

UNIVERSITI TEKNOLOGI MARA

***IN VIVO* SKIN PERMEATION STUDY OF MEDIUM-CHAIN
TRIACYLGLYCEROLS (MCTs)**

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ABSTRACT

This study was carried out to investigate the *in vivo* skin permeation of α -tocopherol in medium chain triacylglycerols (MCTs) vehicles namely virgin coconut oil (VCO) and structured virgin coconut oil (SVCO) creams. MCTs act as permeation enhancers in pharmaceutical and cosmeceutical formulations. VCO contains mainly of 12 carbon chain lengths and lauric acid whereas SVCO which was produced by acidolysis of caprylic acid and VCO contains 60% of caprylic acid with 8 carbon chain lengths. The skin tape- stripping technique was applied to evaluate the level of α -tocopherol retained in the stratum corneum (SC). The amount of α -tocopherol was quantified using high performance liquid chromatography (HPLC). The results showed that both permeation enhancers increased the permeation of α -tocopherol into the stratum corneum, viable skin and the skin surface. The amount of α -tocopherol recovered from the skin surface by VCO was $55 \pm 12\%$ and SVCO was $60 \pm 11\%$. The amount of α -tocopherol recovery from viable skin by VCO was $6 \pm 13\%$ and SVCO was $7 \pm 14\%$ while the amount of α -tocopherol recovery from stratum corneum by VCO was $11 \pm 12\%$ and SVCO was $12 \pm 13\%$ respectively. In conclusion MCTs creams promote the permeation of α -tocopherol into the stratum corneum, viable skin and skin surface by modulating the barrier function of the skin.

CHAPTER 1

INTRODUCTION

1.1 Background

The skin is the primary defensive barrier for the body to numerous environmental, chemical, and physical agents, such as ultraviolet light, air pollutants, and chemical oxidants that cause oxidative stress (Heather *et al.*, 2003). Oxidative stress and subsequent oxidative damage is likely an important factor in the pathogenesis of skin cancer and photo aging (Packer *et al.*, 2001). Besides external inducers of oxidative attack, the skin has to cope with endogenous generation of reactive oxygen species (ROS) and other free radicals, which are continuously produced during physiological cellular metabolism. To counteract the harmful effects of ROS, the various compartments of the skin (stratum corneum (SC)/skin barrier, epidermis, dermis, subcutaneous) are equipped with layer specific antioxidant systems, which help to maintain equilibrium between ROS and antioxidants and thus prevent oxidative stress (Jens *et al.*, 2007). Facial skin, especially, is exposed to a variety of environmental oxidants and therefore requires antioxidant protection. Because vitamin E is the most potent lipid-soluble antioxidant *in vivo*, it is thought to play an important role in skin protection (Heather *et al.*, 2003).