

# CHAPTER I

## INTRODUCTION

### 1.1 Background

Pineapples are one of the most cultivated fruits. Pineapple cultivation can be found all over the world, hence its vast number of cultivars. It is widely consumed due to its ability to be eaten as is or processed into several products such as juices, jams, preserves, or concentrates. Its addition to confectioneries has been proven to increase nutritional value such as vitamin C, potassium, and calcium. When added to jelly candies, it increases the product's texture, colour, and flavour acceptance. Palembang type pineapples are one of the many types found in Indonesia. It has a relatively greater moisture content, cheaper price, and high availability (Wijaya *et al.*, 2014; Lubis *et al.*, 2014; Bogha *et al.*, 2019; Purba *et al.*, 2018).

Table sugar, or commonly known as sucrose, is a disaccharide consisting of one unit of glucose and one unit of fructose connected via glycosidic linkage. It is very widely used as food sweetener in confectionery products. It is a source of energy, and the most commonly used sweetener (Stipanuk and Caudill, 2013 and White, 2014).

Gelatine itself is a protein of high molecular weight, a product derived from collagen. It is widely used in food products, especially in the production of jelly candies due to its ability to form gel. It can be extracted from several origin such as

mammalian, fish, and poultry skin and bones. It is advantageous than other gelling agents as it melts just below body temperature, releasing all the flavour in the mouth upon consumption. It also gives a chewy texture, a desirable parameter in jelly candies. Additionally, it is pH independent at 4.6-8.0 and forms a thermo-reversible gel network. The properties of gelatine depends on its origin, thus these properties vary (Azira *et al.*, 2014; Duconseille *et al.*, 2015; Mohos, 2016).

Jelly candy is a chewy candy which texture is highly dependent on the addition of a gelling agent such as gelatine due to its gelling ability by forming coils. Other than the gelling agent, the type of sweetener used can also influence the properties of jelly candies such as texture and colour; the presence of sugar as well as the amount of dissolved solid strengthen the gel strength. When artificial sweeteners are used, they decrease gel strength as there is less solid. This problem can be solved by incorporating natural sweeteners such as honey (Benjakul *et al.*, 2012; Gibson, 2018; Jiamjariyatam, 2017).

Honey is defined by a saturated sugar solution derived from nectar by enzymatic reactions by honeybees. A vast number of types can also be found around the world as a result of different food substances. Honey obtained from forests in Borneo Island was reported to have phytochemicals such as phenolic and flavonoid compounds, contributing to its high antioxidant properties. It also has a pH value ranging from 3-4, which may affect the texture of food products (Syafrizal *et al.*, 2020 and Prayitno *et al.*, 2020).

There are studies which incorporate honey into confectioneries. This have been proven to result in acceptable products. Some reported that honey gave no

significant effect to textural properties, but some reported a decrease in hardness and increase in cohesiveness (Cano-Lamadrid *et al.*, 2020 and Rivero *et al.*, 2020). However, in pineapple jelly candies, the ratio of sugar:honey and its relationship with the gelatine concentration have not been studied yet. Therefore, this study aims to identify the effect of sugar:honey ratio and gelatine concentration towards pineapple jelly candy characteristics.

## 1.2 Research Problem

The commercial production of jelly candies usually uses sugar as a sweetener and gelatine as a gelling agent. Their quality is evaluated from the physicochemical properties such as texture, colour, moisture content, organoleptic properties, and overall acceptance. Even though sugar results in an acceptable product, the incorporation of honey may increase both textural and organoleptic properties. These properties may include hardness, cohesiveness, or fruity flavour. Until today, there is no comprehensive studies done to evaluate the best formulation of sugar:honey ratio and gelatine concentration. Thus, the overall objective was to examine the effect of sugar:honey ratio and gelatine concentration in the production of pineapple jelly candies to determine if the physicochemical properties would be improved.

### **1.3 Objectives**

#### **1.3.1 General Objectives**

The general objectives of this research are to study the effect of sugar:honey ratio and the concentration of gelatine in the manufacture of pineapple jelly candy.

#### **1.3.2 Specific Objectives**

The specific objectives of this research are:

1. To observe the effect of different ratio of sugar to honey, and the different concentration of gelatine to the physical, chemical, and organoleptic properties.
2. To determine the preferred ratio of sugar to honey and the concentration of gelatine in pineapple jelly candy
3. To evaluate the chemical characteristics of the preferred formulation.

