



Sap Analysis
EMPOWERS
REAL-TIME NUTRITION
DECISIONS



Agro-K advances
Science-Driven Nutrition™
to the next level.

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FRUIT GROWER

SAP ANALYSIS

Empowers Real-Time Nutrition Decisions

EVERY GROWER HAS ONE THING IN COMMON. Despite the wide diversity in American agriculture in both crops grown and operational practices, all growers want to make the decisions that help them get ahead. That means maximizing marketable yield and increasing profitability year-over-year, while also reducing pest and disease problems, nutrient deficiencies, and labor and input costs.

Although soil testing, leaf testing and pre-harvest fruit analysis can provide clues about a crop's nutrient levels, one test stands out from the rest. Sap analysis is here to foster more accurate real-time, in-season decisions and change the way growers nourish their crops forever. Sap analysis is like a blood test measuring only immediately available nutrients in the plant, helping growers to identify and correct imbalances that limit yield and quality.

"Sap reports show 21 nutrient indicators that provide a comprehensive view of what the plant has immediately available for growth," says Jeff Glass, Southern Business Development Manager at Agro-K. "Measurements include all the essential macro and micro nutrients, along with plant health indicators like sugars, electrical conductivity, pH and others that you don't have access to in a regular tissue test."



HOW SAP ANALYSIS WORKS

Sap analysis is relatively new to the agriculture industry, but Agro-K has already used this test to help a number of growers transform their crops for the better. While a hops grower in Idaho, a tomato grower in Iowa and a citrus grower in Florida may not seem like they have a lot in common, sap analysis worked wonders for their farms.

This unprecedented insight into their crops' real-time nutritional status offered the information these growers required to make the most effective, in-season management decisions. In doing so, they improved the quality of the developing crop, often overcoming long-standing issues like excessive nitrogen applications or consistently underperforming groves. To understand how sap analysis works and why it's such a powerful tool, it's helpful to recognize how it compares to a traditional tissue test.

"The difference between sap analysis and a traditional tissue test is pretty easy," Glass says. "A tissue test measures all of the nutrients in a leaf — both the nutrients in the tissue and nutrients in the plant sap, so you see what has happened up to that point in time — you might think of a tissue test like a 'biopsy.'"

"On the other hand," Glass continues, "sap analysis is focused only on what's accessible to the plant for continued growth — it's more like a 'blood test' of the plant. Sap analysis measures what's immediately available for use going forward, and not so much a look back at what's happened in the past."

Using boron as an example, sap analysis would indicate how much boron is in a plant in a parts per million. By comparing sap in a young leaf with sap in an old leaf, the grower will begin to understand the mobility of nutrients from one plant part to another, and what might be a looming deficiency before it becomes evident — something that cannot be achieved with a tissue test. While a tissue test is an assessment of what has occurred in the past, sap analysis is a real-time snapshot of availability, allowing the grower to look forward.

Because growers are able to see the immediately available nutrient levels in their crop, they know if these nutrients are balanced and within the ideal range for plant growth.

Sap analysis also allows a grower to see when antagonistic nutrients are competing with one another.



SAP ANALYSIS

Next Level Science-Driven Nutrition

Using calcium and potassium as examples, sap analysis can indicate if high potassium levels are interfering with the calcium uptake. If that's the case, Agro-K can provide a science-driven approach to assist growers in metabolizing some of the potassium and create space for calcium — before the plant becomes calcium deficient.

THE SAP ANALYSIS PROCESS

When it comes to sampling, shipping and understanding sap analysis results, precision is essential. The process is simple, but there are a number of factors that can skew or otherwise disrupt the results. This graphic explains the step-by-step process for accurate sap analysis. Check out the Sap Analysis Best Practices chart to ensure the most accurate results.

SAP ANALYSIS: Step-By-Step Instructions

PREPARE YOUR MATERIALS.

You will need a few items before starting the sap analysis process: 1-quart Ziploc freezer bags, one set of pre-paid labels for each set of leaf samples, paper bags, tissues or a salad spinner, a marker, and tape.

COLLECT YOUR SAMPLES.

When collecting leaf samples for sap analysis, the details matter. There should be two samples, one of old leaves and one of new leaves. Each sample should weigh 80 grams.

PREPARE THE SAMPLES FOR SHIPPING.

The leaf samples used for sap analysis must be dry. Gently blot damp samples with a tissue. Do not rub the samples. Put wet leaves into a salad spinner to help remove excess water.

PACKAGE THE SAMPLES.

Put each sample into a plastic Ziploc bag and squeeze out the air. Apply a completed label to the sample bag, as the sample will not be processed without this information. Confirm that the label's information is accurate.

SHIP THE SAMPLES TO THE LAB.

Leaf samples are express shipped direct to the lab using FedEx International Priority service. Fill out the provided paperwork and attach the completed paperwork to the package in a separate pouch.

AGRO-K DECIPHERS THE RESULTS. After the leaf samples are shipped to the lab, results are typically returned within seven days. Agro-K Nutrition Experts will help you interpret the results, allowing you to identify and correct the nutrient imbalances that limit crop yield and quality.



SAP ANALYSIS Best Practices

Sampling

- Select leaves from the same sides of the tree and only pick those that are representative of the field overall.
- Sample the youngest fully developed leaf and the oldest vital leaf.
- Collect the samples during the first three hours after sunrise for sufficient leaf-tension and moisture.
- When sampling trees, pull leaves from the sunny or shady side of the plants consistently.
- Remove all petioles from the leaves.

Shipping

- Cool the sealed samples to maintain freshness until they can be shipped. Do not freeze the samples.
- Protect the sample labels from excess moisture.
- The best days to ship the leaf samples are Monday, Tuesday or Friday.

Results

- Lab results are usually returned within seven days of shipping.
- Agro-K Nutrition Experts will help you interpret the results to ensure you get the most from your sap analysis.



USING SAP ANALYSIS ON YOUR FARM

Sap analysis is currently available for wide range of crops, including citrus, strawberry, hops, watermelon, tomato and pepper. In order for Agro-K to perform a sap analysis and provide actionable insights into a crop's performance, there must be nutrient benchmarks for the crop. It takes approximately 1,000 samples to create these crop-specific nutrient target levels.



Benchmarks exist today for the majority of crops. Every time a sap sample is collected around the world, the data contributes toward creating better defined benchmarks. As more testing builds a larger database of information about optimum nutrient levels, growers get more refined insight to previously unavailable information.

For the crops that sap analysis can help currently, the impacts are often profound.

This science-driven approach to nutrition can help growers achieve an optimal and balanced nutrient uptake across their farms. In turn, this has a positive effect on the quality and marketability of crop yield — size, color, firmness and other factors — while ensuring overall plant health and growth.

Sap analysis is efficient and affordable, too. A speedy turnaround means the test findings can also be implemented quickly so fertilizer programs can be fine-tuned during the growing season.

Similarly, by revealing the effectiveness of a grower's current nutrient program and identifying potential deficiencies weeks before they appear in the crop, the operation can make changes that maximize results, reduce costs of unnecessary applications and enhance plant health.



For 45 years, Agro-K has been an innovator in the agricultural industry worldwide. For decades the company has continually invested in the agricultural industry through academic research and fields trials. Using a science-driven approach, Agro-K has been focused on improving the return on investment for our growers. Our approach has led to the engineering and development of truly unique product lines that support our 5Rs of Science-Driven Nutrition™.

Biological Solutions

Agro-K's comprehensive line of biological products are developed using a science-driven approach. This helps growers consistently produce top-quality crops. These soil biological inputs are designed as amendments to feed the existing soil biology. As a result, those microbes work harder to create a better root zone environment for improved root growth, plant health and increased soil nutrient availability/efficiency. Each product contains specific food sources, micronutrients and enzymes to support and help increase beneficial bacteria and fungal activity. The line of biological solutions includes BioMax, NutriMax, RootMax, Bio-Mulch™, Symbex, BioMax OC, BioMax Dual Action.

System Series:

Agro-K's line of low-pH, phosphite complexes are designed to rapidly deliver essential nutrients in systemic forms during key windows of opportunity to enhance crop production and crop quality. System Series products leverage the unique properties of phosphites to rapidly penetrate plant tissue and move nutrients throughout the plant's vascular system.

Dextro-Lac and Vigor:

Dextro-Lac products are made using two biologically important carbohydrate molecules — dextrose and lactose — as complexing agents to deliver nutrients that absorb readily and metabolize easily, requiring minimal plant energy. The exclusive Vigor process adds additional value and performance using a proprietary biological finishing technique to ensure safe foliar applications and improve performance.

AgroBest:

Agro-K's line of N-P-K liquid plant food fertilizers are specifically designed for foliar applications, where product purity is critical.

CLEAN:

This organic line of foliar crop inputs includes macronutrient and micronutrient formulations that meet strict National Organic Program (NOP) standards.

With Agro-K's CLEAN organic product lineup organic growers now have a full selection of foliar fertilizers to meet the various nutrient needs through the growing season. No more compromises!

*To learn more about Sap Analysis
and what it can do for your crop,
visit agro-k.com/sapanalysis.*



Science-Driven NutritionSM

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