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AYURVEDA FOR VIRUS: A REVIEW

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ABSTRACT

There are several microorganisms in nature, which are one of the important components of the trophic structure of the ecosystem. They act not only as decomposers but also act as causatives of several deadly diseases. Virus are among one of the major factors for causing several untreatable ailments. They rapidly undergo amplification and get converted into various strains which are difficult to diagnose for the cure. Although researchers are continuously doing their efforts to find out proper treatment for viral diseases, still lots of work needs to be done in this field. Ayurveda for a long period of time proved itself the best remedy for several deadly diseases including virus. Present paper is an effort to review the role of Ayurveda in treating some specific viral diseases.

Keywords: Virus, disease, treatment, Ayurveda

1. INTRODUCTION

Any abnormal condition originating at physical, mental and social level is called a disease. It is generally associated with specific signs and symptoms. A disease may be caused by some external factors such as pathogens e.g., bacteria, virus, protozoa etc. or by internal dysfunctions. Among pathogens viruses are the smallest of all the microbes and are regarded as obligate intracellular parasites classified as "connecting link between living and nonliving. Virus are made up of DNA or RNA and protein capsid. As they don't have their protein synthetic machinery, the virus interrupts the host's protein synthetic machinery and replicates. As a result of this repeated replication cycle increased population of virus causes severe infection which may lead to hospitalisation and may death.

In this paper we are focusing on both DNA and RNA virus. All these viruses are responsible for pandemic diseases. And still we all are suffering from pandemic COVID-19 caused by coronavirus (SARS – CoV-2). The main difficulty to treat any viral disease is that a drug that targets any part of viral replication inside the host cell, could also harm the patient's cells and may cause severe adverse effects on their body. Till now drugs are not properly available for several viral diseases and vaccines are also yet to come against several viral ailments.

There are many systems of medicine to treat the diseases such as Allopathy, Ayurveda, Unani, Homeopathy, Naturopathy, etc. The Ayurvedic system of medicine is one of the world's oldest healing systems, which originated in India more than 3000 years ago. Ayurveda is boon for humanity, which is found to be responsible for curing several ailments since long period of time. The objective of this paper is to review the role of ayurvedic medicines and herbs in the treatment of several diseases caused by virus. It is high time to prove ayurvedic concept of treatment on modern parameters because these medicines naturally boost immunity against any infection without causing any harm to host cells.

2. AYURVEDA IN VIRAL AILMENTS

Studies revealed that Ayurveda has been continuously involved in welfare of mankind. It is also proved to be successful in treating several viral disorders. Some of the peculiar observations revealing use of Ayurveda in viral diseases are as under-

2.1. SARS

Severe acute respiratory syndrome is caused by SARS associated coronavirus; it was first reported in China (2003). Approx. 3% people were found to be affected by this in whole world. In the present time, several viral diseases have been spread out in our surroundings, which are not only chronic but hard to manage also as there is still no proper medication for viral ailments. Although several systems of treatment are continuously trying to evaluate anti viral drugs but still it is very challenging to find accurate drug. In this context in the present scenario Ayurvedic formulations are found to be quite beneficial and effective against viral effect.

2.1.1. SARS-CoV-1

The leaf extract of *Toona sinensis* Roem have been proved a SARS-CoV-1 Inhibitor due to presence of some bioactive components like gallic acid, methyl gallate, quercetin, (+)-catechin, (−)-epicatechin etc. **[1]**. A compound Emodine isolated from root tubers of Rheum officinale inhibit the S protein and ACE2 interaction, it can be considered a therapeutic agent **[2]**.

A medicinal plant *Cullen corylifolium* was evaluated for its antiviral properties against SARS-CoV. Extraction of its seeds was processed for chemical isolation and some flavonoids like, isobavachalcone, Bavachinin, psoralidin, neobavaisoflavone, 40 –O-methylbavachalcone, and corylifol A were isolated. They exhibited inhibitory activity against SARS-CoV as dose dependent manner **[3]**. Another study carried out by Chih-Chun et al for antiviral activity with 200 plants where the rhizome of *Gentiana scabra*, seed of *Cassia tora*, tuber of *Dioscorea batatas*, stem and leaf of *Taxillus chinensis* and rhizome of *Cibotium barometz* found effective with inhibition of 50% viral replication **[4]**.

2.1.2. SARS CoV2

Diseases caused by SARS CoV2, named coronavirus 2019 (COVID-19) by WHO. After the report of COVID-19 first case in Wuhan city of China, it spread rapidly throughout the world due to its highly contagious property. Medicines that are presently used to treat that diseases are symptom based, but there is not a single drug available to cure this disease. Thousands of researchers are working to solve that problem and try to evaluate an effective drug which can be available easily and does not have any adverse effect. Traditional medicines, that are used for treatment of several diseases may prove a best alternative against COVID-19, because these are natural products or its formulations, without any side effect.

With the help of sequential matching process, it has been proved that SARS-CoV-1 and SARS-CoV-2 have 96% similarity **[5]**. *Lycoris radiata* was tested for antiviral property against SARS CoV. Its alkaloid named Lycorine gave the best result and inhibited the replication of the virus and can be used against SARS-CoV-2 **[6]**. Studies revealed that *Aloe vera* has potent antimalarial activity for different viral diseases like SARS CoV, HIV-1, HSV-1, poliovirus etc, it may act against COVID-19 **[7]**. Gentile *et al* proposed that the compounds, 8,8′-Bieckol, 6,6′-Bieckol, Dieckol) and 1,3,5-Trihydroxybenzene isolated from the brown algae *Ecklonia cava* and *Sergassum spinuligerum*, respectively, inhibit major protease of SARS-CoV-2 actively **[8]**.

2.2. MERS

A natural product Resveratrol found in fruits and vegetables, it is a polyphenol nonflavonoid compound and has divers' therapeutic activities, like antioxidant, antitumor, anti-inflammatory. It was found as a potent antiviral activity for MERS virus in in vitro assessment. This activity is due to reduction of nucleocapsid N expression in MERS virus **[9]**.

2.3. Hepatitis C

Hepatitis C: More than 325 million people in the world are found to be affected by

hepatitis infection and approx. 6-12 million people in India are found to be infected with hepatitis C.

Hepatitis also now becomes a common liver disorder, caused by Hepatitis C Virus (HCV). It is basically a blood born disease which may lead to cirrhosis or liver cancer particularly hepatocellular carcinoma and lymphomas. HCV exists as virus quasispecies with several variants so it is quite difficult to study it and therefore there is no still effective treatment and vaccination for hepatis C.

It has been found out that use of Tridham is effective for the treatment of hepatocellular carcinoma, which constitutes the seed coat of *Terminalia chebula*, fruit of *Elaeocarpus ganitrus* and leaves of *Prosopis cineraria.* This composition led to programmed cell death of cancerous cells **[10]**.

It had been also reported that green tea constituted specific herbal derivatives like catechin, gallocatechin, epigallocatechin, epicatechingellate etc. which were found to be useful for preventing hepatitis C virus entry in the body **[11]**.

2.4. Swine flu (H1N1)

Swine flu is a viral disease caused by H1N1 virus. This virus is very contiguous and leads many complications in human like, respiratory tract infection, bronchitis and pneumonia. According to WHO, 12,787 cases and 413 deaths were recorded on oct 2009. Many clinical experiments are conducted, with herbal products or its formulations to treat the H1N1 virus. A study reported that Andrographolide which is diterpenoid found in Andrographis paniculate have antiviral activity and inhibit neuraminidase activity of H1N1. Andrographolide has bioactive components such as diterpenoids, flavonoids and polyphenols which may prove an alternate treatment for Swine flu infection **[12]**.

Some plants collected from Tamil Nadu against H1N1 virus, thestem bark extract of *Cayratia pedate* (20.5 lg/mL) and *Strychnos minor* (22.4 lg/mL) showed high antiviral activity **[13]**. Another study revealed that stem and root extract of *Salacia reticulata* gave promising results with decrease in coughing and pulmonary inflammation in mice caused due to H1N1 infection. These extracts increase the activity of NK cells in the pulmonary and splenocyte cells **[14]**.

2.5. Herpes Simplex Virus Type-1 (Anti-HSV-1)

Herpes Simplex Virus Type-1 causes serious infection in humans, transmitted through direct contact of body fluid. An Indian medicinal plant named *Swertia chirata* evaluated for antiviral activity in vitro against HSV-1. Its crude extract inhibited the plaque formation more than 70% level and helped to prevent multiplication of virus **[15]**. Aqueous extract of bark of *Azardirachta indica* plant

showed potent antiviral activity against HSV-1. It blocks the entry of virus in host cells at concentration of rang 50 to 100 µg/ml. It also inhibits the cell-to-cell fusion mediated by glycoprotein in HSV-1 **[16]**.

Karimi et al evaluated different fractions of *Quercus brantii* against HSV-1 on hamster kidney cells. The results indicated that the chloroform fraction of *Q. brantii* gives the highest inhibitory effect and blocked the replication of HSV-1 **[17]**. Two other plants, *Euphorbia coopire* and *Morus alba*, showed antiviral activity for HSV-1. Some flavonoid compounds isolated from these two plants namely; 7-galloyl catechin, kaempferol 3-O-β-(6″-O-galloyl)-glucopyranoside, curcumin, gallic acid, quercetin 3-O-β-(6″-O-galloyl)-glucopyranoside, quercetin and kaempferol were significantly inhibit HSV-1 **[18]**.

3. CONCLUSION

Man is adversely affected by viral diseases. Due to lack of proper treatment and vaccination, eradication of these diseases is very difficult. However natural products have been proved an excellent source for discovery of novel viral treatment. A lot of herbal products or compounds are observed who have promising antiviral activity which can be used for further development of effective drug to treat deadly viral diseases. Enormous work has been done but still lots of studies and research needs to be done in this area to explore several bioactive compounds and their mechanism of action against virus. Some additional studies are also required like combination therapies with different natural ingredients or with standard drugs which can help to cure from drug resistant viral diseases. Present review is an effort to sum up some peculiar ayurvedic formulations which were effectively used against viral ailments as natural products are full of bioactive compounds and play an important role in development of antiviral drugs.

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