CHAPTER I

INTRODUCTION

1.1 Background

Functional beverage is defined as a drink that is formulated by adding functional ingredients or by reducing ingredients that is less healthy, thus the beverage able to provide specific health benefits beyond regular nutrition (Paquin, 2009; Smith, 2013; Shahidi and Cesarettin, 2016). According to the Euromonitor International (2014), the market of the functional products in Indonesia is showing the highest among the Southeast Asian region with the increasing in the value of US$5 billion in 2011 into US$7 billion in 2013. In fact, most of the functional beverage marketed in Indonesia still imported from abroad.

Increase in the market value of functional products is due to the growing of the health concern, where the products that contain health benefits are more preferable, such as with antioxidant, antidiabetic, antihypertension properties, and many more. Antioxidant is a compound that able to delay, prevent, or remove the negative effects of oxidants in the body (Hery, 2007). The natural antioxidant can be obtained from several foodstuffs, especially in fruits and vegetables, such as in green leafy vegetables which commonly contain high phenolic content, which relates to the antioxidant (Lu *et al*., 2010; Kesuma *et al.*, 2015).

According to Sari (2008), Indonesia is known as tropical country that rich in many kinds of herb plant, for example *sirih, salam, sambiloto, ketumbar,* mint,

kesum and many more. However, there are only few of them that has been processed as an industrial functional food products. *Polygonum minus* Huds., which is locally known as *daun kesum* is a culinary herb that mainly found in Southeast Asia countries. *Kesum* leaves has been traditionally used in global for medicine, cuisine, and cosmetics. *Kesum* leaves is known for containing high natural plant antioxidant, where in the methanolic extract, the IC_{50} value showing the value of 6.78±0.85 µg/L (Okeke, *et al*., 2015).

Mint leaves or *Mentha arvensis* L. is known as common herb that originally from North India, but also grow in several places in Indonesia. Mint leaves contain antioxidant activity which known to possess good effect for health. The IC_{50} value of the methanolic and ethanolic extract are showing the value of 13.33±1.07 and 21.86±2.73 µg/L, respectively (Viji *et al*., 2015; Benabdallah *et al*., 2016). Thus, the herb is commonly used in traditional system of medicine for various minor ailments.

Nowadays, people are prefer to use the natural sweetener, and look for the natural sweetener that safe to be consumed. There are several example of the natural sweetener that commonly used, such as maple syrup, honey, stevia, molasses, coconut sugar, date sugar, agave nectar, xylitol, yacon roots, beet sugar, and many more (Neacsu and Madar, 2014). Stevia is known as zero calorie sweetener, where the consumption of it does not cause the increasing in blood glucose which safe to be consumed for diet and people with diabetes (Kumari and Sheela, 2014).

Kesum has been the main consideration in this research as it contain very strong antioxidant activity. Since *kesum* leaves contain very strong foreign aroma, mint leaves were added to increase the acceptance of the functional beverage product by masking the strong foreign aroma of *kesum* leaves. It is expected that the utilization of *kesum* leaves and mint leaves with stevia as functional beverage is able to enhance consumer health as well as adding more kinds of functional beverages.

1.2 Research Problem

Increase in consciousness of healthy lifestyle increase the needs of functional beverage. In fact, Indonesia is still limited in kind of functional beverage production. *Kesum* leaves grow well in Indonesia and also containing health beneficial effect for human, however the leaves is still unfamiliar. Mint leaves also grow very well in Indonesia and very good for health. Healthy lifestyle need to use non-sucrose sweetener, where natural sweetener can be used. Stevia is natural sweetener that grow well in Indonesia, but the usage are still limited. Combination of mint leaves and *kesum* leaves with stevia in the making of functional beverage is expected to overcome such problems above.

1.3 Objective

1.3.1 Main Objective

The main objective of the research was to develop the making of functional beverage made from the extract of *kesum* leaves and mint leaves with stevia.

1.3.2 Specific Objective

The specific objectives of doing the research were:

1. To determine the effect of temperature on the making of aqueous extract of *kesum* leaves; and to select the temperature based on the antioxidant activity, total phenolic content, and total flavonoid content.
2. To determine the effect of different ratio of *kesum* and mint leaves aqueous extracts, and different concentration of stevia towards physical and chemical characteristics of beverage.
3. To determine the best formulation of beverage based on panelists preferences through sensory evaluation of hedonic test.
4. To analyze the nutrition composition and antioxidant activity of the beverage of the best formula.