

CHAPTER I

INTRODUCTION

1.1 Background

Nowadays, people are more concerned toward the health. Many ways are done in order to achieve better health status; starting from consuming nutritious food, exercising, and even taking supplements that are believed to raise the health status. In recent years, people have started to focus on the food that can prevent some disease, especially the degenerative disorder that is caused by the tissue damage. The damage of the cells itself caused by to the oxidative damage, which has been known can be inhibited by antioxidants activity.

Many studies have been performed to learn about health protective mechanisms from food. Various antioxidant components have been found naturally in many kinds of food, such as from fruits, vegetables, several beverages and even herbs. The natural foods contain natural antioxidant that can scavenge the free radicals. The natural antioxidants are found in various types such as polyphenols, glucosynolates, carotenoids, vitamin C and vitamin E. These antioxidants are called as phytochemical antioxidants, which are bioavailable in biological fluid and able to prevent retard chronic disease (Aljadi and Kamaruddin, 2002; Blasaet. *al*, 2010).

Many kinds of food have been studied and claimed to have antioxidant; and one of the food is honey. Honey has been used as food since ancient times and is traditionally used as sweetening agent. Many people believe that honey gives better benefit toward health compares to refined sugar. Many studies

conducted in honey found that honey contains antioxidant and antimicrobial compounds. The antioxidant compounds that have been identified are the phenolic compounds including phenolic acids and flavonoids, ascorbic acid, and some enzymes such as glucose oxidase, catalase, and peroxidase (National Honey Board, 2001; Jaganathan and Mandal, 2009). However, the antioxidant capacity and composition in honey is depending on the floral source used to collect nectar, and it also depends on the seasonal, environmental factors including geographical, and the processing effect.

Besides the antioxidant content, people are also focusing on the ability of these components to inhibit the oxidation process. Oxidation process itself is known to give negative effect for example as occur in lipid. Lipid oxidation itself gives damaging effect such as deterioration of food due to the loss of flavor, quality and nutrition and also health risks. The natural occurring lipid oxidation can be seen in meat. The oxidation occurs in meat is caused by negative impact toward meat quality and also consumer health due to the formation of lipid peroxidation. Thus, the addition of natural antioxidant would be the best preference to avoid the lipid oxidation which happens in meat especially during cooking.

In recent years, there have been several researches found that non enzymatic browning reaction, which is Maillard reaction, can form the chemical compounds which possess antioxidant properties. The unexpected functional property is studied further to understand the ability of these compounds to prevent oxidation process. Maillard Reaction Product (MRP) plays key role in extending the shelf life of food by slowing down the rate of desirable oxidation reactions.

Honey itself contains reducing sugar and can undergo Maillard reaction by heating process. Therefore, study of preformed MRP on honey regarding with its ability to prevent the lipid oxidation occur in meat is conducted.

1.2 Research Problem

Honey is a natural food that commonly used as sugar alternatives. Besides the natural antioxidant content, honey also can form MRP which is also found to have antioxidative activity. Formation of MRP will depend on the temperature and time, therefore the best activity is chosen based on the combination of treatment. The correlation between raising of antioxidant activity in honey due to formation of MRP has not been investigated to prevent the oxidation process, especially in preventing the lipid oxidation, eventhough the honey without MRP or the MRP synthesize compounds' activity in preventing lipid oxidation have been learned through some studies. Therefore, in this research the antioxidant activity of honey due to the formation of MRP will be analyzed and the ability of honey contain MRP to prevent lipid oxidation in meat will be studied.

1.3 Objectives

1.3.1 General Objective

The general objective of this research is to know the antioxidant ability of honey due to prolong heat treatment in order to prevent lipid oxidation that occurs in meat.

1.3.2 Specific Objective

The specific objectives of this research are:

- 1) to analyze the free radical scavenging activity and phenolic content of Indonesian honey affected by prolong heat treatment;
- 2) to know the correlation between browning intensity of honey toward the antioxidant activity;
- 3) to know the best antioxidant activities on each type of honey based on the combination of prolong heat treatment;
- 4) to apply the combination and studied the activity in preventing lipid oxidation occur in chicken meat by measuring the malonaldehyde content.

