

## **Procedures for Tissue Sampling to Determine Fruit Crop Nutritional Needs in Oklahoma**

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Soil samples do not adequately reflect nutritional needs for perennial fruit crops, i.e. apples, peaches, pears, pecans, and grapes, after the plant reaches bearing age. Accordingly, tissue sampling is necessary to accurately monitor the plant's nutritional needs and tailor a fertilization program that meets the needs.

Grape testing procedures are somewhat different from tree crops. The Oklahoma grape industry has grown to the extent that tissue testing arrangements are needed but still not adequate to sustain a laboratory specifically for that purpose. Arrangements have been made to allow Oklahoma grape producers to send grape samples to the University of Arkansas analysis laboratory. Procedures required and charges for submission of those samples are also listed below.

### **OKLAHOMA GRAPEVINE TISSUE SAMPLING PROCEDURES:**

Sample analysis can be performed by a number of commercial laboratories. A few are listed.

A&L Analytical Laboratories, Inc.  
2790 Whitten Road  
Memphis, TN 38133  
800-264-4522 901-213-2400  
Fax: 901-213-2440  
[www.allabs.com](http://www.allabs.com)

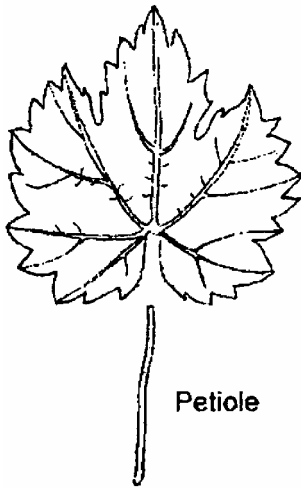
Ward Laboratories, Inc  
4007 Cherry Avenue  
P.O. Box 788  
Kearney, NE 68848  
800-887-7645  
[www.wardlab.com](http://www.wardlab.com)

Western Agricultural Laboratories, Inc  
P.O. Box 64666  
Lubbock, TX 79464  
806-794-4888

Most eastern USA grape production areas utilize **petiole** samples collected at veraison, i.e. **early to mid July** in Oklahoma, to determine vine nutritional status.

Samples should be collected from uniform areas of the vineyard and should not represent more than ten acres. If the vineyard is not uniform (different soil types, uneven irrigation, presence of nematodes, etc.) more samples should be taken and sent to the laboratory. A change in variety or rootstock within an otherwise uniform ten acre block would require collection of more petiole samples.

The size of the sample should be approximately 100 petioles. Samples can be collected from a select group of vines (reference plot) or by using a consistent pattern across the uniform vineyard block such as sampling from every tenth vine in every fifth or tenth row depending on block size. It is critical that the sample be representative of the vineyard block. Also, sampling from the same vines each year allows the grower to discern seasonal trends in vine nutritional status which could be difficult to identify if the variability in sampling is large.



Petioles used for analysis should come from the youngest full mature leaf near the shoot apex (shoot tip). The leaf blade should be removed and discarded. Petioles are then placed in a clean, labeled paper bag (small lunch size). A record of all information regarding the sample should be retained by the grower to allow for sample identification and interpretation of results from the laboratory.

Petiole samples should be sent to the laboratory immediately. A delay in this process will reduce the accuracy of results. Samples should be kept in a dry and well-ventilated location until they are delivered to the laboratory.

Other items which should be considered by the grower desiring accurate petiole analysis and interpretation of results are: 1) critical values for nutritional status of grapevines in most eastern USA viticulture regions have been primarily developed from research on the Concord variety. Other varieties may have somewhat different nutritional requirements; 2) application of certain fungicides and nutrient sprays can influence petiole sample results. Collection of samples following rainfall or washing of samples with distilled water may help alleviate this concern but careful assessment of lab results should include knowledge of prior spray applications.

Critical nutrient calculations for grapevine petioles sampled at veraison are given in Table 1. The utilization of a well-planned and consistent petiole sampling program will yield important information on vine nutritional status. This information along with proper timing of application can maximize fertilizer use efficiency, vine performance, environmental protection, and vineyard profitability.

Table 1. Specific Element Recommendations for Grapes from Petioles.

Element <sup>1</sup>	Deficient	Below Normal	Normal	Above Normal	Excessive
N (%)	0.3 - 0.7	0.7 - 0.9	0.9 - 1.3	1.4 - 2.0	2.1+
P (%)	0.12	0.13 - 0.15	0.16 - 0.29	0.30 - 0.50	0.51+
K (%)	0.5 - 1.0	1.1 - 1.4	1.5 - 2.5	2.6 - 4.5	4.6+
Ca (%)	0.5 - 0.8	0.8 - 1.1	1.2 - 1.8	1.9 - 3.0	3.1+
Mg (%)	0.14	0.15 - 0.25	0.26 - 0.45	0.46 - 0.80	0.81+
Mn (ppm)	10 - 24	25 - 30	31 - 150	150 - 700	700+
Fe (ppm)	10 - 20	21 - 30	31 - 50	51 - 200	200+
Cu (ppm)	0 - 2	3 - 4	5 - 15	15 - 30	31+
B (ppm)	14 - 19	20 - 25	25 - 50	51 - 100	100+
Zn (ppm)	1 - 15	16 - 29	30 - 50	51 - 80	80+

<sup>1</sup>Values may differ among species for optimal growth. Values from leaves will vary significantly. For petioles taken between July 15 to August 15.

Source: Midwest Small Fruit Pest Management Handbook Ohio State Bul. 861