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Development and Optimization of pH-Independent Extended Release Matrix Tablet of Propranolol Hydrochloride Using Eudragit RSPO by Hot Melt Granulation

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Abstract

Extended release tablets offer many advantages in oral administration of medications. This study reports the development and evaluation of controlled release propranolol hydrochloride matrix tablets. Matrix tablets weighing 600 mg containing 80 mg propranolol hydrochloride were fabricated by hot melt granulation method and direct compression of the granules. They contain polyethylene glycol 4000, polyvinyl acetate and eudragit RSPO in different ratios. Tablets were evaluated for their physical characterstics and drug release as well as swelling behavior. Results showed that the rate of release of propranolol hydrochloride was dependent on concentrations of polyvinyl acetate and eudragit RSPO in the formulation. Also in-vitro swelling study indicates that the tested formula has considerable swelling that follows almost zero-order pattern. Analysis of release mechanism using various available models showed that release of propranolol hydrochloride from matrix tablets fitted to Korsmeyers – Peppas equation indicated an anomalous non-fickian transport suggesting that the drug release is mainly a diffusion- erosion controlled mechanism. In conclusion, propranolol hydrochloride can be prepared as extended- release pH independent matrix tablet using eudragit RSPO, polyvinyl acetate and polyethylene glycol 4000 by hot melt granulation technique. Sustained release of drug was achieved up to 12 hours and the release pattern follows Peppas model.

Keywords

Matrix Tablet,
Extended Release,
Eudragit,
Poly Vinyl Acetate,
Polyethylene Glycol,
Propranolol Hydrochloride

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1. Introduction

Oral administration is the most common and preferable route for drug delivery. This is attributed to patients' acceptance, ease of administration, accurate dose, cost-effectiveness of preparation and longtime stability. Extended release dosage forms which release the drug over extended periods of time are developed in order to improve the pharmacotherapy [1]. The advantages of extended release dosage forms include maintenance of a steady drug plasma level over prolonged time thus reducing the fluctuation of drug plasma level, maintenance of the therapeutic drug level hence stabilizing the medical treatment and reducing the side effect of drug, reduction in the frequency of drug administration which improves patient's compliance and consequence