CHAPTER I

INTRODUCTION

1.1 Background

Functional food are food items which have beneficial effects on health, in addition to the nutrients the food item contains. These beneficial effects are attributed to the bioactive compounds in the food may be in the form of vitamins, minerals, phytosterols, antioxidants and other physiologically active compounds. Guava leaves (*Psidium guajava* L.) are the leaves of an evergreen shrub or small tree from the Myrtaceae family. The leaf has been used as folk medicine and traditional remedies against cough, fever, inflammation and bacterial infections. Extracts of the guava leaves are known to contain alkaloids, carotenoids anthocyanins, vitamin C, triterpenes, saponin, flavonoid, tannin and eugenol (Indriani, 2006). Other study suggests that guava leaves contain phenolic compounds, which are responsible for the antioxidant properties (Rosalina and Purwaningsih, 2013).

Various studies have been conducted to determine the extraction method that retains the highest functional properties. However, most previous studies are conducted using the extract of guava leaves, where they are dried and extracted with polar solvents. While this method may prolong the extract shelf life, fresh guava leaves may retain more of the functional properties. Guava leaves extract displays higher antioxidant characteristics with a DPPH IC_{50} value of 23.453 µg/mL when

extracted with ethyl acetate (Chen and Yen, 2006). Therefore, investigating the effect of different drying temperature on the antioxidant capacity of the guava leaf might be necessary.

In addition, despite exhibiting many health benefits, guava leaf is not acceptable to most people due to its bitter taste. Jelly is becoming more prominent nowadays for its used as topping in beverages. Therefore, incorporating guava leaf in the making of jelly was expected increase the functional properties of the jelly. Sugar could also be added to mask the bitterness sourced from the leaf, hence increasing the jelly acceptance. However, the effect of sugar addition on the functionality of guava leaf jelly is not yet known. The optimum concentration of sugar to be incorporated to the jelly would therefore be another factor in this experiment. Addition of guava leaf is expected to increase the total phenolic content, total flavonoid content, and antioxidant capacity of the jelly. Sugar addition might also add on to the overall phenolic and flavonoid content of the jelly as it contains phenolic compounds (Almeida *et al*., 2014), but it might also hinder the antioxidant activity of the jelly due to chemical reaction between sugar molecules and phenolic compounds contained by guava leaf (Shalaby *et al*., 2016). Therefore, this research was done to investigate on the optimum concentration of guava leaf and sugar that would produce functional guava leaf jelly.

1.2 Research Problem

Guava leaves are often used as traditional medicines due to the many bioactive compounds contained, such as flavonoid compounds, hence the antioxidant properties. However, the flavor of guava leaves is unacceptable to most

people, hence the lack of consumption. Incorporation of guava leaf into a food product, such as jelly, may increase its acceptance. Sugar is incorporated into the making of jelly to increase its acceptance, while *kappa*-carrageenan is required to produce the jelly-like texture. The effect of guava leaves extract at different concentrations to make jelly is not yet known. Therefore, a study to investigate the effect of guava leaves extract and sugar concentration, and their concentrations towards the antioxidant and physicochemical characteristics of jelly needs to be conducted.

1.3 Objectives

1.3.1 General Objective

The general objective of this research was to utilize guava leaves (*Psidium guajava* L.) in the making of jelly to increase its functional properties.

1.3.2 Specific Objectives

1. To determine the effect of the drying temperature on the total phenolic content, total flavonoid content and antioxidant capacity of guava leaves.
2. To determine the effect of guava leaves and sugar concentration towards the total phenolic content, total flavonoid content, and antioxidant capacity of guava leaf jelly.
3. To determine the effect of guava leaves and sugar concentration towards physical and sensory characteristics of jelly.