

# CHAPTER I

## INTRODUCTION

### 1.1 Background

Snacking is often defined as consuming a food or drink between regular meals. Snack could have impact on health, such as to fulfil human diet from the perspective of nutrient. Many healthy snacks have been created due to high demand of healthy lifestyle. Herb cookies can be an alternative from conventional cookies for snacking, where some part of the based flour is substitute by herb. Cookies is a sweet, usually containing refined flour, sugar, and fat. It could include another ingredient (Njike *et al.*, 2016 and Hess *et al.*, 2016).

Beetroot (*Beta vulgaris*) belongs to the Chenopodiaceae family, it is a vegetable that is rich in phytochemicals and bioactive compound. Beetroot can be eaten raw, used for juice extraction or baked. Beets can be categorized as superfood due to the component which is very useful for human diet (Masih *et al.*, 2019 and Kumar 2015). The commonly known type is red beetroot, beets have been used in traditional medicine to treat constipation and joint pain. Nowadays the utilization of beets has been implemented in many aspects from medicine until food. Beetroot contain many minerals such as iron, magnesium, sodium and potassium. Beets also high in fibre and vitamin (Babarykin *et al.*, 2019).

Holy basil has a Latin name *Ocimum tenuiflorum* is have many names such as Tulsi, or Ruku-ruku is a part Lamaiaceae family. It is known for long since it was written in Hindi Sanskrit (Tulasi). It widely used in culinary as well medicinal

aromatic herb. Several health benefit such as relieve stress/adaptogen, bolsters immunity, enhances stamina, a natural immune modulator, and promotes healthy metabolism. Tulsi component is a good source of mineral and fiber (Singh and Chaudhuri, 2018 and Mannan *et al.*, 2019).

Margarine and butter are a type of fat that is common to be use in baking. Butter is made from dairy while margarine is made from vegetable oil to imitate the function of butter. Margarine is invented to imitate butter but less expensive, and have more shelf life, thus margarine can be used as butter substitution, but the aroma, taste and mouthfeel is more inferior compared to butter, and will create different texture. Butter contain more lauric acid (C12:0) compared to margarine, which produced unique buttery flavour. Different type of fat could affect the physical characteristic (texture and spread ratio) and sensory characteristic of the cookies (Marcus, 2013; Zhou and Hui, 2014, and Zohng, 2013).

Cookies is a convenient food product and can be a created with various ingredient either to substitute the flour and adding additional ingredient to act as fortification. Cookies demand in healthier ingredient is increasing, other than the price is not relatively high and affordable, and many people eat cookies as a snack (Chopra *et al.*, 2018)

The application or utilization of cookies created with composite flour is varies nowadays. Some created with a specific purpose such as to increase fibre content to create herbal cookies and to increase the quality and added more functionality to cookies (Sahni and Shere, 2016; Upadhay *et al.*, 2017). The utilization of cookies made with beetroot flour is existing with many purposes such as to identify physiochemical characteristic, increasing nutritional content (crude

fibre, mineral and crude protein), and addition with more Fe (Aulia and Sunarharum, 2020; Ingle et al., 2017, and Suryani *et al.*, 2019). While for holy basil, there were several researches to utilize in cookies such as to make a fibre enriched biscuit, and research regarding the mineral composition of holy basil but the utilization for the mineral on food product is quite low while, many researches regarding holy basil focus on the health effect, and the benefit to human health such and utilize in the form of medicine or supplement (Alam *et al.*, 2013; Vidhani *et al.*, 2016, and Bhateja and Arora, 2012).

Thus, the utilization of beetroot and holy basil can be used as additional source of mineral in food product such a cookie, and the different type of fat used to know the interaction between the composite flour and type of fat toward the acceptance and characteristic of the resulting cookies. It might show a significant difference from the interaction of wheat flour to composite ratio as well the type of fat used.

## **1.2 Research Problem**

Micronutrient such as minerals is important for the human body even though the requirement only in small amount it is essential for metabolism and human health. A research conducted by Prasetyo *et al.* (2018) shown that 52.4% adult in Indonesia has calcium deficiency. Cookies can be eaten anywhere and a stable, long shelf life food also it relatively purchasable. With the substitution of beetroot and holy basil which high in mineral it could create high mineral food-based snack as an alternative. Studies regarding the utilization of beetroot itself is many and vary, but the utilization combining with holy basil (*Ocimum tenuiflorum*) is minimal.

In previous research conducted by Sahni and Shere (2016) and Ingle *et al.* (2017), beetroot cookies lack of acceptance because of the earthy flavour, therefore the addition of holy basil which contain minty aroma profile (Raina *et al.*, 2013) might masked the earthy flavour of beetroot.

Beetroot is rich in mineral such as iron, calcium, magnesium and phosphorus (Mirmiran *et al.*, 2020), and from the previous research only 10% of the addition is accepted in term of sensory. Holy basil also high in calcium, iron and magnesium (Vidhani *et al.*, 2016), thus the mixture of both flour can further increase the mineral amount and the sensory acceptance of the cookies. The composite mixture of holy basil flour and beetroot is 1:1 ratio, this was done because as stated before beet contain earthy aroma and flavor while holy basil was high in minty aroma and flavor, the 1:1 ratio can balanced both minty and earthy aroma, because if one ratio is to dominance, either too minty or too earthy it will decrease sensory acceptance.

Therefore, a balance between the ratio of wheat flour and composite flour will increase the mineral content of cookies as well as selection of fat source (butter and margarine) are needed to be evaluated to produce cookies with desirable properties and have functional properties.

### **1.3 Research Objective**

#### **1.3.1 General Objective**

The general objective of this research is to utilize beetroot (*Beta vulgaris*) and holy basil (*Ocimum tenuiflorum*) as mineral source (Fe, Ca, Mg) and different

type of fat (butter and margarine) used to know the different in physical, chemical, and sensory characteristic of cookies.

### **1.3.2 Specific Objective**

The specific objective of this research are:

1. To determine the physical and chemical characteristic of beetroot and holy basil flour
2. To determine the effect of different ratio of composite (beetroot and holy basil) flour to wheat flour and different type of fat in producing cookies towards physical, chemical, and sensory characteristic of cookies.
3. To evaluate the chemical characteristics of the best formulation cookies and compare to control.

