Intisari

Kombinasi natrium benzoat dan asam sitrat memiliki fungsi sebagai pengawet dan pengatur keasaman. Penelitian ini bertujuan untuk mengembangkan, memvalidasi, dan diaplikasikan dalam produk minuman yang mengandung natrium benzoat dan asam sitrat.

Metode analisis dikembangkan menggunakan 16 *training set* dan 10 *test set*. Konsentrasi yang digunakan 2,0-7,0 µg/ml (natrium benzoat), dan 200,0-800,0 µg/ml (asam sitrat). Komposisi *training set* dibuat berdasarkan ketentuan dalam *central composite design* (CCD) sedangkan *test set* diambil secara acak, selanjutnya absorbansi dibaca pada spektrofotometer UV dengan panjang gelombang 200-240 nm, kemudian diolah dengan model *partial least square-1* (PLS-1). Model divalidasi internal dan eksternal. Selanjutnya dilakukan validasi metode analisis berupa linearitas, rentang, akurasi, presisi, batas deteksi, dan kuantifikasi.

Hasil dari penelitian ini didapatkan bahwa metode spektrofometrik UV dengan pendekatan kemometrika Partial Least Square-1 dapat digunakan untuk mengukur kadar senyawa natrium benzoat dan asam sitrat dalam produk minuman berenergi secara simultan, dapat memenuhi persyaratan parameter validasi metode analisis berupa linearitas dan rentang, preisisi serta akurasi, serta dapat diaplikasikan dalam penentuan kadar natrium benzoat dan asam sitrat secara simultan pada produk minuman berenergi.

Kata Kunci : Natrium Benzoat, Asam Sitrat, PLS-1, Validasi.

Abstract

The combination of sodium benzoate and citric acid have functions as preservator and acidity regulator. These research aimed to develop, validate, and apply a product drink containing sodium benzoate and citric acid.

Analysis method was developed using 16 training sets and 10 test sets. The concentration was 2,0-7,0 µg/ml (sodium benzoate), and 200,0-800,0 µg/ml (citric acid). The composition of the training set was made based on the central composite design (CCD), while the test sets were drawn at random. Then the absorbance was read at UV spectrophotometer with a wavelength of 200-240 nm, and then processed with a model-1 partial least square (PLS-1). The model was validated internally and externally. Furthermore, the analysis method was validated such as linearity, range, accuracy, precision, limits of detection and quantification.

The results from this study was the method of UV spectrophotometric with Partial Least Square-1 chemometric approach can be used to measure levels of sodium benzoate and citric acid in the product energy drink simultaneously, meet the requirements of validation parameters analysis methods such as linearity and span, precision and accuracy, and can be applied in the determination of levels of sodium benzoate and citric acid simultaneously on product energy drinks.

***Keywords**: Sodium Benzoate, Citric Acid, PLS-1, Validation.*