

CHAPTER I

INTRODUCTION

1.1 Background of Study

Brownies is basically a cake that fail to rise during the baking process, it has a sweet taste and a dense texture. Like the name “brownie”, brownies have a brown color and usually square in shape. Brownies first discovered in United States in 1897 (Mulyadi *et al.*, 2022). Brownies is popular especially for people who love chocolate. However unfortunately, people who have gluten intolerance could not taste it because of the gluten content in wheat flour that is used as one of the ingredients to make brownies. Wheat flour is a wheat grains that is processed and milled into powder.

Indonesia is unable to make wheat domestically, so it requires to import from abroad. In the past 6 years, Indonesia is becoming one of the largest wheat importers in the world among with Egypt and Alegria. Based on the data by Food and Agriculture Organization, Indonesia is the largest wheat importer in 2019 with 10.716.402 tons and keep increasing in 2021 to 2022 for 12 percent from 10.7 million metric tons (MMT) to 11.3 MMT. This can cause the wheat-based foods are dependent on the imported wheat. In order to help overcome this issue by reducing or replacing the use of wheat flour with other local ingredients. Indonesia has a lot diversity of local food ingredients, one of the local foods that is highly produced in Indonesia is pumpkin (*Cucurbita Moschata*). In 2018, Central Bureau of Statistics recorded that the average pumpkin production in Indonesia reached 55,74 tons per hectare. However, the consumption rate is very low which under 5 kilograms per capita per year (Ghifarie & Rahmawati, 2022). Pumpkin has high nutritional value, it contains vitamin C, vitamin K, vitamin B3, and fiber. It is also rich of beta-carotene that is obtained in the yellow color of

the fruits and functions as provitamin-A which is good for eyes, growth, and maintenance for body tissue (Halimah & Rahmawati, 2021).

Mocaf (Modified Cassava Flour) is also used to make this gluten free brownies as the flour substitution. The advantage of using mocaf is because the raw material cassava is highly produced in Indonesia and the price is relatively cheap compared to the imported wheat. Ministry of Agriculture's Food Security Agency in 2020 recorded that cassava production reached 18,48 million tons, rose 13,07% than last year's production (Dihni, 2021). It is also one of food sources with good nutritional value, rich in fiber, iron, and high carbohydrate content that can be a replacement for wheat flour (Ihromi *et al.*, 2018). Modern modification cassava flour is using fermentation technic that involves physical, chemical, and microbiological modifications (Asmoro, 2021). The use of mocaf substitution in this product is to reduce the strong pumpkin flour smell, and enhance the texture.

With the research above, wheat flour that is needed to make brownies will be replaced with 2 flour substitution, pumpkin flour and mocaf. Both of the flour does not contain gluten so it is safe for people who have coeliac disease, which is a chronic systemic autoimmune disorder caused by permanent intolerance to gluten that can only be solved by replacing the ingredients with gluten free product (Valentina & Francesca, 2019).

1.2 The Objectives of the Study

The objectives of this study are following below:

1. Reduce the use of imported wheat flour with a local ingredient by utilizing pumpkin into flour
2. Processing brownies by replacing wheat flour into gluten free product
3. To analyze nutritional content of brownies from pumpkin flour and mocaf