Formulation and Evaluation of Immediate Release Bilayer Tablets of Telmisartan and Hydrochlorothiazide

N. Patel, R. Natarajan*, N.N. Rajendran and M. Rangapriya
Swamy Vivekanadha College of Pharmacy, Elayampalayam, Tamil Nadu, India.
Received April 05, 2011; accepted October 31, 2011

ABSTRACT
The main goal of this study was to develop a stable formulation of antihypertensive drugs telmisartan and hydrochlorothiazide as an immediate-release bilayer tablet and to evaluate the dissolution profile in comparison with a reference product. The formulation development work was initiated with wet granulation. Telmisartan was converted to its sodium salt by dissolving in aqueous solution of sodium hydroxide to improve solubility and drug release. Lactose monohydrate and microcrystalline cellulose were used as diluents. Starch paste is prepared in purified water and was used as the binder. Sodium starch glycolate is added as a disintegrating agent. Magnesium stearate was used as the lubricant. The prepared granules were compressed into a double-layer compression machine. The tablets thus formulated with higher proportion of sodium starch glycolate showed satisfactory physical parameters, and it was found to be stable and in vitro release studies are showed that formulation (F-T5H5) was 101.11% and 99.89% respectively. The formulation T5H5 is further selected and compared with the release profile of the innovator product, and was found to be similar (f2 factor) to that of the marketed product. The results suggest the feasibility of developing bilayer tablets consisting of telmisartan and hydrochlorothiazide for the convenience of patients with hypertension.

KEYWORDS: Bi-layer tablets; telmisartan; hydrochlorothiazide; super disintegrant.

Introduction
The goal of drug delivery systems is to provide a therapeutic amount of the drug to the proper site in the body to achieve promptly, and then maintain the desired drug concentration (Nagaraju et al., 2009). The oral route of drug administration is perhaps the most appealing route for the delivery of drugs. Of the various dosage forms administered orally, the tablet is one of the most preferred dosage forms because of its ease of manufacturing, convenience in administration, accurate dosing, stability compared to oral liquids, and because it is more tamper-proof than capsules. The oral bioavailability of drug is dependent on disintegration, dissolution and various physiological factors. In recent years, scientists have focused their attention on the formulation of quickly disintegrating tablets. The task of developing rapidly disintegrating tablets is accomplished by using suitable diluents and a super disintegrant (Shailesh et al., 2010).

Bilayer tablets are prepared for immediate release, while the second layer is also designed to release the drug immediately. Bilayer tablet is suitable for sequential release of two drugs in combination and separate two incompatible substances (Shiyani et al., 2008).

There is strong consideration of combination therapy for the treatment of various diseases and disorders requiring long term therapy such as hypertension and diabetes. Combination therapies have various advantages over monotherapy such as the problem of dose dependent side effects being minimized. A low-dose combination of two different agents reduces the dose-related risk; the addition of one agent may counteract some deleterious effects of the other. Using low dosages of two different agents minimizes the clinical and metabolic effects that occur with maximal dosages of individual component of the combined tablet and thus dosage of the single components can be reduced (Ramya et al., 2010).

Hypertension and angina pectoris, the most common cardiovascular diseases that require constant monitoring. Hypertension means high pressure in the arteries. High blood pressure is one of the most important modifiable risk factors for cardiovascular disease. Hypertension is designated as either primary hypertension or secondary hypertension (Mullaicharam et al., 2010).

Telmisartan is used to treat hypertension by blocking the hormone angiotensin thereby relaxing blood vessels, causing them to widen. High blood pressure reduction helps prevent strokes, heart attacks, and kidney problems. Telmisartan is an angiotensin receptor blocker (ARB), which shows high affinity for the angiotensin II type 1 (AT1) receptors, has a long duration of action, and