

# CHAPTER I

## INTRODUCTION

### 1.1 Background of the Study

In recent years, there has been a significant shift in consumer dietary habits, influenced by increasing awareness of health, nutrition, and functional food benefits. The demand for high-protein foods has grown across diverse market segments driven by consumer interest in fitness, weight management, and general health maintenance. Convenience foods such as cup noodles are popular globally because of their ease of preparation and affordability (Mohammed et al., 2022). However, traditional instant noodles are often high in carbohydrates yet low in protein, making them nutritionally unbalanced and less suitable as meal replacements (Bhatt et al., 2023). With consumer priorities shifting toward functional foods that offer both convenience and enhanced nutritional benefits, reformulating traditional products like cup noodles to maintain the carbohydrates and increase protein content has become an area of focus in food innovation and research. This study investigates the development of a high-protein cup noodle product using firm silken tofu and vital wheat gluten as the main protein contributors. These two ingredients were selected based on their high protein content.

Firm silken tofu is a soy-derived food product with a delicate, soft texture and high moisture content. It is formed by coagulating soy milk without pressing, which gives it a smooth consistency suitable for integration into soft-textured foods like cup noodles. Tofu contains complete proteins, providing all essential amino acids, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine. In addition to its protein quality, tofu offers nutritional value through micronutrients such as iron and calcium (Qin et al., 2022). The functional characteristics of tofu, including gel strength and water-holding capacity, depend significantly on soybean variety and processing conditions. For

instance, tofu made from the Bunya soybean variety using 3.0 g/kg coagulant yielded firmer tofu with reduced water loss, a desirable property in rehydratable foods (Yang & James, 2013). Although other soy-derived food products such as tempeh or soy bean flour offers more protein density, its limitations in flavor and texture integration make it less practical for noodle production (Aini et al., 2012). For these reasons, silken tofu is often the better option when balancing protein content with texture, consistency, and sensory quality in high-protein noodle development.

Vital wheat gluten, a concentrated protein derived from wheat flour, is composed mainly of glutenin and gliadin proteins. It is known for its high protein content, ranging from 81.6% to 95.7% depending on the processing conditions (Schopf et al., 2021) and for its unique viscoelastic properties that contribute structure, chewiness, and elasticity to various food products. In high-moisture formulations, wheat gluten plays a crucial role in maintaining the structural integrity of the food matrix. Beyond its natural functionality, recent research has shown that wheat gluten can be further improved through chemical and physical treatments. For example, pH shifting followed by thermal processing enhances solubility and emulsifying capacity, improving its integration into complex food systems such as fortified noodles (Sun et al., 2023). Furthermore, combining wheat gluten with other plant proteins in optimized ratios has been shown to improve the springiness and cohesiveness of high-moisture extrudates (Zhang et al., 2023).

The combination of firm silken tofu and vital wheat gluten offers both nutritional and functional synergies. Tofu contributes moisture and softness, while wheat gluten provides structure and elasticity, together forming a stable and protein-rich base ideal for cup noodle products (Peng et al., 2023). Therefore, this study seeks to develop a high-protein cup noodle product incorporating firm silken tofu and vital wheat gluten, with the goal of improving the protein density, texture, and overall nutritional value of instant noodle formulations. The outcome aims to contribute to the body of knowledge on functional food design and support the

development of healthier convenience food options that align with evolving consumer preferences.

As more consumers look for practical ways to support their health and fitness, high-protein foods that are both convenient and satisfying have become increasingly important. This high-protein cup noodle was created to meet the demands of health-conscious and active individuals, offering a quick, balanced meal that requires minimum time and equipment. The product features two key protein sources: firm silken tofu, which offers a smooth texture and is rich in essential nutrients, and vital wheat gluten, known for its dense protein content and satisfying, chewy bite.

## **1.2 Objectives of the Study**

The objectives of the study are following below:

1. To formulate a cup noodle that achieves a significantly higher protein content compared to conventional instant noodles by incorporating silken tofu and vital wheat gluten.
2. Determining the nutritional facts, food safety and packaging, as well as the financial aspects of the tofu cup noodle.