

CHAPTER I

INTRODUCTION

1.1 Background

Nowadays, the concept of eating is no longer limited to just satisfying the appetite or providing basic nutrients. People become more and more concerned to issues related to health concerns such as the adverse effect of unhealthy food or adopting a healthy lifestyle (Keshavarz *et al.*, 2012). Consuming functional foods may help people in prevention and treatment of illness and diseases. Functional food contributes to additional health benefits in addition to their basic nutritive value (Goldberg, 2012). Plant-based foods are rich in phenolic and flavonoid compounds. The phenolic and flavonoid compounds exhibit radical scavenging activity, which is the capability to prevent oxidation damage by donating an electron to an unpaired electron in free radicals which stabilize the compound thus, preventing the propagation of free radicals (Skinner and Hunter, 2013). The examples of fruits and vegetables which are rich in phenolic and flavonoid compounds are mango, cranberry, spinach, and onion. African bitter leaf plant is also one of the plants that is rich in phenolic and flavonoid compounds.

African bitter leaf plant (*Vernonia amygdalina* Del.) is a shrub belonging to the family Asteraceae which originates from several parts of Africa such as, Benin, Nigeria, Cameroon, and Gabon. It is also commonly known as bitter leaf due to the bitter taste of the leaf. Bitter leaf has been reported to have several medicinal properties as it is traditionally used to treat malaria, diabetes, diarrhea, hepatitis,

gastrointestinal problems, treatment of wounds (Grubben, 2004). Bitter leaf is high in alkaloid, flavonoid, and phenols. It also exhibits strong antioxidant properties from its flavonoids. Due to the bitter taste, bitter leaf is not popular to be consumed despite of the health benefits (Tsado *et al.*, 2015).

Soy milk is a product derived from soya beans extract. It is often consumed as a substitute for milk as it is high in protein and contain no lactose. Therefore, people with lactose intolerance can consume soy milk (Srilakshmi, 2003). As one of soy products, soy milk contains components such as isoflavones, essential fatty acids, phytosterols, fats, inositols that might have beneficial effects on weight control and blood pressure (Keshavarz *et al.*, 2012).

Yoghurt is a fermented milk product that is made by inoculating lactic acid bacteria to pasteurized milk. The cultures that are used in yoghurt production are *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. Lactic acid bacteria are capable of fermenting the sugar in milk into lactic acid which cause curdling. The acid produced by the bacteria contributes to the taste and promotes health benefits. The fermentation lower the pH which can inhibit the growth of pathogen bacterias. Yoghurt are rich in protein, calcium, magnesium, potassium, and phosphorus which helps to improve digestive health, lowering blood pressure, and inhibition of carcinogen production. Yoghurt which is made from soy milk contains health promoting compounds which are not present in milk (Tamang, 2015).

Due to increase in personal health concern, the consumption of yoghurt as functional dairy product has been increasing these past few years as yoghurt is quick and nutritious to be consumed (Weerathilake *et al.*, 2014). The addition of bitter

leaf crude extract which is high in flavonoids and phenols in soy yoghurt is expected to improve the radical scavenging properties of the product.

1.2 Research Problem

Soy yoghurt claims to have health benefits such as reducing risk of heart disease and high in antioxidant activity. However, results from research showed that antioxidant activity of soy yoghurt are low due to reduced of bioactive compound caused by processing treatments such as washing and heating. Addition of extract that contains high antioxidant capacity into soy yoghurt may produce functional soy yoghurt with high antioxidant activity. Bitter leaf (*Vernonia amygdalina* Del.) is well known for the high antioxidant capacity due to the abundance of phenolic, flavone, and tannin compounds. According to research by Mardjuki (2018), addition of African bitter leaf crude extract into yoghurt could improve its functional property. Therefore, in this research bitter leaf crude extract would be used to improve the functional property of soy yoghurt with physicochemical properties that still complies with the standard.

1.3 Objectives

1.3.1 General Objectives

The general objective of this research was to study the physicochemical and antioxidant characteristics of soy yoghurt mixed with african bitter leaf crude extract.

1.3.2 Specific Objectives

The specific objectives of this research were:

1. To determine effect of ratio of soy milk to African bitter leaf extract, and fermentation time on physicochemical and antioxidant properties of soy yoghurt mixed with African bitter leaf crude extract.
2. To determine the proximate and sensory analysis of selected soy yoghurt mixed with African bitter leaf crude extract based on antioxidant activity.

