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RESEARCH ARTICLE

COMPARATIVE EVALUATION OF *IN SITU* INTESTINAL ABSORPTION OF ACECLOFENAC FROM SOLID DISPERSIONS, *β*-CYCLODEXTRIN COMPLEXES AND CO-PRECIPITATES IN RATS

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Aceclofenac (AF), a new generation nonsteroidal anti-inflammatory drug with a good tolerability profile in a variety of painful conditions. Aceclofenac is proven to be effective for both acute and chronic inflammatory and degenerative diseases such post traumatic pain, cervical pain, rheumatoid arthritis and osteoarthritis. Aqueous solubility of aceclofenac was enhanced by preparing its solid dispersions and co-precipitates using polyvinyl pyrrolidone (PVP) as water soluble carrier and cyclodextrin complexes with *β*-cyclodextrin. Absorption studies using *in situ* rat gut technique exhibited greater rate of intestinal absorption with co-precipitates of aceclofenac when compared with solid dispersions and *β*-cyclodextrin. The intestinal absorption followed the first order rate kinetics. Statistical correlation of *in vitro* drug dissolution and *in vitro* drug absorption indicates a positive correlation (R^2= 0.931 to 0.964). This increased absorption may be due to the solubilization and improved wetting of AF in PVP rich micro-environment.

Key words: Aceclofenac, Solid dispersion, *β*-Cyclodextrin, *In situ* absorption, Polyvinyl pyrrolidone.

INTRODUCTION

A method is reported for studying gastro-intestinal drug absorption from isolated gut segments of the anesthetized rat *in situ*. The experimental technique is simple and utilizes readily available laboratory equipment. The results are closely reproducible and yield absorption rates which are realistic in terms of the known absorption behavior of drugs in humans and intact animals (Martin and Doluisio, 1977). Solid dispersion is a unique approach in which the drug is dispersed in extremely fine state in an inert water-soluble carrier in solid state (Damian *et al* 2002). Polyvinyl pyrrolidone (PVP) has been used extensively for the enhancement of solubility and dissolution rate of low solubility drugs. PVP-coprecipitate of water-insoluble drugs is formed by dissolving both components in a common solvent and subsequently removing the solvent (Anastasiadou *et al* 1983). Cyclodextrins and their derivatives play an important role in formulation development due to their effect on solubility, dissolution rate, chemical stability and absorption of drugs. Though cyclodextrins have been investigated widely during the last two decades, their commercial application in pharmaceutical formulation was started only in recent years with drugs such as piroxicam and nimesulide (Jun *et al* 2007). Aceclofenac (AF) is a new generational non-steroidal anti-