

## PENGARUH PERBEDAAN LOKASI TUMBUH TERHADAP PROFIL METABOLIT DAUN GAHARU *Gyrinops versteegii* (Gilg.) Domke

Tiandi Widayat  
15/380963/BI/09464  
Dosen Pembimbing: Dr. Tri Rini Nuringtyas, S.Si., M.Sc.

### INTISARI

Gaharu merupakan produk hasil hutan bukan kayu Indonesia berpotensi untuk dikembangkan sebagai herbal. Salah satu jenis gaharu yang tumbuh di Indonesia adalah *Gyrinops versteegii* (Gilg.) Domke. Daun *G. versteegii* diketahui mempunyai aktivitas sebagai antioksidan, imunomodulator dan bersifat sitotoksik terhadap sel kanker. Komposisi dan kadar metabolit sekunder yang berperan dalam bioaktivitas tersebut sangat dipengaruhi oleh faktor lingkungan tempat tumbuh individu tersebut. Penelitian ini dilakukan untuk mengetahui pengaruh perbedaan lokasi tumbuh terhadap profil metabolit daun gaharu *G. versteegii*. Sampel diperoleh dari Balai Pengembangan Teknologi Hasil Hutan Bukan Kayu (BPTHBK) Kota Mataram, NTB dan Kebun Raya Bogor, Jawa Barat. Sampel diekstraksi secara maserasi dengan menggunakan pelarut etanol, kloroform dan etil asetat. Profil metabolit dievaluasi dengan kromatografi lapis tipis (KLT) dan GC-MS (Shimadzu) 2010. Kandungan mineral tanah tempat tumbuh tanaman gaharu dianalisis dengan metode Kjeldahl, spektrofotometer, flame fotometri dan spektrofotometer serapan atom. Pengamatan anatomi daun gaharu *G. versteegii* berupa sayatan melintang dilakukan dengan metode penyelubungan parafin. Analisis data GC-MS dilakukan dengan Analisis Multivariat (MvA) dan *T-Test*. Hasil KLT menunjukkan variasi golongan senyawa metabolit sekunder antara daun *G. versteegii* Bogor dan Mataram. Sampel Bogor memiliki kandungan terpenoid yang lebih beragam. Hasil MvA menunjukkan pemisahan yang signifikan antara metabolit sekunder sampel Mataram dengan Bogor. Sebanyak 15 senyawa metabolit yang menyebabkan perbedaan tersebut, yaitu *trans- $\alpha$ -bergamotene*, *neral*, *lupeol*, *isopropyl myristate*, *heptacosane*, *geranyl linalool*, *farnesyl acetone*, *farnesyl acetate*, *farnesol*, *beta-caryophyllene*, *beta-farnesene*, *beta-bisabolene*, *alpha-humulene*, *alpha-copaene* dan *1-octadecyne*. Secara keseluruhan ukuran sel atau jaringan pada sayatan melintang daun *G. versteegii* Mataram lebih kecil dari Bogor. Terdapat empat unsur tanah yang berbeda signifikan antara Bogor dan Mataram, yaitu N dan Ca yang lebih tinggi pada tanah Mataram, serta K dan Mn yang lebih tinggi pada tanah Bogor.

Kata kunci: *Gyrinops versteegii*, analisis multivariat, GC-MS, metabolit sekunder, profil metabolit.

## THE EFFECT OF DIFFERENT PLANTING LOCATION ON METABOLITE PROFILES OF AGARWOOD LEAVES *Gyrinops versteegii* (Gilg) Domke

Tiandi Widayat

15/380963/BI/09464

Supervisor: Dr. Tri Rini Nuringtyas, S.Si., M.Sc.

### ABSTRACT

Agarwood is one of Indonesia's non-timber forest products potential to be developed as an herbal. One kind of agarwood that grows in Indonesia is *Gyrinops versteegii*. *G. versteegii* leaves are known to have activities as antioxidant, immunomodulator and are cytotoxic to cancer cells. The composition and levels of secondary metabolites that play a role in the bioactivity are strongly influenced by environmental factors where the individual grows. This study was conducted to evaluate the effect of different planting locations on leaves metabolite profiles of the *G. versteegii*. Samples were obtained from Research and Development Institute of Technology Non Timber forest Product in Mataram City, NTB and Bogor Botanical Gardens, West Java. Samples were extracted by maceration overnight with three different solvents including ethanol, chloroform and ethyl acetate. The extracts analyzed with thin layer chromatography and GC-MS (Shimadzu) 2010. The mineral content of the soil where the agarwood plant grows was also tested with Kjeldahl, spektrofotometer, flame fotometri and atomic absorption spectroscopy method. Preparation of *G. versteegii* leaf transverse section was carried using paraffin embedding method. Analysis of GC-MS data was carried out by Multivariate Analysis (MvA) and T-Test. Thin layer chromatography result showed that there were variations in the group of secondary metabolites between the leaves of *G. versteegii* Mataram and Bogor. The Bogor sample contains more diverse terpenoids. The results of MvA showed a significant separation between secondary metabolites of Mataram samples with Bogor. There were 15 metabolic compounds that cause these differences, were trans- $\alpha$ -bergamotene, neral, lupeol, isopropyl myristate, heptacosane, geranyl linalool, farnesyl acetone, farnesyl acetate, farnesol, beta-caryophyllene, beta-farnesene, beta-bisabolene, alpha-humulene, alpha-copaene and 1-octadecyne. Overall the cells size in the transverse section of *G. versteegii* Mataram is smaller than Bogor. There are four significantly different elements of soil between Bogor and Mataram, which are higher N and Ca in the Mataram and higher K and Mn in the Bogor.

Key Words: *Gyrinops versteegii*, multivariate analysis, GC-MS, secondary metabolites, metabolite profiles.