



Spatial distribution of fluoride and nitrate in groundwater and its associated human health risk assessment in residents living in Western Khorasan Razavi, Iran

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ABSTRACT

Fluoride and nitrate are the important factors that influence the drinking water quality. A health risk assessment was performed for exposure to fluoride and nitrate via drinking water ingestion pathway for the inhabitants living in Bardaskan County, Iran. In the present work, totally 30 drinking water samples were collected from private wells, monitoring wells, and boreholes during June 2018, from different previously unexplored rural and urban areas. The concentration of fluoride and nitrate varied from 0.55 to 1.75 mg/L (mean 0.873 mg/L) and from 5.7 to 25.4 mg/L (mean 12.58 mg/L), respectively. None of the 30 studied areas had fluoride, except one place, and nitrate concentrations above WHO guidelines. Hazard index (HI) values for adults, children and infants varied from 0.4160 to 1.1886 (mean 0.6405), from 1.0921 to 3.1203 (mean 1.6813) and from 1.165 to 3.3283 (mean 1.7934), respectively. HI estimated for groundwater in 3.3%, 100%, and 100% cases were found to be above the safety limit of 1 for adults, children, and infants, respectively. This research provides evidence that local residents in Bardaskan County may be at a high risk of health problems caused from fluoride and nitrate in drinking water. It is, therefore, important to take some remedial measures to prevent any health problem in this county.

Keywords: Fluoride; Nitrate; Human health; Risk assessment; Bardaskan

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