

CHAPTER I

INTRODUCTION

1.1 Background

Nowadays, there are significant numbers of digestive diseases causing discomfort to individuals. Considerable attentions have been focused on dietary source, which are able to inhibit and/or reverse disease caused by oxidative and inflammatory processes (Oboh *et al.*, 2009). The sources that can prevent and inhibit the disease go to probiotics and *Vernonia amygdalina* Del. Probiotics are living organism, which has been studied which in adequate amounts they confer a health benefits which primarily in preventing diarrhea and allergies (Merenstein *et al.*, 2010).

Some researchers of *Vernonia amygdalina* Del. or is known as bitter leaf, grows up to 3 m high in the African tropics, have been reported to have several benefits such as against amoebic dysentery, gastrointestinal disorders, liver diseases, bacterial infection, fertility inducer, kidney problems and diabetes (Farombi *et al.*, 2011). The organic fraction extracts of *Vernonia amygdalina* Del. has been shown to possess cytotoxic effects towards human carcinoma cells of the nasopharynx. The plants also have antioxidant activities antimicrobial activities that inhibit the growth of pathogen bacteria (Oboh *et al.*, 2009).

The probiotic source must be resistant to bile acids thus it can go through bile intestine, capable of attaching in mucosa intestine, capable of producing antimicrobial substances. *Lactobacillus casei* and *Lactobacillus plantarum* are

good sources for digestive system and slow the growth of pathogen bacteria. The current of favorable opinions towards the consumption of natural foods is to maintain the health and prevent the degenerative disease (Tamang, 2015). The “health claims” must be defensible when placed under the scrutiny by the controlling authorities (Prado *et al.*, 2008).

The consumption of probiotic of fermented drink has been increasing recently due to its benefits toward human’s digestive system. According to Insiroh *et al.*, (2014), the higher concerns come from people who consumed foods with high of fat have had side effect of their health. In this view, consumption the probiotic-fermented drink with addition of African bitter leaf crude extract may reduce oxidative damage, free radical scavenging rate and modification in activity of crucial anti-oxidative enzymes in human cells. According to Watson and Preedy (2015), it is found that fermented drink is proved to lower the malondialdehyde in human blood which leads to the slowdown of peroxide process in the body. Due to synergistically contribute to some health benefits such as antioxidant, prevent chronic disease, antidiabetic, lowers cholesterol and suppress the pathogen growth.

1.2 Research Problem

Probiotic fermented drink is good for the human digestion system. The antioxidant activity and physicochemical of probiotic fermented drink also has been studied. The results show that probiotic fermented drink has low antioxidant activity. Bitter leaf has known as antioxidant agent with rich of flavonoid,

however the utilization of bitter leaf is less in food applications. Therefore by adding bitter leaf in probiotic fermented drink is expected to increase the antioxidant activity that decreases the degenerative or chronic diseases. This research is utilized the African bitter leaf crude extract to probiotic-fermented drink as functional bioactive source, thus the probiotic-fermented drink is expected to have an increase of antioxidant activity.

The utilization of bitter leaf may affect the physicochemical characteristics, sensory characteristics, color characteristics and the nutrition composition in the probiotic fermented drink. According to Hui *et al* (2012), the physicochemical characteristics, sensory characteristics, color characteristics and the nutrition composition of probiotic fermented drink is very important. These characteristics are affected by fermentation time and percentage of bitter leaf crude extract added to the probiotic fermented drink.

1.3 Objectives

1.3.1 General Objectives

The general objectives of this research were to study the physicochemical and antioxidant characteristics of African bitter leaf probiotic fermented milk using *Lactobacillus casei* and *Lactobacillus plantarum*.

1.3.2 Specific Objectives

The specific objectives of this research were:

1. To determine effect of skim milk, African bitter leaf crude extract and fermentation time on physicochemical and antioxidant characteristics of

probiotic fermented drink.

2. To determine the proximate, sensory and total of probiotic lactic acid bacteria of the best antioxidant activity of African bitter leaf probiotic fermented drink.

