

CHAPTER I

INTRODUCTION

1.1 Background of the Study

As public awareness regarding a healthy lifestyle continues to rise, particularly among housewives, the demand for gluten-free food products has also significantly increased (Bastiawan et al., 2022). In recent years, many gluten-free food options have emerged, including dedicated restaurants (Foschia et al., 2016). In Indonesia, one of the most popular snack items is nuggets, which are widely enjoyed by children and adults alike due to their convenience and the crispy texture from the outer breading (Hidayat et al., 2024). Nuggets are processed products that are widely known and have good market acceptance, plus they have a fairly long shelf life, especially when frozen (Hayati et al., 2023). However, most nuggets available in supermarkets or minimarkets still contain gluten, making them inaccessible to individuals with gluten intolerance or celiac disease (Soares et al., 2018; Hosseini et al., 2018).

Celiac disease is a condition caused by an intolerance to gluten, a protein found in wheat, rye, and barley. It is estimated that around 0.5-1% of the Indonesian population suffers from celiac disease every year, but this figure could be higher (Mohta et al., 2021). When individuals with celiac disease consume gluten, their immune system attacks the small intestine, causing damage and interfering with nutrient absorption. The gluten content in wheat flour can trigger severe immune reactions in the body (Nadira Ismiyatul Finani and Yusuf, 2023). Therefore, the development of this product is intended for those who cannot consume gluten, offering a healthier alternative snack. In response to this issue, there is a need to develop a healthier, gluten-free nugget alternative that maintains the delicious taste and texture familiar to consumers. The proposed innovation introduces a gluten-free mackerel nugget using taro flour as a substitute for wheat-based ingredients.

The main ingredient, mackerel, was selected due to its high nutritional value, particularly its content of protein, omega-3 fatty acids (EPA & DHA), and vitamin B6 (Khalili Tilami and Sampels, 2018). Those nutrients are beneficial for individuals who lead less healthy lifestyles, such as those suffer from high blood pressure (Rokot et al., 2019). Additionally, mackerel is relatively affordable and readily available in both traditional and modern markets, making it an accessible protein source for the general public (Robinson et al., 2022). The flavor profile of mackerel also offers a unique sensory experience for consumers, contributing to the appeal of trying a new, healthier nugget variant.

To ensure that the product is gluten-free, taro flour (*Colocasia esculenta*) is used as a primary dry ingredient. Taro flour is naturally gluten-free, low in fat, and a good source of complex carbohydrates that support digestion and provide prolonged satiety (Aryanti et al., 2017; Kusumasari et al., 2019). However, it is important to note that excessive use of taro flour may negatively affect the texture of the nugget, making precise formulation critical (Hanafi et al., 2020). In this innovation, taro flour serves both as a binder and a base coating prior to the final outer layer. And make this product gluten-free, taro flour (*Colocasia esculenta*) is used as a substitute for wheat flour. This flour is well known as a source of complex carbohydrates, low in fat, easy to digest, and capable of providing a longer-lasting feeling of fullness (Aryanti et al., 2017; Kusumasari et al., 2019).

However, excessive use of taro flour may affect the final texture of the product, making it important to carefully control its proportion in the nugget formulation (Hanafi et al., 2020). In this innovation, taro flour functions not only as a binder for the mixture but also as an alternative base layer prior to the final coating. To achieve a crispy outer texture, modified tapioca flour is used as the final coating after the nuggets are dipped in egg white. This combination allows the nuggets to maintain a crunchy exterior and tender interior, even without the use of wheat flour.

1.2 Objectives of the Study

The objectives of this study are following below:

1. To analyse the effect of using taro flour as a substitute for wheat flour on the sensory quality, texture, and consumer acceptability of gluten-free mackerel nuggets.
2. To evaluate the potential of taro flour-based mackerel nuggets as a healthy alternative to conventional nuggets, and to encourage a shift in consumer preference toward more nutritious and gluten-free options.