

Uji Aktivitas Antioksidan Metode Ferric Reducing Antioxidant Power (FRAP) dan Antielastase Ekstrak Etanol 70% Daun Belimbing Wuluh (*Averrhoa bilimbi* L.) = Antioxidant Activity Test Ferric Reducing Antioxidant Power (FRAP) Method and Antielastase of Wuluh Starfruit Leaves (*Averrhoa bilimbi* L.)

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Abstrak

Averrhoa bilimbi L. merupakan tanaman suku Oxalidaceae yang telah dimanfaatkan sebagai obat tradisional karena memiliki aktivitas antioksidan yang tinggi, namun masih jarang dimanfaatkan untuk pengobatan topikal dan perawatan kulit. Ekstrak etanol 70% tanaman ini telah dilaporkan memiliki aktivitas antioksidan, tetapi belum terdapat penelitian terkait enzim yang berperan dalam proses penuaan dini seperti enzim elastase. Penelitian ini bertujuan untuk mengetahui hasil rendemen dan kadar air, kandungan senyawa fitokimia, kadar flavonoid total, aktivitas antioksidan metode FRAP, dan uji penghambatan aktivitas enzim elastase dari ekstrak. Metode ekstraksi dilakukan dengan maserasi menggunakan etanol 70%, skrining fitokimia dengan kromatografi lapis tipis, penetapan flavonoid total metode kolorimetri dengan standar rutin, pengujian aktivitas antioksidan metode FRAP dengan standar $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ dan kontrol positif asam askorbat, serta pengujian antielastase menggunakan porcine pancreatic elastase, substrat N-suksinil-Ala-Ala-Ala-p-nitroanilin, dan kontrol positif epigalokatekin galat (EGCG). Berdasarkan hasil ekstraksi, didapatkan ekstrak kental dengan kadar air 7,5% dan rendemen 21,35% yang positif mengandung senyawa golongan fenol, flavonoid, alkaloid, dan terpenoid, dengan kadar flavonoid total $64,5063 \pm 0,44$ mg ER/g ekstrak. Pengujian antioksidan FRAP menunjukkan ekstrak memiliki aktivitas antioksidan $20,2295 \pm 0,29$ g ekuivalen $\text{FeSO}_4/100\text{g}$ ekstrak, sedangkan asam askorbat $308,9458 \pm 2,41$ g ekuivalen $\text{FeSO}_4/100$ g asam askorbat. Pada uji aktivitas penghambatan elastase, ekstrak tidak aktif menghambat aktivitas enzim karena memiliki aktivitas penghambatan 7,21% pada konsentrasi 300 ppm, 14,72% pada 400 ppm, dan 29,73% pada 500 ppm, sedangkan EGCG memiliki nilai IC_{50} 39,14 $\mu\text{g}/\text{mL}$. Dengan demikian, disimpulkan ekstrak etanol 70% daun belimbing wuluh memiliki aktivitas antioksidan dengan metode FRAP yang lebih rendah dibandingkan asam askorbat dan tidak aktif menghambat elastase.

.....*Averrhoa bilimbi* L. is a plant of the Oxalidaceae tribe that has been used as a traditional medicine because it has high antioxidant activity, but is still rarely used for topical treatment and skin care. The 70% ethanol extract of this plant has been reported to have antioxidant activity, but there is no research related to enzymes that play a role in the process of premature aging such as the elastase enzyme. This study aimed to determine the yield and water content, phytochemical compound content, total flavonoid content, antioxidant activity of FRAP method, and elastase enzyme activity inhibition test of the extract. The extraction method was carried out by maceration using 70% ethanol, phytochemical screening by thin layer chromatography, determination of total flavonoids by colorimetric method with rutin standard, FRAP method antioxidant activity testing with $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ standard and ascorbic acid positive control, and elastase enzyme inhibition activity testing using porcine pancreatic elastase, N-succinyl-Ala-Ala-Ala-p-nitroaniline substrate, and epigalocatechin gallate (EGCG) positive control. Based on the extraction results, a thick extract with a moisture content of 7.5% and a yield of 21.35% was obtained which positively

contained phenol, flavonoid, alkaloid, and terpenoid compounds, with a total flavonoid content of 64.5063 ± 0.44 mg ER/g extract. FRAP antioxidant testing showed the extract had antioxidant activity of 20.2295 ± 0.29 FeSO₄ equivalents/100 g extract, while ascorbic acid was 308.9458 ± 2.41 FeSO₄ equivalents/100 g ascorbic acid. In the elastase inhibition activity test, the extract was not active in inhibiting enzyme activity because it had an inhibitory activity of 7.21% at a concentration of 300 ppm, 14.72% at 400 ppm, and 29.73% at 500 ppm, while EGCG had an IC₅₀ value of 39.14 µg/mL. Thus, it is concluded that 70% ethanol extract of belimbing wuluh leaves has antioxidant activity with the FRAP method which is lower than ascorbic acid and is not active in inhibiting elastase.