

Chapter 1

Introduction

This chapter discusses a comprehensive overview of the research background, outlining the key problems that initiated this project, along with the relevant trends and the gap between previous studies. The aim is to clarify the significance of the research and the rationale behind the project. This chapter is concluded with the objectives and hypotheses that guide the research in developing gluten-free sourdough pancakes using gembili and modified cassava flour. .

1.1 Background

As reported by 6Wresearch (2023), the gluten-free market in Indonesia is experiencing growth, influenced by the improving health awareness and adoption of a healthier dietary choice. In fact, a survey done by Rayesa & Ali. (2022) about Indonesian consumers' behavior towards gluten-free (GF) products showed that most respondents (140) view GF products as healthy followed by 121 people who saw it as a part of a healthy diet. Following that, bigger proportions of participants adopted a gluten-free diet to have a healthier lifestyle, while a smaller percentage did it for the trend. One of the gluten-containing foods is pancakes, usually consumed for breakfast or as a snack. The key characteristics of pancakes are in the texture and mouthfeel, therefore having viscoelasticity from gluten is an important aspect to achieve a desirable pancake. However, the main challenge of substituting wheat flour with gluten-free flours in baked goods is the final product being crumbly and dense, hence a method to address this challenge is required, one of which is applying the sourdough technology.

Sourdough technology is a prolonged fermentation by wild lactic acid bacteria (LAB) and yeast, enhancing flavor, texture, and mouthfeel of food products (Lima et al., 2024). This method is usually applied to breads but in fact, sourdough is considered to be an indispensable tool to maximize the potential of whole grain flours, including gluten-free based products (Gobbetti et al., 2014). In this

research, sourdough will act as a natural leavening agent to cause the pancake to rise upon frying. While there are more convenient leavening agents such as baking powder or baking soda, sourdough offers more benefits compared to the instant chemical ingredients. Since the process involves a long-term fermentation, flavor compounds such as organic acids are produced, giving a more complex and pleasant taste, more moist texture, and enhanced nutritional value although the latter will not be the main focus of this research.

This research explores the use of gembili and modified cassava flour as the main ingredients for GF pancake. Gembili (*Dioscorea esculenta L.*) is a local tuber from Papua containing high levels of nutrients and dietary fiber, mainly inulin. Regarding the starch content, gembili flour contains 20.93% and 79.07% amylose and amylopectin, respectively, crucial to the texture in gluten-free baking (Bahlawan et al., 2020).



Figure 1. Raw gembili (Bibitbunga, 2025)

Gembili is a staple food, typically consumed after undergoing thermal processing such as boiling, steaming, roasting, frying, or cooking. In addition, gembili is commonly processed into flour in order to prolong the shelf-life. Unfortunately, this tuber is still far underutilized mainly due to the lack of knowledge on physicochemical and functional properties of this material (Retnowati et al., 2018). A relevant study by Sulistyawati et al. (2024) explored the use of gembili by incorporating it into cookies

made from blends of gembili flour and wheat flour. While the research also focused on flour substitution and sensorial analysis, the cookies developed were not gluten-free, creating a research gap to be studied in this present study by utilizing gembili flour to make gluten-free pancakes.

Modified cassava flour is a cassava flour that underwent a fermentation process by LAB to reduce the hydrogen cyanide (HCN) levels naturally present in cassava flour. Through the fermentation, the physicochemical properties, gelation abilities, viscosity, and digestibility are improved (Arifin et al., 2024). Furthermore, the amylose and amylopectin content of mocaf is found to be 22.48% and 77.52%, consecutively (Wahjuningsih & Susanti, 2018). This ingredient has been widely used in gluten-free baking such as gluten-free brownies made from blends of mocaf and suweg flour, conducted by Marta et al. (2024). Contrasting from this research, the aforementioned study did not incorporate any ingredients or process to help with the texture and as a result, the experimental samples were harder, less springy, and less cohesive than the control sample (100% wheat flour).

Combining these local underutilized commodities with sourdough technology might have a potential in creating a palatable and desirable pancake, in terms of its sensorial and physical properties, especially due to the rich starch profile of the 2 flours, where amylose plays a role in structure and firmness while amylopectin contributes to the softness and moisture retention of the pancake. Therefore, this research will focus on creating a sourdough gluten-free pancake by utilizing gembili and modified cassava flours, and analyzing the acceptance through sensorial and physical properties.

1.2 Objective

The following are the objectives of this research project:

- To substitute all-purpose flour with Gembili and Modified Cassava Flours to make gluten-free pancake

- To develop gluten-free sourdough pancakes with acceptable sensorial and physical properties by comparing the experimental formula to the control formula.

1.3 Hypothesis

The following are the hypotheses of this research project:

- H_0 = The control and experimental sample will result in a significant difference in both sensorial and physical properties acceptance
- H_1 = The control and experimental sample will result in an insignificant difference in both sensorial and physical properties acceptance.