Bilayer Floating Tablets for Gastroretentive Drug Delivery System

Sai Sowjanya Palla¹, Rajkumar Kotha¹, Anusha Paladinug¹, E. Rajesh Kumar Reddy¹, Suryasri Lavanya Adavi¹ and K. Ramamohan Reddy²

¹Department of Pharmaceutics, KLE University College of Pharmacy, JNMC, Belgaum 590010, Karnataka, India, and
²Department of Pharmacology, KLE University College of Pharmacy, JNMC, Belgaum 590010, Karnataka, India.

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ABSTRACT

Oral delivery of the drug is by far the most preferable route of drug delivery due to the ease of administration, patient compliance and flexibility in the formulations but has a drawback of non-site specificity and short gastric resident time. In recent years, scientific and technological advancements have been made in the development of novel drug delivery systems by overcoming physiological troubles such as short gastric residence times and unpredictable gastric emptying times. Among Several approaches of floating systems, Bilayer floating technology is considered as promising approach. It combines the principle of bilayer technology and floating mechanism. The combined principle of bilayer floating tablet helps to release initial dose from the immediate release layer to reach the plasma concentration and then the floating layer absorbs gastric fluid forming an impermeable colloidal gel barrier on its surface, maintains a bulk density less than unity and thereby remains buoyant in stomach providing steady state concentration of drug in system. This review focuses on bilayer floating tablet technology a new era of gastro retentive drug delivery system, its advantages over conventional tablets and it also summarizes the bilayer tablet presses used in the industry, formulation design and evaluation parameters of bilayer floating tablets.

KEYWORDS: Novel drug delivery systems; floating drug delivery systems (FDDS); Floating layer and immediate release layer.

Introduction

The conventional oral drug delivery has been known for decades was the most widely utilized route of administration among all the routes. It remains as the preferred route of administration in the discovery and development of new drug candidates. The popularity of oral route was attributed to patient acceptance, ease of administration, accurate dosing, cost effective manufacturing methods and generally improved shelf life of the product (Chien, 1992).

Tablet is defined as a compressed solid dosage form containing medicaments with or without excipients. According to the Indian Pharmacopoeia, Pharmaceutical tablets are solid, flat or biconvex shaped, unit dosage form, prepared by compressing a drug or a mixture of drugs, with or without diluents. They vary in shape and differ greatly in size and weight, depending on amount of medicinal substances and the intended mode of administration. It was the most popular dosage form and 70% of the total medicines are dispensed in the form of Tablet.

An ideal drug delivery system should be able to show either spatial or temporal delivery of drugs. Spatial delivery relates to targeting a drug to a specified organ or tissue, while temporal delivery refers to controlling the rate of drug delivery to the target tissue. An appropriately designed extended release dosage form shows either spatial or temporal delivery of drugs.

An effective oral drug delivery depends upon gastric emptying time, gastro-intestinal transit. However, it possess several physiological limitations such as variable GI transit and gastric emptying time leading to non-uniform absorption profiles, incomplete drug release and short residence time of dosage form in the stomach. One of the oral drug delivery system which meant to prolong the residence time of dosage form in the stomach is Gastro-retentive drug delivery system (GRDDS). The successful development of gastro-retentive drug delivery systems requires an understanding of two aspects of the system, namely:

1. The physiochemical characteristics of the drug
2. Anatomy and physiology of GIT and characteristics of dosage forms.

Good fundamental understanding of the anatomic and physiological characteristics of the human GIT is required to modulate the gastrointestinal transit time of a drug through FDDS for maximal gastrointestinal absorption of drugs and site-specific delivery.

Anatomy and Physiology of Stomach

Anatomy

The stomach is J-shaped organ located in the upper left hand portion of the abdomen just below the