

# CHAPTER I

## INTRODUCTION

### 1.1 Background

The black nightshade (*Solanum nigrum* L.) is a plant that belongs to *Solanaceae* family. In Indonesia, it is commonly known as “*leunca*”. In some parts of the world, including Europe and North America, the black nightshades are considered as weeds in agriculture. It is different with other countries, including Australia, Uganda, Ethiopia, Nigeria, and Indonesia, where the black nightshades are sometimes used as leafy herbs, vegetables, and fruits (Edmonds and Chweya, 1997).

According to Edmonds and Chweya (1997) and Khattak, *et al.* (2012), the black nightshade has been acclaimed for its medicinal effects. It has antioxidant activity, anticancer activity, antitumor activity, and anti-convulsion activity. However, the utilization of the black nightshade is still rare due to less information about the presence of the plant and the bitter taste produced. In Indonesia, there are only some people who consume the fruits either raw (*lalapan*) or being added to chili paste or *oncom* (fermented food from soybean).

Fermentation has been known and applied since prehistoric times even when the scientific principles have not been understood yet. According to Adams and Nout (2001), fermentation is one of the oldest methods of food processing. A variety of fermented foods gain their popularity among the consumers due to their attractive flavor and nutritional value. The safety of the fermented food can be

increased because fermentation can remove food's natural toxic components or prevent the growth of disease-causing microbes. Therefore, the utilization of the black nightshade juice into fermented beverage is expected to increase the acceptability of the product due to the unique flavor produced during fermentation.

### **1.2 Research problem**

The black nightshade presents abundantly in Indonesia. The utilization of its fruit is also limited either consumed raw (*lalapan*) or added to chili paste or *oncom* (fermented food from soybean). However, the black nightshade has been found to have antioxidant activity, anticancer activity, antitumor activity, and anti-convulsion activity according to Edmonds and Chweya (1997) and Khattak, *et al.* (2012). In addition, fermentation is a low cost, low technology, and an easy method to be done (Adams and Nout, 2001). Fermentation process has also been reported to increase the antioxidant activity in the product (Pebrijusna, 2015). Therefore, the utilization of the black nightshade into a fermented beverage can be further developed to increase the acceptability of the product due to the functional properties contained in the black nightshade.

### **1.3 Objectives**

There were two objectives in this research, such as general objective and specific objective.

### **1.3.1 General objective**

The general objective of this research was to utilize the black nightshade (*Solanum nigrum* L.) juice in the making of fermented beverage.

### **1.3.2 Specific objective**

The specific objectives of this research were:

1. To determine the proper pretreatment and the ratio of the fruit and water on the formulation of the black nightshade juice.
2. To determine the selected sugar concentration and fermentation time on the formulation of the black nightshade fermented beverage.
3. To study the effect of sugar concentration and fermentation time towards the physical, chemical, and microbiological characteristics of the black nightshade fermented beverage.

