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Tissue Sampling & Analysis for Greenhouse Tomatoes

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Plant tissue analysis measures nutrient concentrations within growing plants.

Testing of tomato leaves provides information on whether or not nutrients are sufficient for optimum crop development. Not only does it identify and verify observed nutrient deficiencies and/or toxicities, but it can also identify nutrient shortages before symptoms appear.

Plant tissue samples can be predictive or diagnostic. Routine samples are predictive: that is, they identify nutrient levels within the crop and predict an appropriate approach to fertilization. Diagnostic samples are submitted to identify apparent nutrient problems.

Routine (predictive) analysis measures levels of nutrients present: nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, manganese, copper, zinc, iron, boron and sodium. Results indicate whether plants are absorbing adequate amounts of the nutrients needed for optimum growth. Plant analysis reports give growers the information they need to evaluate the effectiveness of their current fertilization program.

Problem (diagnostic) analysis measures the same nutrients as routine analysis. However, the main goal of the analysis is to identify observed nutrient problems accurately. The best way to do this is to submit samples from "good" (normal-looking) plants and from "bad" (discolored, stunted or misshapen) plants and compare the

results. It may also be helpful to submit nutrient solution samples along with the tissue samples.

Plant tissue samples must be properly collected, carefully handled and submitted to a recognized laboratory. Because nutrient concentrations throughout a plant vary, the correct plant part must be sampled, and it must be at the proper stage of growth. Improperly collected tissue samples can produce unreliable results and lead to incorrect interpretations. Plant nutrient concentrations determined by tissue analysis are compared with sufficiency ranges found in normal plants (see inset below).

The most recent mature or fully expanded leaf is the best indicator sample for all growth stages of tomato. This is generally the 4th or 5th leaf from the growing point. Eight to ten leaves are required for a good sample.

At the first sign of a potential nutrient problem, collect tissue samples for diagnostic analysis. For routine nutrient-level monitoring, submit tissue samples at least two weeks before flowering and repeat every ten days to two weeks. Ship samples to the NCDA&CS laboratory in paper containers. Standard tissue analysis for tomato costs \$5 per sample for N.C. residents.

For additional information on collecting tissue samples, visit

<http://www.ncagr.gov/agronomi/pictorial.htm> or contact your local NCDA&CS regional agronomist (list available at

www.ncagr.gov/agronomi/rahome.htm). The NCDA&CS Agronomic Division provides plant tissue analysis and interpretation for all N.C. residents. The Division will be glad to train any individual or group in proper sampling procedure and provide information on how to interpret the data provided in NCDA&CS plant analysis reports.

* Campbell CR. 2000. Tomato, greenhouse. In: Campbell CR, editor. Reference sufficiency ranges for plant analysis in the southern region of the United States. Raleigh (NC): NC Dept Agriculture & Consumer Services. Southern Cooperative Series Bulletin 394. [available online at www.ncagr.gov/agronomi/saaesd/gtom.htm]

Plant Tissue Nutrient Sufficiency Ranges for Tomato*

Nutrients	Sufficiency Range
N (%)	3.5–5.0
P (%)	0.3–0.65
K (%)	3.5–4.5
Ca (%)	1.0–3.0
Mg (%)	0.35–1.0
S (%)	0.2–1.0
Fe (ppm)	50–300
Mn (ppm)	25–200
Zn (ppm)	18–80
Cu (ppm)	5–35
B (ppm)	30–75