

CHAPTER I

INTRODUCTION

1.1 Research Background

Functional foods represent one of the most intensively investigated and widely promoted areas in the food and nutrition sciences today. Over the years, scientists began to identify physiologically active components in foods from plants, known as phytochemicals that potentially could reduce risk for a variety of diseases (Hasler, 2002). Functional foods can be considered as those whole, fortified, enriched or enhanced foods that provide health benefits beyond the provision of essential nutrients such as vitamins and minerals. Apart from the vitamins and minerals, including trace elements, amino acids, essential fatty acids and dietary fibers, there are other substances present in natural matrices (plants and herbal extracts) that are able to provide nutritional or physiological benefits (Ferreira, 2017).

Studies on antioxidants present in plants and foods have come to be one of the most studied topics in the area of food and agriculture today. In the field of foods, antioxidants are classified as compounds that are able to delay, retard or prevent autooxidation processes. The most widely encountered way of antioxidant formation is natural antioxidant, which is synthesized by various microorganisms, fungi, animals, actually most often by plants. Recently, polyphenols found in plants have begun to receive much attention as a new natural antioxidant. Polyphenols are the complex bioactive compounds dominantly found in tea, in relation to the

steeping of the immersed plant leaves or seeds. Most importantly, these polyphenols play an important role to protect body cells from free radical damage (Moon and Shibamoto, 2009). Moreover, the antioxidant property of the plant material is due to the presence of many active phytochemicals, including flavonoids, terpenoids, carotenoids, saponin and plant sterol. This plant sterol also acts as lactagogue properties, which are affected by the antioxidant characteristic including antioxidant activity, total phenolic, flavonoid contents and complete proximate especially fat and protein content (Iwansyah, *et al.*, 2017).

Torbangun leaf (*Plectranthus amboinicus* L.) is an herbaceous plant that originally grows in the tropical region. The leaves of *Torbangun* plant have been used throughout Indonesia for hundreds of years as a galactagogue, which is the natural herbs or substances used to induce, augment or maintain lactation (Joshi, 2010). Several studies have shown that galactagogue present in *Torbangun* leaves in terms of supplemental form, does increase milk supply (ASI) since breastmilk is the most suitable source of nutrition for infant growth and development as well as its immune system (Zibadi, *et al.*, 2013). Aside from its role as galactagogue, the ethanolic extract and its fraction of *Plectranthus amboinicus* has been proven to exhibit antioxidants effects, which comprise to maintain our health (Damanik, 2018). In other words, it has been identified as free radical scavengers or active oxygen-scavengers, which can reduce and eliminate the free radical exposure (Rahim, 2010). It was evidenced by the result of 17.12% of polyphenol content resulted in about 1 g of *Torbangun* leaves steeps (Saragih, 2014).

Fenugreek (*Trigonella foenum-graceum* L.) also contributes to galactagogue and very commonly recommended as a supplement to increase lactation. Fenugreek seeds have been reputed and valued as medicinal material from very early times, for examples used to cure mouth ulcers, chapped lips and stomach irritation. Moreover, when soaked in water, the seeds swell and produce a soothing mucilage said to aid digestion. Polyphenolic compounds like flavonoids, which are mostly found in Fenugreek seeds, have been reported to have the antioxidant activity. It was evidenced by the IC₅₀ value of methanolic extract of Fenugreek seeds was found to be 1.98 µg/ml (Yadav and Chowdhury, 2017).

Malted health beverage, such as malted milk, is considered as one of healthier alternative to conventional soft drinks and alcoholic beverages (Kraig, 2013). It can be seen by this commercial health beverage, namely as Horlicks, which is a malted grain milk drink utilized as energy-boosting tonics (Baggett, 2005). Meanwhile, the malted Barley milk is not widely known by public. By utilizing Barley into the malted health beverage, it could affect both human health and functionality in food processing. Moreover, the utilization of Barley into malted milk product development is the potential for Barley beverages to improve consumer health and reduce risk of prevalent diseases such as cardiovascular or known as heart disease (Ames, 2008).

1.2 Research Problems

It has been stated that *Torbangun* leaves contain galactagogue compounds or milk production stimulants, which can be classified as medications, herbals or

foods used mostly in lactating mothers for breastfeeding. In this case, herbals must be used with caution as many contain chemical substances, which could be dangerous to the infants (Tabares, *et al.*, 2014). Even though the medicinal-herb interactions associated with galactagogue have concrete evidence that suggests safety and possible efficacy, still the evidence explaining the mechanism of action for most herbals have not been proven, which is very limited and scarce. Up until now, the main ingredient *Torbangun* leaves and its steeped still have not been utilized worldwide as the amount of *Torbangun* leaves are limited. None of the *Torbangun* plants are also applied into the commercial drink. Further evaluation and research regarding antioxidant and other active components contributed in malted milk prepared from *Torbangun* leaves and Fenugreek seeds are needed. Firstly, this research focuses on making the malted milk product, having the health benefits to our body. Moreover, it also focuses on the effect of different ratio on the antioxidant properties and mineral contents of malted milk product prepared from *Torbangun* leaves and Fenugreek seeds.

1.3 Objectives

1.3.1 General Objectives

The objective of this research is to analyze and determine the characteristics of malted Barley milk beverage added with *Torbangun* leaves and Fenugreek seeds as the development of functional beverages.

1.3.2 Specific Objectives

The specific objectives of this research are:

1. To study the process of making *Torbangun* leaves and Fenugreek seeds steeps.
2. To study and examine the effect of ratio between *Torbangun* leaves and Fenugreek seeds steeps into malted Barley milk beverage.
3. To determine and analyze the antioxidant levels and mineral contents between malted Barley milk with and without the addition of *Torbangun* and Fenugreek steeps.
4. To determine the organoleptic characteristics such as color, aroma, taste and overall acceptance of malted Barley milk and its formulation prepared from steeps using *Torbangun* leaves and Fenugreek seeds.

