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# The Monte Carlo-Based Uncertainty Health Risk Assessment Associated with Rural Drinking Water Quality

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## Author(s)

Yu Deng, Fuquan Ni, Zhenguang Yao

## ABSTRACT

In this study, Triangular Fuzzy-number of the Fuzzy Set Theory was introduced to reform parameters of those previous health risk assessment (HRA) models, Monte Carlo simulation parameter was applied to lower the randomness and fuzziness of the HRA system, and the Monte Carlo-United States Environmental Protection Agency (MC-EPA) model was employed to evaluate the health risk associated with water quality (HRWQ), so as to solve the uncertainty HRA associated with rural drinking water quality. Results showed that the water in Mingshan was contaminated mainly by Cr(VI), nitrate, fluoride and Fe. The health risk primarily embodied in the carcinogenic risk (CR) caused by Cr(VI) that generally exceeds the limit while little non-carcinogenic toxic effected presents. However, non-carcinogenic risk (NCR) in some water resources was high, exceeding the limit "1". The results revealed the health risk level of the water quality and the health risk degree caused by the pollutants, providing scientific support for the management of the HRWQ of the WR. It also indicated the significance of MC-EPA model's application.

## KEYWORDS

Monte Carlo; Health Risk; Water Quality; Triangular Fuzzy-Number; Mingshan County

## Cite this paper

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