CHAPTER I

INTRODUCTION

Xyloglucan polysaccharide is found in the primary cell walls of higher plants such as apple, onion, corn and tamarind, etc (Hoffman et al., 2005). Xyloglucan from these plants are different in structural features and molecular weights, therefore different physicochemical properties including viscosity, solubility, gelling, freeze–thaw stability and film formation were reported. Sims et al. (1998) had studied the rheological properties of xyloglucans from three plants; *Nicotiana plumbaginifolia* cells, apple pomace and tamarind seeds. The result showed that xyloglucan from tamarind seeds gave the highest viscosity and the greatest stability over the acid pH range.

Xyloglucan polysaccharide derived from tamarind seed is composed of a (1-4)-β-D-glucan backbone chain which has (1-6)-α-D-xylose branches that are partially substituted by (1-2)-β-D-galactoxylose. The tamarind seed xyloglucan is composed of three units of xyloglucan oligomers with heptasaccharide, octasaccharide and nonasaccharide, which differ in the number of galactose side-chains (Kawasaki et al., 1999).

Tamarind seed xyloglucan possesses many attractive properties such as high viscosity, broad pH tolerance and adhesiveness. This led to its application as stabilizer, thickener, gelling agent and binder in food and pharmaceutical industries (Sumathi and Ray, 2002). In addition to these properties, tamarind seed xyloglucan showed non-carcinogenicity (Sano et al., 1996), sol to gel transition (Yamanaka et al., 2000; Shirakawa, Yamatoya and Nishinari, 1998), mucoadhesivity (Burgalassi et al., 1996), biocompatibility, high drug holding capacity and high thermal stability (Pongsawatmanit et al., 2006). This led to its application as an excipient in drug delivery system namely tablet (Sumathi and Ray, 2002) and in situ gelling formulations (Takahashi et al., 2002; Miyazaki et al., 2001; Suisha et al., 1998).

Centella asiatica extract is a mixture of triterpenes such as madecassic acid, asiatic acid and asiaticoside and used as wound healing agents (Cheng and Koo, 2000). The European Agency for the Evaluation of Medicinal Products Veterinary

Medicines Evaluation Unit (1998) reported that madecassic acid, asiaticoside and asiatic acid acted on fibroblast cells and equilibrated collagen fiber synthesis. The overall effects contributed to the restoration of elastic connective tissue, a reduction in fibrosis and a short in the time necessary for wound healing. The development of *Centella* extract into film attached on skin for wound healing might prolong the existence of the active substances on skin and sustained the action.

In this study, it has been aimed to develop the extraction method and to evaluate properties of extracted xyloglucan from tamarind seeds. Besides, this study also focused on development and evaluation of film formulations of extracted tamarind seed xyloglucan consisting of *Centella asiatica* extract.

The purposes of this study were:

1. To develop the extraction method of xyloglucan from tamarind seeds.
2. To evaluate properties of tamarind seed xyloglucan
3. To develop film formulations of tamarind seed xyloglucan containing *Centella asiatica* extract.
4. To evaluate properties of prepared films such as physicochemical properties, mechanical properties, i*n vitro* release study, skin permeation and stability.