

## CHAPTER I

### INTRODUCTION

Recently, there are many problems in the transport of food. For instance, food products are sent from processing factories to another that has long distance which makes products spoiled easily because of temperature and bacteria. Industries try to keep their freshness and quality as much as possible by using either ice or freeze but still have not enough thus in this work provided the sensor inform of films to examine their spoiling.

There are many kinds of the sensors such as radio frequency identification (RFID), chemical sensor, etc. Potyrailo *et al.* 2012 used RFID for checking the quality and freshness such as milk or fish during transportation. In this work, we are interested to use conducting polymer to produce sensor because it can change conductivity. Polyaniline (PANI) is the most studied conducting polymers or organic metal to use as sensor. We recently developed sensor for food packaging by using conducting polymer capping metal nanoparticles to enhance conductivity because of easy synthesis, environmental friendly and stability, and low cost.

Conducting polymer, PANI can synthesize with many methods such as wet spinning, redox, atom transfer radical, redox, electrochemical, chemical oxidative, in situ polymerization even polymerize based on temperature and etc. Generally, PANI has limitation of solubility, it cannot soluble in water, but there are many researchers such as Detsri and Dubas., 2013 and Kuo and Wen., 2008 who can overcome by using interfacial polymerization. In this study, PANI was synthesized by interfacial polymerization between organic and aqueous phase solutions in which the anionic polymer was used as stabilizing, capping and template, APS as oxidant and acid as dopant. Then, nanoparticles were prepared using PANI as capping agent to make sensor. Sensor was prepared by the layer-by-layer (LbL) self-assembly technique to build up the monolayer for thin film fabrication based on the electrostatic interaction between positive and negative charges of macromolecules because its procedure is simple, does not require any organic solvent and only small amount of chemicals are used. When food starts spoiling, sensor will change the color or optical and conductivity properties.

The purpose of this work is to produce new hybrid films for food packaging sensors by using polyaniline/metallic nanoparticles to obtain food quality by changing color or conductivity of sensor.