

UNIVERSITI TEKNOLOGI MARA

**DEVELOPMENT OF MICROSPHERE OF POLYMER
CONTAINING DRUG BY SPRAY DRYING PROCESS**

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ABSTRACT

Clotrimazole is an antifungal agent that has very low bioavailability compared to other antifungal agents. The absorption profile for the clotrimazole was reported as lower than 0.5 % when applied topically. This value is lower than other antifungal agents. In order to increase the absorption profile and bioavailability of these agents, the clotrimazole was designed to be incorporated in the hydrophilic polymer barrier. The aim of this study was to develop the clotrimazole microsphere incorporated in the sodium carboxymethylcellulose (SCMC). The micropsheres were prepared by spray drying technique that can be proposed as an alternative of other methods. The drugs encapsulation efficiencies were closed to the theoretical values which are for 1 % (w/v) clotrimazole containing in 0.75 % (w/v) SCMC was 82.9 % and for 1 % (w/v) clotrimazole containing in 1 % (w/v) SCMC was 87.8%. The surface morphology of produced microsphere was analysed by using scanning electron microscope (SEM) and was found that SCMC polymer can produced microsphere with smooth surface, spherical but have some pimples at the surface. The average particle size of produced micropshere was ranged from 10 to 40 μm . Spray drying technique was a suitable method for the production microsphere of clotrimazole of barrier SCMC.

CHAPTER 1

INTRODUCTION

1.1 Clotrimazole

Antifungal agents are divided into topical and systemic use. The azoles group of antifungal was developed about three decades ago and consisted of two classes, the imidazoles and triazoles (Hardman and Limbird, 2001).

Clotrimazole, 1-[[[2-chlorophenyl] diphenyl methyl]-1 *H*-imidazole} (Figure 1.1) is a broad spectrum synthetic imidazole derivative, developed for the treatment of mycotic infections. Commonly, it is applied topically for the treatment of dermatophyte infections, vulvovaginal candidiasis, cutaneous candidiasis, pharyngeal candidiasis and ringworm (Hardman and Limbird, 2001; British Pharmacopoeia 1998).



Figure 1.1 Molecular structure of clotrimazole

Molecular weight: 344.8

(Taken from Abdel Moety *et al.*, 2002)