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RESEARCH ARTICLE

PREPARATION AND EVALUATION OF CAPTOPRIL TRANSDERMAL PATCHES

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Transdermal matrix patches of captopril were prepared by casting method employing different ratios of polyvinyl alcohol, ethyl cellulose, polyvinyl pyrrolidone and hydroxypropyl methylcellulose. The prepared matrix patches were evaluated for physicochemical characteristics such as thickness, weight variation, folding endurance, drug content, percent moisture content, water vapour transmission and *in vitro* drug permeation studies. The results of all physical parameters were satisfactory for the prepared formulations. Drug permeation studies revealed that P21 (EC:PVP K30::3:1) exhibited the highest drug release in 24 h (99.82%) followed by diffusion mechanism as evidenced by Higuchi model (r^2=0.9-0.99). The hydrophilic and hydrophobic polymers in combination showed sufficient potential for the development of transdermal drug delivery system of captopril.

Key words: Captopril, Transdermal drug delivery system, Matrix film, Hypertension, Goat skin.

INTRODUCTION

Literature is enriched with several findings in which techniques for sustained and controlled delivery of drugs have been reported (Dahiya and Gupta, 2011; Kumar and Dureja, 2011; Tripathi *et al* 2011). Transdermal drug delivery system (TDDS) is one of the controlled release system consisting of formulations which are topically applied to deliver drug for systemic effects at a predetermined and controlled rate. The potential advantage of transdermal drug delivery include enhanced efficiency, increased safety, greater convenience, improved patient compliance and avoidance of first-pass gut. (Chien, 1992; Banker and Rhodes, 1990). A transdermal drug delivery device, which may be of an active or a passive design, is a device which provides an alternative route for administering medication (Ansel *et al* 1999).

Captopril is an orally active inhibitor of an angiotensin converting enzyme and widely used in the treatment of hypertension and some of the congestive heart failure. The drug is considered for the treatment of antihypertensive therapy due to its low toxicity (Nur and Zhang, 2000). Captopril shows 70% oral bioavailability but presence of food reduces the oral absorption by 25-40%. Captopril is freely water soluble, has a relatively short elimination half life in plasma (1.6-1.9 h) (Jarrott *et al* 1982). Therefore, the objective of the present study was to develop the controlled release polymeric transdermal films and improve the therapeutic effect of drug.

MATERIALS AND METHODS

Captopril was a gift sample from Wockhardt Limited, Mumbai. PVP K30, HPMC K15M, ethyl cellulose (EC), polyvinyl alcohol (PVA) and dibutyl phthalate were purchased from CDH, Mumbai. Solvents used were of AR grade.

Drug polymer compatibility studies

The drug-polymer compatibility study was carried out using differential scanning calorimetry (DSC-Jade) to confirm the absence of