

THESIS INFORMATION

INTRODUCTION

Thesis title: **RESEARCH ON THE EFFECTS OF GERMINATION CONDITIONS ON NUTRITIONAL AND ANTI-NUTRITIONAL COMPOSITIONS OF MUNG BEAN SEEDS AND ITS APPLICATION IN FOOD PROCESSING**

Major: **FOOD TECHNOLOGY**

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CONTENT

Mung beans have been widely known as a high-quality food with high nutritional values. In addition to their high protein content and availability of essential and non-essential amino acids, mung beans also provide dietary fiber, resistant starch, vitamins, minerals, and biologically active compounds. However, this pulse also contains some antinutrients such as phytates and tannins, resulting in limited usage for human food. One of the simple and effective methods to reduce anti-nutrients as well as increase nutritional and biologically active compositions is germination. Therefore, it is necessary to research on the effects of germination conditions and then apply these products in food processing.

The objective of this study was to determine the markers for selecting the best variety of mung bean for germinating production. The trend of changes in chemical compositions in the germinated seeds, effects of the additional substances, along with soaking and germinating parameters were investigated. Finally, the dried germinated mung bean flour obtained was applied in the production of gluten-free biscuits.

The results of the project have brought new contributions as follows:

Scientifically:

- Provide a database on the chemical composition, physical characteristics and germination ability of eight popular mung bean varieties in Vietnam. Then, choose the most suitable cultivar for germination.
- Determine the relationship between germination time and changes in nutrient compositions and activities of related enzymes.
- Determine the relationship between soaking conditions (temperature, time, ratio of seeds and water, presence of germination-supporting substances) and germination time with changes in GABA and phytate contents, as well as GAD and phytase activity.
- Evaluate the applicability of germinated mung bean flour in making gluten-free biscuits.

In terms of application:

- The mung bean variety of DX208 was selected as it was high in protein and ash content. It also satisfied the most important criterion in food production due to the largest dimensions, the highest density bulk, and 1000 grain weight, as well as the fast germination time (50% of the germinated seeds after 5.35 hours), with the highest germination rate after 24 hours (99.7%), which probably led to the high manufacturing yield.
- The suitable steeping conditions including the seeds/soaking solution ratio of 1/4 (g/mL), 4 hours of soaking time at 40°C, citric acid content of 0.25 mg/L, and 7 hours of germination time, led to the highest GABA accumulation and GAD activity, low phytate content and the highest phytase activity.
- The germinated mung bean flour obtained in this study showed the ability to replace 60% of rice flour in the formula, which not only improved the texture and sensory properties but also increased nutritional values such as crude protein, ash, and amino acid contents — substances almost lacking in gluten-free and whole wheat-based biscuits.

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