



CHAPTER I

Introduction

The protection against solar radiation is available in the form of topically applied sunscreen product. With the awareness of the effect of UV radiation on the skin, the roles of sunscreen products are thus important today (1-3). Ultraviolet chemical absorbers are widely used in sunscreen preparations to protect human skin from UV radiations. Therefore, it is important to conduct more intensive research on their various properties.

Study of the penetration property of sunscreen preparations is highly useful (4) since they are often applied on large skin areas. The efficacy of a sunscreen preparation against UV radiations depends not only on absorption spectrum of chemical filters but also on the type of emulsion and vehicle properties. Low penetration profiles and high photoprotective efficacy play a very important role in any safe cosmetic sunscreens.

This research aims to evaluate the transdermal penetration of UV filters incorporated in two emulsions. Cream bases generally used are oil in water emulsion and water in oil emulsion. It is apparent that oil in water emulsion has been preferably used; one of its disadvantages is that the oil in water emulsion can be easily removed or wash-off by water. So, one of the objectives of this study was to improve the cream bases by means of incorporating the water resistant vehicle into the cream base (5). Silicone oil 350 cps in a concentration of 3% w/w was used as water resistant vehicles.

In the United States, sunscreen products are regulated as over the counter drugs, and their safety and Sun Protection Factor (SPF) claims must

be established according to the Food and Drug Administration's regulations (6). These regulations require the SPF to be determined under specific conditions using human subjects. Historically, prior to final human SPF testing, *in vivo* SPF screening studies were performed using guinea pigs. With the suspension or banning of animal testing by many manufacturers of personal care products, a need now exists for reliable *in vitro* screening assays.

Early attempts to define sunscreen protection by *in vitro* methods involved measuring the transmission of UV light through a dilute solution of sunscreen (7) or measuring the UV transmission through a film of sunscreen applied to a quartz glass (3). However, Groves et al.(8) were able to show that these methods cannot be used reliably due to their overestimation of the SPF value. Recently Diffey and Robson (9). described a rapid method for the determination of SPF by measuring the amount of UV light transmitted through Transpore™ tape with and without sunscreen applied close agreement between the *in vitro* and *in vivo* data was observed. Other investigators have measured the transmission of UV light through biological substrates (e.g., skin from hairless mice) as a means of determining SPF values (10).

The purpose of this studies were

- : to investigate skin penetration of sunscreen agent in oil in water emulsion and water in oil emulsion
- : to determine the SPF value by both *in vitro* and *in vivo* method.