

CHAPTER I

INTRODUCTION

1.1 Background

Halitosis, or simply described as bad breath, has been a common problem experienced by many people. According to Davies and Finlay (2005), halitosis is a condition of having offensive odors originated from the mouth or other hollow cavities such as the nose, sinuses, and pharynx. This condition is generally caused by the bacterial putrefaction of food debris, epithelial cells, blood cells, and saliva within the oral cavity. This putrefaction process is mostly implicated by anaerobic Gram-negative bacteria such as *Treponema melaninogenica*, *Porphyromonas gingivalis*, and *Fusobacterium periodonticum*.

The putrefaction involves the conversion of several proteinaceous compounds into volatile sulfur compounds (VSC), such as hydrogen sulfide and methyl mercaptan, and other volatile non-sulfur compounds. Included in the list of characteristic chemical components of human bad breath are cadaverine, hydrogen sulfide, isovaleric acid, methyl mercaptan, putrescine, and trimethylamine (Lee, 2009^b).

Matcha cajuputs candy is a confectionary product utilizing Indonesian essential oils, namely cajuput and peppermint oil, with the addition of matcha, as the functional flavor components. Cajuputs candy has been developed as a functional confectionary product due to its many potential health benefits such as antimicrobial activity and therapeutic effects on sore throat conditions (Wijaya *et*

al., 2014). The addition of matcha is done to contribute halitosis-reducing effects on the cajuputs candy as the components in matcha have been reported to inhibit the growth and activity of bacteria associated with halitosis and mouth infections (Moghbel *et al.*, 2011).

Various clinical and epidemiological studies have shown the effects of catechin compounds on the suppression of cariogenic factors of *Streptococcus mutans* which are associated as the primary agent of dental caries. Xu *et al.* (2010) reported that tea polyphenols, especially epigallocatechin gallate (EGCG), inhibit the biofilm formation of *S. mutans* and reduce the viability the preformed biofilm. In addition, a study by Sakanaka and Okada (2004) has shown that green tea polyphenols exert inhibitory effects on the production of toxic end metabolites of anaerobic bacterium *Porphyromonas gingivalis* which is known to be one of the virulence factors of periodontal diseases. *P. gingivalis* is also known as one of the main bacterial agents of halitosis. Therefore, the incorporation of green tea or matcha in the cajuputs candy formulation is intended to contribute the halitosis-reducing effects to the cajuputs candy product.

A previous study by Chandra Wijaya *et al.* (2018) reported that the addition of matcha flavor with a concentration of A% was shown to result in optimization between the product's antioxidant activity and acceptable sensory properties. However, the taste preference of the product was shown to be decreased due to the addition of matcha.

Hence, this research is conducted with the purpose of finding the flavor attributes of matcha cajuputs candy that are least preferred by the sensory

panelists by developing the flavor characterization of the matcha cajuputs candy by using QDA (Quantitative Descriptive Analysis) technique in the sensory evaluation. After the least preferable flavor attributes are determined, the flavor optimization of matcha cajuputs candy is done by adding other potentially suitable flavor components including honey, citrus, caramel, and coconut to the matcha cajuputs candy formulation. These flavors are selected as they possess flavor notes which are compatible to those of matcha cajuputs candy.

1.2 Research Problem

Matcha cajuputs candy can be beneficial to the health of the consumers due to the cajuput oil flavor's antimicrobial activity as well as the halitosis-reducing effects of matcha. However, the addition of matcha flavor to the cajuputs candy formulation was reported to have a declining effect to the taste preference of the cajuputs candy product. Previous studies have been done on the antimicrobial effects, antioxidant activity, and sensory acceptability of matcha cajuputs candy; however, sensory profile of matcha cajuputs candy has not yet been studied. Therefore, an analysis of the sensory profile of matcha cajuputs candy is needed as a preliminary stage to identify the attributes contributing to the decline in the taste preference of matcha cajuputs candy. The concentration of matcha addition in the candy formulation has been optimized in terms of antioxidant properties and sensory acceptance has been done; however, the taste preference of the product was still relatively low. Hence, the addition other flavorings which are compatible to the sensory profile of matcha could be done to improve the taste preference of matcha cajuputs candy.

1.3 Objectives

The objectives of this research are divided into general and specific objectives which are described in the following subchapters.

1.3.1 General Objectives

The general objective of this research is to find the formulation of matcha cajuputs candy with the optimized flavor acceptance.

1.3.2 Specific Objectives

The specific objectives of this research include the following:

1. To determine the flavor attributes which contribute to the decline in taste preference by creating the flavor profile of matcha cajuputs candy.
2. To determine other compatible flavorings to be added to the matcha cajuputs candy formulation to improve its sensory acceptance.
3. To determine the concentration of the compatible flavorings with optimized sensory acceptance.