

Uji Aktivitas Antioksidan Serta Penetapan Kadar Fenol dan Flavonoid Ekstrak Etanol 70% Bunga *Caesalpinia pulcherrima* (L.) Sw. dengan Metode Soxhlet, UAE, dan MAE = Antioxidant Activity Test and Determination of Phenol and Flavonoid Content of 70% Ethanol Extract of *Caesalpinia pulcherrima* (L.) Sw. Flower with Soxhlet, UAE, and MAE Methods

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Abstrak

Antioksidan diperlukan untuk mencegah terjadinya stres oksidatif yang diakibatkan ketidakseimbangan antara jumlah radikal bebas dengan antioksidan dalam tubuh dan berpotensi memicu patogenesis dari berbagai penyakit. Penelitian ini membandingkan efisiensi tiga metode ekstraksi, yaitu Soxhlet, Microwave-Assisted Extraction (MAE), dan Ultrasonic-Assisted Extraction (UAE), untuk menghasilkan ekstrak bunga *Caesalpinia pulcherrima* (L.) Sw. dengan pelarut etanol 70%. Penelitian ini bertujuan untuk mengetahui dan melihat perbedaan aktivitas antioksidan dari ekstrak etanol 70% bunga kembang merak yang diekstraksi dengan metode Soxhlet, UAE, dan MAE melalui uji DPPH, FRAP, dan ABTS. Selain itu, dilakukan juga penetapan kadar fenol total dengan menggunakan reagen Folin-Ciocalteu, penetapan kadar flavonoid total dengan metode kolorimetri AlCl_3 , serta penapisan fitokimia dari ekstrak. Rendemen yang diperoleh dari metode ekstraksi UAE, MAE, Soxhlet berturut-turut sebesar 18,26%, 17,24%, dan 13,64%. Kadar fenol total yang diperoleh pada ekstrak hasil UAE, MAE, dan Soxhlet berturut-turut sebesar $92,02 \pm 0,56$; $90,52 \pm 0,7$; $86,97 \pm 0,41$ mgGAE/g ekstrak. Kadar flavonoid total yang diperoleh pada ekstrak hasil UAE, MAE, dan Soxhlet berturut-turut sebesar $20,56 \pm 0,06$; $19,59 \pm 0,08$; dan $18,83 \pm 0,06$ mgEK/g ekstrak. Nilai IC_{50} dari hasil uji DPPH untuk metode UAE, MAE, dan Soxhlet berturut-turut sebesar 43,49; 44,4; dan 80,68 ppm. Angka hasil uji FRAP yang diperoleh dari metode UAE, MAE, dan Soxhlet adalah 19,28; 18,26; dan 13,75 g FeSO_4 ekuivalen/100 g ekstrak. Nilai IC_{50} dari hasil uji ABTS untuk metode UAE, MAE, dan Soxhlet berturut-turut sebesar 40,47; 41,34; dan 86,7 ppm. UAE terbukti sebagai metode optimal, menghasilkan ekstrak dengan aktivitas antioksidan dan kandungan senyawa bioaktif tertinggi.

.....Antioxidants are essential for preventing oxidative stress caused by an imbalance between the number of free radicals and antioxidants in the body, which can potentially trigger the pathogenesis of various diseases. This study compares the efficiency of three extraction methods Soxhlet, Microwave-Assisted Extraction (MAE), and Ultrasonic-Assisted Extraction (UAE) to produce extracts from the flowers of *Caesalpinia pulcherrima* (L.) Sw. using 70% ethanol as a solvent. The aim is to determine and observe the differences in antioxidant activity of the 70% ethanol extract of peacock flower through DPPH, FRAP, and ABTS assays. Additionally, total phenolic content was determined using the Folin-Ciocalteu reagent, total flavonoid content was assessed through AlCl_3 colorimetric method, and phytochemical screening of the extracts was conducted. The yields obtained from UAE, MAE, and Soxhlet extraction methods were 18.26%, 17.24%, and 13.64%, respectively. The total phenolic content in the extracts from UAE, MAE, and Soxhlet were found to be 92.02 ± 0.56 ; 90.52 ± 0.7 ; and 86.97 ± 0.41 mg GAE/g extract, respectively. The total flavonoid content for UAE, MAE, and Soxhlet extracts were 20.56 ± 0.06 ; 19.59 ± 0.08 ; and 18.83 ± 0.06 mg EK/g extract, respectively. The IC_{50} values from the DPPH assay for UAE, MAE, and Soxhlet methods were

43.49; 44.4; and 80.68 ppm, respectively. The FRAP assay results showed values of 19.28; 18.26; and 13.75 g FeSO₄ equivalent/100 g extract for UAE, MAE, and Soxhlet methods, respectively. The IC₅₀ values from the ABTS assay for UAE, MAE, and Soxhlet methods were 40.47; 41.34; and 86.7 ppm. UAE proved to be the optimal method, yielding extracts with the highest antioxidant activity and bioactive compound content.