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REVIEW ON HERBAL MEDICINAL APPROACH TOWARDS HIV/AIDS

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ABSTRACT

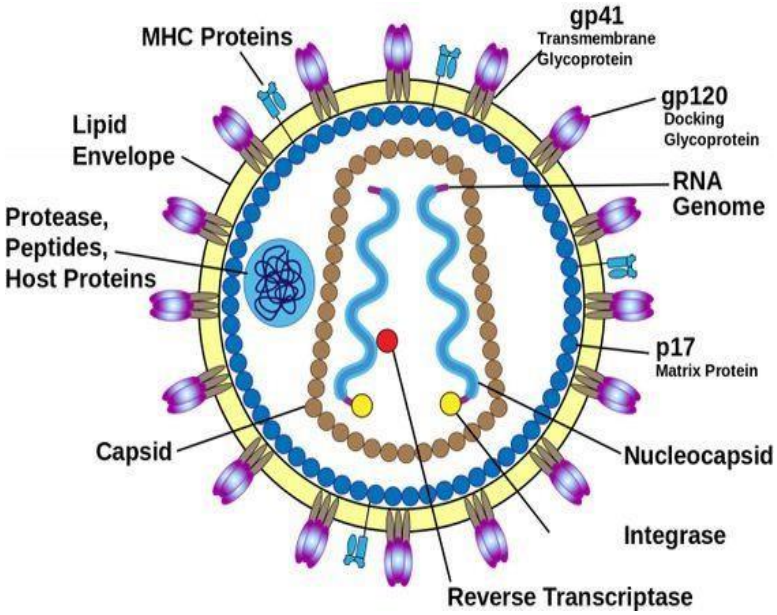
Acquired Immunodeficiency Syndrome (AIDS) is a clinical syndrome that is the result of infection with Human immuno deficiency virus (HIV), which causes profound immunosuppression. Current therapies available for symptomatic treatment of AIDS are quite expensive. Herbal medicines can be developed as a safe effective and economical alternate. Herbal medicine provides rational means for the treatment of AIDS. The herbal drugs which are used for treatment of AIDS are Kalmegh, Betel nut, Ipecac, Turmeric, Clove, Liquorices, Cotton seed, Sarpgandha, Ashoka, Arjuna etc. Many compound of plant origin that inhibits HIV during various stage of cycle, these include several alkaloids carbohydrates, coumarine, flavonoids, lignin, phenolics, proteins, quinines, xanthenes, phospholipids and tannins. These candidates have the potential to come up as drug for treatment for HIV infection. so the aim of this review article is to identify plants and their active principles possessing activity against Human immunodeficiency virus with objective of providing an effective approach for prevention of transmission and treatment of these diseases.

KEYWORDS: HIV, AIDS, immunosuppression, syndrome.

• INTRODUCTION

Human immunodeficiency virus infection / acquired immunodeficiency syndrome (HIV-AIDS) is a viral infection that effects the human immune system. The HIV virus comprises of two types, HIV-1 and HIV2, and is a retrovirus that infects and destroys T-cells, macrophages and dendritic cells. HIV-2 is predominant in West Africa, whereas the more virulent HIV-1 is the cause of the majority of infections globally. Symptomatically, within

two weeks of initial infection, infected individuals may experience an influenza-like illness, with associated swelling of lymph nodes and skin rash, which then subsides with no further symptoms.1 As the disease progresses the individual's immune system becomes suppressed via the reduction of cluster differentiation 4 protein (CD4), which is a glycoprotein found on the surface of immune cells, such as T-helper cells (herein abbreviated CD4 cells), which has an important role in the adaptive immune system. Clinically, HIV infected patients display CD4 cell countstissues such as the eyes and tear ducts. At present there is no HIV vaccine available, with anti-retroviral treatment only slowing the progression of the disease. Immune system support appears to be another therapeutic opportunity, with certain herbal medicines appearing useful in the management of the immune system and thus HIV management. According to the World Health Organization (WHO), traditional medicines, which include herbal medicines, acupuncture, manual therapies, spiritual therapies, exercise, etc., are the most commonly used form of medicines/treatments in many parts of the world.2 The use of traditional medicine is especially common in developing countries (i.e. Africa, Asia and Latin/South America). In developing countries, an estimated 60 to 90% of the population use traditional medicines which mainly serve their primary healthcare needs. On the other hand, in developed countries (i.e. Australia, Europe and North America) traditional medicine is commonly used in parallel with allopathic medicine (i.e. highly active antiretroviral therapy (HAART)).2 The use of complementary and 'alternative medicines' is widespread in chronic conditions, including HIV-AIDS infection. Even though herbal medicine is one of the most commonly used traditional medicines, statistics on the utilisation of herbal medicine in the treatment and management of HIV among the Australian population are largely unavailable. According to a US study, 26% of HIV-infected people use herbal medicine as part of their treatment.3 A European study showed that herbal medicines are used by approximately 25% of HIV infected people.4 The primary reason for the use of traditional medicines in the treatment of HIV, especially in developing countries, is the high cost and/or the unavailability of HAART.5 Herbal medicines are more likely to be used in HIV-AIDS treatment in western countries as an adjunct therapy to support the immune system, reduce the side-effects of medication (for example nausea and depression), reduce viral replication6 and improve general wellbeing (i.e. act as an adaptogen). Herbal medicines may function in different ways in HIV infection and associated conditions.



- **Types of HIV**

Two major types of HIV have been identified

- HIV 1: It is the cause of the worldwide epidemic and is most commonly referred to as HIV. It is a highly variable virus, which mutate readily. There are many different strains of HIV-1, which can be classified according to groups and subtypes; M and O. Within group M, there are currently known to be at least ten genetically distinct subtypes which are A to J.
- HIV 2: In addition, Group O contains another distinct group of heterogeneous viruses. HIV-2 is less pathogenic and occurs rarely; it is found mostly in West Africa.

- **HIV Infection Mechanism**

HIV begins its infection by binding to the CD4 receptor on the host cell. CD4 is present on the surface of many lymphocytes, which are a critical part of the body's immune system. It is now known that a co-receptor is needed for HIV to enter the cell. Following fusion of the virus with the host cell, HIV enters the cell. The genetic material of the virus, which is RNA, is released and undergoes reverse transcriptase is necessary to catalyze this conversion of viral RNA into DNA. Once the genetic material of HIV has been changed into DNA, this viral DNA enters the host cell nucleus where it can be integrated into the genetic material of the cell. The enzyme integrase catalyses this process. Once the viral DNA is integrated into the genetic material of the host, it is possible that HIV may persist in a latent state for many years. This ability of HIV to persist in certain latently infected cells is the major barrier to eradication or cure of HIV.

- **Mode of Transmission Infected Blood**

HIV spread through contact with infected blood. HIV is transmitted through transfusions of contaminated blood orblood components.

- Contaminated Needles

HIV is frequently spreading among users by the sharing of needles or syringes contaminated with very small quantities of blood from someone infected with the virus.

- Mother to child

Women can transmit HIV to their babies during pregnancy or birth. HIV can also be spread to babies through the breast milk. If the mother takes certain drugs during pregnancy, she can significantly reduce the chances that her baby will get infected with HIV. Sexually Transmitted Infections If the person is infected with syphilis, genital herpes, chlamydia infection, gonorrhea, or bacterial vaginosis then he/she may be more susceptible to get HIV infection during sex with infected partners.

- **Stages of HIV Infection**

Basically, four different stages of HIV infection exist.

1. **Healthy carrier state**

A carrier is someone who is infected with a disease and shows no clinical symptoms, but who is capable of infecting other people with the disease. At this time, the only safe practice is to assume that anyone carrying the virus is capable of transmitting it to others.

2. **Lymphadenopathy Syndrome (LAS)**

Lymphadenopathy means "disease of the lymphatic system." One of the key signs of lymphadenopathy is swollen lymph glands. Of course, any infection, such as flu, causes the lymph nodes to swell; but nodal swelling due to normal infections passes quickly. With HIV infection, this nodal swelling may persist for months, with no other signs of a temporary infectious disease.

Consequently, lymphadenopathy is sometimes called Persistent Generalized Lymphadenopathy (PGL).

3. **AIDS-Related complex (ARC)**

It is a more advanced level of HIV infection. Symptoms generally include the symptoms of

lymphadenopathy, abnormal body conditions revealed by laboratory tests, and/or the presence of one or more opportunistic infections. A person with ARC has a discomforting illness. His or her everyday activity may be restricted and he or she is probably manifesting bouts of illness that require short-term or long-term medical treatment in and out of the hospital.

4. Acquired Immune Deficiency Syndrome (AIDS)

AIDS is the "full-blown" syndrome, also called "frank" AIDS. Patients suffering from AIDS often have many numbers of the opportunistic diseases. These diseases develop because of the widespread failure of the immune system. Drug treatments are available for many of these infections; but, without the support of the immune system, the drugs fail to cure the disease fully or are unable to keep the disease from returning. These opportunistic infections cause death of most AIDS patients.6

- **Symptoms of AIDS**

There are no clear defined symptom in HIV infected person in initial stage, however, have a flu-like illness within a month or two after exposure to the virus. This illness may include rash fever, headache, tiredness and enlarged lymph nodes (glands of the immune system easily felt in the neck and groin). More persistent or severe symptoms may not appear even for 10 years or more after HIV enters the body in adults, or within 2 years in children born with HIV infection. This period of "asymptomatic" infection varies greatly in each individual. Even during the asymptomatic period, the virus is actively multiplying, infecting, and killing cells of the immune system. Other symptoms often experienced from months to years before the onset of AIDS include

- Lack of energy
- Anorexia
- Fatigue
- Frequent fevers and sweats
- Persistent or frequent yeast infections (oral or vaginal)
- Persistent skin rashes or flaky skin
- Pelvic inflammatory disease in women that does not respond to treatment
- Short-term memory loss
- Weight loss

Table 1: Herbal remedies for Aids

S.No.	Family/Species	Active Constituents	Mechanism of Action
1.	Acanthaceae Andrographis paniculata	Aqueous extracts of leaves diterpene lactones (andrographolide)	Inhibition of HIV protease and reverse transcriptase. Inhibit HIV-infected cells from arresting in G2 phase in which viral replication is optimal. Inhibit cell-to-cell transmission, viral replication and syncytia formation in HIV-infected cells.
2.	Amaryllidaceae Galanthus nivalis Hippeastrum hybrids	Plant lectins: G. nivalis agglutinin(GNA),Hippeastrum hybrid agglutinin (HHA), and monocot mannose-binding lectins (MBLs)	Potent inhibitors that stop the spread of HIV among lymphocytes by targeting gp120 envelope glycoprotein; most prominent anti-HIV activity is found among MBLs; GNA has specificity for terminal -(1-3)-linked mannose residues; HHA recognizes both terminal and internal -(1- 3)- and -(1-6)-linked mannose residues.
3.	Anacardiaceae Rhus succedanea L.	Biflavonoids, robustaflavone and hinokiflavone	Strong inhibition of the polymerase of HIV-1 reverse transcriptase
4.	Ancistrocladaceae Ancistrocladus korupensis	Michellamines A and B	Anti-HIV -1 and anti-HIV-2 activities. Act at early stage of the HIV life cycle by inhibiting reverse transcriptase and at later stages by inhibiting cellular fusion and syncytium transformation.
5.	Apocyanaceae Rauwolfia	Papaverine	Inhibition of HIV reverse transcriptase and HIV cell growth

- **Herbal remedies for AIDS** Remedies derived from plants are common to many cultures and a number of advanced pharmaceutical drugs were derived from plants.

- There are herbs that can heal dangerous disease such as Cancer too. Sometimes it is said that where allopathic fails, herbal.

Table 2: Phytoconstituents responsible for Anti HIV activity

S. No.	Phytoconstituents	Source
1.	Alkaloids	
	Buchapine	Eodia roxburghiana
	Cepharanthine	Stephania cepharantha
	Nitidine	Toddalia asiatica
	Berberine	Berberise Aristata
	Brucine,Strychnine	Strynchos nuxvomica
2.	Coumarins	
	(+)-Calanolide A	Callophyllum lanigerum
	(–)-Calanolide B	C. lanigerum
	Coriandrin	Coriandrum sativum
3.	Flavonoids	
	Robustaflavone	R. succedanea
	Wikstrol B	Wikstroemia indica
	Xanthohumol	Humulus lupulus
4.	Phenolics	
	8-C-Ascorbyl (–)- epigallocatechin	Green and black tea
	Balanocarpol	Hopea malibato
	Caffeic acid tetramer salts	Arnebia eucbroma
5.	Quinones	
	Conocurvone	Conospermum incurvum
	Hypericin	Hypericum perforatum
6.	Saponins	

- remedies work. Herbal remedies are said to work to such an extent that they can even do away with the need for the surgery. In India the medicine of herbs came to be known as Ayurveda. This form of medicine has used herbs to cure all forms of diseases.

- **Literature Survey**

Acquired immunodeficiency syndrome (AIDS) is a clinical syndrome that is the result of infection with Human immuno deficiency virus (HIV), which causes profound

immunosuppression. Current therapies available for symptomatic treatment of AIDS are quite expensive. Herbal medicines can be developed as a safe effective and economical alternate. Herbal medicine provides rational means for the treatment of AIDS. The herbal drugs which are used for treatment of AIDS are Kalmegh, Betel nut, Ipecac, Turmeric, Clove, Liquorices, Cotton seed, Sarpgandha, Ashoka, Arjuna etc. Many compound of plant origin that inhibits HIV during various stage of cycle, these include several alkaloids carbohydrates, coumarine, flavonoids, lignin, phenolics, proteins, quinines, xanthenes, phospholipids and tannins. These candidates have the potential to come up as drug for treatment for HIV infection. So the aim of this review article is to identify plants and their active principles possessing activity against Human immunodeficiency virus with objective of providing an effective approach for prevention of transmission and treatment of these diseases.

- HIV is a retroviral disease of the immune system that leads to decreased immunity via reduced CD4+ T-helper cells (CD4 cells) and increased susceptibility to infections, and ultimately AIDS.

Currently it is an epidemic in parts of Asia such as southern Yunnan, China and regions of southern Africa. Herbal medicines are widely used by patients with HIV especially in developing countries due to the high cost of pharmaceuticals and also cultural factors. In these countries herbal medicines are often used for primary care and treatment of opportunistic infections, whereas in developed countries they are used along with conventional modern medicine as ‘complementary medicines’.

Herbal medicines are also commonly used in HIV-AIDS treatment, in line with growing evidence suggesting the utility of herbal medicines to be beneficial for immune support, anti-oxidant status and anti-retroviral activity. There are concerns about the safety of some herbs and about false claims of efficacy. We reviewed clinical trials of herbal medicines employed in the treatment of HIV- AIDS using clinical trials. Our review clearly suggests that herbal medicines are being used in the management of HIV-AIDS primarily for immune support to maintain immunological parameters.

However, further extensive clinical studies are required to establish the safety and efficacy of herbal remedies in the treatment of HIV-AIDS.

- **Need and objectives**

1. Need

HIV-infected people and AIDS patients often seek complementary therapies including herbal medicines due to reasons such as unsatisfactory effects, high cost, non-availability, or adverse effects of conventional medicines.

2. Objective

To assess beneficial effects and risks of herbal medicines in patients with HIV infection and AIDS. The objective of this review is to assess the beneficial and harmful effects of herbal medicines on patients with HIV infection or AIDS compared with no intervention, placebo, or antiretroviral drug. The outcomes of interest would be mortality and morbidity, adverse events, immunological and virological responses, quality of life, and health economics.

- **Types of interventions**

Herbal medicines defined as preparations derived from plants or parts of plants used for treatment of disease could be extracts from a single herb, or a compound of herbs. They were compared with no intervention, placebo, and antiretrovirals (monotherapy and combination therapies including HAART). Trials of herbal medicine plus antiretroviral drug(s) versus antiretroviral drug(s) alone were also included.

- **RESULT**

Eight different herbal medicines were tested.

- **CONCLUSION**

Acquired immunodeficiency syndrome, caused by humanimmunodeficiency virus is an immunosuppressive disease. Acquired immunodeficiency syndrome are gaining significant importance at present due to rapid spread of the diseases, high cost of treatment and the increase risk oftransmission of other STDs & AIDS. Current therapies available for symptomatic treatment of AIDS are quiteexpensive. Many patients of AIDS are seeking help from alternative system of medicines such as Unani, Chinese, Ayurvedic & homeopathy. Since a long time medicinalplant have been used for the treatment of AIDS, research is in progress to identify plants and their active principles possessing activity against sexually transmitted pathogensincluding human immunodeficiency virus with objective of providing an effective approach for prevention of transmission and treatment of this disease. Medicinal plants have a long history of use and their use is widespread in both developing and

developed countries. Herbal medicine provides rational means for the treatment of AIDS. Many compound of plant origin that inhibits HIV during various stage of cycle, include alkaloids, carbohydrates, coumarine, flavonoids, lignin, phenolics, proteins, quinines, xanthenes, phospholipids and tannins. Plant derived microbicide and plant bodies are some of new approach for prevention of HIV. So, herbal medicines can be developed as a safe effective and economical alternate for AIDS.

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