

KARAKTERISASI VARIETAS BERAS AROMATIK DI PULAU JAWA BERDASARKAN PROFIL SENYAWA VOLATIL ORGANIK

INTISARI

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Beras aromatik merupakan salah satu komoditas pangan yang memiliki karakteristik khas berupa aroma spesifik yang terbentuk dari interaksi antara faktor genetik varietas dan kondisi lingkungan tempat tumbuh. Karakteristik khas tersebut tidak hanya berperan dalam menentukan mutu dan nilai ekonomi beras, tetapi juga menjadi informasi penting dalam mengidentifikasi keterkaitan karakteristik produk dengan wilayah geografis asalnya, dalam mendukung pengembangan dan perlindungan Indikasi Geografis. Penelitian ini bertujuan untuk menganalisis senyawa volatil utama dan mengkarakterisasi varietas beras aromatik dari Pulau Jawa yaitu Pandanwangi dari Cianjur, Mentikwangi Susu dari Magelang, dan Sintanur dari Bondowoso. Sampel beras dianalisis menggunakan *electronic nose* (hidung elektronik) dan *gas chromatography–mass spectrometry* (GC-MS) untuk memperoleh pola respons aroma dan profil senyawa volatil organik. Sinyal hidung elektronik dan data GC-MS dianalisis menggunakan *partial least squares discriminant analysis* (PLS-DA) dan *variable importance in projection* (VIP) untuk mengidentifikasi senyawa volatil yang berkontribusi terhadap diskriminasi. Analisis korelasi Pearson digunakan untuk mengevaluasi hubungan antara respons sensor hidung elektronik dan senyawa volatil. Analisis PLS-DA hidung elektronik dan analisis PLS-DA GC-MS menunjukkan pemisahan yang jelas antarvarietas dengan total variansi sebesar 86,85% dan 84,03%. Analisis VIP mengidentifikasi 15 senyawa volatil dengan nilai VIP >1 yang berperan sebagai marker compounds dalam membedakan varietas, yaitu furan-2-pentyl, nonanal, 1-butanol-4-hydroxy-3-methyl, tetradecane-4-methyl, butyric acid, 1-penten-3-ol, 1-octen-3-ol, 1-hexanol, n-butyl ether, 2-acetyl-1-pyrroline, hexanal, undecane, 2-nonenal, 3-hydroxy-2-butanone, dan decane-3,7-dimethyl. Analisis korelasi Pearson menunjukkan adanya hubungan antara respons sensor hidung elektronik dan senyawa volatil hasil GC-MS, terutama pada sensor S2, sehingga memperlihatkan bahwa hidung elektronik mampu merepresentasikan fingerprint volatil beras aromatik.

Kata Kunci : beras aromatik, GC-MS, hidung elektronik, karakterisasi varietas senyawa volatil organik

CHARACTERIZATION OF AROMATIC RICE VARIETIES IN JAVA ISLAND BASED ON ORGANIC VOLATILE COMPOUND PROFILES

ABSTRACT

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Aromatic rice is a food commodity characterized by a distinctive aroma resulting from the interaction between varietal genetic factors and growing environmental conditions. These distinctive characteristics not only contribute to rice quality and economic value but also provide important information for identifying the relationship between product characteristics and their geographical origin, supporting the development and protection of Geographical Indications. This study aimed to analyze major volatile compounds and characterize the varieties of aromatic rice from Java Island, namely Pandanwangi from Cianjur, Mentikwangi Susu from Magelang, and Sintanur from Bondowoso. Rice samples were analyzed using an electronic nose (E-nose) and gas chromatography–mass spectrometry (GC-MS) to obtain aroma response patterns and volatile organic compound profiles. E-nose signals and GC-MS data were analyzed using partial least squares discriminant analysis (PLS-DA) and variable importance in projection (VIP) to identify volatile compounds contributing to discrimination. Pearson correlation analysis was used to evaluate the relationships between E-nose sensor responses and volatile compounds. PLS-DA analysis of the E-nose data and GC-MS-based PLS-DA analysis showed clear separation among the rice varieties, with total explained variances of 86.85% and 84.03%, respectively. VIP analysis identified 15 volatile compounds with VIP values >1 that served as marker compounds for discriminating the varieties, namely furan-2-pentyl, nonanal, 1-butanol-4-hydroxy-3-methyl, tetradecane-4-methyl, butyric acid, 1-penten-3-ol, 1-octen-3-ol, 1-hexanol, n-butyl ether, 2-acetyl-1-pyrroline, hexanal, undecane, 2-nonenal, 3-hydroxy-2-butanone, and decane-3,7-dimethyl. Pearson correlation analysis showed relationships between E-nose sensor responses and volatile compounds identified by GC-MS, particularly for sensor S2, indicating that the E-nose was capable of representing the volatile fingerprint of aromatic rice.

Kata Kunci : aromatic rice, electronic nose, GC-MS, varieties characterize, volatile organic compound