Adhesive Property, in vitro Release and Permeation Studies of Ketoprofen Transdermal Drug Delivery Systems

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ABSTRACT

Transdermal drug delivery system of ketoprofen, a potent non-steroidal anti-inflammatory drug, was prepared using combined acrylate pressure-sensitive adhesives: Eudragit® NE30D and Eudragit® E100. Propylene glycol (PG), butylene glycol (BG) and oleic acid (OA) were the selected additives and added in the ketoprofen transdermal drug delivery systems (KP-TDDSs). The adhesive property of each formulation was determined by rolling ball tack test and peel adhesion 180° test. It was found that all KP-TDDS formulations, except the one containing BG, exhibited the similar tack and peel adhesion values. In vitro release studies of all formulations across cellophane membrane were investigated, using modified Franz® diffusion cells. It was shown that the release rate of KP from the KP-TDDS formulation containing OA or PG was significantly higher than the formulation containing BG. In vitro permeation studies through rat skin were also evaluated. The flux of KP permeating from the formulation containing OA or PG was significantly higher than that from the formulation containing BG or without additives. In summary, both in vitro release and permeation studies revealed that the formulation containing OA or PG was an effective formulation and can be further developed to obtain the high potential transdermal delivery of KP.

Key words: Ketoprofen, Transdermal drug delivery system (TDDS), Adhesive property, *In vitro* release, *In vitro* permeation

INTRODUCTION

Ketoprofen is a potent non-steroidal anti-inflammatory agent, widely used for the symptomatic treatment of inflammatory syndromes such as rheumatoid arthritis, osteoarthritis and acute gouty arthritis (Porzio et al., 1998; Kalia and Guy, 2001; Sweetman, 2002). In order to minimize its gastric irritation after oral administration, various transdermal dosage forms containing ketoprofen have been reported including creams (Itoh et al., 1985; Kyuki et al., 1985), gels (Chi and Jun, 1991; Vincent et al., 1999), ointments (Henmi et al., 1994; Gurol et al.,1996), microemulsion (Rhee et al., 2001) and patches (Yim et al., 1994; Valenta and Almasi-Szabo, 1995; Singh et al., 1996). Although many topical dosage forms of ketoprofen have been investigated, there are only a few reports concerning both adhesive property and *in vitro* drug release and permeation studies of ketoprofen transdermal drug delivery system (KP-TDDS).