Development of Sustained Release Floating Tablet for Cefpodoxime Proxetil (CP)

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ABSTRACT

Oral drug delivery is the most common way of drug delivery by a great deal because of flexible formulation, patient compliance, the ease of administration, and etc. The drug administration to the *digestive system* normally involves an immediate release formulation, typically a tablet or a capsule. Over the last 30 years, different approaches have been followed to enhance the residence time of an oral drug in the stomach, such as expanding and swelling systems, floating systems, modified-shape systems, high-density systems, bioadhesive systems, and other devices, which delay gastric emptying. Bio-adhesive systems are used to place a delivery device inside the body cavity and lumen to increase the absorption of the drug in a site-specific manner. Studies about the solubility and solution stability of Cefpodoxime proxetil (CP) in buffers with different pH showed that solubility and solution stability of CP has a high dependence on buffer pH. "There was a very high solubility and solution stability in the acidic pH values. The reported study showed similar results. Formulations F15(H1), F15(H2), F15(H3), F16(H1), F16(H2), and F16(H3) prepared at different hardness showed that release of drug from the hydrophilic matrix is independent of the matrix tablet hardness. The obtained results are in support of the reported research work. Various kinetic models were used for describing the release kinetics of all formulations. All the formulations were according to Pappas drug release model with the highest coefficient of determination (r^2) than other drug release kinetic models. The release profiles of all formulations were statistically analyzed by Student t-test and ANOVA using GraphPad Prism software. The results concluded that persistent and stable buoyancy was obtained by gas trapping by the hydration of high viscosity grade HPMC K100M. Moreover, this novel floating, the intragastric two-layer tablet is able to stay more in the stomach. Moreover, the two distinct layers allow the separate regulation of the floating ability and drug release kinetics. However, further in-vivo studies are needed to determine whether this translates into improved bioavailability.

Key Words: *Oral delivery, Cefpodoxime proxetil, Solubility, Sustained release, Bioavailability.*

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INTRODUCTION

Oral drug delivery is a great deal the most common way of drug delivery because of flexible formulation, patient compliance, the ease of administration, etc. [1]. The consumption of drugs to the *digestive system* normally involves an immediate release formulation, typically a tablet or a capsule. Although such formulations are still preferred for their relative simplicity and low cost, formulations that address specific issues in oral drug delivery require more sophisticated attributes. *The extended-release dosage forms* are now used in some products. These products permit a reduced dosing frequency, leading to improved patient compliance and, in some instances, improved pharmacologic response [2].

Extended-release (ER) dosage forms are widely used to improve the therapeutic effect of various essential drugs. However, the *extended-release* method cannot be the most useful and preferable route for oral delivery of some drugs. For example:

1. Drugs which are absorbed in the upper gastrointestinal tract [3]
2. Drugs which are unstable in lower GIT, because of enzymes of the intestinal lumen or pH

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