Introduction
INTRODUCTION

The modulation of immune response by using medicinal plant products as a possible therapeutic measure has become a subject of scientific investigations. The basic concept has, however, existed in the ancient vedic scripture, the Ayurveda, and has been practiced in Indian traditional medicine for many centuries. One of the therapeutic strategies in Ayurvedic medicine is to increase body's natural resistance to the disease causing agent rather than directly neutralizing the agent itself; in practice this is achieved by using extracts of various plant materials called rasayanas (Charak Samhita 1935). This concept in modern scientific understanding would mean enhancement of immune responsiveness of an organism against a pathogen by non-specifically activating the immune system using immunomodulatory agents of plant origin. It is now being recognized that immunomodulation could provide an alternative to conventional chemotherapy for a variety of diseased conditions, especially when host's defense mechanisms have to be activated under the conditions of impaired immune responsiveness or when a selective immunosuppression has to be induced in situations like autoimmune disorders and organ transplantation.
The basic function of the immune system is to protect the body against infectious agents and potential pathogens, which puts the immune system in a vital position between a healthy and diseased state of a host. It's protective task is regulated by an intricate regulatory mechanism involving humoral and cellular factors. Immunomodulatory agents can enhance the immunological responsiveness of an organism by interfering with its regulatory mechanisms. These may be antigen independent and may directly induce production of mediators and effector molecules by the immunocompetent cells. This type of antigen-independent immunity is thus distinct from the one achieved by conventional immunization or by passive immunization using antibodies.

The immunomodulatory agents may selectively activate either cell mediated or humoral immunity by stimulating either TH₁ or TH₂ type of T-cell response, respectively. It is now being realized that enhancement of TH₁ type of T-cell response may be of therapeutic significance for a variety of intracellular pathogens, like protozoan parasites, mycobacteria and viruses; whereas TH₂ type of response may be beneficial against extra-cellular pathogens.

Another essential function of the immune system is to distinguish self from non-self and this discrimination is carried out primarily by T lymphocytes. Activation of T-cells by self antigens is
regulated by different mechanisms, both thymic and peripheral; failure of these mechanisms controlling tolerance to self antigens may lead to auto-immune diseases. Similarly, allogenic response of T-cells is a critical factor in rejection or success of organ transplantation. Recent progress in our understanding of the immune system have opened many possibilities for the selective immuno suppression. The main targets identified are major histocompatibility complex (MHC) molecules on antigen presenting cells, T-cell receptors, CD-4, CD-8 and other molecules on T-cells. Selective immuno suppression by immunomodulatory agents, especially those inhibiting signal transduction pathways for T-cell activation, as therapeutic strategy against graft rejection or auto immune diseases has already been established.

Immunostimulants or immunopotentiators are compounds leading predominantly to a non-specific stimulation of immunological defence system. However, immunostimulants may also stimulate T-suppressor cells and thereby reduce immune resistance.

An immunomodulator substance, may influence any constituent or functional system of immune response in a specific or non specific manner. Further more, negative feed back mechanisms appear to be an important phenomenon in immune system. This, immuno suppression can be brought about, by stimulating the
inhibitor cells or humoral factors, as well as inhibition of effector cells. Similarly, the immunostimulation can be initiated by stimulating effector cells or production of their metabolic inducers or by inhibiting the immunity limiting factors.

Objectives of immunomodulation as visualized by modern researchers are multifaceted. In clinical medicine, probably both aspects of immunomodulation, viz. immunostimulation and immunosuppression are equally important in their own right.

Prophylaxis of opportunistic infections in risk prone patients may be an important clinical objective of immunomodulation. Present level of understanding on tumour biology in malignancies, also hints at a positive role of immunomodulation in medical oncology.

Furthermore, by modulating the immune responses it is presumed that, treatment of auto immune disorders as rheumatoid arthritis, multiple sclerosis etc. may be rendered more effectively when such research reaches its application phase. However, the choice of immuno suppressant drugs in such conditions is more or less based on empirical experience, at present.

As a part of the continuously growing enthusiasm to search for the novel immunomodulator compounds, medicinal plants used in India have also been subjected to screening by various researchers.
A screening study by Atal et al. (1986) have reported the immunomodulatory activity of ethanol extracts of some Indian medicinal plants. The study has covered *Picrorhiza kurroa*, *Aconitum heterophyllum*, *Zylophora indica*, *Zinzopora cordifolia*, *Holarrhena antidysenterica* and *Hemedismus indicus*.

In the present study an attempt was, therefore, made to investigate the immunomodulatory effect of certain medicinal plants, widely used in Ayurvedic and Unani systems of medicine for the treatment of chronic infections and immunological disorders.