

## **Grape Petiole Analysis**

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Fertilizer needs can be determined by 3 ways: observing visual symptoms, using soil tests, and using tissue (petiole) analysis. Because each method had advantages and limitations, all 3 should be checked on a regular basis. Petiole analysis is one of the best tools available to monitor the nutrient status of your grape varieties. Unfortunately, grape producers do not often use it. Tissue analysis serves two purposes: determine the nutrient status of the vine; and identify a suspected nutrient deficiency observed in the vineyard. By using tissue analysis, growers have a better handle on their fertilizer program and usually end up cutting costs since fertilizers are applied only as needed. Here are answers to commonly asked questions about petiole analysis:

### ***Why petiole test if I did the soil test?***

Soil testing is important, before planting and for established vineyards, to determine soil pH and monitor the overall balance of major nutrients. However, there is a poor relationship between soil and plant nutrient levels. Simply put, a soil may be high on a nutrient, but the same nutrient is deficient in the vine; or the vine may show sufficient level of another nutrient while the soil test indicates a deficiency. For these reasons, petiole tests are generally more useful and more reliable for judging nutrient status of the plant than soil tests.

### ***When should I do the test?***

**“Trouble-shooting”**: If you observe leaf symptoms and suspect a nutrient deficiency, collect petiole samples from vines showing leaf symptoms and from vines without symptoms (healthy or normal). The two samples are sent and analyzed separately for comparison purposes. This will allow you to diagnose whether or not the problem is related to nutrient status of the vine. In case of trouble-shooting, samples are collected anytime leaf symptoms “show up” during the growing season.

**“Routine assessment”**: In our region, veraison (Mid July – Mid August) is the ideal time for petiole sampling for several reasons. Veraison sampling gives a better measure of Potassium (K). Potassium levels are especially critical for wine grapes since they are correlated with wine quality (high fruit K leads to high pH and thus unstable wines); there is less vineyard activity (if there is such a thing!) near veraison and more time for petiole sampling; most important is the standard optimum level of each nutrient is determined at veraison. It is recommended collecting petioles about 10 weeks after bloom but before harvest.

### ***What are the most common nutrient deficiencies in Ohio vineyards?***

During the past two years, potassium (K) and magnesium (Mg) are the most common nutrient deficiencies I have observed either visually or by petiole analysis. Other nutrient problems occur occasionally and include nitrogen (N), boron (B), zinc (Zn), and iron (Fe).

### ***Which vines should I sample?***

- ❖ If you grow more than one variety, sample each variety separately.
- ❖ It is not necessary to sample non-bearing vines (1<sup>st</sup> and 2<sup>nd</sup> year of establishment), unless you observe foliar symptoms.
- ❖ Begin tissue analysis when vines are producing (usually 3<sup>rd</sup> year) and repeat every year until yields are stable and yearly fertilizer needs are determined.
- ❖ For mature vines, tissue analysis is done every 2 to 3 years. Don't forget that once in a while (3 to 5 years) you should take a soil test as well to monitor pH changes and correct as needed. Remember that nutrient availability in the soil is pH dependent. Also, the combination of soil and plant analysis provides an excellent assessment of fertility status.

### ***What should I sample?***

Collect a representative sample of 60 to 80 leaf petioles (more for small-sized petiole, less for large-sized petioles); one or two petioles per vine for each variety. A petiole is the stem that attaches the leaf blade to the shoot. Take petioles from mature, fully expanded leaves located 5 to 7 leaves from the shoot tip. Detach each petiole from the leaf blade immediately. Place petioles in a paper bag not a plastic Ziploc bag. Label each sample and keep your own record of the following: varieties sampled, vineyard block where the samples are collected, sampling date, and conditions of vineyard. Prior to shipping, allow samples to dry for a day in a warm, dry, well-ventilated place.

### ***Where do I send the samples?***

The following is a list of labs that perform tissue analysis for a fee. Petiole analysis is usually performed for nitrogen, phosphorus, potassium, magnesium, calcium, manganese, iron, zinc, boron, and copper. Laboratory results will show that each nutrient is “adequate”, “deficient” or “excessive”. Adequate or normal nutrient ranges are shown in the following table.

#### ***Grape Tissue Analysis Labs***

A & L Great Lakes Lab, Inc.  
3505 Conestoga Drive  
Fort Wayne, IN 46808  
(219) 483-4759

Agricultural Analytical Services  
Pennsylvania State University  
University Park, PA 16802  
(814) 863-6124

Brookside Farm Lab  
308 South Main Street  
New Knoxville, OH 45871  
(419) 753-2448

### Suggested “Normal” Ranges of Nutrients from Grape Leaf Petioles\*

<b>Nutrient</b>	<b>Normal Range</b>
Nitrogen (N)	0.9 – 1.3 %
Phosphorus (P)	0.16 – 0.29 %
Potassium (K)	1.5 – 2.5 %
Calcium (Ca)	1.2 – 1.8 %
Magnesium (Mg)	0.26 – 0.45 %
Manganese (Mn)	31 – 150 ppm
Iron (Fe)	31 – 50 ppm
Copper (Cu)	5 – 15 ppm
Boron (B)	25 – 50 ppm
Zinc (Zn)	30 – 50 ppm

\*Values are based on petioles taken between July 15 and August 15.  
Source: Midwest Grape Production Guide, 2005.

#### ***Take Home Message***

Be proactive not reactive: Do not wait until you see visual symptoms to correct a nutritional problem. If you see it, the problem already exists and the damage has already been done on growth, yield, and fruit quality. The goal of fertilization is to prevent nutrient deficiencies from occurring in the first place.