CHAPTER I
INTRODUCTION

1.1 Background

During the last few years, the average amount of protein consumption per capita of Indonesian people is around 54.16 grams (Susenas, 2014). However, when that result is compared with standard consumption of protein per capita which is 57 grams protein, it is concluded that protein intake of Indonesian population is still bit lower than standard (Badan Pusat Statistik, 2015). Furthermore, the protein consumed by Indonesian population generally has low protein digestibility (Gilani, et al., 2012).

Protein digestibility, protein bioavailability, amounts of dietary indispensable amino acids (IAA), and non-essential nitrogen are important parameters to determine the quality of a protein source. According to balance sheets, dietary surveys, protein, and amino acid composition data of regional and country, there are differences in protein and amino acid availabilities between developed and developing countries. In addition, it is considered that protein digestibility and quality of mixed diets in developing countries are lower than those in developed countries (Gilani, et al., 2012). The need of protein can be obtained from many sources. One of the good sources of protein from plant are legumes such as beans, peas, nuts, bread, and cereals (Nisha, 2006; Winch, 2006).

Cowpea (Vigna unguiculata L.) as a part of legumes has been recently put into consideration as a protein source for food products (Yana and Kusnadi,
Protein content of cowpea is around 18.3-25.53% and it has good nutritional composition of protein, vitamin B, vitamin C, and fiber (Rosida, et al., 2011). The example of utilization of cowpea in food products are in the making of tempeh, cake, and yogurt (Haliza, et al., 2010; Susilo and Imelda, 2007; Yana and Kusnadi, 2015). Then, soybean (Glycine max L.) is one type of legumes known as an essential crop at the global level. It is the most nutritious, widely used, and has protein content around 40%. The examples of foods derived from soybean are tofu, tempeh, soymilk, soy noodles, natto, and miso (Riaz, 2006; Singh, 2010).

Germination process of legumes can increase protein digestibility. During germination process, enzymes inside legumes will catabolize complex protein into simpler compounds, which are amino acids. Those amino acids will be easier to be digested and absorbed by body, leading in enhancing protein digestibility (Wachid, 2006; Winarsi, 2010).

Tofu is one type of traditional soy food derived from whole soybeans (Kong, et al., 2008). Tofu contains some components, such as water, protein, fat, and mineral. This food promotes the best properties compared with foods from other plant origins. Tofu making method consists of two basic steps, which are soymilk preparation and soymilk coagulation in order to create curd which is further processed into several types of tofu (Hui and Evranuz, 2016). Therefore, a study regarding the combination of germinated cowpea and soybean in the production of tofu can become one of the solution in enhancing the protein digestibility of tofu as well as increasing the utilization of cowpea.
1.2 Research Problem

Indonesian dietary consumption is still bit lack of protein, in which the protein intake during recent years is still lower compared to the minimum standard of WHO. Moreover, protein taken by Indonesian people seem has low digestibility value. Indonesia has many varieties of legumes that contain high protein, but some of them, such as cowpea have not been thoroughly utilized. Germination process is known could increase the protein digestibility, however this method is not common yet. Therefore, the use of germinated cowpea and soybean as ingredients in the making of tofu is expected to enhance digestibility of protein in line with increasing the quality.

1.3 Objectives

Objectives of this research are divided into general objective and specific objectives.

1.3.1 General Objectives

General objective of this research is to develop the utilization of germinated cowpea and soybean to increase the protein digestibility and the quality of tofu.

1.3.2 Specific Objectives

Specific objectives of this research are:

1. To analyze the effect of germination of cowpea and soybean on percent yield and several quality parameters.

2. To observe the effect of different ratio of germinated cowpea and soybean and heating time on physicochemical characteristics of tofu.
3. To determine the best formula of germinated cowpea and soybean and heating time of tofu based on sensory evaluation.

4. To observe the nutrient composition and protein digestibility of tofu with the best formula.