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THE EFFECT OF PREPARATION PARAMETERS ON THE IBUPROFEN-PLGA MICROPARTICLES USING SPRAY DRYING METHOD

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ABSTRACT

Spray drying method is one of technique that can be used to prepare Ibuprofen-poly (lactide-co-glycolide) (PLGA) microparticles. However, suitable and appropriate parameters are needed to prepare these microparticles that conform to optimal morphology, size distribution and yield to provide better and satisfied results upon characterization study. In this study, the effect of manipulating operating temperature of spray dryer or also known as the inlet temperature of a spray dryer towards microparticle shape, size and yield were investigated. Ibuprofen-PLGA microparticles were prepared by spray drying process under varying operating temperature of 37 °C, 45 °C, 55 °C and 67 °C. The other process parameters like feed rate, spray gas flow, sample concentration and organic solvent used are being standardized and constant.

Microparticles produced are being observed under Compound Research Polarizing Microscope for determination of shape and size. Most of microparticles observed under microscope were in spherical shape when operated under 45 °C. The yield is derived from calculation from equation based on weight. The yield of microparticles prepared by spray drying process was very low, and the highest yield was obtained when operating under 67 °C. Meanwhile smallest size range of microparticles was obtained when the operating or inlet temperature was set at 45 °C. The results thus revealed that optimal shape and size distribution for spray drying process was achieved under operating temperature of 45 °C despite the unsatisfactory yield.

CHAPTER 1

INTRODUCTION

1.1 Background of study

Poly (D, L-lactide-co-glycolide) (PLGA) is the polyester of choice due to its biodegradability, biocompatibility and physical properties which enable them to be prepared and shaped easily (Fu *et al.*, 2001). What is meant by biocompatible is that the polymer and their degradation products do not induce inflammatory responses in the blood or tissues. On the other hand, the biodegradable term propose that this polymer do not need to be removed surgically since it can be metabolised and excreted by natural pathways (Tsai, 2003).

Non-steroidal anti-inflammatory drug (NSAID) like ibuprofen (Ibu) is amongst the most commonly prescribed medications (Sam *et al.*, 2008). Ibuprofen is a propionic acid derivatives which posses anti-inflammatory, anti-pyretic, analgesic, and anti-thrombotic properties. Despite its therapeutic properties, NSAID is often associated with side effects, the most prominent being gastrointestinal disturbances.