Ayurveda: Combating Viral Diseases since Ages

Preeti Awasthi, Siva G Mavuduru, Manik Ghosh*
Birla Institute of Technology, Mesra, Ranchi - 835 215

Abstract
Ayurveda is one of the oldest systems of medicine originated in India and written in Sanskrit language. Plants from Ayurveda showed significant activity against various viral symptoms, though virus and viral diseases were not known at that time. Hence in this article we made an attempt to prove Ayurveda had once combated and still combating against symptoms of viral infections and hence viruses. In modern literatures the antiviral activities of plants (already present in Ayurveda) like Dracaena cinnabari, Cicer arietinum, Achyranthes aspera, Melia azedarach, Piper longum, Acacia nilotica, Ocimum sanctum, Euphorbia hirta, Alpinia galanga, Cardiospernum halicacabum and Carica papaya were reported. In the present review a comparison was made of the symptoms of viral diseases with therapeutic uses (by translating from Sanskrit to English) of the above plants reported in Ayurvedic Pharmacopoeia of India. There is good co-relation between the symptoms of viral infections and therapeutic uses of Ayurvedic plants, which proves Ayurveda once combated well against symptoms of viral infections and hence viruses. We have made an attempt to show Ayurvedic drugs were successful in combating various viral infections.

Key words: Ayurveda, Viruses, Ayurvedic Pharmacopoeia of India, Symptoms.

Introduction
The term Ayurveda is derived from two words, ‘Ayur’ means ‘healthy life’ and ‘veda’ means science.¹ Charaka-Samhita, which is considered to be the oldest book in Ayurveda, along with Sushruta-Samhita and Samhitas of Vagbhataand are considered as Brihat-trayee.²,³ Ayurveda is divided into eight branches which include internal medicine, treatment of head and neck disease, surgery, pediatrics, toxicology, purification of genetic organs, health and longevity and psychiatry.⁴

In Ayurveda, Prakruthi is the body’s constitution and according to it, the universe and its subjects are made up of five elements namely earth, air, water, fire and ether. Ayurveda says these five elements with their unique combination make three doshas namely vata, pitta, kapha. Air and ethereal elements are associated with vata, fire and water with pitta, water and earth with kapha. Based on imbalance of these doshas the person may develop diseases. When these are in appropriate levels then it is called healthy condition, and if there is any difference in the balance it leads to vikruthi, which is ill health. This may leads to vata dosha, pita dosha and/or kapha dosha.⁵,⁶

Viruses are obligate intracellular parasites, having no internal cellular structure and metabolism. Inside the living organisms they behave as living cells by undergoing replication but
outside they remain as inert chemical structures. Various Ayurvedic plants are used for treating symptoms caused by different viral infections. By comparing the therapeutic uses of Ayurvedic plants with symptoms of viral infections, we made an attempt to prove Ayurveda, in the past itself, was successful in combating viral infections.

**Plants that can be used as antivirals**

Herpes Simplex Virus (HSV) infection is characterized by ulcers, blisters, fever, genital lesions causing burning sensation and enlargement of lymph nodes in the neck. The activity of *Dracaena cinnabari* against HSV was reported by Mothana RA *et al.* They reported methnaolic extract of *Dracaena cinnabari* have activity against HSV. The same plant is referred as *Lohitaniryaśa* in Ayurveda, reported for symptoms like *Vrana* (ulcer) *Raktārśa* (bleeding piles), *Raktapitta* (bleeding disorder), *Rakta-Pradara* (menorrhagia), *Raktasrāva* (bleeding disorder). *Cicer arietinum* had been reported for HSV by Asuman Kan *et al.* who reported that methanolic extract of seeds obtained from *Cicer arietinum* was having activity against HSV. This plant is named as *Cānaka* in Ayurveda has been used for similar symptoms of HSV infection like *Annadravaśūla* (gastric ulcer), *Jwara* (fever) and *Dāha* (burning sensation). Hemantha Mukherjee *et al.* established the antiviral activity of *Achyranthes aspera* against HSV. The methanolic extract (ME) and oleanolic acid (OA) showed significant antiviral activity against HSV. The activity was assessed by Minimum Inhibitory Test (MIT) and Plague Reduction Assay where positive control was Acyclovir and negative control was DMSO (Dimethyl sulfoxide). ME and OA inhibit both HSV-1 and HSV-2 with an EC₅₀ of 64.4 µg/ml and 6.8 µg/ml for HSV-1F and 72.8 and 7.8 µg/ml for HSV-2G. In Ayurveda, *Achyranthes aspera* which is referred as *Apāmārga*, reported for *Sula* (pain), *Udara roga* (diseases of abdomen), *Apaci* (cervical adenitis) the same symptoms of HSV infection. So, the above mentioned plants of Ayurvedic origin have anti HSV activities.

Kuniaki applied a patent on an agent obtained from the water or organic solvent extract of *Melia azedarach* containing anti-influenza activity. Symptoms include fever, running nose and breathing problem. The same plant called as *Mahanimba* is used in Ayurveda for treating *Jwara* (fever) and Śvāsa (respiratory distress and breathing difficulty). By this it can be estimated *Melia azedarach* once used for treating influenza infections.

*Piper longum* had been reported to have activity against Hepatitis B Virus (HBV) infection. The common symptoms of HBV include appetite loss, fatigue, low fever, muscle and joint aches, nausea and vomiting. *P. longum* known as *Pippalīmūla* in Ayurveda is reported to have activity against similar symptoms like *Udararoga* (diseases of abdomen) *Gulma* (abdominal lump) *Krmiroga* (worm infestation). Its activity against HBV had been proved by Zhi-Yong Jiang *et al.* They found that piperine is able to inhibit HBV and inhibited the secretion of Hepatitis B surface antigen and HBV E antigen. The ethanolic extract was obtained, from where different compounds were isolated among which erythro-1-[1-oxo-9(3,4-methylenedioxyphenyl)-8,9-dihydroxy-2E-nonenyl]-piperidine, threo-1-
[1-oxo-9 (3,4-methylenedioxyphenyl) 8,9-dihydroxy-2E-nonenyl]-piperidine, piperine, guineesine found to have anti HBV activity.\textsuperscript{21}

Human Immunodeficiency Virus (HIV) clinical manifestations include diarrhea, red rash that does not itch, fever and flu like infections.\textsuperscript{22} The aqueous extract from pods of \textit{Acacia nilotica} had been reported by Khan \textit{et al.}, having activity against HIV by inhibiting reverse transcriptase enzyme.\textsuperscript{23} The same plant called as \textit{Babbiula} has been used in Ayurveda for \textit{Kustha} (Leprosy / diseases of skin), \textit{Atisara} (Diarrhea), \textit{Kāsa} (Cough) and \textit{Krmiroga} (worm infestation), symptoms of HIV infection.\textsuperscript{24} \textit{Ocimum sanctum} activity against HIV was reported by Anuya A Rege \textit{et al.} who stated aqueous extract of \textit{Ocimum sanctum} can inhibit reverse transcriptase enzyme of HIV.\textsuperscript{25} Even in Ayurveda this plant called \textit{Tulasi} has been reported for \textit{Krmiroga} (worm infestation), \textit{Kustha} (Leprosy / diseases of skin), \textit{Kāsa} (cough), \textit{Śvāsa} (Asthma) and \textit{Pratiśyāya} (coryza), similar to symptoms mentioned above.\textsuperscript{26} \textit{Euphorbia hirta} has been reported its activity against HIV1 and HIV2. The plant which is referred as \textit{Dugdhik} in Ayurveda referred for treatment of symptoms like \textit{Krmiroga} (worm infestation), \textit{Kāsa} (cough), \textit{Kustha} (Leprosy/diseases of skin), \textit{Mutrakrichhra} (dysuria), \textit{Puyameha} (urinary infection), \textit{Sula} (pain / colic), \textit{Tamakasvasa} (bronchial asthma) in Ayurveda which proves this had been used for symptoms of HIV.\textsuperscript{27} \textit{Euphorbia hirta} anti-HIV activity was reported by Gyuris Agnes \textit{et al.} They found 50% methanolic extract of \textit{Euphorbia hirta} aerial parts had activity on MT4 human T lymphocyte cell line. The aqueous extract was having dose dependent reverse transcriptase inhibition activity on HIV 1 and HIV 2.\textsuperscript{28}

\textit{Alpinia galanga} is a plant whose activity was reported against HIV which has flu like symptoms, swollen lymph glands and ulcers in the mouth. \textit{A. galanga} in Ayurveda referred as \textit{Kulanjana} has reported activity in Ayurveda against similar symptoms like \textit{Pratisyaya} (coryza) \textit{Svasa} (Asthma) \textit{Hikka} (hiccups) \textit{Sopha} (oedema) \textit{Udara roga} (diseases of abdomen).\textsuperscript{29} The anti-HIV activity was reported by Ying Ye and Baoan Li. The methanolic extract was found to contain 1′S-1′-Acetoxychavicol acetate which found to inhibit reverse transport, an essential factor for HIV replication.\textsuperscript{30} In Ayurveda, \textit{Cardiospermum halicacabum} referred as \textit{Karnasphota} has reported activity against \textit{Jwara} (fever) \textit{Sopha} (oedema) \textit{Pandu} (anemia) \textit{Sula} (pain).\textsuperscript{31} The similar symptoms are also present for HIV infection like fever, swollen lymph glands which states \textit{Cardiospermum halicacabum} has activity against HIV symptoms. Kasi Murugan \textit{et al.} has reported methanolic extract and petroleum ether extract are able to inhibit reverse transcriptase of HIV.\textsuperscript{32} This gives a proof that above mentioned plants are successful in treating the various symptoms of HIV infection in the past itself.

\textit{Carica papaya} had reported to contain activity against dengue which is mainly characterized by Dengue Hemorrhagic fever.\textsuperscript{33} In Ayurveda \textit{Carica papaya} is called \textit{Erandkarkati} has been reported for activity against \textit{Krmiroga} (worm infestation), \textit{Kāsa} (cough), \textit{Raktavikara} (disorders of blood).\textsuperscript{34} This gives a justification that \textit{Carica papaya} can be used for symptoms of Dengue. Similar results were found by Nisar Ahmad \textit{et al.} There was a disturbance in blood cell levels and reduction of platelet count from 176 x 10\textsuperscript{3}/µL to 55 x 10\textsuperscript{3}/µL, white blood cells from 8.10 x 10\textsuperscript{3} /µL to 3.7 x
10^3/µL, and neutrophils count from 84.0% to 46.0%. After administrating the aqueous extract from leaves of *Carica papaya* the values raised from 55 x 10^3/µL to 168 x 10^3/µL, WBC from 3.7 x 10^3/µL to 7.7 x 10^3/µL and neutrophils count from 46% to 78.3%, which is showing *Carica papaya* has effect on Dengue Haemorrhagic fever.35

Conclusion

Viral diseases are always a threat for human health and there is a need of development of efficient antiviral drugs. Ayurvedic plants have proved to be valuable sources as antiviral agents in treatment of many viral diseases such as Dengue, Human Influenza Virus, Influenza virus, Herpes Simplex Virus, Hepatitis viruses etc. By comparing the modern literature, symptoms of various diseases with Ayurvedic uses in Sanskrit, we can say Ayurveda, from olden times and still used for treating various viral diseases and the problem is conversion of Sanskrit into modern languages.

References


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