ABSTRACT

Purpose To design and develop novel drug delivery systems, namely, oral hydrogel tablets and liposomes, for Cefditoren pivoxil, third generation semi-synthetic cephalosporin antibiotic used to treat uncomplicated skin diseases, *Haemophilus influenza*, *Klebsiella pneumonia* and *Staphylococcus aureus*, pharyngitis, tonsillitis, community-acquired pneumonia and acute bacterial exacerbation of chronic bronchitis.

Methodology Preformulation studies were carried out by using FTIR and DSC techniques to find out the possible interactions between the drug and the polymers. Oral hydrogel tablets were prepared using carbopol and sodium carboxy methyl cellulose as core polymers with gas generating agents such as sodium bicarbonate. Liposomes were prepared using core polymers, such as phosphotidyl choline, distearyl phosphotidyl choline and cholesterol. Both the hydrogel tablets and liposomes were characterized for their physical properties, content uniformity, *In vitro* dissolution and diffusion studies were performed. The formulations were subjected to stability studies at 40°C and 75% RH. Kinetic studies were carried out to know the mechanism of drug release. *In vivo* studies in rabbits were performed for the selected formulations and compared with a marketed product. A novel method was developed for determination of Cefditoren pivoxil in tablets using FTIR spectroscopy.

Results The prepared hydrogel tablets containing sodium carboxy methyl cellulose and sodium bicarbonate shows good swelling behavior, physical characteristics and stability compared to alginate. Liposomes which contain distearyl phosphotidyl choline and cholesterol show better pharmacokinetic parameters compared to marketed product. The liposomal formulation containing glucose as cryo-protectant shows good entrapment efficacy and stability. The method developed by FTIR to quantify the Cefditoren pivoxil from the marketed formulation was found to be simple, rapid and eco-friendly technique.

Conclusions The results suggest that the developed hydrogel tablets and the liposomes for Cefditoren pivoxil shows a controlled drug release and had potential use in controlling uncomplicated skin diseases, community-acquired pneumonia and acute...
bacterial exacerbation of chronic bronchitis in patients as a simple alternative to the marketed conventional formulations with better patient compliance.