ABSTRACT

The present study was undertaken to elucidate the immunomodulatory potential of five medicinal plants which are used by traditional and Ayurveda practitioners of Sri Lanka to treat various ailments. Ethanolic extracts of roots of *Clerodendrum infortunatum* Linn., *Croton laccifer* Linn. and *Solanum surattense* Burm.f., rhizomes of *Alpinia calcarata* Rosc. and tubers of *Cyperus rotundus* Linn. were tested on a rat model at doses of 50, 100 and 200 mg/Kg/day via oral route. Immunomodulatory activity was assessed in terms of inflammatory response, differential leukocyte count, granulocyte adhesion, modulation of cytokines including IL-1β, IL-4, IL-6, IL-10, IL-12, IFN-γ and TNF-α and immunological memory. As indicated by the results of CRBC induced inflammatory response assay (Paw Edema Assay) rats treated with plant extracts showed significantly higher ($P<0.05$) paw edema thickness and shorter recovery periods in comparison to control rats indicating a possible strong cell mediated immune response induced by plant extracts. In the case of secondary exposure to the same antigen after seven days from first challenge rats treated with plant extracts showed rapid inflammatory response and recovery rates in comparison with primary challenge indicating a significant buildup of short term immunological memory induced by plant extracts. As suggested by granulocyte adhesion assay rats treated with the plant extracts showed significantly higher adhesion percentages ($P<0.05$) in dose independent manner in comparison with the control rats indicating a probable up regulation of expression in cellular adhesion molecules of granulocytes. The tested plant extracts especially at higher doses induced cell mediated immunity by significantly increasing ($P<0.05$) granulocyte, monocytes and hence total leukocyte count. Further treatment of tested plant extracts did not significantly alter the hematological parameters such as RBC count, HGB, HCT, Platelet Count, RDW, PDW and P-LCR indicating specific action of these plant extracts on immune cells. In vivo cytokine assay suggested that tested plant extracts stimulated the production of cytokines for varying degrees in a dose dependent manner in comparison with control groups. In contrast to control group rats treated with plant extracts showed enhanced survival ratios indicating a potential tolerance against immunosuppression induced by cyclophosphamide. In this context these findings have contributed to reasonably conclude that all the five plant extracts are positive immunomodulators in innate immunity.

Key words: Immune system, Medicinal plants, Immunomodulation, Cytokines, Leukocytes, Inflammation, Immunological memory.