ABSTRACT

Casein is a predominant phosphoprotein often fabulated in particulate/drug delivery systems and widely used as a carrier for cytotoxic drugs. This is mainly because casein is highly inexpensive, readily available, non toxic, natural food product, biodegradable and biocompatible. Casein microparticles have more attractive properties widening the applications of casein particles in biomedicine and biopharmaceutics. The thesis is aimed to evaluate casein’s ability to act as carriers by studying casein microparticles for drug delivery systems and casein films for transdermal drug delivery. The study has been conducted towards the delivery of an anti-cancer drug, anti-epileptic drug, anti-histaminic drug, anti-diabetic drug, transdermal delivery of an anti-hypertensive medication and animal studies to confirm the absence of inflammatory and haematological reactions.

The methodologies adopted to carry out the studies include optimization of casein microparticles, finding the encapsulation efficiency using Fourier Transform Infra Red spectroscopy and X-Ray Diffraction studies, analysis of particle size and shape using Laser particle size analyzer and Scanning Electron Micrograph, in-vitro release studies to confirm whether the drug is released within the therapeutic level or not, in-vivo studies to proof the efficiency of anti-diabetic formulations of Glimipiride, casein film preparation for transdermal delivery, animal studies to check implications of hypersensitivity reactions. The studies using all the drugs loaded with casein microparticles confirms the efficacy and possibilities of casein microparticles for being the carriers to deliver the drugs which concludes casein as a trustworthy candidate for producing modified dosage forms. The results offer a promising method for tailoring biodegradable, drug-loaded casein microparticles as controlled, long-circulating drug delivery systems of anticancer, anti-histaminic, anti-epileptic, anti diabetic and anti hypertensive drugs and also towards Alzheimer’s disease management and also in reducing extensive hepatic metabolism. Thus the study works towards meeting requirements such as low cytotoxicity, abundant renewable sources, high drug binding capacity and significant uptake into the targeted cells.