

ABSTRACT

THE EFFECT OF CORN STARCH MODIFICATION BY FREE RADICAL GRAFTING (FRG) METHOD USING GALLIC ACID ON THE INHIBITION OF α -AMYLASE AND α -GLUKOSIDASE ENZYME ACTIVITY

By

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Diabetes mellitus is a disease caused by metabolic disorders that occur in the pancreas, characterised by hyperglycaemia. One alternative to control blood glucose levels is to inhibit the performance of α -amylase and α -glucosidase enzymes. The purpose of this study was to determine the effect of gallic acid concentration and to determine the best gallic acid concentration conjugated to corn starch using the Free Radical Grafting method on the inhibition of α -amylase and α -glucosidase enzyme activity. This study consisted of the process of conjugating corn starch and gallic acid with Free Radical Grafting and then testing the total phenol and antioxidant activities. The research was arranged in a non-factorial Randomized Completed Block Design (RCBD). The study used 5 treatments with the addition of gallic acid concentrations P1 (0%); P2 (0.5%); P3 (1%); P4 (1.5%) and P5 (2%) and 4 replicates. The grafting results were analysed for total phenolics, inhibition of α -amylase and α -glucosidase enzyme activities. The data obtained were tested for data homogeneity, analysed for variance, and then subjected to a further test of Least Significant Difference (LSD) at the 5% level. The results showed that the best treatment was found at 2% gallic acid concentration per weight of corn starch with a total phenol value of 62,97 ppm (GAE), inhibition of α -amylase enzyme activity of 24.75 mg/dL and α -glucosidase 96.59%.

Keywords: *Gallic acid, free radical grafting, corn starch, α -amylase, α -glucosidase.*

ABSTRAK

PENGARUH MODIFIKASI PATI JAGUNG DENGAN METODE *FREE RADICAL GRAFTING* (FRG) MENGGUNAKAN ASAM GALAT TERHADAP PENGHAMBATAN AKTIVITAS ENZIM α -AMILASE DAN ENZIM α -GLUKOSIDASE

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Diabetes melitus merupakan penyakit yang disebabkan oleh gangguan metabolisme yang terjadi pada organ pankreas yang ditandai dengan hiperglikemia. Salah satu alternatif untuk mengendalikan kadar glukosa darah adalah dengan menghambat kinerja enzim α -amilase dan α -glukosidase. Tujuan penelitian ini adalah mengetahui pengaruh konsentrasi asam galat serta mengetahui konsentrasi asam galat terbaik yang dikonjugasikan pada pati jagung menggunakan metode *Free Radical Grafting* terhadap penghambatan aktivitas enzim α -amilase dan α -glukosidase. Penelitian ini terdiri dari, tahapan proses konjugat pati jagung dan asam galat dengan *Free Radical Grafting* kemudian dilakukan uji aktivitas total fenol dan antioksidan. Penelitian disusun dalam Rancangan Acak Kelompok Lengkap (RAKL) non faktorial. Penelitian menggunakan 5 perlakuan dengan penambahan asam galat konsentrasi P1 (0%); P2 (0,5%); P3 (1%); P4 (1,5%) dan P5 (2%) dan 4 ulangan. Hasil *grafting* dianalisis total fenol, penghambatan aktivitas enzim α -amilase dan α -glukosidase. Data yang diperoleh diuji kehomogenan data, dianalisis ragam, kemudian dilakukan uji lanjut Beda Nyata Terkecil (BNT) taraf %5. Hasil penelitian menunjukkan bahwa perlakuan terbaik terdapat pada konsentrasi asam galat 2% per berat pati jagung dengan nilai total fenol 62,97 ppm (GAE), penghambatan aktivitas enzim α -amilase 24.75 mg/dL dan α -glukosidase 96,59%.

Kata Kunci : *Asam galat, free radical grafting, , pati jagung, α -amilase, α -glukosidase*