

SPECTROSCOPIC DETECTION OF ACESULFAME POTASSIUM SOFT DRINKS BY DOUBLE BEAM UV-VIS (ULTRAVIOLET VISIBLE SPECTROPHOTOMETRY)

Nurul Aireen Alias^a, So'bah Ahmad^{ab*}

Background: This study focuses on determining the physicochemical properties and detecting acesulfame potassium (Ace-K) in soft drinks.

Methods: The research investigates the use of double beam UV-Vis spectrophotometry to detect Ace-K through spectroscopic analysis. The study examines the physical and chemical properties of original and zero-sugar soft drinks from two brands, focusing on attributes such as colour, Brix, density, pH, viscosity, and total sugar content.

Results: The results show that original sugar beverages have higher Brix values, indicating greater sugar content, and slightly increased density (0.2-0.3 g/mL). Viscosity measurements reveal that sugar-containing beverages exhibit greater viscosity, suggesting the presence of natural sugars. Colour analysis using a chromameter indicates that original sugar drinks appear darker and less yellow compared to zero-sugar drinks. pH analysis shows that original sugar beverages are more acidic, enhancing their sweetness and flavor. Total soluble sugar content analysis using the phenol sulfuric acid method confirms that zero-sugar drinks have significantly lower sugar levels.

The detection of Ace-K confirms its presence in both types of beverages, with zero-sugar drinks using Ace-K to achieve desired sweetness without added calories. UV-Vis spectrophotometry at 620 nm was used for total sugar content analysis, and double beam UV-Vis spectrophotometry at 190-280 nm was employed to detect Ace-K.

This study analyzed Coca-Cola Original, Cola by Sainsbury's Original, Coca-Cola Zero Sugar, and Zero Cola by Sainsbury's. Significant differences were found in Brix, density, viscosity, colour, total soluble sugar content, and total sugar content, with original sugar beverages consistently showing higher values. Ace-K concentrations were 0.006 g/mL for Coca-Cola Zero and 0.015 g/mL for Zero Cola by Sainsbury's, compared to 0.018 g/mL for Coca-Cola Original and 0.020 g/mL for Cola by Sainsbury's Original.

Conclusion: These findings validate the reduced sugar claims of zero-sugar drinks and highlight the importance of examining the health impacts of artificial sweeteners. This research confirms the reliability of UV-Vis spectrophotometry for beverage analysis and provides valuable insights for product development in the soft drink industry. The practical implications suggest that beverage manufacturers can rely on UV-Vis spectrophotometry and physicochemical analyses to verify the composition of both original and zero-sugar soft drinks.

Keywords: Soft drinks, Cola, Zero sugar, Acesulfame Potassium, sugar content.

*Correspondence: rohana_micro@uitm.edu.my

^a School of Biology, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia