

## Uji In Vitro Aktivitas Antidiabetes dan Antioksidan Ekstrak Etanol dan Ekstrak Air Daun Afrika (*Vernonia amygdalina*) = Phytochemical Constituents, Antidiabetic and Antioxidant Activities of *Vernonia amygdalina* Leaves Extract in Various Solvent Concentration

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### Abstrak

Diabetes melitus adalah penyakit yang ditandai dengan kondisi hiperglikemik dan akumulasi stress oksidatif mikrovaskular. Tanaman daun afrika (*Vernonia amygdalina*) diketahui memiliki efek antidiabetes dan antioksidan, sehingga berpotensi sebagai terapi alternatif dari diabetes melitus. Penelitian ini menguji aktivitas antioksidan dan antidiabetes ekstrak air dan ekstrak etanol tanaman daun afrika dengan metode inhibisi DPPH dan enzim  $\alpha$ -glukosidase serta menginvestigasi metabolit sekunder yang terkandung pada tiap ekstrak. Tanaman daun afrika diekstraksi dengan menggunakan pelarut etanol, air, dan campuran air:etanol (1:1). Tiap ekstrak dilakukan skrining fitokimia, kromatografi lapis tipis, dan LC-MS. Selanjutnya, dilakukan uji inhibisi ekstrak tanaman daun afrika terhadap radikal bebas DPPH dan enzim  $\alpha$ -glukosidase. Aktivitas inhibisi dinyatakan dengan nilai IC<sub>50</sub>. Perbedaan komposisi air dan etanol mempengaruhi aktivitas antioksidan dan kandungan metabolit sekunder, tetapi tidak mempengaruhi aktivitas antidiabetes dari ekstrak daun afrika. Ekstrak campuran air:etanol (1:1) mempunyai aktivitas antioksidan dan antidiabetes yang lebih tinggi daripada ekstrak air dan ekstrak etanol daun afrika. Skrining fitokimia menunjukkan adanya kandungan alkaloid, tanin, saponin, dan terpenoid. IC<sub>50</sub> dari ekstrak campuran air:etanol (1:1) terhadap DPPH adalah 418,5  $\mu$ g/mL, sedangkan nilai IC<sub>50</sub> terhadap enzim  $\alpha$ -glukosidase adalah 585,8  $\mu$ g/mL. Ekstrak campuran air:etanol (1:1) tanaman daun afrika dapat dikembangkan lebih lanjut sebagai antioksidan dan antidiabetes.

Diabetes mellitus is a disease characterized by hyperglycemic conditions that can cause various complications through the accumulation of microvascular oxidative stress. Bitter leaf plants (*Vernonia amygdalina*) are known to have antidiabetic and antioxidant effects, so they have the potential as an alternative therapy for diabetes mellitus. This research is conducted to analyze the antioxidant and antidiabetic activity of water and ethanolic extract of *Vernonia amygdalina* measured by using DPPH and  $\alpha$ -glucosidase inhibition and investigated its secondary metabolites contained. The extraction of *Vernonia amygdalina* was conducted using ethanol, water, and a mixture of water:ethanolic (1:1). Each extract was analyzed by phytochemical screening, and LC-MS. The extract of *Vernonia amygdalina* were then tested for its inhibition activity toward DPPH and  $\alpha$ -glucosidase enzyme. The inhibition activity of each tests was calculated in IC<sub>50</sub> value. The composition of water and ethanol solvents affects the antioxidant activity and its secondary metabolites, but not the antidiabetic activity in *Vernonia amygdalina* extract. The mixed water extract:ethanolic (1:1) had higher antioxidant and antidiabetic activity than the water extract and the ethanol extract of *Vernonia amygdalina* leaves. Phytochemical screening showed the presence of alkaloids, tannins, saponins, and terpenoids. The IC<sub>50</sub> value of the water:ethanol (1:1) mixture extract against DPPH was 418.5  $\mu$ g/mL and the IC<sub>50</sub> value for  $\alpha$ -glucosidase enzyme was 585.8  $\mu$ g/mL. The mixture of water:ethanolic (1:1) extract of *Vernonia amygdalina* could be observed and improved further as an antioxidant and antidiabetic agents.