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Assessment of sources and fate of nitrate in shallow groundwater of an agricultural area by using a multi-tracer approach (Article) ([Open Access](#))

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Abstract

[View references \(79\)](#)

Nitrate isotopic values are often used as a tool to understand sources of contamination in order to effectively manage groundwater quality. However, recent literature describes that biogeochemical reactions may modify these values. Therefore, data interpretation is difficult and often vague. We provide a discussion on this topic and complement the study using halides as comparative tracers assessing an aquifer underneath a sub-humid to humid region in NE Mexico. Hydrogeological information and stable water isotopes indicate that active groundwater recharge occurs in the 8000km² study area under present-day climatic and hydrologic conditions. Nitrate isotopes and halide ratios indicate a diverse mix of nitrate sources and transformations. Nitrate sources include organic waste and wastewater, synthetic fertilizers and soil processes. Animal manure and sewage from septic tanks were the causes of groundwater nitrate pollution within orchards and vegetable agriculture. Dairy activities within a radius of 1000m from a sampling point significantly contributed to nitrate pollution. Leachates from septic tanks caused nitrate pollution in residential areas. Soil nitrogen and animal waste were the sources of nitrate in groundwater under shrubland and grassland. Partial denitrification processes helped to attenuate nitrate concentration underneath agricultural lands and grassland, especially during summer months. © 2013 The Authors.

SciVal Topic Prominence

Topic: [nitrate](#) | [nitrogen isotope](#) | [nitrate sources](#)

Prominence percentile: 95.468

Author keywords

Denitrification

Groundwater

Halides

Isotopes

Mexico

Nitrate

Tracer

Indexed keywords

Engineering
controlled terms:

Agricultural wastes Agriculture Aquifers Data processing Denitrification
Groundwater Groundwater pollution Groundwater resources Isotopes Nitrates
Pollution Septic tanks Sewage Water quality

Engineering
uncontrolled terms

Biogeochemical reactions Denitrification process Ground-water qualities
Groundwater nitrate pollutions Halides Hydrogeological informations Me-xico
Tracer

Engineering main
heading:

Recharging (underground waters)

EMTREE drug
terms:

dissolved oxygen ground water halide nitrate surface water

GEOBASE Subject
Index:

agricultural land aquifer denitrification environmental fate groundwater pollution
hydrogeology isotopic analysis nitrate pollutant source recharge tracer
water quality

EMTREE medical
terms:

agricultural land alkalinity aquifer article atomic emission spectrometry
biogeochemistry denitrification electric conductivity environmental monitoring
environmental protection grassland humidity hydrology manure organic waste
pH priority journal rural area scrub soil analysis soil property soil treatment
summer temperature

Regional Index:

Mexico [North America]

Species Index:

Animalia

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Nitrogen Isotopes Water Pollutants, Chemical

Chemicals and CAS Registry Numbers:

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