

Advanced Formulation and Comprehensive Pharmacological Evaluation of a Novel Topical Drug Delivery System for the Management and Therapeutic Intervention of *Tinea Cruris* (Jock Itch)

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Abstract

Aim: This research was initiated with an aim to formulate a controlled release local drug delivery system of luliconazole for the management of jock itch. **Methods:** To enable regulated medication release by using a quasi-emulsion solvent diffusion technique, microsponges containing liconazole were created and then implanted in transdermal gel. Total six formulations of Luliconazole microsponges were developed with different concentrations of drug and polymer and evaluated for size, shape, thermal characteristics, drug content and in-vitro drug release pattern. **Results:** The formulated microsponges' round shape and spongy texture were validated by the SEM assessment. Formulation LM 04 had the greatest drug content (93.58%), and the results of the in-vitro drug diffusion investigation show that 98.56% had been released after 12 hours. Drug release kinetics was monitored in all formulations. Formulation LMG 01 was chosen as the optimal formulation and integrated into a carbopol gel base based on drug content, in vitro drug release tests, and other assessment characteristics. When paired with a commercially available luteconazole gel, it was discovered that the in vitro drug release from the designed microsp sponge integrated gel was extended. **Conclusion:** The manufactured liconazole microsp sponge reduces the frequency of administration by delivering the medicine in a regulated release over an extended period of time.

Keywords: Topical, Transdermal, Microsponges, Luliconazole, Jock itch, Dermatophytes.

1. INTRODUCTION

Fungal infections are a prevalent cause of morbidity and other health problems. There are two types of fungal infections: internal and exterior. Between 20% and 25% of people worldwide suffer from fungal infections that are external and are linked to daily activities, unhealthy lifestyles, and low health awareness. Malassezia spp. infections, dermatophytes, and candida infections can all result in external fungal infections. Some aerobic fungi are called dermatophytes. In the outer layers of the epidermis, the dermatophytes multiply and digest keratin for development (1) (2).

Luliconazole is an imidazole antifungal drug that has a distinct structure because it incorporates the imidazole moiety into the structure of ketene dithioacetate. The R-enantiomer, luconazole, is more effective against a wide range of fungi, particularly dermatophytes, and has stronger antifungal action. A 1% cream called luconazole is used to treat jock itch and athlete's foot, which are brought on by dermatophytes such Trichophyton rubrum, Microsporum gypseum*, and Epidermophyton floccosum (3)(4).