Thesis Title	Optimization and Bioactivities of Beta Glucan Extracted from *Pleurotus ostreatus* Cultivated on Germinated Riceberry Rice (*Oryza sativa*)
Author	Jutamat Nacha
Degree	Master of Science (Biological Science)
Advisor	Assistant Professor Sunita Chamyuang, Ph. D.
Co-Advisor	Associate Professor Hongyu Chen, Ph. D. Amorn Owatworakit, Ph. D.

ABSTRACT

Beta-glucan (β-glucan), a polysaccharide recognized for its prebiotic effects and potential to inhibit colon cancer cell proliferation, is derived from sources like grains (β-1,3/1,4-glucan) and fungi (β-1,3/1,6-glucan). This study focused on optimizing the co-culture of germinated Riceberry rice with *Pleurotus ostreatus* mycelium to enhance the yield of this valuable bioactive compound. Optimal conditions for beta-glucan production were achieved after 9 days of co-cultivation, resulting in a substantial yield of 222.94 ± 2.33 mg/g of dried Riceberry rice. The extracted β-glucan was confirmed as a β-1,3/1,6-glucan using FTIR spectroscopy. Biological activity assessment demonstrated the extract's promising prebiotic properties, significantly promoting the growth of *Lacticaseibacillus rhamnosus* and *Bacillus coagulans*, as indicated by their respective Prebiotic Indices (6.36±0.72 and 115.70±10.19) and Prebiotic Activity Scores (0.56±0.03 and 1.39±0.06). Notably, the extract exhibited potent anti-colorectal cancer activity in vitro, inhibiting 66.23% of SW480 cell growth at a concentration of 1 mg/mL, a more pronounced effect than observed with standard beta-glucan and 5-fluorouracil. Additionally, the extract induced a significant level of apoptosis (28.91%) in these cancer cells. The formulated beta-glucan extract shows strong nutritional value, reinforcing its role as a promising health-promoting and anticancer nutraceutical.

Keywords: Beta-glucan, *Pleurotus ostreatus*, Riceberry Rice, Prebiotic, Anti-cancer, Mushroom Mycelium