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DEVELOPMENT OF ASSAY METHOD FOR NIFEDIPINE AS TRANSDERMAL DOSAGE FORM

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ABSTRACT

Formulation of nifedipine as a transdermal delivery system has been established as an alternative to oral and other modes of administration. A simple, rapid and precise HPLC system for detection of nifedipine when incorporated with chitosan as the polymer was developed and validated. The method was based on separation of drug on a reversed-phase, C_{18} column using a mobile phase of methanol, water and 0.02% triethylamine (50:35:15) with a programmable flow rate of 2 ml min^{-1}. The detection was performed at 260 nm. The calibration graph of nifedipine in methanol was linear in the concentration range of 100-1000 ng ml^{-1} and the retention time was 6.7±0.07 min. The correlation coefficient, slope and intercept were 0.9999, 9.4725 and 7.817. The coefficient of variation for within and between day analyses was not more than 2% for both standard and sample nifedipine. Nifedipine is rapidly decomposed upon exposure to daylight; so in the design of chromatographic method, it was protected from light to prevent photodegradation from taking place. The proposed method could be applied to the assay of nifedipine as transdermal dosage form.

CHAPTER 1

INTRODUCTION

Nifedipine is a dihydropyridine calcium channel antagonist that is widely used in the treatment of angina pectoris, hypertension and other vascular disorders. Existing dosage forms of nifedipine for sublingual or oral dosing are composed of tablets and capsules. For the past two decades, transdermal delivery system has become established as an effective alternative to oral and other modes of drug administration (Thacharodi and Panduranga, 1995; Zeng, 2004). McDaid and Deasy (1995) suggested that the design of nifedipine as transdermal system is due to its low required daily dose (20-60 mg). In advanced to conventional dosage form which requires at least three times dosing daily, the transdermal system of nifedipine may reduce the frequency of dosing up to three to five days dosing interval. Besides that, this type of delivery system would eliminate first-pass metabolism and hence, ensure more uniform plasma levels, reduce side effects and aid in patient compliance. Another important advantage of this system is that drug input can promptly be interrupted if any toxicity occurs (Zeng, 2004).

Chitosan (-(β 1–4)-2-amino-2-deoxy-D-glucose) is the *N*-deacetylated product of the polysaccharide chitin. It is a water-soluble derivative of cellulose and is one of the most abundant polymers in nature, since it is the principle component of crustacean's shells and insects. Chitosan has many potential applications as an excipient in the