

Analysis of mineral content in bottled mineral water: A brand-by-brand comparison

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Structured Abstract

Background: Water is essential for human health and with growing concerns about the safety of drinking water, bottled mineral water has become increasingly popular in Malaysia. The increase in sales of bottled mineral water has caused the emergence of a lot of brands in the mineral water industry. Four minerals (sodium (Na), potassium (K), magnesium (Mg) and calcium (Ca)) in five brands of mineral waters (range from RM 16.00 to RM 1.63 per litre) were quantified by Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES) and Flame Atomic Absorption Spectroscopy (FAAS).

Methods: Na and K were quantified using ICP-AES while Mg and Ca were measured using FAAS. Series of standard mixture of Na and K were prepared for calibration in ICP-AES as the instrument allows for simultaneous detection while a separate series of Mg and Ca were prepared for calibration in FAAS. Since the sample is a simple mineral water, no further digestion method is required. 100 mL sample was added with 1 % nitric acid to stabilize the analytes. These sample solutions were further diluted to match the calibration curve concentration range.

Results: Calibration curve of the four elements showed a good R^2 value of greater than 0.900, reflects well fit of the experimental data with linear regression line. The sample were then quantified using the linear equation of the calibration curve obtained. The relationship between concentration of elements in mineral water and its price were conducted using Pearson correlation and linear regression. The results of Pearson correlation showed a strong positive association between price and the concentration of Mg and Ca but negative correlation for Na and K. Linear regression analysis assessed that only concentration of Mg and Ca has statistically significant relationship with price ($p < 0.05$), suggesting that higher-priced mineral water tends to contain more of the elements.

Conclusion: It was found that relationship between price and concentration of element only exist for Ca and Mg, while the concentration of Na and K was not affected by the price of the water.

Keywords: Mineral water, Sodium, Potassium, Magnesium, Calcium

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