Scope and Plan
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* Immunomodulators are the substances which have the ability to influence various components of the immune system, they are used therapeutically for correcting the pathological aberrations of the immune response, or for augmentation, inhibition of physiological responses. Immunomodulators mediate the immune responses directly or indirectly. There is a need to identify compounds possessing immunomodulatory properties, which can act as immuno stimulators or immuno suppressors.

* Development of a safe and clinically effective immunostimulant is a major task. Though the voluminous experimental data are available about immunostimulant properties of many agents, only a few of them have been utilized for therapeutic uses.

* Immunomodulators such as Corynebacterium parvum, Levamisole, IFN and IL-2 are used in combination with cisplatin, adriamycin, 5-fluorouracil, etc., in the treatment of many types of carcinomas. The disadvantage of the synthetic immunomodulators is their side effects. Several agents create side effects in the form of myalgias, fatigue, neutropenia, anorexia, elevated transaminases and proteinuria.
Immunomodulatory compounds isolated from microbial sources like *Corynebacterium parvum, Listeria monocytogenes, Salmonella typhimurium, Brucella abortus* have found to be highly toxic. There is a need to identify a potent and non-toxic immunomodulators for clinical use.

Considering the immune potential of immune modulators in prevention and control of a variety of disease states, it is imperative to conduct research for screening of newer immunomodulatory agents for which the medicinal plants present a promising future, since they are cost effective, efficacious, have a broad spectrum activity and may have less of side effects.

The literature survey revealed the therapeutic efficacy of many indigenous plants for a variety of diseases which has been widely documented in traditional medicinal literature (Satyavathi and Gupta, 1987). Many plants that are presently available in India have been reported by scientific investigators (Kirtikar and Basu, 1935; Chopra et al., 1956) to be effective against various diseases.

Immunomodulatory compounds derived from medicinal plants may be free from toxic effects, since many of these plant materials identified in the traditional system of medicine have been in use for many centuries and have been found to be safe and free from any undesirable side effects.
The medicinal plants offer distinct advantages over currently available immunomodulatory agents. They are effective when given orally, less expensive, preparation procedures are simple and can be easily standardized.

A major drawback in administering the entire crude extract of the plant, in terms of current scientific approach is the lack of knowledge of its active principle. Hence the crude extracts are subjected to purification of the compounds using chromatographic techniques.

In order to utilize the plant based medicines for clinical use, toxicity studies are necessary to ascertain the validity of the plant material for human use.

With the above perspectives in mind and appreciating the knowledge of medicinal plants, the present study was organised and executed.

1. The present study was planned to study the immunomodulatory properties of the selected Indian medicinal plants following their medico-ethano botanical knowledge. The selected plants for the study are a) Alternanthera sessilis, b) Justicia gendarussa, c) Evolvulus alsinoides, d) Plumbago indica, e) Tribulus terrestris, f) Vitex negundo, g) Polygala chinensis, h) Oxalis corniculata, i) Aegle marmelos and j) Aloe vera.
2. To prepare plant extracts from the leaf, root and whole plant

3. To conduct preliminary biosafety studies on the selected ten medicinal plants by cytotoxic studies in vitro.

4. To test by in vitro method the stimulation / inhibition of lymphocyte proliferation of all the crude medicinal plant (methanolic) extracts by $^3$H thymidine uptake.

5. To conduct successive extraction using the different solvents such as n-hexane, benzene, ethyl acetate, chloroform, acetone, ethanol and water, for the plants showing maximum activity and to test the extracts for stimulation / inhibition of lymphocyte proliferation.

6. To separate the fractions of the extracts showing maximum activity using high pressure liquid chromatographic techniques and to test their inhibitory / stimulatory potentials by lymphocyte proliferation assays.

7. To standardize PCR based assays to detect, in vitro induction of cytokines such as IFN-$\gamma$ and IL-4, using whole extracts and the HPLC fractions of extracts.
8. To investigate the anti inflammatory effect of the plant which has shown a maximum immunosuppressive activity \textit{(in vitro)} on adjuvant induced arthritis in a suitable animal model (Rat).

9. To study the delayed type hypersensitivity of selected plant extracts.

10. To study the effect of the plant extracts on SRBC induced humoral antibody response in rats by haemagglutination tests.