

UNIVERSITI TEKNOLOGI MARA

**THE EFFECT OF PREPARATION VARIABLES ON
THE POLY(D,L-LACTIDE-CO-GLYCOLIDE)
(PLGA) MICROPARTICLES BY MODIFIED
EMULSIFICATION DIFFUSION METHOD**

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ABSTRACT

Poly(D,L-lactide-co-glycolide) (PLGA) is the most commonly used biodegradable polymer in microparticles and nanoparticles. The PLGA microparticles were commonly prepared by technique of evaporation but less with diffusion method. The aim of this study was to prepare and determine the effect of preparation variables on PLGA microparticles by the modified emulsification diffusion method. The preparation method consists of emulsifying a solution of polymer and an aqueous phase containing stabilizer, previously saturated, followed by adding excess water. The concept of this method used a binary mixture, dichloromethane (DCM) and acetone (ACE) as polymer solvents and using of PVA as stabilizer. Influence of process variables such two particular variables that are PVA concentration (0.1%, 0.5%, 1.0%, 2.0% and 3.0% w/v) and homogenizer speed (1000, 3000, 5000, 7000 and 9000 rpm) were studied. The discrete powder of PLGA microparticles was obtained by freeze drying. The mean particle size, particle size distribution and the morphology of the PLGA microparticles were evaluated. The results were clarified that both parameters, PVA concentration and homogenizer speed had influenced on the mean particle size and particle distribution of PLGA microparticles. As the PVA concentration and/or homogenizer speed increase, the mean particle sizes of PLGA microparticles were decreased. The prepared PLGA microparticles with different homogenizer speed were in unimodally dispersed particles with mean particle size of about range from 7 μm to 45 μm , whereas those prepared with different PVA concentration exhibited bimodal distribution with mean particle size of about range from 9 μm to 52 μm . The micrograph from scanning electron (SEM) revealed the surface of PLGA microparticles was not smooth and the particle size distribution was not good.

CHAPTER ONE

INTRODUCTION

1.1 Background

Poly(D,L-lactide-co-glycolide) (PLGA) is synthetic biodegradable polymer derived from lactic acid (Riberio et al., 2008). PLGA polymer containing 50:50 ratio of lactic and glycolic are hydrolysed much faster than those containing higher proportion of either of the two monomers (Jain 2000). PLGA prepared from poly lactic acid (L-PLA) and poly glycolic acid (PGA) are crystalline copolymers while those from D,L-PLA and PGA are in amorphous of nature (Jain 2000). PLGA undergo hydrolysis in the body to produce their monomers (Riberio et al., 2008) which are easily removed from the body throughout natural life process (Brown 2003).