CHAPTER I
INTRODUCTION

The coconut trees are mostly grown in Thailand, thereby we obtained a lot of coconut juice for food products. One of the most famous food products from coconut water is Nata de coco, which is well known as dessert, produced by fermentation of coconut water with a culture of Acetobacter xylinum. Glucose in coconut juice is converted into bacterial cellulose that is metabolized by Acetobacter xylinum. The main component of Nata de coco is bacterial cellulose (Halib *et al.*, 2012). Bacterial cellulose is one of the most attractive biological based materials and a nano-biomaterial which provides many unique properties (Hong *et al.*, 2008). It has also a wide variety of potential applications.

Among many applications of bacterial cellulose, a selective membrane is an interesting application. Bacterial cellulose has been introduced to use as a membrane because of its superior mechanical properties, high resistance to chemical corrosion, biodegradability, ease of tailorability and economical processing (Pandey *et al.*, 2005). Consequently, bacterial cellulose is chosen for this work as a hydrophilic membrane for CO_2/CH_4 separation.

Due to the increasing of demand for the use of natural gas as the principal feedstock for the chemical industry (Yeo *et al.*, 2012), the purification of natural gas is also an important process. Generally, the compositions of natural gas include methane, other light hydrocarbons, such as ethane and propane, and heavier hydrocarbons. In addition, carbon dioxide, hydrogen sulfide, helium and nitrogen at varying concentrations can be contained in natural gas as well. Therefore, the separation of CO_2 from natural gas is an important industrial process because at higher concentrations, it contributes to pipeline corrosion, etc. In this work, membrane technology will be used for CO_2 separation because of the various advantages of membrane separation technology.