

# CHAPTER I

## INTRODUCTION

### 1.1 Research Background

In this modern era, people become more aware of healthy lifestyle. One of the ways to achieve a healthy lifestyle is through food consumption. Foods from natural products like fruit, vegetable, and plants contain various important bioactive compounds such as vitamins, carotenoids and phenolics. Natural products are widely consumed for its bioactive compounds in addition to its rich nutrients. Many vegetables and plants have been reported to possess anti-oxidative capacities such as scavenging free radicals, chelating metal ions, inhibiting nitrosation and modulating certain enzymatic actions (Ola *et al.*, 2009). Natural antioxidants inhibit deleterious effects of free radicals in human body and deterioration of fats without corresponding side effects when compared with synthetic antioxidants. Examples of beneficial plants are ginger, garlic, rosemary, peppermint, lavender, chamomile, sage, including African bitter leaf.

*Vernonia amygdalina* Del. or an African bitter leaf plant is a soft wooded shrub that can grow from 2 to 10 m tall. This plant can be found in different parts of the world, but originates from Africa. Bitter leaf is known to have several health benefits such as for treating diabetes and fever. It also could help toning vital organs like liver and kidney. Traditionally, dried bitter leaf was boiled in water and soup was used to treat many diseases like Gastro Intestinal Tract (GIT)

disorders, bacterial infection, kidney problem, liver disease, diabetes, malaria, and nausea. The prominent phytochemical in the bitter leaf is of the flavonoids group.

Although contains many health benefits, the utilization of bitter leaf is still minimum. Traditionally, it is mostly utilized as healthy drink by boiling it in water or as vegetables macerated in soups or tonic to treat various diseases (Igile *et al.*, 1995). In addition, some studies have been incorporating bitter leaf into food products, such as tea (Gunario, 2017), yoghurt (Mardjuki, 2017), sorghum beer (Adenuga *et al.*, 2010). However, there has been no research regarding utilization of African bitter leaf in kombucha.

Kombucha is a fermented beverage made by fermenting infusion of tea leaves with a symbiotic culture of bacteria and yeast, or commonly called as "tea fungus" (Jayabalan *et al.*, 2014). Although consumed worldwide, this beverage is historically originated from China (Hui, 2012). In recent years, the beverage has gained substantial popularity especially in the West because of a large number of health claims. Drinking kombucha has been associated with many health benefits, such as: reducing cholesterol level, reducing stress, having antimicrobial activity, among others.

## **1.2 Research Problem**

*Vernonia amygdalina* Del. is a plant originated from Africa, but nowadays, it also can be found in Indonesia. It is known to have high antioxidant properties in inhibiting disease such as cancer and cardiovascular risk. However, the utilization is still limited due to the strong bitter taste. African bitter leaf usually

consumed as soup or vegetable.

On the other hand, kombucha is a fermented tea where the consumption is recently increasing due to its health benefits. However, lots of people still prefer to drink herbal teas rather than kombucha due to its smell and sharp sour taste. Therefore, incorporating African bitter leaf in kombucha would be expected to increase the consumption and functionality of the African bitter leaf, while still maintaining, or even enhance the antioxidant properties. Furthermore, there is no study regarding the utilization of African bitter leaf as tea substitute in kombucha.

### **1.3 Objectives**

#### **1.3.1 General Objectives**

The objectives of this research were to utilize African bitter leaf as tea (*Camellia sinensis*) substitute in kombucha fermentation as functional drink and to characterize its physicochemical and organoleptic properties.

#### **1.3.2 Specific Objectives**

The specific objectives of this research were:

1. To prepare African bitter leaf with various types of tea leaves processing, such as green tea, black tea, and plain dried leaf.
2. To determine effect of steeping time and temperature on the antioxidant activity of African bitter leaf green tea, black tea, and dried leaf tea.
3. To determine effect of starter and sugar (or sugar+stevia) concentration on the physiochemical characteristics and organoleptic properties of African bitter leaf kombucha.