SIMULTANEOUS SPECTROPHOTOMETRIC DETERMINATION OF THREE ARTIFICIAL SWEETENERS IN SALEP DRINK

Fatma TURAK, Hakan BAŞTÜRK, Mahmure ÜSTÜN ÖZGÜR

Department of Chemistry, Faculty of Science and Art, Yıldız Technical University, 34220 Istanbul, TURKEY

{fturak2005@yahoo.com.tr, Tel: 0212 3834148, Fax: 0212 3834134}

Key Words: Salep, Derivative Spectrophotometry, Sweetener, Aspartame, Acesulfame-K, Saccharin

A derivative spectrophotometric method for the simultaneous determination of three artificial sweeteners, aspartame (ASP, E951), acesulfame-K (ACE-K, E950), and saccharin (SAC, E954) in salep drink is proposed.

Sweeteners are the modern non-caloric alternatives to sugars as additives in foods and drinks.

At present, six sweeteners are included in European Union legislation to be used in food: Acesulfame-K, Aspartame, Saccharin, Cyclamate, Neohesperidine DC and Thaumatin (1). Sweeteners can be used separately or in combination with others and it has been a reported sinergistic effect in various sweetener combinations. (2)

Salep drink is a traditional daily beverage which is generally consumed during winter in TURKEY. The main ingredients of salep drink are milk, sugar and salep powder which is obtained from tubers of wild orchids. The salep powder also contains starch, mineral matter and in addition to glucomannan. (1)

Although a great variety of methods have been applied to the analysis of the aforementioned compounds in foods (3, 4), there is no procedure for the simultaneous determination of ACE-K, ASP, and SAC in salep drink. Since the three sweeteners studies here present spectral overlapping, their simultaneous determination is hard when conventional methods are used. In this study ternary mixtures of sweeteners (ACE-K, ASP and SAC) are resolved by using the first, second, and three derivative spectra and zero crossing method. The amplitudes of first derivative at 249 nm were used for the determination of ACE-K in presence of ASP and SAC in the concentration range of 2.0-10.0 µg/mL. The amplitudes of the second derivative at 253 nm and 208 nm were also used for the determination of ACE-K, and SAC, respectively. The amplitudes of the three derivative at 245 nm and 227 nm were used for the determination of SAC and ASP, in the concentration ranges of 2.0-5.0 µg/mL and 2.0-10.0 µg/mL, respectively.

The sensitivity and reproducibility of the method were determined by using the standard mixtures prepared by us, and the proposed method was applied to a commercially available salep sample. For the comparison of the results, the standard addition technique was also tested. In general, satisfactory results were obtained.

References