

CHAPTER I

INTRODUCTION

1.1 Background of The Study

Cereals are known to be edible seeds or grains. The most common vegetation in the world is wheat and rice, accounting for more than half of all grain output (Nayik et al.,2023). Consumption of whole grain cereal products is associated with higher diet quality and nutrient-dense foods delivering protein, lipids, B vitamins (including thiamin, niacin, riboflavin), vitamin E, and minerals (calcium, magnesium, potassium, phosphorus, iron, and sodium) (Laskowski, 2019). Even though cereal has many nutritional benefits, not everyone can consume it safely because of the allergens in it. One of the components that are widely appeared in cereals but also causes allergies is gluten.

During recent decades, allergies and certain food intolerances have shown a worldwide gradual increase in prevalence (Gilissen, 2014), including gluten intolerance. Gluten triggers all kinds of gluten related disorders and represent proteins of wheat, barley, rye and, probably, oat. Gluten intolerance integrating three major types of gluten-related disorders: autoimmune celiac disease (CD), allergy to wheat and non-celiac gluten sensitivity (Balakireva & Zamyatnin., 2016). Although gluten intolerance primarily affects the small intestine, it often manifests as systemic symptoms, including diarrhea, anemia, weight loss, muscle spasms, chronic fatigue, and bone pain (Park & Kim, 2023). The easiest way to avoid these symptoms is by substitute or eliminate gluten from their diet

Rice (*Oryza sativa*), one of the most widely consumed staples worldwide, serves as a versatile gluten-free substitute (Park & Kim, 2023). Compared to milled rice, the benefits of brown rice are relatively high, due to its milled process. The milled fraction of rice grains differs in terms of its protein content, with brown rice, being higher than milled rice or white rice due to the removal of the protein-rich bran during milling. (Amagliani et al.,

2017). Brown rice (*Oryza sativa L.*) is also known for its higher vitamin, fiber and mineral content than regular white rice.

Mocaf flour can also be a substitute for products that contain gluten. Modified Cassava Flour (MOCAF) is a product derived from cassava flour using the principle of cassava cell modification by fermentation (Anindita et al., 2017). Although it is known for its high calcium and fiber content, Mocaf flour only has a small amount of protein. Therefore, a mixture of ingredients is needed in a processed Mocaf product to complete its nutritional content (Pandini et al., 2022).

This research aims to analyze and design a formulation for making gluten-free cereal by combining brown rice and mocaf flour. The results of this research can also be used for further product development with variations in flavor or shape.

1.2 The Objectives of The Study

The objectives of this study are following below:

1. Designing a base formulation for making gluten-free cereal by combining brown rice and mocaf flour which can later be developed in terms of flavor and shape.
2. Analyzing the nutritional value of cereal products made from brown rice and mocaf flour as a substitute for gluten-based cereals.