

Chemical composition of Chilean bottled waters: Anomalous values and possible effects on human health

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The Chilean bottled water market has experienced continuous growth since 2000, surpassing 500 million liters sold in 2015. Generally, consumers tend to associate the consumption of bottled water with a healthy lifestyle, but current Chilean law does not require the product to be labelled with the chemical composition, thus preventing consumers from making informed choices. Our study focuses on determining the water quality of ten brands of bottled water available for sale in Santiago, Chile. All of the analyzed water was not carbonated and in plastic containers in the 1.5 L size when available and the closest size to this when not available. Thirty-two chemical elements were analyzed, including minor and trace elements, and the data have been evaluated with respect to the limits established by Chilean and international regulatory agencies. Our results indicate that the quality of the analyzed water generally complies with Chilean law for bottled water. However, 30% of the analyzed samples exceed the values of arsenic (As) permitted by Chilean drinking water regulations, the World Health Organization and the United States Environmental Protection Agency. In 40% of the samples, the NO₃ content is higher than groundwater values suggesting that the source of the bottled water is superficial. The purified bottled water brands contain minimal amounts of dissolved elements but do not comply with all of the parameters (e.g., pH) established by Chilean drinking water regulations. Our study highlights that there is an inconsistency between the Chilean norms that regulate bottled water and those that regulate drinking water. Some of the analyzed bottled waters do not comply with the drinking water regulations and paradoxically these brands should not be consumed by humans. However, risk assessment calculations for As ingestion show that the consumption of 1 L/day of bottled water does not pose a risk for human health.