

CHAPTER I

INTRODUCTION

1.1 Background

Africa is the major country supplying 73.1% cocoa beans and then followed by America, and Asia. In Indonesia, Sulawesi Tengah is the biggest cacao seeds producer at 2018 by supplying 100.7 thousand tons or 17.45% from the Indonesia total production. Cocoa seeds from the cacao tree (*Theobroma cacao*) were further produced as various types of chocolate liquor, butter, powder, and other chocolate derivative products. According to Codex Alimentarius, cocoa powder consists of at least 32% mass per mass (m/m) cocoa powder or 29% (m/m) on a dry matter basis with a mixture of sugar or sweeteners (Abt *et al.*, 2018; BPS, 2018; ICCO, 2018).

Nowadays, the world is facing a severe climate changes that has a negative impact on global food production. The production of cocoa beans encounters significant loss due to the sensitivity of cocoa beans growth in dry season. Cocoa production in Sulawesi incur losses around 62% due to the climate change. Drought leads to significant decrease of cocoa yield circa 89% and high cocoa tree mortality circa 15%. Moreover, it also increased infection rate of the chronic fungal disease called witches broom (*Moniliophthora perniciosa*). The limitation on the production of cocoa leads to the research of cocoa substitutes to balance the high demand of chocolate due to its unique flavor and health beneficial effect (Schroth *et al.*, 2016; Tanner *et al.*, 2018).

Southeast Asia is the region where durian (*Durio zibethinus*) as a tropical fruit mainly grows. Durian fruit with its spine-covered shell is rich in carbohydrates,

protein, fat, phosphorus, iron, and vitamin A (Bai-Ngew *et al.*, 2011). According to the previous research done by Wijayahena and Jayaweera (2020), durian seed has similar properties with cocoa beans that could be processed through acidification and fermentation pretreatments to produce similar flavor characteristics with cocoa powder, yet limited reports were found on the application of this research to food products.

Fermentation is an important process in cocoa powder production to develop chocolate flavor and aroma. In addition, roasting process is another important process that triggers Maillard reaction to further develop color and aroma of chocolate. (Aprotosoai *et al.*, 2016; Ruan, *et al.*, 2018). Therefore, in this research durian seed will undergo several pretreatments such as acidification and fermentation with different roasting time and temperature to be applied on baked product to enhance the best properties of chocolate aroma and flavor produced.

1.2 Research Problem

Previous research found that durian seeds could be processed to produce flavor and aroma similar to chocolate. However, there is none reported about the application of the cocoa replacer into food products. Extra processing steps such as baking could affect the sensory properties of food products. Thus, in this research several pretreatments of durian seed powder were conducted and roasted with different combination of temperature and time. It was further applied to baked product which is brownies to obtain the degree of acceptability. The best pretreatment with different temperature and time from the previous sensory

evaluation was further compared with commercial cocoa powder to test the similarity.

1.3 Objectives

The objectives from the research conducted are classified into two which are general and specific objectives.

1.3.1 General Objectives

The general objectives from the research done was to utilize durian (*Durio zibethinus* L.) seeds for the substitution of cocoa powder in the application of baked product.

1.3.2 Specific Objectives

1. To determine the best pretreatment for durian (*Durio zibethinus* L.) seeds that enhance chocolate-like aroma and flavor.
2. To determine the best combination of roasting temperature and time for cocoa powder from pretreated durian (*Durio zibethinus* L.) seeds in the application in baked product.