CONCLUSION

The aim of our study was to encapsulate HBsAg using different biodegradable polymers like chitosan and albumin and to compare the immunogenecity between these microsphere formulations and also with intramuscular injections. HBsAg was successfully encapsulated in microspheres with the help of protease inhibitors and permeation enhancers. Protease inhibitors have a role in preventing the inactivation of antigen following oral delivery. Permeation enhancers facilitate transport of co-administered substances across biological epithelial barriers.

Antigens can be encapsulated with suitable carriers to provide local and systemic immunity. Our study showed that as compared to free antigens, microspheres encapsulated with HBsAg have the potential to elicit antibody titre levels thereby providing a means of targeted delivery of antigens to the mucosa associated lymphoid tissues.

This study was carried out by using polymers like chitosan and albumin. HBsAg loaded chitosan and albumin microspheres showed significant anti-HBs titre values after oral administration. The HBsAg loaded chitosan microspheres showed more significant antibody response than HBsAg loaded albumin microsphere. Analysis of the effect of protease inhibitors like aprotinin and bacitracin revealed that a combination of HBsAg with bacitracin entrapped in chitosan microspheres produces a higher immune response compared to a combination of HBsAg with aprotinin entrapped in chitosan. Similarly, the HBsAg with bacitracin entrapped in albumin microspheres exhibited a better response than HBsAg with aprotinin entrapped in albumin microspheres. From our results, we can conclude that bacitracin has a better protease inhibitor activity than aprotinin in the production of protective levels of immunity. The
concentration of bacitracin as a protease inhibitor could be optimized through the study. Since an increase in concentration of bacitracin did not produce a significant improvement in response, the lowest concentration was selected. Sodium taurocholate has also played an important role in producing significant anti-HBs titre value, as a permeation enhancer.

Stability studies were carried out for the optimized formulation. The microspheres were stored at different temperatures and humidity conditions for a period of three months. After three months, it was observed that the anti-HBs titre values in all the study conditions were far above the cut-off values (10mIU/ml). No statistically significant difference was observed between microspheres stored in refrigerator and the control for a period of 9 months. For microspheres stored at RT, as compared to the control group, a statistically significant difference was observed only after 120 days. However, the microspheres stored at 40°C showed a statistically significant difference after 90 days.

To conclude, even though, there was a statistically significant difference in anti-HBs titre values after 120 days and 90 days from microcapsules stored at RT and 40°C respectively, under both the conditions, the microspheres were able to produce good antibody response. The stability exhibited by the microspheres for a period of 4 months at RT can help to overcome the incomplete vaccine coverage due to the thermolability of vaccines, which require continuous storage and transport in a cold chain and it is also an oral delivery system which will help in reducing the logistics requirement.
SCOPE FOR FURTHER STUDY

Since 1986, the immunization programmes throughout the world have changed their focus to the control or elimination of major infectious diseases. Though, our efforts in the development of controlled release microsphere based system for antigen delivery, exhibited encouraging results, still there is a need for elaborative study including clinical and preclinical trials taken up with large population.