CHAPTER I
INTRODUCTION

1.1 Background

Functional foods 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. African bitter leaf (*Vernonia amygdalina* Del.) is the leaf from a perennial herb from the Asteraceae family. The leaf has been used as folk medicine and traditional remedies against cough, fever, constipation, protozoal and bacterial infections. A recent study by Mardjuki (2018) determined that the optimum solvent for the extraction process of african bitter leaf was 96% ethanol. Extracts of the African bitter leaf is known to contain saponins, alkaloids, terpenes, steroids, coumarins, flavonoids, phenolic acids, lignans, xanthones and sesquiterpenes. Betel leaf (*Piper betle* L.) or *sirih* is a leaf of a climbing plant from the Piperaceae family. Betel leaf has been used as a traditional medicine and folk remedy for bacterial infections. Extracts of betel leaf is known to contain polyphenols, flavonoids and catechols. Green grass jelly leaf (*Cyclea barbata* Miers) is often used as an ingredient for green grass jelly or *cincau hijau*. The phytochemicals contained in green grass jelly leaves include flavonoids, alkaloids, saponins, tannins and steroids. These compounds are responsible for the antioxidant activity in green grass jelly. Sorbets are frozen desserts which are made using fruit juice as a base, instead of dairy. Due to the minimal thermal

treatment and low storage temperature of sorbets, bioactive components which are present in the ingredients before processing may be better retained when compared with other products such as jams and jellies.

1.2 Research Problem

Pineapple sorbet is a fruit-based frozen dessert which is commonly consumed. Pineapple sorbet is not known for its antioxidant capacity. Therefore, pineapple sorbet may be made into functional pineapple sorbet through the addition of antioxidant. African bitter leaf (*Vernonia amygdalina* Del.), betel leaf (*Piper betle* L.) and green grass jelly leaf (*Cyclea barbata* Miers) are known for their antioxidant characteristics which makes the leaf extracts a possible functional food ingredient. A recent study by Mardjuki (2018) observed that ethanol was the optimum solvent for African bitter leaf extraction. However, the effect of solvent type used in the extraction process for green grass jelly leaf and betel leaf is not yet known. Moreover, the effect of African bitter leaf, betel leaf extract and green grass jelly leaf extract addition at different concentrations to pineapple sorbet is not yet known. Therefore, a study to investigate the effect of leaf crude extract types and their concentrations towards the antioxidant and physicochemical characteristics of pineapple sorbet needs to be conducted.

1.3 Objectives

1.3.1 General Objective

Study of the effect of solvent type on antioxidant characteristics of betel leaf extract and the effect of leaf crude extract type and extract concentration towards the antioxidant and physicochemical characteristics of pineapple sorbet.

1.3.2 Specific Objectives

1. To determine effect of solvent types used in the extraction process on antioxidant characteristics of crude extracts of betel leaf and green grass jelly leaf, and then to select the best solvent for extraction.
2. To determine effect of addition of African bitter leaf, betel leaf or green grass jelly leaf crude extracts and their concentrations on the antioxidant and physicochemical characteristics of pineapple sorbet.