

UNIVERSITI TEKNOLOGI MARA

THE EFFECTS OF SURFACTANTS ON THE  
PERMEATION OF CAFFEINE CREAM USING  
FRANZ DIFFUSION CELL

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## ABSTRACT

Caffeine is commonly used as a model of hydrophilic drug because of its ability to permeate through the skin. It is also used as an active compound in many commercial preparations such as anti-cellulite cream, gels, moisturizers, serums and shampoos. However, the stratum corneum which is the hydrophobic layer of the epidermis of skin is the main protective barrier for to the caffeine to pass through the skin. The aim of this study was to investigate the caffeine cream permeation profile with or without co-administration of surfactants including Cremophor EL, Labrasol, Labrafil through the synthetic membrane and rat skin by using Franz diffusion cell. The cumulative permeation amount of caffeine cream with presence of surfactants (Cremophor EL, Labrasol, Labrafil) showed higher permeation rate compared to caffeine cream (control). Among surfactants used, the presence of Labrasol in caffeine cream significantly ( $p < 0.05$ ) increased the caffeine permeation through synthetic membrane and rat skin. The use of Labrasol in the caffeine cream formulation has the potential to increase the permeation rate through transdermal delivery, thus, increase its therapeutic effects.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of study

The drug can be delivered to the body by many routes of administration which including the skin for local and systemic effects (Pathan & Setty, 2009). The topical drug administration can be defined as a drug delivery system which use skin as routes of administration especially for localized effects (Bharadwaj & Gwalior, 2012). The products that are topically administered for their local action including the semisolid dosage form such as creams, ointments and gels. Generally, caffeine can be found commonly in consumed beverages such as coffee, tea and cola. It is used as an active compound in many commercial preparations such as anti-cellulite cream in cosmetic (Bolzinger *et al.*, 2008). Caffeine is used because of its ability to permeate through the skin and high biological activity (Herman & Herman, 2013). In order to reach the bloodstream, a drug must first pass through few layer of skin. However, the stratum corneum which is the hydrophobic layer of the epidermis of skin is the main protective barrier for to the caffeine to pass through the skin. Thus, in order to enhance the drug permeation through skin, both the chemical penetration enhancer and physical methods can be used to disrupt the permeability of the stratum corneum structure (Pathan & Setty, 2009).