

CHAPTER 1

INTRODUCTION

1.1 Background

Sponge cake is classified as foam-style cake manufactured by either oven baking or steaming. The quality of sponge cake depends on the type of ingredients, formulation and processing conditions. In general, the desirable qualities of sponge cakes are: high volume with fine uniform moist crumb, long shelf life and tolerance to stalling (Sozer et al., 2011). These characteristics worsen overtime due to the physical and chemical changes that take place during storage period. In fact, the occurrence of physical and chemical changes along with the presence of high sugar content in sponge cake can also promote suitable conditions for mold and bacterial growth. Therefore, due to the short shelf life, in the steamed sponge cake industry, cakes need to be made fresh daily to ensure safety and quality of the product. To remedy the short shelf life of the sponge cake, many preservatives can be used to extend the shelf life. These preservatives however need to be added at the right concentration to be able to extend the shelf-life of the cake without affecting the overall quality of the sponge cake.

Furthermore, staling of sponge cake is highly associated with the nature of moisture migration that arises throughout the storage period. Uncontrolled moisture migration in a food system can lead to the increase of water activity which can compromise the safety of a product as a consequence of mold and bacterial growth as well as higher degree of firming rate as a result of moisture loss which further decrease the quality of the product. As stated by Willhoft (1973), similar to bread, cakes become firmer over time, in addition, the firming rate for sponge cake is more rapid than other types of cake. Especially with steamed sponge cake, the steaming conditions create a humid environment surrounding the product which could accelerate the process of moisture migration by means of balancing out the moisture equilibrium between the product and the atmosphere surrounding the product (Labuza and Hyman, 1998).

A study from Cauvain & Young (2010) stated that one of the main ways to extend shelf life of bakery products is the addition of humectant. Humectant is widely known as one of the substances to control moisture movement in food. The application of humectant provides several benefits including to prevent spoilage by mold and bacteria as well as to maintain texture and flavor throughout the shelf life of the product (Young and O'Sullivan, 2011). Humectant plays a crucial role in absorbing high amounts of moisture from the surrounding product environment which delivers soft texture to the crumb of bakery products. Glycerol is one of the preferred humectants to be applied in soft bakery products due to its ability to increase softness of the product and to provide desirable texture during storage (Cauvain & Young, 2009; Bennoin et al., 1997). Moreover, storage study is required to compare the shelf life before and after product reformulation as well as to investigate the mechanism of humectant in the food system. However, there is a gap in the knowledge when applying the proposed preservatives to steamed sponge cake. Therefore, this proposed thesis project investigates the effect of incorporating humectants to steamed sponge cake formulation with regards to shelf life and quality of the end product.

1.2. Problem Formulation

According to the research background, the problem formulations that would like to be addressed are:

1. Does the addition of glycerol as humectant in the formulation affect the physicochemical properties during storage of steamed sponge cake?
2. Is the addition of 2% glycerol effective to maintain the quality of steamed sponge cake during storage?

1.3. Objectives

The objective of this thesis research is to determine whether the addition of glycerol as humectant in steamed sponge cake formulation is able to maintain physicochemical properties (i.e: water activity, moisture content, and texture) that may contribute to quality of the product during storage.

1.4. Scope of work

The scope of work of this thesis research comprises of:

- Reformulating steamed sponge cake with the addition of glycerol as the humectant
- Determining the physicochemical properties such as water activity, moisture content and texture analysis of steamed sponge cake during storage
- This thesis project will not include the safety assessment of the product as it will be studied through a different concurrent project.