CHAPTER I
INTRODUCTION

In the treatment of wound, the promotion of rapid wound healing with the best functional and cosmetic results is the most important to wound healing (Wiseman DM et al., 1992; Dale J, 1997). Wound healing is a dynamic process and the performance require-ments of a dressing can change as healing progresses. The most agreeable wound care and wound healing theory is wound healing by closing wound with moist wound healing environment (Muangsombat et al., 2006).

Development to an ideal wound dressing is based on the scientific basics of moist environment at the wound interface, allow gaseous exchange, act as a barrier to microorganisms and remove excess exudates. It should also be non-toxic, non-allergenic, non-adherent and easily removed without trauma, and it should be made from a readily available biomaterial that requires minimal processing, possesses antimicrobial properties and promotes wound healing. Currently, a large number of research groups are dedicated to producing a new, improved wound dressing by synthesis and modifying biocompatible materials (Draye JP.et al., 1998; Shibata H. et al, 1997; Ulubayram K. et al, 2001).

The interesting material for use in medical science is silk. Since it is natural material that has good mechanical properties including tensile strength, elasticity and toughness (Kaplan et al., 1998). So, it has been used as biomedical suture for a long time (Asakura et al., 1994). Moreover, SF has permeability to oxygen and water, cell adhesion and growth characteristics, relatively low inflammatory response (Vepari et al., 2007). Therefore, it is an attractive natural fibrous protein for biomedical application such as a cell culture substrate(Gotoh et al., 1997), controlled drug release (Hofmann et al., 2006; Wang et al., 2007;Mandal et al., 2009), tissue engineering (Wang et al., 2006; Lawrence et al., 2009; Fang et al., 2009; Zhang et al., 2008; Cai et al., 2009) including a substrate for wound dressing since it can control wound exudates and can provide moist environment to a wound resulting in better wound healing (Schneider, et al., 2009). However, silk has no antimicrobial activity to prevent wound infection. So, in this work, coconut oil was incorporated into silk fibroin

Coconut oil has been reported to be beneficial to human health because it is the source of important physiologically functional components that are found in the fat part of whole coconut.The fat part consist of high saturated chain that has lauric acid as major fatty acid. Lauric acid that can be antibacterial and improves the immune system's anti-inflammatory response. Moreover, coconut oil contain high vitamin E in form of phenolic substances, tocopherol and tocotrienol that relate to antioxidant properties (Kapila, et al., 2009).

The objectives of this work were to investigate the condition for incorporate coconut oil into silk fibroin by varying the concentration of silk fibroin, coconut oil as well as surfactant and in this study was Pluronic f68. After understanding the emulsification of the fibroin/oil mixture, the wound dressing materials were fabricated via air-drying technique. The air-dried materials were coated with silk fibroin solution and subsequently dried under ambient condition. There after, the oil-incorporated silk fibroin sheet coated with silk fibroin layer were subjected to study of oil release behavior, water absorption, water evaporation and anti-bacterial activity againts both Gram positive (*Staphylococcus aureus*) and Gram negative (*Escherichia coli*).