

ABSTRACT

OXYGEN AND NITROGEN ISOTOPE RATIOS IN GROUND WATER FROM AN AGRICULTURAL AREA IN THE SAN JOAQUIN VALLEY, CALIFORNIA

Nitrate concentrations in ground water are affected by agricultural, urban, and natural biological activities. As different processes influence nitrogen and oxygen isotope ratios of nitrate, it may be possible to determine probable sources of nitrate contamination. This study is an investigation of using the variation of nitrogen and oxygen isotopic ratios of groundwater nitrate to determine the source of the nitrate. The study area lies in the eastern San Joaquin Valley, California, where livestock farms and agricultural fields are abundant. One wastewater effluent sample and 51 groundwater samples were analyzed for isotopes of nitrate, nutrients, and major ion chemistry.

Analyses of the samples revealed that nitrate concentrations in half of the samples exceeded the maximum contamination level in drinking water as determined by the U.S. E.P.A. Possible sources of the high nitrate in these samples include a wastewater treatment facility, a dairy, and a meat processing plant. Analyses of samples associated with a municipal wastewater treatment facility suggest that denitrification may be occurring onsite and continuing down-gradient.

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