

CHAPTER I

INTRODUCTION

1.1 Background

Livestock are very popular worldwide as primary sources of protein and chicken is one of the most widely consumed livestock. It is prepared in various ways around the world and frying them is a popular technique. However, the rapidly increasing number of global population along with limited capacity and available land to produce livestock including chickens is becoming a gradually more serious issue that threatens food security. In addition, methane gases and carbon dioxide is produced by livestock which contributes to the greenhouse effect. Therefore, an alternative source of protein that resembles the overall properties of chickens is needed. Not only similarity in taste is required, but also resemblance of other features such as texture and nutritive value (Choi *et al.*, 2017).

Flavor and aroma are essential elements in food. Flavor and aroma can originate either from the raw material or can be derived from the physicochemical changes that occur during processing. However, several products such as meat analogue lack the typical flavor and aroma of meat since the product itself does not contain meat. Therefore, artificial flavorings are usually used to imitate meat-like taste and aroma that is absent in the raw materials of meat analogue (Galanakis, 2018).

Edible insects can possibly be a promising future alternative as replacements for currently-consumed livestock, as they are high in protein and

can be consumed in all stages of their life cycle which includes eggs, larvae, pupae and adult stages (Verkerk *et al.*, 2007). One of the common edible insects that is currently increasing in demand as both animal and human consumption is mealworms (*Tenebrio molitor* L.), which is the larval stage of mealworm beetles. Mealworms are rich in protein, containing as much as 46.44 percent protein, while chicken meat contains 18.66 percent protein, which is less compared to mealworms (Ravzanaadii *et al.*, 2012; Omotayo *et al.*, 2016).

Tropical fruits are widely known and consumed especially in countries having tropical and warm climate, including Indonesia. Most tropical fruits produced worldwide, as much as 98%, are produced by countries having these types of climates with asia and pacific accounting for 56% of the worldwide production. Jackfruit is an example of tropical fruit which in both its young or unripe and ripe stage can be consumed. Fresh jackfruit can be eaten as it is, while young jackfruit flesh can be processed into several dishes such as curry, salad, or jackfruit chips (Agrihortico, 2019; Paull and Duarte, 2011).

1.2 Research Problem

Demand for chicken as one of the most globally consumed livestock keeps increasing along with the increase in population. Plant based meat analogue can serve as an alternative and provide more variety to choose from for consumers, specifically in the form of fried chicken which is a popular dish worldwide. Fruits, mushrooms, and beans are examples of materials used in meat analogues. Boiled young jackfruit flesh, in particular, has similar texture with meat, thus it can serve as a possible base material in chicken-analogue fried patties to provide structure

and texture that resembles meat. In addition, despite having high nutritional value, edible insects has not been explored fully as potential human food and there are limited current studies and applications of it in meat analogues, thus it may be an option for a protein source in the future to reduce demand towards livestock as protein sources. Jackfruit is a tropical fruit grown in Indonesia that is popular as fruit and often used in vegetable dishes, while mealworms are high in protein that is a possible substitute to the protein in chicken. Therefore, the ratio of young jackfruit flesh and mealworms as well as concentration of artificial chicken flavoring added must be determined in order to produce chicken-analogue fried patties with desirable physicochemical and organoleptic properties.

1.3 Objectives

1.3.1 General Objectives

To utilize young jackfruit flesh and mealworms along with artificial chicken flavoring as ingredients to produce chicken-analogue fried patties.

1.3.2 Specific Objectives

1. To prepare mealworm powder and boiled young jackfruit flesh.
2. To determine effect of ratio of young jackfruit flesh to mealworm powder on physicochemical properties of chicken-analogue fried patties, and then to select the best formulation.
3. To determine effect of concentration of artificial chicken flavor on organoleptic properties of selected chicken-analogue fried patties formulation, and then to select the most preferred chicken-analogue fried patty.