CHAPTER I

INTRODUCTION

1.1 Background

Indonesia, as a tropical country, has a great potential in producing various kinds of fruits. It is known as one of the top-ten pineapple producers in the world, with 1,81 million tons of pineapple production in a year with the largest plantation area (BPS, 2018). Pineapple does not have a specific fruiting season throughout the year and it is classified as one of the most popular of the non-citrus tropical and subtropical fruits, mainly due to its attractive flavor and refreshing sugar-acid balance. In addition, pineapple is rich in large varieties of minerals, such as potassium, sodium, phosphorus, and vitamins, including vitamin A, B, C and E (Simmonds and Preedy, 2015). It is also categorized as the leading edible fruit as it can be processed into many types of food.

Due to the high-water content inside, pineapple is classified as perishable fruit. According to Hosain (2016), it is usually stored only for four to five days after harvesting in normal conditions. Besides taking all precautions for post-harvest handling, the only way to make it available for later use in distant markets is by converting it to a more stable form. Thus, food processing is emphasized for its preservation or shelf-life extension by preventing undesirable changes in wholesomeness, nutritive value, and sensory qualities. Jam is an example of a processed food product that derives from fruits. It is a semi-solid preserved food

with moisture content of 15-40% and composed of 45-part fruit and 55-part sugar (Istianah *et al*., 2019 and Gardjito, 2014). Commercial jam that is sold in markets nowadays is inconvenient as it requires extra effort to spread. Hence, developing products in making the jam in sheeted form is meant to extend shelf-life and increase the product value as it will be more practical in serving, compared to jam in paste form (Simamora and Rossi, 2017).

The processing steps used in making sheeted jam are actually like making commercial jam, but with two required additional steps: molding and cutting (Septiani, 2013). Meanwhile, the most important factor in dictating the functional characteristics of sheeted jam is the selection of hydrocolloid and its concentration. The utilization of hydrocolloid in the food industry has a large increase in recent years, including thickening and gelling aqueous solution, inhibiting ice and sugar crystal formation, and stabilizing emulsions.

Based on the previous study by Ikhwal (2014); Ismail (2015); and Anggarini (2016) on pineapple fruit sheeted jam, carrageenan is used instead of other hydrocolloids. It is because carrageenan is more stable and easier to immobilize water with its hydrophilic characteristics in low concentration and a lot cheaper than other hydrocolloids (Septiani, 2013). Despite the advantages of carrageenan, it will instead show brittleness properties of carrageenan gel (Kaya *et al*., 2015 and Yu *et al*., 2011). Thus, utilization of konjac compounds in this research is believed to improve the texture of pineapple sheeted jam. According to Kaya *et al*. (2015), konjac has a lower surface tension, thus can form more elastic gel and it increases gel strength. Moreover, konjac, as a gelling agent, has the unique ability to form

reversible and irreversible gels at different conditions. Synergistic effects of combined konjac and carrageenan can give superior texture to single hydrocolloid used (Banerjee and Bhattacharya, 2011). Thickening, absorbing, and water binding ability is improved, to produce gels with higher gel strength, better texture, and better elasticity (Behera and Ray, 2016). With the presence of konjac and carrageenan, the sheeted jam is expected to have a chewy yet sturdy texture.

Furthermore, the concentration of hydrocolloids is highly affected by the resulting sheeted jam (Putri *et al.*, 2013). According to Pratiwil *et al*. (2016), too high concentration of hydrocolloids can cause stiff sheeted jam, while if the concentration of hydrocolloid is too little, it can result in soft sheeted jam. Thus, suitable formulation of ratio and concentration of konjac and carrageenan need to be studied to obtain the good characteristics of sheeted jam based on physicochemical analysis as well as sensory evaluation.

1.2 Research Problem

The changes in modern lifestyle and new processing technologies has led to a rapid rise of ready-made meals. Thus, the development of streamlined products, such as sheeted jam, can shorten the preparation time of traditional jam. Despite the unique and refreshing flavor of pineapple, the low storage time of pineapple fruit has become the main reason in preserving pineapple fruit.

Despite the texture of sheeted jam should be chewy yet sturdy, carrageenan itself alone cannot achieve this kind of texture. Meanwhile, the utilization of combined hydrocolloid has been proven to give better characteristics rather than

the usage of single hydrocolloid. The interaction of konjac and carrageenan through hydrogen binding ability produce a stronger gel texture. However, the concentration and ratio of konjac and carrageenan need to be studied further to produce sheeted jam that can be well-accepted by consumers in physical, chemical, and sensory characteristics.

1.3 Objectives

1.3.1 General Objectives

The general objectives of this research were to produce pineapple sheeted jam as an act of preservation, as well as its physicochemical and organoleptic characteristics with different ratio and concentration of konjac and carrageenan.

1.3.2 Specific Objectives

The specific objectives of this research were as following:

1. To determine effect of ratio and concentration of konjac and carrageenan on the physicochemical characteristics of pineapple sheeted jam, and to select 5 preferred formulations.
2. To determine the best formulation of the pineapple sheeted jam throughout the organoleptic evaluation.
3. To evaluate the moisture content and water activity of best formulation of pineapple sheeted jam.