THESIS INFORMATION

INTRODUCTION

Thesis title:	**PRODUCTION OF RESISTANT STARCH FROM MUNG BEAN STARCH AND APPLICATION IN FOOD PROCESSING**
Major:	**FOOD TECHNOLOGY**
Major code:	**62.54.01.01**
PhD Student:	**NGUYEN THI MAI HUONG**
Training institute:	**HO CHI MINH CITY UNIVERSITY OF TECHNOLOGY, VIETNAM NATIONAL UNIVERSITY- HOCHIMINH CITY**
Scientific supervisors:	**ASSOC. PROF. DR. PHAM VAN HUNG**
	ASSOC. PROF. DR. PHAN NGOC HOA

CONTENT

Resistant starch (RS) is defined as starch fractions that escapes digestion from the small intestine of a healthy body and is fermented at the large intestine by the intestinal microflora to form short-chain fatty acids. RS has not only beneficial physiological effects for human as a form of dietary fiber but also exhibits excellent properties in food processing.

Mung bean is a kind of popular beans in Vietnam and Asia, which has a relatively high amylose content and suitable molecular structure for the RS enrichment. Methods using enzymes and microwaves are very effective with different starch groups. Meanwhile, the studies on RS enrichment of mung beans mainly use autoclave or heat moisture treatments, but there are no studies using enzyme and microwave methods. In addition, application of RS-rich mung bean starch in the production of gluten-free cookies to reduce the glycemic index (GI) of this product has not been investigated.

Currently, diabetes and obesity related to excessive consumption of starchy foods are on the rise. Therefore, it is necessary to investigate treatment conditions for producing resistant starch from the mung bean starch and then application for production of low-carb products.

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

Scientifically:

- Provide a database of mung bean raw materials and select suitable mung bean varieties for resistant starch production. In mung bean starch, look for a negative correlation between the values $\overline{DP_n}$ and %RS and a positive correlation between the content AM and %RS.

- Evaluation of the impact of cleaning aids in the process of obtaining starch from mung beans on the changes in color, structure, and morphology of starch granules.

- Proposed a method of enriching resistant starch from mung bean starch based on enzyme-microwave treatment technology combined with temperature control of starch degradation. Explain the mechanism of action of microwave and pullulanase enzymes by investigating the

influence of parameters (energy power, starch moisture, microwave treatment time, enzyme concentration, starch/buffer ratio, and enzyme treatment time) on %AM, $\overline{DP_n}$, the proportion of branches A, B1, B2, and B3 in the structure of AP. At the same time, starch retrogradation temperature was also determined to change the percentage of crystallinity and degree of the double helix in RS-rich starch.

- Assess the applicability in practice, creating food products to support health.

In terms of application:

- Mung bean variety DX044: 43.1% starch; 32.9% AM; 13%RS, small $\overline{DP_n}$, long $\overline{CL_n}$ (40), long AP branch is determined as suitable material for RS enrichment.

- 0.15% NaHSO3 is determinaed as suitable supporting chemical for starch purification without affecting the molecular structure.

- Developing a technical process using a combined enzyme-microwave method and the starch degradation process to increase the resistant starch content to 52.8% at the conditions of 30 upun/g; 1/20; 16 hours, then dried and continued to microwave at 20% moisture, 35W/g, for 3 minutes; retrogradation at +4oC for 24 hours.

- Developing a technical process for production of low GI cookies from rice flour substituted with 30% RS-rich mung bean starch.

Scientific superviors **PhD Student**

Assoc. Prof. PhD. Pham Van Hung **Nguyen Thi Mai Huong**

Assoc. Prof. PhD. Phan Ngoc Hoa