ABSTRAK

Indonesia dikenal sebagai salah satu produsen kopi terbesar di dunia dengan keragaman varietas, termasuk kopi Excelsa yang memiliki profil rasa khas serta dugaan kandungan kafein yang lebih rendah dibandingkan jenis kopi lainnya. Meskipun konsumsi kopi dapat memberikan manfaat fisiologis, asupan berlebih berpotensi menimbulkan efek samping seperti gangguan tidur, kecemasan, dan keluhan gastrointestinal. Berdasarkan ketentuan BPOM, batas aman konsumsi kafein harian ditetapkan sebesar 150 mg, sehingga informasi mengenai kadar kafein pada setiap jenis kopi menjadi aspek penting bagi konsumen. Penetapan kadar kafein pada kopi Excelsa memerlukan metode analisis yang tervalidasi agar hasil pengukuran dapat dipertanggungjawabkan. Penelitian ini merupakan studi non-eksperimental dengan pendekatan deskriptif yang menggunakan instrumen *Reversed Phase–High Performance Liquid Chromatography*. Analisis dilakukan menggunakan kolom silika oktadesil C18 (LC-2030C(-48) SHIMADZU) sebagai fase diam dan campuran aquabidestilata–metanol sebagai fase gerak. Sampel yang dianalisis berupa kopi bubuk Excelsa. Validasi metode mencakup pengujian selektivitas, linearitas, rentang, akurasi, dan presisi. Hasil menunjukkan bahwa metode memiliki selektivitas yang baik, ditunjukkan oleh nilai resolusi (Rs) sebesar 2,357 pada baku kafein, 2,078 pada sampel kopi bubuk Excelsa, dan 1,840 pada sampel adisi baku. Linearitas memenuhi kriteria dengan koefisien korelasi (r) sebesar 0,9995. Uji akurasi dan presisi, baik intraday maupun interday, pada konsentrasi 8, 10, dan 12 ppm menghasilkan nilai yang berada dalam rentang validasi, yaitu akurasi (% recovery) 80–110% dan presisi (% KV) < 7,3%. Berdasarkan keseluruhan hasil, metode *Reversed Phase-High Performance Liquid Chromatography* dinyatakan memenuhi persyaratan validasi untuk penetapan kadar kafein pada rentang konsentrasi 4–16 ppm.

Kata kunci: validasi metode, kafein, kopi excelsa, *Reversed Phase-High Performance Liquid Chromatography*

ABSTRACT

Indonesia is recognized as one of the world's major coffee-producing countries, offering a wide range of varieties, including Excelsa coffee, which is characterized by a distinctive flavor profile and is presumed to contain lower caffeine levels compared to other coffee types. Although coffee consumption may confer physiological benefits, excessive intake can lead to adverse effects such as sleep disturbances, anxiety, and gastrointestinal discomfort. According to BPOM regulations, the recommended safe daily caffeine intake is 150 mg, making accurate information on caffeine content across different coffee varieties essential for consumers. The determination of caffeine levels in Excelsa coffee requires a validated analytical method to ensure the reliability and accountability of the measurement results. This research is a non-experimental descriptive study employing Reversed Phase–High Performance Liquid Chromatography as the analytical instrument. The analysis was conducted using an octadecyl silica C18 (LC-2030C(-48) SHIMADZU) column as the stationary phase and an aquabidest–methanol mixture as the mobile phase. The sample analyzed consisted of Excelsa ground coffee. Method validation encompassed assessments of selectivity, linearity, range, accuracy, and precision. The results demonstrated good selectivity, indicated by resolution (Rs) values of 2.357 for the caffeine standard, 2.078 for the Excelsa ground coffee sample, and 1.840 for the spiked sample. Linearity met the acceptance criteria, with a correlation coefficient (r) of 0.9995. Accuracy and precision tests conducted both intraday and interday at concentrations of 8, 10, and 12 ppm, yielded values within the validation requirements, namely accuracy (% recovery) of 80–110% and precision (% CV) below 7.3%. Overall, the RP-HPLC method was confirmed to meet validation criteria for determining caffeine content within the concentration range of 4–16 ppm.

Keywords: method validation, caffeine, Excelsa coffee, Reversed Phase-High Performance Liquid Chromatography