ANALISIS KADAR ALFA-ARBUTIN PADA SERUM PENCERAH YANG DIJUAL DI TOKO KOSMETIK X KOTA BATAM MENGGUNAKAN METODE SPEKTROFOTOMETRI UV-Vis

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ABSTRAK

Alfa-arbutin bekerja sebagai inhibitor kompetitif enzim tirosinase yang menghambat melanogenesis, dan aman digunakan pada kadar maksimum 2% untuk produk wajah. Meskipun demikian, kadar aktual senyawa ini pada sediaan komersial rentan mengalami ketidaksesuaian terhadap klaim etiket yang dapat memicu praktik *overclaim*. Penelitian ini bertujuan menganalisis kadar alfa-arbutin pada serum pencerah yang dijual di Toko Kosmetik X Kota Batam menggunakan metode spektrofotometri UV-Vis. Penelitian ini menggunakan rancangan eksperimental untuk menetapkan kadar alfa-arbutin pada tiga sampel serum pencerah (A, B, C) yang diperoleh secara *purposive sampling* dari Toko Kosmetik X Kota Batam, dianalisis dengan spektrofotometri UV-Vis pada panjang gelombang maksimum 282,5 nm setelah metode divalidasi. Uji kualitatif menunjukkan keberadaan analit pada seluruh sampel, hasil validasi menunjukkan linearitas baik (r = 0,9999), LOD 0,669 ppm, LOQ 2,028 ppm, %RSD 0,500%, dan recovery 98,370–100,357%. Kadar rata-rata alfa-arbutin adalah 1,99% (Sampel A), 2,00% (Sampel B), dan 1,18% (Sampel C) dari klaim label 2%. Uji *One-Sample t-Test* menunjukkan Sampel A dan B tidak berbeda signifikan dari klaim (p > 0,05), sedangkan Sampel C berbeda signifikan (p = 0,000), mengindikasikan *overclaim* pada produk tersebut.

Kata Kunci: alfa-arbutin; serum pencerah; spektrofotometri UV-Vis; validasi metode; *overclaim*

Analysis of Alpha-Arbutin Content in Brightening Serums Sold at Cosmetic Store X in Batam City Using UV-Vis Spectrophotometry Method

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ABSTRACT

Alpha-arbutin acts as a competitive inhibitor of the tyrosinase enzyme that suppresses melanogenesis, and is considered safe for use at a maximum concentration of 2% in facial products. Nevertheless, the actual content of this compound in commercial preparations is prone to inconsistency with label claims, which can lead to overclaiming practices. This study aimed to analyze the alpha-arbutin content in brightening serums sold at Cosmetic Store X in Batam City using the UV-Vis spectrophotometry method. An experimental design was employed to determine the alpha-arbutin content of three brightening serum samples (A, B, C) obtained through purposive sampling from Cosmetic Store X in Batam City, which were analyzed by UV-Vis spectrophotometry at a maximum wavelength of 282.5 nm after the method was validated. The qualitative test confirmed the presence of the analyte in all samples, and the validation results showed good linearity (r = 0.9999), a limit of detection (LOD) of 0.669 ppm, a limit of quantitation (LOQ) of 2.028 ppm, an RSD of 0.500%, and a recovery of 98.370–100.357%. The mean alpha-arbutin content was 1.99% (Sample A), 2.00% (Sample B), and 1.18% (Sample C) of the 2% label claim. The One-Sample t-Test showed that Samples A and B did not differ significantly from the claim (p > 0.05), whereas Sample C differed significantly (p = 0.000), indicating overclaiming in that product

*Keywords**:** alpha-arbutin; brightening serum; UV-Vis spectrophotometry; method validation; overclaim*