

UNIVERSITI TEKNOLOGI MARA

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

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ABSTRACT

The proposed paper describes the formation of clotrimazole loaded in a composite Hyaluronic acid (HA) microsphere by spray drying process. Clotrimazole, the lipophilic drug, was widely used as a broad spectrum antifungal agent all over the world. Its lipophilic properties limits its solubility in aqueous phase, therefore, preparing microsphere with hydrophilic polymer will helps its solubility in this medium. In this study, clotrimazole incorporated with sodium hyaluronate microsphere was determined using UV-visible spectrophotometer at its maximal absorption of 215nm wavelength. Briefly, prior to UV detection, the microspheres were initially diluted in the miscible solvent, methanol:water (2:1, v/v). The calibration graph was linear over the concentration range of 1-9 μ g/ml. The correlation coefficient of the calibration curve was ≥ 0.99 . The morphology, particle size, encapsulation efficiency and drug loading were also investigated. Study under analytical scanning electron microscopy revealed a smooth surface microsphere presenting a hole. The average size of drug loaded microsphere were 22.60-47.70 μ meter and 41.00-57.90 μ meter in diameter for microsphere produced from 11ml/min and 3ml/min respectively, the encapsulation efficiency was 84.71% and drug loading was 33.98% for microsphere produced from 11ml/min and 66.57% encapsulation efficiency and 74.29% for those produced from 3ml/min feed rate. Hence, clotrimazole-loaded hyaluronic acid microsphere could be considered as a basic unit to develop new device for the treatment of fungal infection.

CHAPTER 1

1.0 INTRODUCTION

1.1 Clotrimazole

The azole antifungal includes two broad classes; imidazole and triazole. Both classes share the same antifungal spectrum and mechanism of action. The systemic triazoles are more slowly metabolized and have less on human sterol synthesis than that the imidazoles (Goodman and Gillman, 2001). Clotrimazole, one of imidazole derivatives, was frequently used as antifungal agents, both clinical as well as agriculture. The antifungal activity is due to their capacity to inhibit cytochrome P450-mediated ergosterol synthesis (Navas et al, 2004).

Clotrimazole 1-[(2-chlorophenyl) diphenylmethyl]-1*H*-imidazole (CLO) (Figure 1.1) is a broad spectrum antifungal agent, interferes in the lipid synthesis of fungi thus causes an alteration of the permeability of the skin walls. Its efficacy spectrum includes all human pathogenic non invasive fungi; which are dermatophytes (species of *microsporum*, *tricholhyton* and *epidermophyton*) and yeasts (*candida* group and *malassezia furfur*). CLO is also active against gram-negative bacteria *trichomonas*. To