



## Health implication of anion contents in different brands of bottled water samples consumed in some parts of south west Nigeria

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### ABSTRACT

In recent time, many bottled water factories in Nigeria are producing water for consumption without standard operation procedures for quality water treatments. Twenty-one samples of different brands of bottled water samples were purchased in and around three densely populated states in Southwest Nigeria. The concentrations of phosphate, nitrate, chloride and nitrite anions in the bottled water samples were analyzed using ascorbic acid method, UV-visible spectrophotometry and argentometric titration. Statistically, the regression analysis indicates that nitrate correlated with nitrite and the significance  $F$  value of  $1.7 \times 10^{-3}$  which is lower than the critical value of  $5 \times 10^{-3}$  with  $p$ -value of  $1.7 \times 10^{-3}$  also in good agreement. The principal component analysis strongly revealed that high factor scores of nitrite may be due to Aquarite bottled water with a combined contribution of about 65% in all the nitrites found in the 21 samples. The value of  $0.80 \text{ mg L}^{-1}$  for nitrite in Aquarite exceeds the World Health Organization, European Economic Community and Standard Organization of Nigeria guidelines by factors of 4, 1.6 and 4, respectively. The anion contents in Nirvana bottled water were found to be lower than the International Reference Standards. The exposure dose, lifetime average daily dose and hazard quotient from the bottled waters were below the permissible limits. This study suggests the need for greater awareness of the risks of anion contents in drinking water, and the appropriate authority should consider the constant increase in production of untreated or poorly treated bottled water as well as the global growth in environmental pollution.

**Keywords:** Bottled water; Anions; Chronic daily intake; Health risk; UV-visible spectrophotometry; Ascorbic acid, Argentometry

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