

Assessment of the NPI index, in Algerian bottled water

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Introduction

In Algeria, the total flow of underground reservoirs (mineral water and spring water) revealed by the Ministry of Water Resources is 699 L/s, or 60394 m³ /d. This flow covers 71 source water concessions and 26 mineral water and is equivalent to approximately 40 million bottles. The annual consumption of mineral water according to the Association of Algerian Beverage Producers, estimated at 2.7 billion litres, or 63 L/Hab.

The aim of this work is to examine a considerable number of bottled water samples (41 brand) to cover the entire range of physicochemical concentrations, given the high demand for bottled water for consumption; the high concentrations could seriously jeopardize the safety of human health due to the nitrates collected during the labelling of bottled waters.

Once we examined their physicochemical characteristics, we compared them to Algerian standards for mineral and spring waters, as well as international standards. (O.M.S). subsequently, we analyzed and classified these waters using both hydrochemical methods such as the Piper, Sholler Berkloff and Gibbs diagrams.

Based on their nitrate content, bottled water was, classified according to the nitrate pollution index method. This method plays an essential role in the detection of pollution, which allows us to choose our water properly.

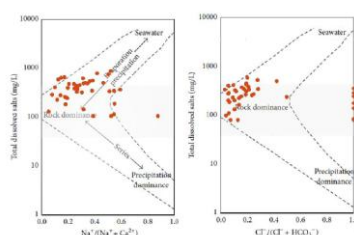
Materials and methods

Due to the high demand on bottled waters for consumption; high concentrations could seriously compromise human health safety due to nitrates collected from bottled water labels. In addition, a fairly wide number of sampling points were studied in this work to cover the entire temporal and spatial range.

Thus, the main objectives of this study are to:

- Analyse the water quality and spatiotemporal variation characteristics of bottled water;
- Evaluate the possible sources and transformation processes for NO₃-N, especially by using the nitrate pollution index
- Estimate the risks of contamination related to various sources of NO₃-N under physicochemical changes on human health.
- Nitrate contamination is a form of water pollution that can be quantified using the Nitrate Contamination Index (NPI).

$$NPI = (Cs-HAV)/HAV \tag{1}$$



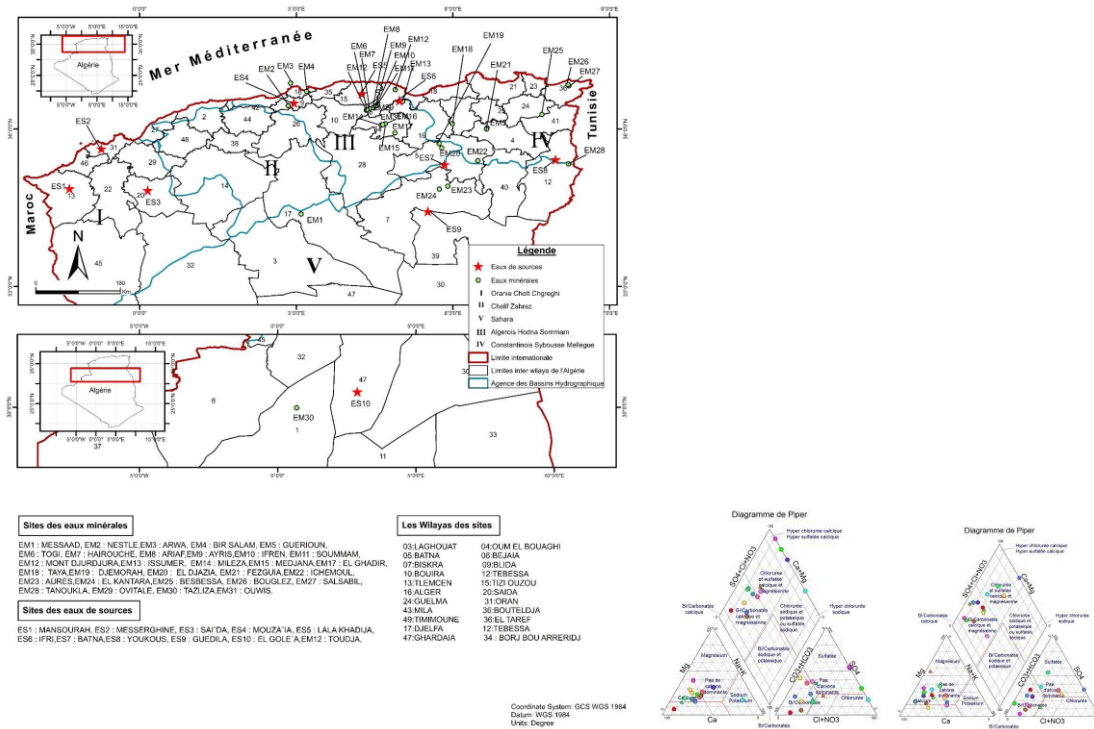


Figure 1. Distribution of mineral water and spring water sites in Algeria

Results and concluding remarks

The Piper diagram gives a general view of the type of spring waters encountered. Reporting the results on this type of diagram shows for most of the samples analyzed that the cations are located in the triangle of —non-dominance— of the cations and that the anions tend to approach the bicarbonate pole. we distinguish three families:

- Chloride and sulfate waters, calcium and magnesium (20%)
- Chloride sodium and potassium or sulfate sodium waters (0%)
- Bicarbonate calcium and magnesium waters (80%)

We note that the majority of bottled waters are classified as clean, unpolluted waters. the presence of low pollution in 07 waters studied (Mont Djurdjura, El Ghadir, Guerioune, Hairouch, Djemourah, El Djazia, Tanoukla)

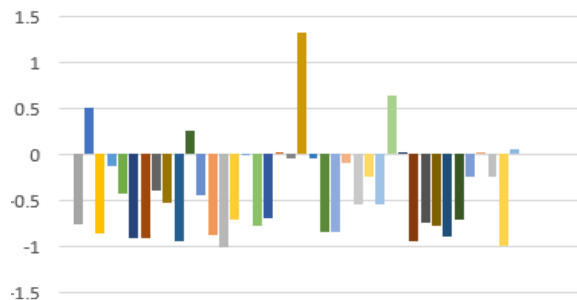


Figure 1. the N.P. Index of bottled waters

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