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Phytoconstituents and antihypertensive activity of Indonesian avocado (*Persea americana* Mill) leaves extracts

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Abstract Avocado (*Persea americana* Mill) has been reported for its various biological activities, including its potential as an antihypertensive medication. There is limited research comparing the bioactivity and phytochemical content of avocado leaves from different Indonesian regions, particularly regarding their antihypertensive potential. Therefore, this research aimed to investigate total phenolic and flavonoid content, antioxidant, and antihypertensive activity of avocado leaves extracts collected from three different regions in Indonesia, along with metabolomics analysis using liquid chromatography-high resolution mass spectrometry (LC-HRMS). The highest phenolic content was found in leaves obtained in Gunungkidul, extracted using 96% ethanol (G96: 108.43 ± 0.77 mg GAE/g) and 70% ethanol (G70: 101.86 ± 1.25 mg GAE/g). The mean value of total flavonoid content varied from 1.23-13.1 mg QE/g, in which the ethanol extracts had a higher flavonoid content than the water extract. A good antioxidant activity, shown by low IC₅₀ values, was exhibited by 70% ethanol extracts from leaves obtained in Klaten (K70: 25.1 ± 2.36 mg/L) and Gunungkidul (G70: 13.35 ± 0.31 mg/L), measured using 2,2-diphenyl-1-picrylhydrazyl (DPPH) and 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid (ABTS) antioxidant assays, respectively. Moreover, 70% ethanol extracts from all regions showed higher antihypertensive activity, and G70 demonstrated the highest angiotension-converting enzyme (ACE) inhibitory activity (86.20%) measured at the concentration of 0.1 mg/L. Partial least square-discriminant analysis (PLS-DA) could discriminate extracts according to their extraction solvents. 23 metabolites that are strongly correlated to the antihypertensive activity were found, including flavonoids such as rutin, quercetin-3 beta-D-glucoside, astragalin, juglalin, coumarin, and luteolin-7-sulfate. Molecular docking analysis of selected flavonoids supported the antihypertensive activity through the ACE inhibitory mechanism. These results suggested the potential use of avocado leaves extract as a natural antioxidant and antihypertensive agent for pharmaceutical and functional food industries.

Keywords

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