CHAPTER I
INTRODUCTION

1.1 Background of The Study

In the middle of the growing environmental issues in today's society, the utilization of existing waste in the environment should become one of the key focuses in preserving nature. Especially food waste, which should be repurposed into something more useful. Transforming food waste into an innovative product not only helps reduce environmental waste but also adds economic value to materials that are typically discarded.

Bananas are among the most widely consumed fruits in Indonesia, with an average intake of around 12 kilograms per person annually. Over the past two decades, national production has grown steadily, reaching about 117 million tons. This growth, however, also generates a large volume of banana peel waste, which poses environmental and economic challenges. Each year, approximately 36 million tons of these peels remain unutilized (Elvinna & Sadek, 2024).

Banana peels are typically used only as animal feed, even though they are rich in nutritional content. Research shows that banana peels contain a higher concentration of phytochemical compounds than the fruit pulp. In addition, they possess antifungal and antibacterial properties that can contribute positively to human health (Anis et al., 2023). Banana peel can be processed into gluten-free flour, which serves as an alternative for people who are avoiding gluten, either due to health concerns or as part of a dietary choice. Furthermore, banana peel flour can be used as the main ingredient in pasta production, replacing semolina flour or another gluten-containing flours.

Pasta is one of the traditional Italian dishes that has gained considerable popularity in Indonesia. While many have already used various types of gluten-free flours in pasta production, banana peel flour has yet to be explored as a substitute. Utilizing it could be a small yet meaningful step toward reducing food waste in Indonesia.

As two of the most preferred foods, pasta and bananas hold a special appeal, with banana-based products being consumed frequently. Personal interest in both foods inspired the idea of combining their elements, particularly through the use of banana peel waste. The frequent observation of discarded banana peels after consuming banana-based products highlighted the potential for reusing them. Considering the large amount of banana peel waste produced each year, along with the fact that banana peels contain a considerable amount of nutrients, this approach offers a sustainable and innovative solution for food development.

Celiac disease is recognized as the most prevalent autoimmune disorder of the gastrointestinal tract, with an estimated global prevalence of about 1%. At present, the only management approved by the US Food and Drug Administration (FDA) is strict adherence to a gluten-free diet, which is often challenging to follow. In the typical Western diet, daily gluten intake ranges 5–15 g gluten/d, while even minimal exposure, around 50 mg/d, can trigger adverse effects in some individuals. Importantly, reducing dietary gluten by 99% may still fail to fully prevent clinical symptoms and intestinal damage (Syage et al., 2018). Therefore, this product can serve as an alternative for those who cannot consume gluten. In addition, it uses a gluten free bread premix, which helps improve the pasta's texture due to the inclusion of flours such as tapioca flour, making the texture more similar to that of regular pasta.

Banana peel itself has a rather unpleasant aroma. Therefore, banana peels must undergo proper processing so that when the banana peel flour is made into pasta, its taste is not much different from regular pasta. According to Segura et al. (2022), the substitution of banana peel flour in pasta should ideally replace only 5–20% of the total flour used. The remaining percentage will be made up of gluten free bread premix and tapioca starch. The use of gluten free bread premix and tapioca starch aims to help achieve a chewy texture in the resulting pasta, making it similar to regular pasta.

The production process of banana peel pasta involves several steps. The initial step is to scrape the inside of the banana peels to remove the bitter taste

and soak the banana peels in a NaHSO3 solution to prevent browning. Next step, dry the banana peels for 7 hours at 60 degrees so they can be ground into flour. Once the banana peels are dried, blend it until smooth and then sift it using an 80-mesh sieve to ensure the flour is fine and does not result in a grainy texture when the pasta is eaten. After the banana peel flour is ready, all the pasta ingredients are mixed and rested for 1 hour to prevent the dough from becoming brittle during shaping. Once rested, the pasta is rolled out and shaped. The final step is to dry the pasta in an oven for 90 minutes at 60 degrees.

1.2 The Objectives of The Study

The objectives of this study are following below:

1. Introducing the use of banana peels as food waste that can be transformed into an innovative and economically valuable new product while also helping to reduce environmental waste to minimize and utilize food waste.
2. Determining the nutritional facts, food safety and packaging, as well as the financial aspects of the banana peel pasta innovation.