UNIVERSITI TEKNOLOGI MARA

PHYSICO-CHEMICAL PROPERTIES OF PINEAPPLE PEEL EXTRACT AND ITS APPLICATION TO ISOLATE LEUCINE FROM BEEF

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ABSTRACT

During canning and juice processing of pineapple, pineapple peel usually discharged. Discharged of pineapple peel during these productions will produce waste and lead to serious environmental pollution. In industrial practices, pineapple waste is either used as animal feed or disposed to the soil as waste. Pineapple peel contain valuable natural enzyme which is bromelain. Bromelain is enzyme which believed to have many benefits and very promising to the development of food and pharmaceutical industries. The purpose of this study is to isolate leucine from beef by using purified bromelain from pineapple peel extract. Purified bromelain powder from pineapple peel was produced through purification process. These include extraction from pineapple peel using purified water as a medium extraction, purification by cation exchange chromatography, desalting using continuous diafiltrator and followed by freeze drying. Each step was found to produce different effect on bromelain activity, protein content, specific enzyme activity and purification level. It was found that bromelain extracted from 100g of pineapple peel could yield 1.0g of bromelain powder. The amino acid composition in 14 beef cuts was also determined in this study. The flank cut was found to contain significantly higher amount of leucine amongst the beef cuts. The enzymatic hydrolysis was done with bromelain enzyme as a substrate to produce beef protein hydrolysate with higher content of leucine. The optimisation condition for the isolation of leucine was found with bromelain concentration of 1.38%, hydrolysis temperature of 42.5°C and hydrolysis time of 31.59 hours. The isolation of leucine was done by cation exchange chromatography and followed by freeze drying to obtain leucine powder. The leucine produce are as crystalline solid form, clean and white deposit. This leucine powder was used to determine the secretion of insulin in plasma of male Sprague-Dawley rats. It was found that the mean plasma insulin concentration value was achieved maximum at 90 minutes and 180 minutes for intramuscular injection and oral, respectively after leucine administered. The percentage of insulin increment for both intramuscular injection and oral administration of leucine are 80.40% and 79.02%, respectively.

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