

# **Synthesis and Characterisation of Sodium Alginate/ Gelatin Interpenetrating Polymeric Network Green Nanocomposites.**

Principal Investigator : Dr. Mohanan A

## **Summary of the findings of the minor research project**

In the present work Sodium alginate/Gelatin/Hydroxyapatite (NaAlg/Gltn/HA) based IPN nanocomposite films have been made in the presence of  $\text{Ca}^{2+}$  as crosslinker. The composite formation was confirmed by SEM, DSC & IR techniques. The characterization techniques revealed that the nanoparticles were spherical in shape with a mean diameter of 235nm. The optimum conditions for the formation of these composites was determined. The films exhibited equilibrium swelling ratio of 130-500 % in neutral medium at 27°C. The swelling capacity of the composite films and the rate of swelling were observed to be influenced by film composition and the preparation conditions. The swelling of the films was least in medium of pH1.2 and highest around pH 7.0. Thus the films exhibited a pH dependent swelling behaviour. The structural parameters of the network and the pH of the medium were also found to influence the permeability property of the films. The extent of absorption of water and the diffusion through the films were observed to be directly influenced by network swelling process controlled by the relaxation of polymer segments. It was observed that for all formulations the diffusion of water was anomalous. The films were observed to hold about 60-80 % of water in their fully swollen state similar to body cells. Since the IPN composite film studied here are made from biocompatible polymers, they may prove good candidates for biomedical and pharmaceutical applications.