serves as further barrier to drug absorption, impermeable epithelium (Wang et al., 2005; Hillery et al., 2001).

1.1.5. Evolution of oral drug delivery technology

Oral drug delivery still is the preferred route of administration for drug products. The evolution of oral drug delivery technology may be described by a three-stage course to reach its current level. With every step forward in drug delivery technology, scientists strive to gain more control over the pharmacokinetics of the drug substance with the goal to increase the therapeutic benefit-risk ratio or to improve bioavailability.

The first generation of oral drug delivery systems show unmodified release (Verma & Garg, 2001). This means that they have no controlled delivery technology incorporated and the drug release process starts immediately upon oral intake.

The second generation products consists of those oral drug products that have some sort of controlled delivery technology build-in, designed to change the pharmacokinetic behavior of the drug (Srikanth et al., 2013).

The third generation oral drug delivery systems aims to target the site where the disease is located ("targeted oral drug delivery"). To navigate to this location, the oral drug delivery system needs to interact with disease-specific targets (Basit, 2005). This approach is under investigation since the 90s and is not reach the market place yet.

Today, many scientific challenges and breakthrough technologies are required to generate novel dosage forms raising drug delivery to higher level. Some are self-emulsifying systems, solid self-nanoemulsion, polymeric micelles, spray freezing, pH