CHAPTER I
INTRODUCTION

Nowadays packaging plays an increasingly important role in the whole food chain 'from the field to the customer's table'. As an example, many fresh agricultural products such as berries and mushrooms are picked in the field or the green house directly into customer packages and plastic or fiber-based trays. The product is thus touched once before it reaches the customer. Another example is ready-to-eat food and snack products which are packed in microwaveable trays which allow consumer to prepare the food immediately and even serve as an eating dish.

Food packaging has developed strongly during recent years, mainly due to increased demands on product safety, shelf-life extension, cost-efficiency, environmental issues, and consumer convenience. In order to improve the performance of packaging in meeting these varied demands, innovative modified- and controlled-atmosphere packaging, and active and intelligent packaging systems are being developed, tested and optimized in laboratories around the world. All these novel packaging technologies have great commercial potential to ensure the quality and safety of food with fewer or no additive and preservatives, thus reducing food wastage, food poisoning and allergic reactions. Intelligent packaging can also monitor product quality and trace a product's history through the critical point in the food supply chain. An intelligent product quality control system thus enables more efficient production, higher product quality and a reduced number of complaints from retailers and customers. Intelligent packaging will also give the food industry the means to carry out in-house quality control required by food regulators.

The intelligence of a package can be based on the package's ability to give information about the requirements of the product quality like package integrity (leak indicators) and time-temperature history of the product (time-temperature indicators). Intelligent packaging can also give information on product quality directly. A freshness indicator indicates directly the quality of the product. The indication of microbiological quality is, for example, based on a reaction between the indicator and the metabolites produced during growth of the microorganisms in the product. Of the indicators mentioned, time-temperature indicators and leak indicators are already

commercially available and their use is increasing constantly. An indicator that would show specifically the spoilage or the lack of freshness of the product, in addition to temperature abuse or package leaks, would be ideal for the quality control of packed products. The number of concepts of packed indicators for contamination or freshness detector of food is still very low, however new concept of freshness indicators are patented and new commercially available products are likely to become available in the near future. Due to a customer convenience, pH-sensitive materials can be used to indicate the spoilage of fresh beverages such as milk and fruit juices. In stead of seeing on the expired date screened on the package, pH-sensitive materials applied in the package can be easier to know when the beverages become bad.

In this study, we have focused on the processing of pH-sensitive materials used for milk packaging based on organomodified clay. The properties including thermal and mechamical properties of polypropylene blended with organomodified clay were determined. The dyes were incorporated in nanoclay before fabricating PP/nanoclay composites sheet. The capability to use this nanocomposite film as pH sensitive packaging was evaluated.