

## Chapter 2

# In Vitro Anti-HIV Activities of Medicinal Plants and Bioactive Compounds and Their Importance in Complementary Systems of Medicine: Role of Medicinal Plants in Complementary and Alternative Systems of Medicine

Ajeet Singh

 <https://orcid.org/0000-0002-4393-8889>

*Department of Botany and Microbiology, Gurukul Kangri University, Haridwar, India*

### ABSTRACT

*Acquired immunodeficiency syndrome (AIDS) patients face great socio-economic problems in obtaining treatment. There is an urgent need for new, ecofriendly, safe, and inexpensive anti-HIV agents. Traditional medicinal plants are a valuable source of novel anti-HIV agents and may offer alternatives to expensive medicines in future. Various medicinal plants or plant-derived natural products have shown strong anti-HIV activity and are under various stages of clinical development in different parts of the world. Areca catechu Linn., Azadirachta indica A. Juss., Aegle marmelos (Linn.) Correa, Argemone mexicana Linn., Hypericum indicum Linn., Terminalia*

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*chebula Retz., Plumbago indica Linn., Asparagus racemosus Willd., Curcuma longa Linn., Coleus forskohlii Andrews, Rubia cordifolia Linn. etc. reported promising anti-HIV potential. The chapter was directed towards discussion of anti-HIV activity of various medicinal plants and their natural extracts.*

## **1. INTRODUCTION**

The World Health Organization (WHO) report on the global acquired immunodeficiency syndrome (AIDS) epidemic indicates that a six fold increase in financing for HIV programs in low and middle-income countries is beginning to bear fruit, with many countries making progress in lowering AIDS deaths and preventing new infections. However, in the year 2008 alone there were 2.7 million new HIV infections and 2 million HIV-related deaths reported worldwide. Globally, there were an estimated 33 million people living with HIV. Younger people aged between 15 and 24 accounted for 40% of all new HIV infections (Sabde et al., 2011).

The US Federal Drug Administration has approved 25 drugs for the treatment of AIDS to date, and none of these is a natural product, though some natural products or their derived compounds are in advanced stages of development. Considerable research efforts have been devoted in the last two decades to the discovery of new active compounds from plants to prevent HIV infection and transmission. The use of ethno-pharmacological data enhances the probability of identifying new bioactive compounds from plants. Although HIV/AIDS is a relatively new human disease, logical linking of treatment of other viral infections or related indications can increase the probability of discovery of new plant-based potential anti-HIV agents. The screening of plants as a possible source of antivirals has led to the discovery of potent molecules like calanolides and suksdorfin (Yu et al., 2007). Various natural compounds from different chemical classes have been reported to possess anti-HIV activity (Cos et al., 2008).

In recent years, medicinal plants occupy an important position for being the paramount sources of the discovery of pharmacologically active compounds. Higher plants serve as a source of new drugs for treating diverse form of diseases together with HIV/AIDS. According to Rates (2001), 25% of the drugs prescribed worldwide come from plants, one hundred and twenty one such active compounds being in current use. Of the two hundred and fifty two drugs considered as basic and essential by the WHO, 11% are exclusively of plant origin and a significant number are synthetic drugs obtained from natural precursors. The idea of the use of plants

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