

CHAPTER I

INTRODUCTION

1.1 Background

Multi grain beverage is one of new food product developments in the functional and specialty beverages segment. Multi-grain beverage is used as the non-dairy milk alternative. Multi grain beverages contain no cholesterol and lactose, so it is suitable to be consumed by a group of population that has lactose intolerance or the disease related by the high cholesterol level. Several health conditions such as lactose intolerance, allergy, vegan diet lifestyles, calorie concern, as well as the high chance of hypercholesterolemia lead to the increase of popularity of the multi grain beverage. Multi grain beverage has been accepted as the functional food due to the presence of dietary fiber, mineral, vitamin, and antioxidants. The first grain beverage that gain popularity is soy milk, and recently, followed by other type of cereals, nuts or legumes (Kuru and Tontul, 2020).

The multi grain beverage is prepared by disintegrating the grain. The nature of the raw material used for making the multi grain beverages will affect the stability of the final products. Multi grain beverage is a colloidal system that content large size of disperse particles. The disperse particle such as protein, starch granules, and the fat globules lead to the separation during storage (Sethi *et al.*, 2016). Multi grain beverage would separate into two layers which are top watery layer and bottom layer containing a bulk of solids during storage. The separation of multi grain beverage can be decreased with the incorporation of stabilizing agent,

thus the stability of multi grain beverage can be maintained during storage (Fernandes *et al.*, 2019).

Tremella fuciformis has been reported to have a property as stabilizer. The crude polysaccharides obtained from the *Tremella fuciformis* are able to exhibit a viscous characteristic. The *Tremella fuciformis* crude polysaccharides have been utilized widely in the food industry as the excellent emulsifier, food fortifier, thickener, and gelling agent (Li *et al.*, 2014). Research conducted by Ju and Song (2020), reported that crude polysaccharides of *Tremella fuciformis* has a gel forming ability, high water absorption property, and film forming capacity therefore it has been successfully used as the active biodegradable film. Another research from Cha *et al.* (2013), reported that crude polysaccharides of *Tremella fuciformis* can be used as a patty substituted as it has an oil retention ability. Research conducted by Basiri *et al.* (2018) showed that a crude polysaccharide obtained from the flaxseed mucilage was effective to be used as a natural stabilizer to reduce a whey syneresis in yoghurt when it was combined with the other stabilizers.

1.2 Research Problem

Multi grain beverage has been widely consumed to be an alternative of non-dairy milk. Stability is one of the factors affecting the sensory properties and overall acceptance quality of multi grain beverage. The separation of multi grain beverage cause a gritty, sandy, or chalky mouth feel that lower the acceptability toward multi grain beverage. Multi grain beverage also lack in creaminess due to low fat content.

Multi grain beverage need stabilizers to avoid separation during storage leading to the decrease of the acceptability (Sethi *et al.*, 2016).

Tremella fuciformis has been utilized widely in the health field as it is known for its nutritional value. *Tremella fuciformis* are high in dietary fiber and protein content. The polysaccharides obtained from *Tremella fuciformis* have a unique structural form and are versatile when applied in the food products. The polysaccharides of *Tremella fuciformis* are composed of xylose, mannose, and glucuronic acid that has the ability to stabilize the food products. Thus, it might be potential to be used as a substitution of stabilizers in multi grain beverage (Gunasekaran *et al.*, 2021). Similar to polysaccharide from flaxseed mucilage, it seems that *Tremella fuciformis* may not be able to be used as a stabilizer alone. Combination with other commercial stabilizers may be needed.

1.3 Objectives

1.3.1 General Objective

The general objective of this research was to utilize the crude polysaccharides from *Tremella fuciformis* as a stabilizer in the multi grain beverage.

1.3.2 Specific Objectives

The specific objectives of this research were:

1. To find the commercial stabilizer the commonly used in multigrain beverage that is the most compatible to the *Tremella fuciformis* crude polysaccharides

2. To determine effect of stabilizers ratio and total concentration of stabilizer mixtures on physicochemical and sensory characteristics of multi grain beverages.
3. To determine the effect of the addition of *Tremella fuciformis* crude polysaccharides as a stabilizer on the dietary fiber content of the multi grain beverage.

