

Sunland Analytical

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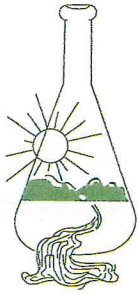
Nitrate in Tomatoes

As with most plants nitrate is taken up by the roots and transported to the various regions of the plant where it is then converted to ammonia, the ammonia used to make amino acids and the amino acids incorporated into protein. Different regions of the plant can carry out these processes at different rates and therefore may accumulate nitrate to differing extents. For example nitrate might not accumulate in a specific region if it were transported to a region slowly thus allowing all nitrate entering the region to be converted into ammonia, amino acids or protein. Likewise, nitrate accumulation would be low if the process to convert it into ammonia, amino acids and protein was very fast. These process not only explain why different regions of the plant may have different nitrate accumulation but also what happens as the plants mature and the same region of the plant has differing nitrate concentrations i.e. either the transport rate or the conversion to ammonia etc. rate changes.

Much of the tomato nitrate data in the literature is for petiole concentrations, because it accumulates rapidly and builds up in proportion the nitrate available to the plant in the soil. Table 1 shows the difference between three petiole nitrate concentrations and leaf tissue from the same plants. Note that there is approximately 40% of the concentration in the leaf tissue that is in the petiole. But this is not a constant relationship. For example, when leaf and petiole tissue were evaluated (from the same plants) within a week after water run fertilization, the petiole had 11210 ppm nitrate while the leaf only showed 3601 ppm. This is only 32% of the nitrate accumulated in the petiole.

TABLE 1
TOMATO NITRATE IN PETIOLE AND LEAF TISSUE
FROM 1" FRUIT STAGE

<u>SAMPLE</u>	<u>LEAF</u>	<u>PETIOLE</u>
1	2600	6225
2	3341	7477
3	3038	7118



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Thus, it is very clear that if evaluation of the nutritional status of the tomato plant is to be made correctly, comparison of nitrate values from the petiole should be used. What should these levels be? Table 2 shows the sufficient petiole-nitrate for tomatoes.

TABLE 2
SUFFICIENT PETIOLE NITRATE LEVELS FOR TOMATO

<u>STAGE</u>	<u>PETIOLE LEVEL</u>
EARLY BLOOM	12,000
1" FRUIT	6,000
FIRST COLOR	3,000

(from Lorenz & Tylor, 1983)

Finally, standardizing the petiole taken as a sample will add to the accuracy and consistency of your results. The data for the sufficient levels were obtained from the forth petiole from the growing tip. In sampling take 30 to 40 of these petioles and store in a paper bag or envelope. Sunland Analytical will fax your nitrate analysis results in 24 hours after receipt.