CHAPTER 1

Introduction

1.1 Motivation

Routine dental prophylaxis for the removal of exogenous stains, pellicle, materia alba, and oral debris is a widely used procedure in the dental office. Ideally a dental prophylaxis paste should be sufficiently abrasive to remove effectively all types of accumulation from the tooth surface without imparting undue abrasion to the enamel, dentin, or cementum *(1)*. The abrasive selected should be harder than the surface stain being removed and softer than the tooth surface, although this is not always practicable. If the tooth structure is excessively roughened during the procedure, it should be polished with a fine abrasive, otherwise, plaque and food substances will easily adhere to it *(2)*. An acceptable prophylaxis paste will possess properties of both a high polishing and low abrasion rate *(3)*. The most common abrasives used in prophylaxis pastes are pumice, silica, perlite, diatomite, zirconium silicate, and other silicates. They are usually supplied in various particle sizes (coarse, medium, fine), which produce different rates of abrasion and sizes of scratches. Fluorides are incoporated into prophylaxis pastes to help prevent dental caries *(2)*. In addition, an ideal prophylaxis paste should contain abrasives which grit sizes decrease and which sharp edges become rounded during use *(4)*.

People in industrialized countries live longer and retain more of their natural teeth than their ancestors did only two decades ago. This development is attributed to a decreased incidence of caries and periodontitis as a consequence of improved home dental care and regular lifelong professional dental maintenance programs *(5,6)*. Unfortunately, frequent use of tooth brushes, dentrifrices, and prophylaxis pastes can significantly abrade dental hard tissue, which can be further aggravated by scaling and root planning *(7)*. These problems are related to the relative abrasion of dentin and enamel by dentifrices and polishing pastes *(8)*. Many clinicians

use only one prophylaxis paste, although patients present with various degrees of stain and plaque, may require only a polish, or may or may not have exposed dentin *(9)*.

An ideal paste should decrease its cleaning potential during use while simultaneously increasing its polishing potential. The resulting properties, which would be friendly to hard tissue *(8,10)*. In addition, raw materials for prophylaxis pastes are available in Thailand. Contrariwise, all the prophylaxis pastes are imported from aboard. Because of this, it will be very worthwhile to start a research on the preparation of prophylaxis paste using local materials.

1.2 Objective

To prepare prophylaxis paste from local materials and study its possibility for clinical application.

1.3 Scope

Selected local minerals are characterized for paticle size distribution and phase composition by physical and chemical means, respectively, and formulated into prophylaxis pastes.

The paste property, abrasion and polishing rate on human teeth, is evaluated by visual inspection using an optical microscope and also by measuring the Ra value (average roughness) using a profilometer. The experiment is conducted in parallel with the commercial prophylaxis paste and the results are evaluated following the ASTM: F 1877-98 and ISO 4288-1996.

1.4 An advantage to be expected from this research

To obtain paste, made from local materials, which have properties close to those of commercial grade, hence import substitute is possible.

1.5 Experimental Procedure

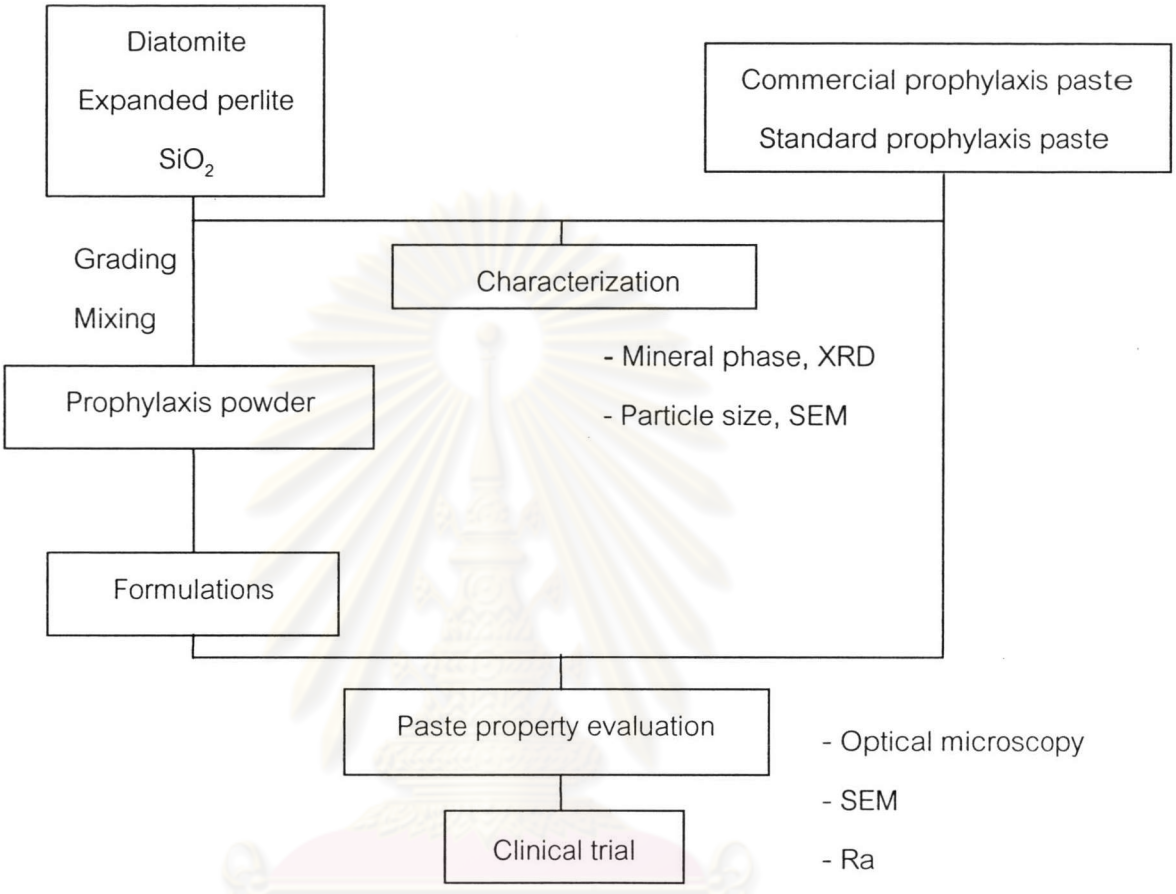

Fig 1.1 Flow chart of experimental procedure