

**UNIVERSITÀ TEKNOLOGI MARA  
UNIVERSITÀ DEGLI STUDI DI PARMA**

**NEW MODULES AND ASSEMBLED SYSTEMS  
FOR THE CONTROLLED RELEASE OF DRUGS  
IN COMBINATION**

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Thesis submitted in fulfillment  
of the requirements for the degree of  
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1 Introduction

Oral administration is the most viable route to deliver drugs and it is also the method which shows the highest patient compliance.

Unfortunately some drugs show a low oral bioavailability or they have a short half-life which require taking several doses in one day.[1]

Modified release drug delivery systems can overcome such issues through changing the kinetics of drug release which then:

- modify drug bioavailability and plasma drug concentration
- reduce the number daily dosing and increase patient compliance
- minimize adverse effects
- prevent over- or under-dosage of drugs [2, 3].

The most common oral dosage form is the polymeric matrix, especially swellable matrices. The swellable matrix is a monolithic system of drug dispersed or dissolved a polymeric bed. It can be manufactured using soluble and swellable polymer which can control the release of the drug due to polymer geiification upon in contact with an aqueous medium.

The geiification of the polymer takes place gradually on time together with the disentanglement of the polymeric chains which elicit matrix erosion. A drug cannot diffuse through the dry (glassy) polymer, but only via the gelled (rubbery) polymer[4]. Figure 1 shows erosion, swelling and diffusion fronts that are encountered in a matrix.

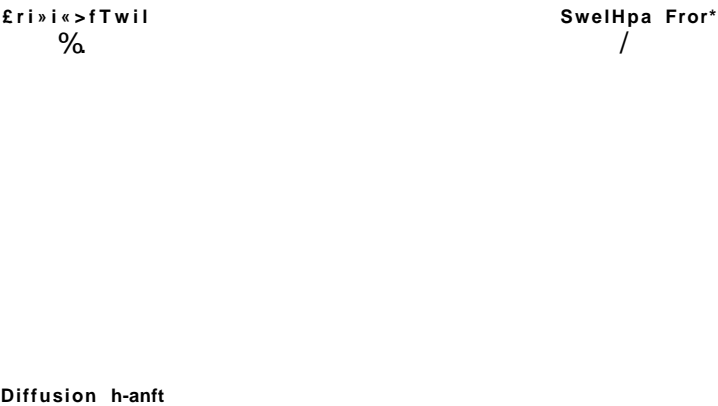


Figure 1. Erosion, diffusion and swelling front