleic acid virus. Indeed, many terpenoids and cannabinoids square measure being studied for his or her chemical change through arrival studies on the infective agent peptidase square measure thought of as attainable prophylactic or therapeutic agents against SARS-CoV-2. varied natural product and their mixtures as enumerated within the Indian ancient health systems are shown to possess potent immunomodulatory and immune boosting effects that will be useful throughout the infection course. respiratory illness could be a key pathological feature of COVID-19. Terpenoids (such as from *Azadirachta indica* plant) and curcumin square measure effective in control the respiratory illness in animal models through the inhibition of the NFκB and associated pathways. Therefore, mixtures of such

natural product could have the potential to be used for bar and adjunct medical care to treat infected people.[14]

**Table 1. Studies describing the antiviral potential completely various medicinal plants or isolated pure compounds against different strains of coronavirus (Cov). SARS, Severe Acute metabolism Syndrome.[12]**

Plant Species or Isolated Compound	Coronavirus Strains
Isatis indigotica, Boenninghausenia sessilicarpa, Lonicera japonica, Eucalyptus spp., Panax ginseng, Lycoris radiata, Artemisia annua, Pyrrosia lingua, Lindera aggregata	SARS-CoV
Dioscorea batatas, Cassia tora, Taxillus chinensis	SARS-CoV (Hong Kong strain)
Amelanchier alnifolia, Cardamine angulata Rosa nutkana, Verbascum Thapsus	Bovine coronavirus (BCV)
Glycyrrhizin (Glycyrrhiza uralensis) Baicalin (Scutellaria baicalensis)	10 strains of SARS-CoV in fRhK4 cell line
Calophyllum blancoi, Pelargonium sidoides, Saikosaponins (Bupleurum spp., Heteromorpha spp., Scrophularia scorodonia)	HCoV-229E
Cinnamomum sp.	SARS-CoV PUMC01 F5
Glycyrrhizin and glycyrrhetic acid found in: Glycyrrhiza radix, Laurus nobilis Essential oil Gentiana scabra	SARS-CoV FFM1
Galla chinensis	SARS-CoV BJ01
Scutettaria baicalensis	SARS-CoV helicase non-structural protein 13 (nsP13)
Scutettaria baicalensis	SARS-CoV helicase non-structural protein 13 (nsP13)
Rheum palmatum, Houttuynia cordata	SARS-CoV 3CLpro
Salvia miltiorrhiza, Torreya nucifera	SARS-CoV CLpro
Broussonetia papyrifera, Psoralea corylifolia	SARS-CoV PLpro
Strobilanthes cusia leaf, Sambucus formosana	HCoV-NL63
Griffithsin (Griffithsin sp.)	HCoV-OC43 HCoV-299E HCoV-NL63

**Table 2. AYUSH suggested medicinal plant extracts for treating COVID-19[13]**

Indian medicinal Plant	Trade name	Indian traditional medical practice	Form of extract	Preparation	Recommended usage	Effective against
<b>1. Preventive and prophylactic</b>						
Tinospora cordifolia	Samshamani Vati	Ayurveda	Aqueous	Samshamani Vati 500 g with warm water	Twice a day for 15 days	Chronic fever
Andrographis paniculata	Nilavembu Kudineer	Siddha	Aqueous	Nilavembu kudineer 60 ml decoction	Twice a day for 14 days	Fever and cold
Cydonia oblonga	Behidana Unnab	Unani	Aqueous	Behidana – 3g Unnab – 5 Nos	Twice a day for 14 days	Antioxidant, immunomodulatory, anti-allergic, smooth muscle relaxant
Zizyphus Jujube Cordia myxa	Sapistan			Sapistan – 9 Nos Boil these 3		anti-influenza activity

				in 250 ml water, boil it until it remains half and filter it		
Arsenicum album 30	Arsenicum album 30	Homeopathy	Tablet		Daily once in empty stomach for 3 days (Should be repeated after 1 month till the infection persist).	Effective against SARS-CoV-2, immune-modulator.
2.Symptomatic Management for COVID-19						
AYUSH -64	-	Ayurveda	Tablet	-	2 tablets twice a day	Respiratory infections
Agastya Haritaki	Agasthya Rasayanam	Ayurveda	Powder	5 g in warm water	Twice a day	Upper respiratory infections
Anuthaila	Sesame oil	Ayurveda	Oil	-	2 drops in each nostril daily morning	Respiratory infections
Adathodai Manapagu	Adathodai Manapagu	Siddha	Aqueous	-	2 drops in each nostril daily morning 10 ml twice a day	Fever
Bryonia alba	Bryonia	Homeopathy	Tablet	-	-	Reduce lung inflammation
Rhus toxicodendron	Rhus tox	Homeopathy	Tablet	-	-	Viral infections
Atropa belladonna	Belladonna	Homeopathy	Tablet	-	-	Asthma and chronic lung diseases
Bignonia sempervirens	Gelsemium	Homeopathy	Tablet	-	-	Asthma
Eupatorium perfoliatum	Eupatorium perfoliatum	Homeopathy	Tablet	-	-	Respiratory symptoms
3.Add on interventions to the conventional care						
Vishasura kudineer	Poly-herbal formulation	Siddha	Tablet	Decoction 60 ml	Twice a day	Fever
Kaba sura kudineer	Poly-herbal formulation	Siddha	Tablet	Decoction 60 ml	Twice a day	Fever, cough, sore throat, shortness of breath

This table depicts the Indian medicative plants and its usage provided by the AYUSH, Government of Republic of India as a therapeutic approach for COVID-19.

**Table 3. List of Indian medicinal herbs which might inhibit the HCoVs and other Viruses.[13]**

S.No.	Plant Source	Mechanism of action	virus	Target
1.	Acacia Nilotica	Inhibition	HIV-PR	-
2.	Allium sativum	Proteolytic and hemagglutinating activity and viral replication	SARS	
3.	Andrographis	Suppression	SARS-COV and	NLRP3, capase-

	paniculata		likely SARS-CoV-2	1, and IL-1 $\beta$
4.	Boerhaavia diffusa	Inhibition	-	ACE
5.	Clerodendrum inerme Gaertn	Inactivation	SARS-CoV-2	Ribosome
6.	Clitoria ternatea	Metalloproteinase inhibitor	-	ADAM17
7.	Coriandrum sativum	Inhibition	-	ACE
8.	Cynara scolymus Cassia occidentalis Cosciniun Fenestratum	Inhibition	-	ACE
9.	Embelia ribes	Inhibition	-	ACE
10.	Eugenia jambolana	Inhibition	-	Protease
11.	Euphorbia granulata	Inhibition	HIV-1 PR	-
12.	Glycyrrhiza glabra	Inhibition of viral replication; Modulation of membrane fluidity	SARS; HIV-1	
13.	Gymnema sylvestre	Inhibition of viral DNA synthesis	-	-
14.	Hyoscyamus niger	Inhibition and Bronchodilator	-	Ca <sup>2+</sup>
15.	Ocimum kilimandscharicum	Inhibition	HIV-1	-
16.	Ocimum sanctum	Inhibition	HIV-1	-
17.	Punica granatum	Inhibition	-	ACE
18.	Salacia oblonga	Suppression	-	angiotensin II, AT1 signal
19.	Sambucus ebulus	Inhibition	Enveloped virus	-
20.	Solanum nigrum	-	HIV-1	-
21.	Sphaeranthus indicus	Inhibition	Mouse corona virus and Herpes virus	-
22.	Strobilanthes callosa	Blocking	HCoV-NL63	-
23.	Strobilanthes cusia	Blocking	HCoV-NL63	-
24.	Vitex negundo	Inhibition	HIV-1	-
25.	Vitex trifolia	Reduction	SARS-COV	-

HIV-1PR: Human Influenza Virus – 1 Protease; SARS: Severe Acute Respiratory Syndrome; SARS-CoV: Severe Acute Respiratory Syndrome – Coronavirus; SARS-CoV-2: Severe Acute Respiratory Syndrome – Coronavirus 2; ACE – Angiotensin converting enzyme; HIV-1: Human Influenza Virus – 1; gp120: Envelope Glycoprotein 120; CD4: Cluster of Differentiation; HCoVNL63: Human coronavirus NL63; RNA: Ribonucleic acid; MHV A59: Mouse Hepatitis Virus –A59; CA<sup>2+</sup>: Calciumion; NLRP3: NLR Family Pyrin Domain Containing 3; AT1: Angiotensin 1; HCoV-NL63: Human Coronavirus – NL63.[13]

**Table 4. Activity of Plants secondary metabolites against SARS [14]**

Plants Secondary Metabolites	Family	Type	Activity	Anti-Viral Activity
Sanguinarine, chelerythrine, chelidonine	Papaveraceae	Isoquinoline alkaloids	Very strong DNA intercalator	HSV, HIV, HIV, influenza
Berberine, berbamine, berberrubine, coptisine, dicentrine, jatrorrhizine, palmatine	Berberidaceae, Papaveraceae	Isoquinoline alkaloids	Strong DNA intercalator	SARS-CoV, HSV, CHIKV, hepatitis C
Tetrandrine, fangcholine, cepharanthine	Menispermaceae	Isoquinoline alkaloids	DNA intercalator	SARS-CoV
Quinine, quinidine, cinchonine, cinchonidine	Rubiaceae	Quinoline alkaloids	DNA intercalation, inhibition of DNA polymerase	HSV, influenza, DENV
Emetine	Rubiaceae	Quinoline alkaloids	DNA intercalation, inhibition of DNA polymerase,	HIV, HSV, Inhibits pseudorabies

			Topoisomerase, Reverse transcriptase, protein synthesis	Semliki Forest
Dictamine, ellipticine, evolitrine, fagarine, skimmianine	Rutaceae	Quinoline alkaloids	DNA intercalation	
Cryptolepine	Apocynaceae	Quinoline alkaloids	DNA intercalation	Antimicrobial
Harmine, harmaline	Zygophyllaceae	$\beta$ -Carboline alkaloids	DNA intercalation, inhibition of DNA polymerase, Topoisomerase, Reverse transcriptase	HSV, MCMV, influenza

### MOLECULAR PHARMING: TOWARDS PLANT BASED MOSTLY VACCINES AND ACTIVE METABOLITES

Secondary metabolites have important biological and ecological functions in plants; notably advantageous is their role in defence attributable to their antioxidative and antimicrobial activities. Thus, molecular farming is employed for the large-scale production of valuable secondary metabolites. The synthesis of fascinating recombinant proteins (pharmaceuticals and industrial proteins) victimization whole plants or in vitro civilized plant tissues/cells in large-scale bioreactors is termed molecular farming. the benefits of plant-based reactors are delineated during a review of molecular farming by as follows: (i) lower value in maintenance; (ii) lower risks of contamination from animal pathogens; (iii) competency to implement modifications in eukaryotic post-translational machinery function; and (iv) being amenable to the large-scale producing method. Vaccines generated in plants are shown to elicit a sturdy immune reaction in humans and animals. Plants have an excellent ability to act as a bioreactor system that supports several necessary biological processes together with virus-like particles (VLPs) and vaccines. Transformation of plants with foreign genes ends up in supermolecule medicine, vaccines, and antibodies against totally different human pathogens thence plants build it simple to modify safe, cheap, and supply untroubled storage of supermolecule vaccines and medicines several analysis studies and clinical trials have shown that plant-made vaccines area unit safe and efficacious. Examples of plant-made vaccines and medicine made by molecular pharming embody vaccines to combat infectious disease, dengue virus and viral hepatitis virus, organism antibodies to HIV and filovirus, and a therapeutic agent to produce glucocerebrosidase and facilitate Gaucher illness patients. many plant pharming corporations and analysis labs have haunted the challenge to combat COVID-19. At an equivalent time, there's a dramatic shortage of COVID-19 tests that would be mitigated by manufacturing diagnostic agents in plants. a number of samples of vaccines, medical specialty for take a look at kits and antiviral medicine are bestowed within the following section. The COVID-19 pandemic may be a challenge for U.S. all. As a result of the present COVID19 pandemic, therapies like Remdesivir, convalescent plasma (CP), and bush leaf extracts are the most effective on the market against COVID-19, till we've vaccinium candidates in hand that have with success undergone laboratory experiments, animal trials, and every one phases (1–3) of clinical trials. here is got to explore plant-based systems to ascertain whether or not VLPs with maintained structure and in sufficient amount will be generated in these systems [123]. On the one hand, this may embody the more refinement of seasoning extracts, notably ones that had been employed in the past to with success inhibit SARS-COV, as they will additionally perform to dam SARS- CoV-2. the utilization of attenuated viruses and microorganism vectors in humans as vaccines might cause sure health risks involving the likelihood of mutation (in the case of attenuated viruses) and recombination (in the case of microorganism vectors). the event of organism antibodies against SARS-COV-2 can also not be a semipermanent resolution because of potential adverse reactions. Thus, VLPs of SARS-CoV-2 generated by a plant expression system might act as a viable vaccinium for the longer term.[15]

### FUTURE PROSPECTS OF MEDICINAL PLANTS

The medicative and antiviral effects of plants area unit thanks to doable by secondary matter production of the plants. During this thought there are augmented waves of interest within the field of analysis in natural product chemistry. the rationale of interest is thanks to numerous factors, together with therapeutic wants, the noticeable diversity of each chemical structure and biological activities of present secondary plants metabolites (SPM), the utility of recent bioactive natural compounds as organic chemistry fathom, the event of recent and sensitive techniques to notice biologically active natural product, improved techniques to isolate, purify, and structurally characterize these active constituents, and advances in determination the demand for



provider of secondary metabolites and sophisticated natural product. The importance of ancient drugs has conjointly admittible by World Health Organization (WHO) and has created ways, pointers and standards for botanic medicines and it's used against numerous diseases. For the cultivation, assortment and process of medicative plants and therefore the manufacture of flavourer medicines agro-industrial technologies ought to be applied. Medicative plants and its extract area unit resources of recent medicine and lots of the fashionable medicines area unit made indirectly from plants. It is critical to continue the event of efficacious antiviral chemotherapeutics that area unit cost-efficient and with borderline aspect effects and which may even be employed in combination with alternative medicine to enhance the medical aid of coronavirus-infected subjects. As protecting vaccines and active antiviral medicine aren't out there for the treatment of many viruses, eliminating these microorganism infections looks onerous and problematic. However, natural product function an incredible supply of diversity for developing innovative antivirals, with new structure-activity relationships, and potent medical and therapeutic approaches against microorganism infections. A main drawback close antiviral medicine targeting specific microorganism proteins or genes is that the capability of a deadly disease to speedily change throughout replication, as discovered for HIV and HSV, oseltamivir- resistant respiratory illness viruses, and acyclovir- and nucleoside/nucleotide analogue-resistant hepatitis B viruses. There are a unit many aspects that ought to be taken under consideration once assessing the antiviral activity of preparations of medicative herbs, like the extraction techniques used, since the very best level of antiviral activity is earned with dimethyl ketone extracts or alcohol fractions. it's thus acceptable, at the offset of a prospective study on aromatic flavourer medicines, to spot the proper methodology for the preparation of the extracts, the components of the plants to be used, the acceptable season(s) for the gathering of the materials, and therefore the details of the applying modality. though most analysis studies during this space area unit in their initial stages, extra analysis on the identification of active substances, the outline of underlying mechanisms, also because the analysis of potency and probable in vivo applications area unit counselled so as to help the pioneering of potent antiviral chemotherapeutics. we have a tendency to trust that flavourer medicative plants used as natural remedies, like aromatic herbs, volatile oils derived from medicative plants, and pure oil compounds, can still play a vital role and participate within the development and upgrade of anti-coronavirus medicine.

## CONCLUSION

COVID-19 could be a pandemic in Republic of India and cuses sizable number of deaths. COVID- nineteen going pandemic in Republic of India as well as whole world thanks to the absence of any correct treatment. this can be additionally a chance for demonstrating the antiviral activity of healthful plants extract and their secondary metabolites and additionally used numerous nutraceuticals and as potential treatments for COVID nineteen. the continued infectious agent pandemic could be a good example of however globalisation and travel accessibility round the world will result in the fast unfold of communicable diseases.so its should to be develop, cost-efficient medicine to regulate the current pandemic COVID-19 nineteen furthermore as for future occurrences. In our review, we have mentioned regarding the present state of affairs of natural seasoning extract furthermore as healthful plants extract and its secondary metabolites analysis to spot the potential anti-coronaviral compounds, nowadays in Republic of India peoples used seasoning extract to extend immunity and healthful plants extract even have potential against COVID-19. the potential of varied seasoning extract and nutraceuticals' as potential treatments for COVID nineteen. plant extracts showed robust inhibitor capability and therefore the extracts will be thought-about a decent supply of natural antioxidants and antimicrobials. Thus, a number of the antiviral medication will solely have potential to inhibit or forestall virus replication and additional infection. Some natural merchandise to dam the virulence of severe acute respiratory syndrome COVID-19 through their restrictive action against infectious agent proteins as well as 3CLpro, PLpro, S, and ACE2, additionally to the restrictive impact against infectious agent replication or virulence. The natural merchandise and healthful plants provide preventive and therapeutic choices against infectious agent infections. These natural plant extract used as drugs to fight against viruses, virtue of their natural origin, safety, and low price compared to artificial medication. Thus, healthful plants extract and merchandise possessory lien an excellent promise for drug development against COVID-19-nineteen and need bigger attention to the agents that have already been shown to parade potent effectuality and activity against numerous strains of COVID-19.

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