ABSTRACT

Effect of Corn Starch Modification by Free Radical Grafting (FRG) Method Using Gallic Acid on Antioxidant Properties of Corn Starch

By

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People with DM are at risk of oxidative stress that can damage cells in the body. Gallic acid as one of the antioxidant source compounds that can be conjugated to starch by free radical grafting (FRG) method. This study aims to determine the effect of gallic acid concentration and the best formulation of gallic acid and corn starch using free radical grafting that produces starch with high antioxidant activity. This study consisted of the conjugate process of corn starch and gallic acid with free radical grafting and then total phenol and antioxidant activity tests. The research was arranged in a non-factorial Randomized Complete 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%), P5 (2%) and 4 replicates. The grafting results were analyzed for total phenolics, DPPH and meat system (TBARS). The data obtained were tested for data homogeneity, analyzed for variance, and then conducted further tests of the Least Significant Difference (LSD) at a significant level of 5%. The results showed that starch-gallic acid conjugate had higher antioxidant activity than regular starch. The best treatment was P5 (2% starch-gallic acid conjugate weight of starch) with a total phenol value of 62.97 ppm GAE, antioxidant activity of DPPH method of 31.52% and meat system of 74.87%.

Keywords: free radical grafting, corn starch, gallic acid, DPPH, meat system (TBARS)

ABSTRAK

PENGARUH MODIFIKASI PATI JAGUNG DENGAN METODE *FREE RADICAL GRAFTING* (FRG) MENGGUNAKAN ASAM GALAT TERHADAP SIFAT ANTIOKSIDAN PATI JAGUNG

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Penderita DM rentan mengalami keadaan stres oksidatif yang dapat merusak sel pada tubuh. Asam galat sebagai salah satu senyawa sumber antioksidan yang dapat dikonjugasikan pada pati dengan metode *free radical grafting* (FRG). Penelitian ini bertujuan untuk mengetahui pengaruh konsentrasi asam galat serta formulasi asam galat dan pati jagung terbaik menggunakan *free radical grafting* yang menghasilkan pati dengan aktivitas antioksidan tinggi. 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%), P5 (2%) dan 4 ulangan. Hasil *grafting* dianalisis total fenol, DPPH dan *meat system* (TBARS). Data yang diperoleh diuji kehomogenan data, dianalisis ragam, kemudian dilakukan uji lanjut Beda Nyata Terkecil (BNT) pada taraf nyata 5%. Hasil penelitian menunjukkan bahwa konjugat pati-asam galat memiliki aktivitas antioksidan lebih tinggi dibanding pati biasa. Perlakuan terbaik terdapat pada perlakuan P5 (konjugat pati-asam galat 2% pada berat pati) dengan nilai total fenol 62,97 ppm GAE, aktivitas antioksidan metode DPPH 31,52% dan *meat system* 74,87%.

Kata kunci : *free radical grafting*, pati jagung, asam galat, DPPH, *meat system* (TBARS)