Vipawanee Pavasutti : Mung Bean (*Vigna Radiata* L.) Seed Coat Aqueous Extract Enhances Glucose Uptake and Lowers Reactive Oxygen Species in Insulin Resistance HepG2 Cells. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology.
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Insulin resistance is the main cause of type 2 diabetes development. Although mung bean has been reported to decrease blood glucose, the underlying mechanism of mung bean is still limited. The present study aimed to investigate the effects of mung bean seed coat water extract (MSWE) on insulin sensitivity in insulin-resistant HepG2 cells. Total phenolic content in MSWE was 0.439±0.002 mg of gallic acid equivalents (GAE)/g extract with IC50 of 0.16±0.01 mg/mL to scavenge DPPH radicals. MSWE increased cellular glucose uptake and reduced intracellular reactive oxygen species (ROS) in insulin-resistant HepG2 cells. MSWE upregulated the expression of IRS1, FGFR1, PI3K and AKT as well as downregulated the expression of FOXO1, PEPCK, GSK3 and GS. MSWE altered the expression of antioxidant genes including NRF2, Keap1, HO-1 and NQO1. In addition, MSWE downregulated IL-6, IL-1β, TNF-α, PTP-1B and p53. In conclusion, MSWE restored insulin sensitivity through 1) IRS1/FGFR1/PI3K/AKT leading to the modulation of glucose metabolism and 2) NRF2/KEAP1 leading to the increase of antioxidant capacity and reduction of inflammatory responses. Nowadays consumer trend moves toward alternative animal products especially plant-based products. This trend is due to the concerns about health and environment. With the above benefits of mung bean seed coat, this research aimed to investigate the effects of the addition of mung bean seed coat, a co-product from mung bean processing industry, on the quality of plant-based meat. The results showed that the addition of mung bean seed coat at levels 4, 6, 8, 10 and 12% increased total phenolic contents and total flavonoid contents in a dose-dependent manner. Plant-based meat with 12% mung bean seed coat had the highest total phenolic content (0.61±0.01 mg gallic acid equivalent/g sample) and the highest total flavonoid content (0.08±0.00 mg catechin equivalent/g sample). For the color quality, the results showed that brightness (L*), redness (a*) and yellowness (b*) of plant-based meat reduced with the increased percentages of mung bean seed coat. In terms of texture, the results showed that when the percentages of mung bean seed coat increased, the hardness, chewiness, gumminess, springiness and cohesiveness of plant-based meat increased. These results indicated that the addition of mung bean seed coat in plant-based meat increased the nutritional properties of the products in terms of phenolic and flavonoid content. These data can be used as a foundation for the utilization of mung bean seed coat as functional food ingredients for diabetes. However, the addition of mung bean seed coat affected color and texture of the product.

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