



## CHAPTER I

### INTRODUCTION

Ointments are semisolid preparation for external application such consistency that they may be applied to the skin with or without inunction. Ointment may serve as vehicle for topically application as emollient and / or as protection and occlusive dressing on the skin.

Ointment base plays important role on drug absorption into the skin, the selection of ointment base generally depending on the compatibility, and the rate of skin penetration of ointment type.

#### Ointment Types (2, 3, 6, 13)

##### 1. Oleaginous Ointment Type.

The oleaginous ointment bases are generally low water absorption capability, included fixed oils of vegetable origin, fats and waxes obtained from both vegetables and animals, and semisolid hydrocarbons obtained from petroleum. The vegetable oils are used chiefly in ointments to lower the melting point or to soften bases of higher consistency.

##### 2. Absorption Ointment Type.

These bases are generally anhydrous substances which have the property of absorbing considerable quantities of water and still retaining their ointment-like consistency. Preparation of this type do not have water as a component of their basic formula, but if water is incorporated, a water in oil emulsion results.

### 3. Emulsion Ointment Type.

These preparations can be divided into two groups on the basis of emulsion type : emulsion ointment base water-in-oil type and emulsion ointment base oil-in-water type.

### 4. Water-Soluble Ointment Type. (Greaseless ointment type)

These bases are prepared from the higher ethylene glycol polymers known as Carbowax compounds. The Carbowaxes have a wide range in molecular weights ranging from 200-700 are liquids, those above 1000 are wax-like solids. Carbowaxes are water soluble, nonvolatile unctuous agents. They do not hydrolyze or deteriorate and will not support mold growth.

### Percutaneous Absorption

Blaug, S. M. (3), Idson, B. and Lazarus J. (6) and Parrott, E. L. (7) had described the route of percutaneous absorption that may occur as follows.

1. transepidermal, through or between the cells of the stratum corneum (outer layer of the skin) as shown in figure 1,
2. transfollicular, through the walls of the hair follicles, and
3. through the walls of the sebaceous or sweat glands.

### Factors Affecting Percutaneous Absorption (3, 5, 6, 13)

1. Skin condition.
2. Skin ages.
3. Increased blood flow.
4. Regional skin sites



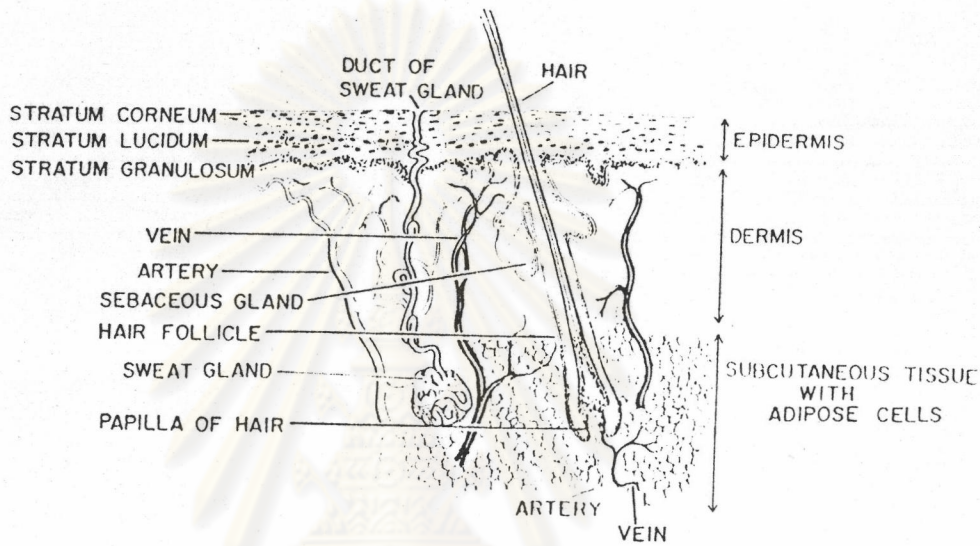


Figure 1 Vertical section of human skin.

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5. Species variation.
6. Hydration
7. Temperature.
8. Drug concentration.
9. Drug solubility characteristics.
10. Molecular characteristics of drugs.
11. Vehicles.
12. Penetration enhancers (additives).

In Thailand there are several indigenous raw materials which could be used to produce oils and waxes for incorporating in ointment base formula, in which so far they are not yet employed. These include banana wax from banana peel waste, sugarcane wax from industrial sugarcane waste, filter mud and ricebran wax from industrial waste from ricebran oil factory.

The Pharmaceutical and Natural Research Division, Thailand Institute of Scientific and Technological Research (TISTR) have carried out the research and development on the production of waxes from industrial waste since 1975. With the idea to made uses of these product in drug and cosmetic preparation.

The study on the releasing property of Me. Sal. from some natural waxes is one of the project task which will provide important technical basic data information to support the justification of the utilization of these waste material in ointment base for drug industry.

#### Statement of Problem.

Me. Sal. O. is one among the most popular household preparation for muscle pain treatment. Beeswax is usually employed as an important



consistency controlling ingredient, which provide appreciable result, but the cost of beeswax has increasing sharply during the last five years, thus this study aims to find out other raw material (s) to replace the beeswax in the Me. Sal. O. Theobroma oil and carnauba wax which are usually employed to control the consistency of ointments, were also included under this study, as existing vegetable wax control. This experiment is planned to determine suitable vegetable waxes, of which its raw materials are locally available, to replace the beeswax, in ointment bases preparations.

#### Purpose of Study.

The purpose of this investigation is to compare the amount of Me. Sal. released from the ointment bases of banana wax, carnauba wax, ricebran wax, sugarcane wax, and theobroma oil versus beeswax in vitro and in vivo.

#### Experimental Procedure.

Step I : Preparation of Me. Sal. O.

Oleaginous type ointment base was selected for this study.

Step II : Study on the property of Me. Sal. releasing from each wax.

In vitro, the diffusion technique described by Bottari, F. et al (4) had been employed.

In vivo, the technique described by Wurster and Kramer. (8) had been employed.

Step III : The interpretation of the result of the study.

The result obtained, from in vitro and in vivo, of each wax will be compared closely with that obtained from beeswax.