



Strawberry Tissue Analysis

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Plant Tissue Nutrient Sufficiency Ranges for Strawberry*

Nutrients	Sufficiency Range
N (%)	3–4
P (%)	0.2–0.4
K (%)	1.1–2.5
Ca (%)	0.5–1.5
Mg (%)	0.25–0.45
S (%)	0.15–0.4
Fe (ppm)	50–300
Mn (ppm)	30–300
Zn (ppm)	15–60
Cu (ppm)	3–15
B (ppm)	25–50

Petiole Nitrate Nitrogen for Bloom and Fruit

Week *	Low	High
1	600	1500
2–3	4000	6000
4	3500	6000
5–8	3000	5000
9	2000	4500
10	2000	4000
11	1500	3000
12	1000	2000

* Sampling generally begins the first week of March and continues for 12 weeks.

* Campbell CR, Miner GS. 2000. Strawberry, annual hill culture. In: Campbell CR, editor. Reference sufficiency ranges for plant analysis in the southern region of the United States. Raleigh (NC): NC Dept of Agriculture & Consumer Services. Southern Cooperative Series Bulletin 394. [www.ncagr.gov/agronomi/saesd/sberry.htm]

Plant tissue analysis measures nutrient concentrations within growing plants.

Testing of strawberry leaves and petioles 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" areas (normal-looking plants) and from "bad" areas (discolored, stunted or misshapen plants) and compare the results. Matching soil samples from the two areas can also provide useful information.

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.

To collect and submit a strawberry tissue samples, follow these guidelines.

- Select the most recently mature, trifoliolate leaves (MRMLs). Those leaves are full-sized and green and consist of one petiole or leaf stalk with three leaflets. MRMLs are usually located three to five leaves back from the growing point.
- Avoid collecting dull, older leaves or damaged tissue.
- Detach the petioles from the leaves as you collect them, but submit them together as one sample.
- Include leaves and petioles from 20 to 25 plants within a uniform area. For example, all of the plant material in a single sample should be the same variety, growing on the same soil type, planted at the same time and having the same management history. This is known as a representative sample.
- Fill out the NCDA&CS *Plant Sample Information* form, including fertilization history and environmental conditions. Provide the name of the strawberry variety being grown as well as its stage of growth at time of sampling. Stage of growth refers to week of bloom and can be coded B1 through B12 (first through 12th week of bloom). This determination can also be estimated relative to week of first harvest, which is typically B6. Accurate management recommendations depend on this information.