ABSTRAK

Penelitian mengenai analisis total flavonoid dan total fenolat dengan dua standar serta eksplorasi potensi aktivitas antioksidan telah dilakukan. Penelitian ini bertujuan untuk membandingkan total flavonoid dan total fenolat dalam ekstrak tanaman herbal menggunakan dua standar berbeda dan disertai aplikasi persamaan yang dapat mengkonversi total flavonoid setara kuersetin menjadi setara rutin dan total fenolat asam galat menjadi setara katekin. Penelitian ini juga bertujuan mengeksplorasi potensi antioksidan dengan metode H_2O_2 sebagai alternatif pengukuran aktivitas antioksidan yang lebih representatif di dalam tubuh dibandingkan dengan metode DPPH, serta mengkorelasikan total flavonoid dan fenolat dengan aktivitas antioksidan. Langkah langkah yang dilakukan melalui beberapa tahap yaitu, karakteristik sifat fisik, skrining fitokimia metabolit sekunder, analisis total flavonoid dengan metode spektrofotometri menggunakan standar kuersetin dan rutin dengan reagen $AlCl_3$, analisis total fenolat dengan standar asam galat dan katekin menggunakan reagen Follin-Ciocalteu, serta penentuan aktivitas antioksidan dievaluasi dengan metode DPPH dan H_2O_2. Hasil karakterisasi sifat fisik ekstrak menunjukkan sesuai dengan standar Farmakope Herbal Indonesia dan terdapat kandungan senyawa metabolit sekunder target. Kandungan tertinggi total flavonoid dan total fenolat pada kedua standar terdapat pada sampel tapak liman yaitu, 24,072 $\pm$ 1,526 mg QE/g dan 55,112 $\pm$ 2,165 mg RE/g untuk flavonoid, serta 141,778 $\pm$ 2,226 mg GAE/g dan 144,299 $\pm$ 2,246 mg CE/g untuk fenolat. Konversi konsentrasi flavonoid dari rutin ke kuersetin diperoleh rumus dari persamaan linier: kadar kuersetin = kadar rutin + 16,735 dibagi 3,0743. Konversi konsentrasi fenolat dari katekin ke asam galat diperoleh rumus dari persamaan linier: kadar asam galat= kadar katekin-0,3714 dibagi 1,0156. Aktivitas antioksidan tertinggi ditunjukkan pada sampel tapak liman baik metode DPPH maupun H_2O_2. Terdapat korelasi sangat kuat antara total flavonoid dan total fenolat terhadap aktivitas antioksidan dari ketiga ekstrak tanaman.

Kata kunci: aktivitas antioksidan, DPPH, fitokimia, total fenolat, total flavonoid

ABSTRACT

Research on the analysis of total flavonoids and total phenolics with two standards and exploration of potential antioxidant activity has been conducted. This study aims to compare total flavonoids and total phenolics in herbal plant extracts using two different standards and accompanied by the application of equations that can convert total flavonoids equivalent to quercetin to rutin and total phenolics gallic acid to catechin equivalents. This study also aims to explore the antioxidant potential with the H_2O_2 method as an alternative measurement of antioxidant activity that is more representative in the body compared to the DPPH method, and to correlate total flavonoids and phenolics with antioxidant activity. The steps taken through several stages, namely, physical property characteristics, secondary metabolite phytochemical screening, total flavonoid analysis by spectrophotometric method using quercetin and rutin standards with $AlCl_3$ reagent, total phenolic analysis with gallic acid and catechin standards using Follin-Ciocalteu reagent, and determination of antioxidant activity evaluated by DPPH and H_2O_2 methods. The results of the characterization of the physical properties of the extract showed that they were in accordance with the Indonesian Herbal Pharmacopoeia standards and contained target secondary metabolite compounds. The highest content of total flavonoids and total phenolics in both standards was found in the tapak liman sample, namely, 24.072 ± 1.526 mg QE/g and 55.112 ± 2.165 mg RE/g for flavonoids, and 141.778 ± 2.226 mg GAE/g and 144.299 ± 2.246 mg CE/g for phenolics. The conversion of flavonoid concentration from rutin to quercetin was obtained by the formula from the linear equation: quercetin content = rutin content + 16.735 divided by 3.0743. The conversion of phenolic concentration from catechin to gallic acid was obtained by the formula from the linear equation: gallic acid content = catechin content - 0.3714 divided by 1.0156. The highest antioxidant activity was shown in the tapak liman sample using both the DPPH and H_2O_2 methods. There is a very strong correlation between total flavonoids and total phenolics and the antioxidant activity of the three plant extracts.

Keywords: antioxidant activity, DPPH, phytochemicals, total phenolics, total flavonoids