

**PENENTUAN KOMPOSISI KIMIA AROMA BUNGA KAMBOJA MERAH
MENGUNAKAN METODE *HEAD SPACE-SOLID PHASE MICRO
EXTRACTION (HS-SPME)* dan *GAS CHROMATOGRAPHY-MASS
SPECTROMETRY (GC-MS)***

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ABSTRAK

Bunga kamboja merah (*Plumeria rubra*) merupakan tanaman bunga tropis yang menghasilkan senyawa volatil yang memiliki aroma khas dan dapat dimanfaatkan pada industri parfum, kosmetik, dan farmasi. Namun, komposisi kimia minyak atsiri dan aroma bunga ini belum banyak diteliti. Penelitian ini bertujuan untuk menentukan komposisi kimia aroma bunga kamboja merah menggunakan metode *Head Space Solid-Phase Micro Extraction (HS-SPME)* yang dikombinasikan dengan *Gas Chromatography-Mass Spectrometry (GC-MS)*. Sampel bunga kamboja merah pada penelitian ini diambil di area taman Kampus Tengah Undiksha, Singaraja, Bali, saat bunga mekar sempurna dan tidak terkontaminasi air hujan. Proses ekstraksi senyawa volatil dilakukan dengan menggunakan metode HS-SPME tanpa pelarut, dan dianalisis menggunakan GC-MS untuk identifikasi senyawa berdasarkan spektrum massa dan pustaka data Wiley dengan nilai Similarity Indeks $\geq 85\%$. Hasil penelitian menunjukkan bahwa komposisi kimia aroma bunga kamboja merah didominasi oleh dua kelompok senyawa utama yaitu, senyawa aromatik (54,67%) dan monoterpen teroksigenasi (36,21%). Senyawa dominan yang berhasil diidentifikasi meliputi linalool (34,66%), benzaldehyde (25,22%), dan benzene ethanol (15,48%). Komposisi kimia yang diperoleh menunjukkan karakteristik unik pada bunga kamboja merah dari Bali dibandingkan dengan penelitian terdahulu, yang umumnya berhasil mengidentifikasi seskuiterpen sebagai kelompok senyawa dominan. Perbedaan komposisi ini terjadi karena faktor lingkungan, kondisi geografis, serta selektivitas metode HS-SPME terhadap senyawa volatil ringan. Hasil penelitian ini menegaskan bahwa metode HS-SPME yang dikombinasikan dengan GC-MS efektif untuk menentukan komposisi kimia aroma bunga kamboja merah yang segar dan dapat memberikan kontribusi dalam pengembangan basis data fitokimia lokal.

Kata Kunci: Bunga Kamboja Merah, Senyawa Volatil, *Head Space Solid-Phase Micro Extraction (HS-SPME)*, *Gas Chromatography-Mass Spectrometry (GC-MS)*, aroma bunga.

**DETERMINATION OF THE CHEMICAL COMPOSITION OF RED
FRANCISCO FLOWER AROMA USING THE HEAD SPACE-SOLID PHASE
MICRO EXTRACTION (HS-SPME) AND GAS CHROMATOGRAPHY-MASS
SPECTROMETRY (GC-MS) METHODS**

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ABSTRACT

*The red frangipani flower (*Plumeria rubra*) is a tropical flowering plant that produces volatile compounds with a distinctive aroma and can be used in the perfume, cosmetics, and pharmaceutical industries. However, the chemical composition of essential oils and the aroma of this flower have not been widely studied. This study aims to determine the chemical composition of the aroma of red frangipani flowers using the Head Space Solid-Phase Micro Extraction (HS-SPME) method combined with Gas Chromatography-Mass Spectrometry (GC-MS). The red frangipani flower samples in this study were taken in the park area of the Undiksha Central Campus, Singaraja, Bali, when the flowers were in full bloom and not contaminated with rainwater. The extraction process of volatile compounds was carried out using the HS-SPME method without solvents and analyzed using GC-MS for compound identification based on the mass spectrum and Wiley data library with a Similarity Index value $\geq 85\%$. The results of the study showed that the chemical composition of the aroma of red frangipani flowers was dominated by two main groups of compounds, namely, aromatic compounds (54.67%) and oxygenated monoterpenes (36.21%). The dominant compounds identified included linalool (34.66%), benzaldehyde (25.22%), and benzene ethanol (15.48%). The chemical composition obtained showed unique characteristics in red frangipani flowers from Bali compared to previous studies, which generally succeeded in identifying sesquiterpenes as the dominant compound group. This difference in composition occurred due to environmental factors, geographical conditions, and the selectivity of the HS-SPME method towards light volatile compounds. The results of this study confirmed that the HS-SPME method combined with GC-MS is effective in determining the chemical composition of the fresh aroma of red frangipani flowers and can contribute to the development of a local phytochemical database.*

Keywords: *Red frangipani, Volatile Compounds, Head Space Solid-Phase Micro Extraction (HS-SPME), Gas Chromatography-Mass Spectrometry (GC-MS), floral aroma.*