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Data Article

Calculating fluoride concentrations data using ambient temperatures in drinking water distribution networks in select provinces of Iran

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ABSTRACT

Fluoride concentrations in drinking water were analyzed relative to air temperature data collected in different provinces of Iran. Determining suitable concentrations of fluoride in drinking water is crucial for communities because of the health effects of fluoride on humans. This study analyzed fluoride concentrations in drinking water from selected Iranian provinces. The data were derived mainly from a detailed literature review. The annual mean maximum temperatures (AMMTs) were collected from a popular website that maintains records of daily ambient temperature measurements for the last five years (2012–2016). Using regional ambient temperatures, the optimal value of fluoride in drinking water for each province was calculated by the Galgan and Vermillion formula. These optimal fluoride concentrations in drinking water for different Iranian regions were calculated to be 0.64–1.04 mg F/L. Most of the selected provinces were found to have acceptable concentrations of fluoride, except for Alborz,

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Khuzestan, and Hormozgan, which reported concentrations of 0.66, 0.66, and 0.64 mg/L, respectively.

Specifications Table

Subject area	Environmental health
More specific subject area	Concentrations of fluoride in drinking water impacting daily fluoride intake
Type of data	Fluoride concentrations in drinking water
How data was acquired	First data was acquired through a literature search and from a local meteorological organization
Data type	Raw and analyzed data
Experimental factors	The relevant data were collected using keywords including “drinking water,” “fluoride,” “fluoride concentration,” and “temperature.” Monthly maximum ambient temperatures for selected provinces in Iran were obtained from the website of the world Meteorological Organization (WMO). WMO is a specialized agency of the United Nations. It is the UN system's authoritative voice on the state and behavior of the Earth's atmosphere
Experimental features	The optimal amount of fluoride in drinking water was calculated using the local temperature and the Galgan and Vermillion formula.
Data source location	Iran
Data accessibility	The relevant data are reported in this article.

Value of the data

- The collected data and the Galgan and Vermillion formula were used to calculate the fluoride concentrations in drinking water for selected Iranian provinces.
- The results identify provinces that have critical fluoride concentrations in drinking water.
- Sharing such data can enable much earlier rectification of the issue and therefore lessen the possible negative impacts arising from consumption of polluted water.
- Combining the reported data on fluoride concentrations in drinking water with information on ambient temperature is very useful; this study is the first to attempt this methodology successfully in the Iranian context.

1. Data

Tables 1 and 2 show data obtained through the literature review and calculated using the method described. Table 1 shows fluoride concentration in water supplies in different provinces of Iran. Table 2 lists the AAMT data by provinces and the calculated optimal fluoride concentrations in their respective water supply systems.

The results of Table 1 show that the reported fluoride concentrations of most provinces are less than the calculated values reported in Table 2. However, some provinces, such as, Chaharmahal and Bakhtiari, Qom, Hormozgān, Isfahan, and Khorasan, Razavi, have fluoride concentrations higher than values calculated using the standard formula and AMMT data.

Fig. 1 shows the comparison of the calculated fluoride concentrations in drinking water for various provinces of Iran as well as the values reported in the literature against the allowable concentration level according to the WHO guideline [25]. The minimum allowable concentration of fluoride (0.7 mg/L) is represented by the green line in Fig. 2, which also reveals that most of the selected provinces meet the stipulated guideline, except for Alborz, Khuzestan, and Hormozgan. The fluoride concentrations for these provinces were found to be less than 0.7 mg/L.