CHAPTER I
INTRODUCTION

Wound dressing materials have been developed for a long time. There are many different types of wound dressing materials. For the conventional wound dressings such as cotton, gauze can absorb exudates but it cannot provide moist environment that result in stripping off the new regenerating skin and causing some pain while removing the wound dressing off the skin. It also does not flexible which lead to enhance an improvement of new wound dressing materials. Active wound dressings have improved the efficiency of wound treatments because it can retain and create a moist environment around the wound, including synthetic polymers and biopolymers (Boating *et al.*, 2008).

In the present day, biopolymers are very interesting materials because of environmentally friendly, biodegradable, biocompatible and non-toxic which is an important factor in wound dressing material.

Bacterial cellulose can be synthesized by *Acetobacter xylinum* in the form of ultrafine network of cellulose nanofibers (Vandamme *et al.*, 1998). Due to this unique structure, bacterial cellulose can provide many advantages in wound care treatment. For example, it can provide moist environment, high exudates absorption, allow gas exchange, close wound coverage, allow easy and painless removal, high mechanical strength, high purity, nontoxic and biocompatibility (Czaja *et al.*, 2007). All of these properties, bacterial cellulose can be considered as an ideal wound dressing material. However, bacterial cellulose itself has no antibacterial property to protect wound against infection (Wei *et al.*, 2011). Recently, several studies have successfully prepared the combination of bacterial cellulose with other natural polymers such as gelatin (Nakayama *et al.*, 2004), collagen (Zhijang & Guang, 2011), aloevera (Saibuatong & Phisalaphong, 2010) and alginate (Phisalaphong *et al.*, 2008).

Silk sericin is removed from silk fibers by degumming process as waste material which cause water pollution (Zhang, 2002) ,thus lead to investigation of silk sericin to make more value added product. Recently, Silk sericin is useful as coating material for biomedical applications. Due to its biocompatibility, nontoxic (Aramwit & Sangcakul, 2007), antioxidant (Kato *et al.*, 1998; Dash *et al.*, 2007), moisturizing capability (Padamwar *et al.*, 2005) , promoted cell proliferation (Teramoto *et al.*, 2008) and cell attachment (Tsubouchi *et al.*, 2005) which can promote for wound healing process. However, the structure of sericin is amorphous that result in quite fragile and not easy to fabricate (Namviriyachote *et al.*, 2009).Thus, sericin should prepare with another matrixes for support itself.

Chitosan (poly-β(1-4)-D-glucosamine), a cationic polysaccharide, is obtained by deacetylation of chitin with alkaline, the principal exoskeletal component in crustaceans. Furthermore, chitosan has many useful biological properties such ashemostasis and acesodyne activity, wound healing property, reducing scars, bacteriostasis, biocompatibility, biodegradability and so on (J. Kim *et al.*, 2011). Chitosan and its modified analogs have shown many applications in medicine, cosmetics, agriculture, biochemical separation systems, biomaterials and drug controlled release systems. So, it is very suitable to be a kind of wound dressing material.

The objective of this study is to prepare bacterial cellulose containing chitosan and sericin for wound dressing material application in an attempt to use the synergic beneficial of those materials. The antibacterial activity, antioxidant activity, water vapor transmission rate, and protein releasing will be evaluated.