

COMPARISON OF HOM MALI AND TUBTIM CHUMPHAE RICE BRAN ON THE BIOACCESSIBILITY OF GLUCOSE, REDUCING SUGAR, AND SOLUBLE PROTEIN BY IN VITRO GASTROINTESTINAL DIGESTION

ABSTRACT

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Rice bran is a by-product of the rice milling process and contains dietary fiber, protein, carbohydrates and lipids. Rice bran varieties possess diverse nutritional profiles that enable them to cater to particular nutritional requirements or create functional food items with targeted health advantages. This study was conducted to examine the absorption fraction of a nutritional compound in pigmented and non-pigmented rice bran by comparing the bioaccessibility of glucose concentration, reducing sugar release, soluble protein content, and dietary fiber in pigmented rice bran, Tubtim Chumphae Rice Bran (TCRB), and non-pigmented rice bran, Hom Mali Rice Bran (HMRB), using an in vitro gastrointestinal static model. The methods used in this study included enzyme activity testing for an in vitro gastrointestinal digestion model, DNS's method to determine reducing sugar, GOD-POD to determine glucose concentration, and Lowry's method to determine soluble protein content. The results showed that the reducing sugar content in each phase of digestion of TCRB and HMRB was not significantly different ($p > 0.05$), with the highest levels in the intestine phase "120 min" of 1.163 ± 0.44 mg/mL and 1.206 ± 0.022 mg/mL, respectively. The concentrations of glucose and soluble protein in each phase of the digestion of TCRB and HMRB were significantly different ($p < 0.05$). The highest sugar concentration in TCRB and HMRB was in the intestine phase "120" min, which amounted to 1.192 ± 0.072 mg/mL and 1.127 ± 0.048 mg/mL. The highest soluble protein content in TCRB and HMRB was in the "120" min intestine phase, which amounted to 1.079 ± 0.002 mg/mL and 0.811 ± 0.029 mg/mL, respectively. Total dietary fiber in TCRB was higher than HMRB with a value of 26.79 ± 0.01 g/100 g DW. Both rice bran show that the largest constituent of dietary fiber is insoluble dietary fiber.

Keywords: In Vitro Gastrointestinal Digestion, Glucose Concentration, Reducing Sugar, Soluble Protein, Total Dietary Fiber

PERBANDINGAN DEDAK PADI HOM MALI DAN TUBTIM CHUMPHAE TERHADAP BIOACCESSIBILITY GLUKOSA, GULA REDUKSI, DAN PROTEIN TERLARUT SECARA PENCERNAAN IN VITRO GASTROINTESTINAL

INTISARI

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Dedak padi merupakan produk samping dari proses penggilingan padi yang mengandung serat pangan, protein, karbohidrat dan lipid. Varietas dedak padi memiliki beragam profil nutrisi yang memungkinkannya memenuhi kebutuhan nutrisi tertentu atau menciptakan makanan fungsional dengan manfaat kesehatan yang ditargetkan. Penelitian ini dilakukan untuk mengetahui fraksi serapan suatu senyawa nutrisi pada dedak padi berpigmen dan non-pigmen dengan membandingkan bioaksesibilitas konsentrasi glukosa, pelepasan gula pereduksi, kandungan protein larut, dan serat pangan pada dedak padi berpigmen, Dedak Padi Tubtim Chumphae (TCRB), dan dedak padi non-pigmen, Hom Mali Rice Bran (HMRB), menggunakan model statis in vitro gastrointestinal. Metode yang digunakan dalam penelitian ini meliputi pengujian aktivitas enzim untuk model in vitro gastrointestinal digestion, DNS method untuk mengukur gula reduksi, GOD-POD untuk mengukur konsentrasi glukosa dan Lowry untuk mengukur protein terlarut. Hasil penelitian menunjukkan bahwa kandungan reducing sugar pada setiap fase pencernaan TCRB dan HMRB tidak berbeda signifikan ($p > 0.05$) dengan kadar tertinggi di fase intestine “120 min” sebesar 1.163 ± 0.44 mg/mL dan 1.206 ± 0.022 mg/mL. Konsentrasi glukosa dan soluble protein pada setiap fase pencernaan TCRB dan HMRB menunjukkan hasil perbedaan yang signifikan ($p < 0.05$). Konsentrasi gula tertinggi pada TCRB dan HMRB berada di fase intestine “120” min yaitu sebesar 1.192 ± 0.072 mg/mL dan 1.127 ± 0.048 mg/mL. Kandungan protein terlarut tertinggi pada TCRB dan HMRB berada di fase intestine “120” min yaitu sebesar 1.079 ± 0.002 mg/mL dan 0.811 ± 0.029 mg/mL. Total dietary fiber pada TCRB lebih tinggi dibandingkan dengan HMRB dengan nilai 26.79 ± 0.01 g/100 g DW. Kedua rice bran menunjukkan bahwa penyusun serat pangan terbesar adalah serat pangan tak larut

Kata kunci: Pencernaan In Vitro Gastrointestinal, Konsentrasi Glukosa, Gula Reduksi, Protein Terlarut, Serat Pangan.