

# CHAPTER I

## INTRODUCTION

### 1.1 Background

Increasing trend for low fat food products has promoted innovations of many reduced fat foods. Fat as source of high energy can cause high caloric intake in food products which is related to obesity. Moreover, cholesterol and saturated fat as well as trans fatty acids had also been associated with increase in serum cholesterol level, leading to cardiovascular disease and hypercholesterolemia (Sanders, 2015). However, fat is utilized in the production of bakery products in form of butter or margarine. In these products, fat imparts flavor, texture, volume, and firmness (Quiles *et al.*, 2016). Brudel cake, a traditional cake from Manado, North Sulawesi, is one type of bakery product that uses either butter or margarine as a fat source. It has its root from Dutch traditional cakes, mixed with the local taste in each of the Dutch colonies where they are commonly known as breudher. Taste of brudel cake comes from butter and eggs, with slight sweet taste from sugar. Brudel cake has dense texture with bread-like and milk aroma, prepared using wheat flour and yeast (Anonymous, 2019; Sinombor *et al*, 2013).

Avocado (*Persea Americana* Mill.) is a well-received fruit especially favored for its extensive health benefits.. Avocado fruits are abundant in monounsaturated fatty acid, namely oleic acid. Compared to other fruits, they contain high fat and protein content but are low in carbohydrate. The properties of its pulp including smooth, buttery texture and bland taste with slight nutty flavor

makes up the uniqueness of avocado compared to other types of fruits (Salunkhe & Kadam, 1995). As a fat replacer, its potential in oatmeal cookies has been found comparable to commercial fat replacer at 50% level of replacement, reducing 35% of fat content (Wekwete & Navder, 2008). Other studies have also supported its feasibility such as incorporation into muffins, brownies, and pound cakes (Othman *et al.*, 2018; Lambertha, 2018; Nathalie, 2019). Being an accessible fruit with exceptional health benefits and potential to replace fat in butter or margarine, utilization of avocado in products such as brudel cakes would be highly advantageous.

Wheat flour can often be differentiated into cake flour, all-purpose flour, and bread flour. The protein content determines the purpose of each flour type, because it will affect gluten formation in the baked products (Vaclavik & Christian, 2008). Gluten structure is required in yeast leavened product to retain gas produced in fermentation but the utilization of fat replacer may weaken gluten network (Hui, 2006). Moreover, baking is an important step in cake production. While conventional oven is common and quality-proven, microwave oven is also utilized as an alternative with much shorter time required (Brown, 2008). Both flour choice and baking methods can determine the result in producing acceptable and convenient product.

## **1.2 Research Problem**

Demand for low fat food products has increased, including in bakery products where fat is required to produce acceptable results. Avocado fruit puree

has potential for application in brudel cake to reduce the undesirably high fat content from margarine. These are linked to several diseases including obesity, cardiovascular diseases, and hypercholesterolemia. Other than having less fat content, the major fatty acids in avocado is monounsaturated fatty acid. It was able to be utilized in several bakery products such as cookies, muffins, brownies, and pound cakes, however, its utilization in terms of ratio of avocado fruit puree to margarine applicable to brudel cakes had not been known.

Substitution of margarine with avocado fruit puree may change physical, chemical, and sensory characteristics of brudel cake. The best ratio, along with proper choice of wheat flour and baking method are all determinant in order to develop an acceptable product. Therefore, a study was needed to improve brudel cake by using avocado fruit puree as margarine substitute based on its physical, chemical, and sensory characteristics.

### **1.3 Objectives**

#### **1.3.1 General Objective**

The general objective of this study was to produce brudel cake using avocado fruit puree in exchange to margarine with acceptable characteristics in terms of its physical, chemical, and sensory properties.

#### **1.3.2 Specific Objectives**

The specific objectives of this research were:

1. To determine effect of ratio of avocado fruit puree to margarine added to brudel cake prepared with different wheat flour types, i.e. all purpose flour, cake flour, and bread flour on physical characteristics of brudel cake baked using

conventional and microwave ovens; and to select best formulation from each types of wheat flour.

2. To determine effect of selected formulations on chemical composition and sensory characteristics of brudel cake baked in conventional and microwave ovens and to select best formulation.
3. To compare baking methods (conventional vs. microwave ovens) based on several characteristics of brudel cake.

