

CHAPTER I

INTRODUCTION

1.1 Background

Diabetes Mellitus (DM) is a metabolic disorder due to the condition of hyperlycemia and lack of secretion of the insulin enzyme (Singh *et al.*, 2008). In people with DM type 2, there is a decrease in insulin sensitivity due to deficiency or damage to insulin receptors so the blood glucose could not enter the cells to be metabolized to produce energy. As a result, there is an increase of the blood (hyperglycemia). The conditions of hyperglycemia that occurs in a long time will cause the glycosylation reaction of non-enzymatic protein to form the end product of glycosylation (AGEs) which can increase oxydative stress (Ruhe & McDonald, 2001). There is one way to to reduce the risk of oxydative stress in people with DM is to provide a high intake of antioxidant foods.

Anthocyanins are natural pigments that belong to the flavonoid group responsables for the red, purple, and blue color of the foodstuff. According to Wang *et al.*, (2007) black rice (*Oryza Sativa L. indica*) contains about 4.3% of anthocyanins that are shown to reduce oxidative stress and inflammation. Kefir is a sour-tasting drink made from cow's milk fermented with certain bacteria. Kefir is made from kefir grain. These grains contain the bacteria like *Lactobacilli*, *Streptococcus sp* and some types of yeast/non-pathogenic khamir (Usmiati, 2007). Water kefir is one of some fermentation product with water substrate, sugar, or fruit juice that has the potential to reduce the effect on blood sugar levels due to the metabolite component produced. Maeda *et al.* (2004), in his research explained that kefir has a positive effect on diabetics. The consumption of water kefir for 5 (five) weeks at a concentration of

10-30% shows a very good effect on blood glucose profile, weight, and fat (Alsayadi *et al.*, 2014).

So far there has been no research to see the level of effectiveness of black rice anthocyanin applied in fermented drink namely black rice milk kefir. Based on the benefits of anthocyanin and metabolites produced in functional beverage kefir products, it is expected that the combination of black rice as a substrate in the kefir fermentation process will produce a synergistic effect to reduce the condition of hyperglycemia in patients with Diabetes Mellitus type 2.

1.2 Objective

1. Presenting a functional and healthy beverage called Black Rice Milk Kefir.
2. We would like to give a new drink variant, with black rice as the main ingredients.