

CHAPTER I

INTRODUCTION

In each year, there are a number of patients suffering from scar appearance. Scar prevention and management continue to be important issues.

Natural rubber, cis-1,4-polyisoprene, is an elastomer derived from the *Hevea brasiliensis* trees. Natural rubber has already been studied as a matrix for nanocomposite with crab shell chitin whiskers (Nair et al., 2003) and cellulose whisker (Bras et al., 2010). Nevertheless, the presence of protein in the natural rubber latex can cause severe allergy in sensitive persons. Thus, deproteinization step is an important process to ensure that natural rubber is safe to be used as health care products (Wagner et al., 1999).

Chitin whiskers are crystalline nanofibrils obtained by acid hydrolysis of chitin or poly β -(1-4)-N-acetyl-D-glucosamine. Chitin whiskers have been reported to be used as a reinforcing material in the composites in order to improve the mechanical properties (Sriupayo et al., 2005) and dimensional stability of the composites (Wongpanit et al., 2007).

Virgin coconut oil (VCO) is a vegetable oil that is extracted from the kernel or meat of coconut fruits. It is rich in lauric acid and vitamin E. Inside the body, lauric acid is converted to monolaurin which has powerful anti-viral, anti-microbial and anti-fungal activities. In addition, VCO will help to reduce skin inflammation and promote wound healing process (Manisha et al., 2011).

Pluronic is a non-ionic triblock copolymer of polyethylene oxide-polypropylene oxide-polyethylene oxide. Pluronic has amphiphilic characteristic and can self-assemble to form micelles in an aqueous solution. Micellization at a fixed concentration occurs above a critical micelle temperature (cmt) or at a fixed temperature above a critical micelle concentration (cmc) (Boucenna et al., 2009). Pluronic has been widely use in several industries, especially in cosmetics and pharmaceuticals. Moreover, pluronic has been reported to improve blood flow on a

burn wound, resulting in less scar (Baskaran et al., 2001), therefore, pluronic is an attractive substance for wound treatment.

In this study, chitin whisker-reinforced natural rubber bionanocomposite sheet containing coconut oil in pluronic micelles was fabricated by solution casting. The effect of the ratio of oil to pluronic on micelle formation and micelle stability were determined. The effects of coconut oil and chitin whisker content on tensile strength and elongation at break of the bionanocomposite sheets were evaluated. The diffusion of coconut oil from the bionanocomposite sheets was examined by using modified Franz diffusion cells.