UNIVERSITI TEKNOLOGI MARA

ORAL ABSORPTION STUDY OF LEVODOPA-LOADED CHITOSAN MICROPARTICLES

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ABSTRACT

Levodopa is the most common drug that has been used to treat Parkinson Disease. This study was conducted to increase the bioavailability of levodopa after size reduction andto study the pharmacokinetic profiles of levodopa loaded chitosan microparticles after oral administration. Levodopa-loaded chitosan microparticles has been formulated by using ionic gelation method. The characterization of microparticle was carried out by using Malvern Particle Size Analyzer to evaluate the mean particle size and uniformity of levodopa-loaded chitosan microparticle which was 39.9 μm. By using Scanning Electron Microscopy (SEM), the morphology of the levodopa loaded chitosan microparticle showed levodopa was encapsulated in the chitosan-sodium TPP polymer. The value of drug entrapment efficiency for the levodopa loaded chitosan was 75.06%. Fourier Transform Infrared (FTIR) showed that there was interaction and extension of hydrogen bonding between sodium TPP. The characterization by using X-Ray Diffraction showed the amorphous state of levodopa loaded chitosan after blended with chitosan. By pharmacokinetic study, it showed AUC value was 5664.19$\pm$132μg/ml.min as compared to the control (3436.17$\pm$385.52). The concentration of levodopa microparticles was significantly increased ($p < 0.05$) as compared to unprocessed levodopa.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF RESEARCH

Nowadays, polymer- micro and nanoparticles have been used widely in drug delivery system(Valente et al., 2012). Polymer nanoparticles as a carrier for drug delivery that biodegradable and biocompatible with the human body are suitable to deliver the drug to the target(Tahara et al., 2009).This type of carrier solves many problems with drugs such as insufficient dose, low solubility/dissolution, poor stability of the therapeutics and also uncertain potency. Nanoparticles are quite interesting candidates for drug delivery because of their benefits such as the ability to provide a large surface area and promote mass transfer of small molecules with precise kinetics (Valente et al., 2012). In the body, this drug delivery system can provides accurate dose of drug, with the right time, to the right target location, increase efficacy and compliance with minimize side effect of drug.

Basically, oral routes become a most frequent and convenient one to deliver the drug due to its high absorption in the small intestine. But, there are some limitations because the delivery of the drug moves through the digestive tract. Normally, absorption begins in the mouth and stomach but most drug usually absorbed from the small intestine before the drug travel to the liver. Differential drug