Autentikasi Kopi Bubuk Liberika Tungkal Jambi Menggunakan *Spectroscopy Near-Infrared* (NIR) dan Analisis Multivariat

INTISARI

Kopi Liberika Tungkal Jambi adalah kopi *single origin* asal Provinsi Jambi terkenal dengan profil cita rasanya yang unik. Namun, harga jual yang relatif tinggi membuatnya rentan terhadap kemungkinan pemalsuan, seringkali dengan menambahkan bahan pencampur untuk menambah massa produk dan mendapatkan keuntungan tambahan. Penelitian ini bertujuan untuk membedakan kopi Liberika Tungkal Jambi yang autentik dan non autentik pada sampel bubuk kopi yang dicampur dengan berbagai jenis bahan antara lain beras, kopi Robusta Tungkal Jambi, dan kopi Liberika Probolinggo. Pencampuran dilakukan dengan proporsi berkisar antara 10% hingga 50%. Sebanyak 140 sampel diuji menggunakan spektroskopi *Near-Infrared* (NIR). Data spektrum dianalisis menggunakan metode analisis multivariat seperti *Principal Component Analysis* (PCA) dan *Linear Discriminant Analysis* (LDA) dengan penerapan berbagai teknik *pretreatment* antara lain penggunaan *Smoothing Savitzky-Golay, Standard Normal Variate* (SNV), dan *Multiplicative Scatter Correction* (MSC). Hasil penelitian ini menunjukkan bahwa *Spectroscopy Near Infrared* (NIR) efektif untuk autentikasi kopi bubuk Liberika Tungkal Jambi, membedakannya dengan sampel dengan tambahan bahan pencampur. Menggunakan pendekatan analisis multivariat, seperti *Principal Component Analysis* (PCA) dan *Linear Discriminant Analysis* (LDA), data berhasil diklasifikasikan menjadi sembilan kelompok. Penggunaan PCA mencapai tingkat keberhasilan sebesar 98% sementara LDA mencapai 77%, keduanya dengan menerapkan *Pretreatment Multiplicative Scatter Correction* (MSC). Penerapan *Pretreatment* MSC terbukti mampu memisahkan kopi Liberika Tungkal Jambi natural dan *honey* dari bahan pencampur, serta mengidentifikasi asal geografis dengan kopi Liberika Probolinggo. Tingkat keberhasilan yang tinggi ini menunjukkan potensi *Spectroscopy Near Infrared* (NIR) dan penggunaan analisis multivariat PCA dan LDA untuk mengautentikasi kopi bubuk Liberika Tungkal Jambi.

Kata Kunci : Kopi Liberika Tungkal Jambi, NIR, *Single Origin*

Authentication of Liberica Tungkal Jambi Ground Coffee Using Spectroscopy Near-Infrared (NIR) and Multivariat Analysis

ABSTRACT

Liberica Tungkal Jambi coffee is a single origin coffee from Jambi Province, known for its unique flavor profile. However, its relatively high selling price makes it vulnerable to possible counterfeiting, often by adding blending ingredients to increase the mass of the product and gain additional profit. This study aims to differentiate authentic and non-authentic Liberika Tungkal Jambi coffee in coffee powder samples mixed with various types of ingredients including rice, Robusta Tungkal Jambi coffee, and Liberika Probolinggo coffee. The blending was done with proportions ranging from 10% to 50%. A total of 140 samples were tested using Near-Infrared (NIR) spectroscopy. Spectrum data were analyzed using multivariate analysis methods such as Principal Component Analysis (PCA) and Linear Discriminant Analysis (LDA) with the application of various pretreatment techniques including the use of Savitzky-Golay Smoothing, Standard Normal Variate (SNV), and Multiplicative Scatter Correction (MSC). The results of this study show that Near Infrared (NIR) Spectroscopy is effective for the authentication of Liberika Tungkal Jambi ground coffee, distinguishing it from samples with added blending agents. Using multivariate analysis approaches, such as Principal Component Analysis (PCA) and Linear Discriminant Analysis (LDA), the data was successfully classified into nine groups. The use of PCA achieved a success rate of 98% while LDA achieved 77%, both by applying the Multiplicative Scatter Correction (MSC) *Pretreatment*. The application of MSC *Pretreatment* proved to be able to separate natural and *honey* Tungkal Jambi Liberika coffee from blending materials, as well as identify the geographical origin with Probolinggo Liberika coffee. This high success rate demonstrates the potential of Near Infrared (NIR) Spectroscopy and the use of PCA and LDA multivariate analysis to authenticate Liberika Tungkal Jambi ground coffee.

Keywords: Coffee Liberica Tungkal Jambi, NIR, Single Origin