ABSTRACT

IDENTIFICATION OF PHYSICAL CHARACTERISTICS OF COFFEE BEANS IN THREE TYPES OF SPECIALTY ARABICA COFFEE: GAYO, KINTAMANI AND WAMENA

By

SEPTIAN TRISAPUTRA

Indonesia as the second largest coffee exporter in Asia has a rich variety of coffee from each region known as specialty coffee. The protection with Geographical Indication certification (GI) has been given to several Indonesian specialty coffees, including Gayo, Kintamani and Wamena. There are arabica coffee type that has high economic value because it has typical taste. High production and consumption levels also increase the rate of counterfeiting and admixture between high quality coffees with low-quality coffee or non-coffee ingredients. Therefore this research was done to measure physical parameters on coffee beans from three varieties namely Gayo, Kintamani and Wamena.

Physical measurements include measurement of mass, thickness, diameter, sphericity, surface area, volume and color. Classification analysis is performed using a linear classification model with Principal Component Analysis (PCA), Soft Independent Modeling of Class Analogy (SIMCA) and non-linear classification model using Support Vector Machine (SVM) on The Unscrambler v9.2 and The Unscrambler v10.5 software. The test was conducted with 300 samples of Gayo, Kintamani and Wamena coffee beans with 100 samples of each type. Results of data analysis with Randomized Block Design (RBD) showed variable

thickness (T), green color (G), blue (B). L * a* and b * can be a parameter to distinguish Gayo, Kintamani and Wamena coffee beans, PCA analysis produces PC1 and PC2 which shows the largest contribution to detonate the three types of coffee that is variable D1.V and D2.V. The result of analysis with SVM shows the best classification result with RBF kernel either with SVM type C-SVC and nu-SVC with 100% accuracy and 0% *error* value. The SVM classification model shows the best result to classify samples according to their type.

ABSTRAK

IDENTIFIKASI KARAKTERISTIK FISIK BIJI KOPI PADA TIGA JENIS KOPI ARABIKA SPESIALTI: GAYO, KINTAMANI DAN WAMENA

Oleh

SEPTIAN TRISAPUTRA

Indonesia sebagai negara pengekspor kopi terbesar kedua di Asia memiliki kekayaan jenis kopi dari setiap daerahnya yang dikenal dengan kopi spesialti. Perlindungan dengan sertifikasi Indikasi Geografis (IG) telah diberikan pada beberapa kopi spesialti Indonesia antara lain kopi Gayo, Kintamani dan Wamena. Tingkat produksi dan konsumsi yang tinggi juga meningkatkan tingkat pemalsuan dan pengoplosan biji antara kopi berkualitas tinggi dengan kopi yang berkualitas rendah atau bahan selain kopi. Untuk itu pada penelitian ini dilakukan pengukuran fisik pada biji kopi pada tiga varietas Gayo, Kintamani dan Wamena.

Pengukuran fisik meliputi pengukuran massa, ketebalan, diameter, sperisitas, luas permukaan, volume dan warna. Kemudian dilakukan analisis klasifikasi menggunakan model klasifikasi linier dengan *Principal Component Analysis* (PCA), *Soft Independent Modeling of Class Analogy* (SIMCA) dan model klasifikasi *non-linear* dengan *Support Vector Machine* (SVM) pada *software The Unscrambler* v9.2 dan *The Unscrambler* v10.5. Pengujian dilakukan dengan 300 sampel biji kopi Gayo, Kintamani dan Wamena, dengan 100 sampel dari setiap