

OurwaterQuality

Uranium in drinking, garden water

Northern Santa Fe County is an area known for high levels of naturally occurring uranium in groundwater. Contrary to popular belief, this uranium content is attributable not to Los Alamos National Laboratory (LANL) but to as many as four geologic factors: erosion of granite in the Sangre de Cristo Mountains, shallow uranium-rich ore bodies, hydrothermal emplacement, and decomposition of volcanic ash beds derived from ancient eruptions in the Jemez Mountains. The non-anthropogenic, natural sources of uranium in local groundwater are confirmed by studies by geoscientists from the New Mexico Environment Department.

Useful information about uranium and its possible health consequences is available on the websites of the NM Environment Department (Drinking Water Bureau) and the Department of Health (Environmental Health - Biomonitoring) and in a joint publication titled *Uranium and Human Health*. The three most obvious recommendations

in this publication are that when the uranium content of your water is over the Maximum Contamination Level: 1) do not boil the water (which will actually increase uranium concentration), 2) seek another source of water, or 3) use uranium removal technology.

Once you have addressed the drinking water dilemma, what about irrigating your garden with uranium-contaminated water? There is actually a very informative study that was done in Nambé. The experiment was conducted by two LANL environmental scientists and a researcher from the Department of Radiological Health Sciences at Colorado State University. They established a test garden plot and irrigated tomato, lettuce, squash, and radishes with samples of non-uranium water and three samples of representative Nambé well water, with uranium concentrations at multiples of 5, 12 and 30 times the EPA's Maximum Contamination Level for uranium of 30 ppb.

To replicate local growing conditions, the team developed a controlled soil

mixture with a uranium content representative of the area and tested all the components of the water and soil at the New Mexico State University testing lab. The study was designed to determine if garden vegetable crops irrigated with Nambé well water of various uranium concentrations accumulated uranium beyond background concentrations. Samples of produce collected from the experimental garden at the end of the growing season were analyzed for various elements, including uranium. Needless to say, the results of such a study are site-specific and reflect many variables.

The order of uranium uptake in the four experimental produce types was (from greatest to least) as follows: radish, lettuce, squash, and then tomato. The estimated uranium concentration ratios in radish and lettuce irrigated with Nambé well water exceeded the recommended International Atomic Energy Association standards for uranium by a factor of 100, where squash and tomato remained within recommended IAEA standards. Uranium



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concentration in plants increased linearly with increasing uranium concentration in irrigation water.

These conclusions caused me to investigate the USDA's criteria for organic certification of produce. The listing criteria do not include the chemistry of the water used to irrigate the crops.

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