

## Studi Metabolomik dan Bioaktivitas Ekstrak Metanol Kayu Manis (*Cinnamomum burmannii* Blume) dari Lima Provinsi di Indonesia = Metabolomic Study and Bioactivity of Methanol Extract of Cinnamon (*Cinnamomum burmannii* Blume) from Five Provinces in Indonesia

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### Abstrak

Kayu manis (*Cinnamomum burmannii* B.) merupakan tanaman asli Indonesia yang biasa digunakan sebagai rempah dan obat tradisional. Perbedaan lokasi tumbuh *C. burmannii* di Indonesia memiliki potensi untuk memengaruhi senyawa bioaktifnya yang bermanfaat bagi kesehatan. Penelitian ini bertujuan untuk mengidentifikasi dan mengelompokkan metabolit ekstrak metanol kayu manis (*C. burmannii*), serta mengevaluasi aktivitas antioksidan dan toksisitas ekstrak *C. burmannii* dari lima provinsi di Indonesia. Senyawa metabolit dianalisis dengan teknik kromatografi cair-spektrometri massa (LC-MS). Kandungan total fenolik (TPC), kandungan total flavonoid (TFC), nilai antioksidan, dan nilai toksisitas secara berturut-turut diukur menggunakan metode Folin-Ciocalteu, kolorimetri  $AlCl_3$ , 2-Diphenyl-1-picrylhidrazyl (DPPH), dan Brine Shrimp Lethality Test (BSLT). Hasil penelitian menunjukkan bahwa model Partial Least Squares Discriminant Analysis (PLS-DA) yang dibangun mengelompokkan sampel ke dalam tiga kelompok yang signifikan dengan nilai  $R^2X$  (cum) = 0,775,  $R^2Y$  (cum) = 0,992, dan  $Q^2$  (cum) = 0,875. Senyawa dengan ID N1543 dan N31 teridentifikasi sebagai senyawa yang terdapat di semua sampel. Ekstrak *C. burmannii* dari lokasi tumbuh yang berbeda memiliki kandungan total fenolik dan flavonoid secara berturut-turut sebesar  $82,42 \pm 3,4$ – $316,26 \pm 20,94$  mg GAE/g dan  $18,08 \pm 0,23$ – $96,10 \pm 7,97$  mg QE/g, serta aktivitas antioksidan dan toksisitas secara berturut-turut sebesar  $43,85 \pm 1,09$ – $170,54 \pm 24,61$   $\mu$ g/mL dan  $341,95 \pm 32,24$ – $826,10 \pm 57,79$   $\mu$ g/mL. Kandungan metabolit sekunder aktif dalam ekstrak kayu manis, yaitu senyawa fenolik dan flavonoid, ditemukan berkorelasi pada sifat antioksidannya.

.....Cinnamon (*Cinnamomum burmannii* B.) is a native Indonesian plant commonly used as a spice and traditional medicine. The variations in the growing locations of *C. burmannii* in Indonesia can potentially affect its beneficial bioactive compounds. This study aims to identify and categorize the metabolites of cinnamon (*C. burmannii*) methanol extracts and evaluate the antioxidant activity and toxicity of *C. burmannii* extracts from five provinces in Indonesia. The metabolite compounds were analyzed using Liquid Chromatography-Mass Spectrometry (LC-MS) technique. The total phenolic content (TPC), total flavonoid content (TFC), antioxidant value, and toxicity value were measured using Folin-Ciocalteu method,  $AlCl_3$  colorimetric assays, 2-Diphenyl-1-picrylhidrazyl (DPPH), and Brine Shrimp Lethality Test (BSLT), respectively. The results showed that the constructed Partial Least Squares Discriminant Analysis (PLS-DA) model categorized the samples into three significant groups with  $R^2X$  (cum) = 0.775,  $R^2Y$  (cum) = 0.992, and  $Q^2$  (cum) = 0.875. The compound with ID N1543 and N31 were identified as a compound present in all samples. The *C. burmannii* extracts from different growing locations had total phenolic and flavonoid contents ranging from  $82.42 \pm 3.4$ – $316.26 \pm 20.94$  mg GAE/g and  $18.08 \pm 0.23$ – $96.10 \pm 7.97$  mg QE/g, as well as antioxidant activity and toxicity ranging from  $43.85 \pm 1.09$ – $170.54 \pm 24.61$   $\mu$ g/mL and  $341.95 \pm 32.24$ – $826.10 \pm 57.79$   $\mu$ g/mL, respectively. The presence of active secondary metabolites, such as phenolic and flavonoid compounds in cinnamon extracts correlated with its antioxidant properties.