

xylem



# Citrus juice testing solutions

Delivering trusted results to your lab bench

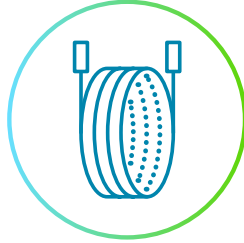
# Unique solutions for your lab

We provide innovative equipment and expert support to help you overcome analytical challenges.

Learn More: [ysi.com/lab-solutions](https://ysi.com/lab-solutions)



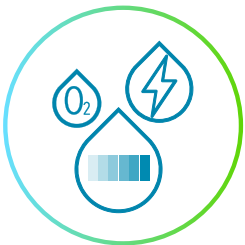
Automated Chemistry Analyzers



Gas Chromatography



Bio Analysis



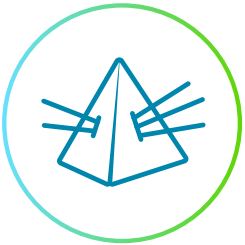
Multimeter eChem



Extraction & Distillation



Polarimeters



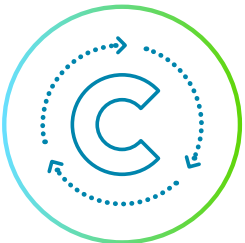
Refractometers



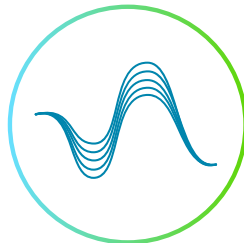
Temperature Data Loggers



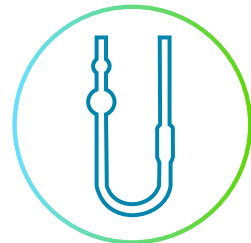
Titration



Total Organic Carbon



UV/VIS Spectrophotometers



Viscometers

## Our lab brands



O-I Analytical



-ebro-



SI Analytics



# Open your lab to the possibilities...

Most every specific food industry (dairy, meat, etc.) has its own specific quality measurements, and citrus is no exception. These parameters are routinely and regularly measured by citrus processors who must consider U.S. regulations, USDA quality grading programs, and internal and customer product specifications.

Xylem Lab Solutions has a variety of tools to help support your quality test protocols in the citrus beverage laboratory and manufacturing operations that can improve your speed, confidence, and safety.

## Key quality control (QC) parameters for citrus juices include:

- Scotts Oil Test, recoverable oil (% d-limonene)
- Brix
- Acidity (% citric acid)
- BAR value (Brix/Acid Ratio)
- Color measurements
- Temperature
- Pesticides / adulteration by GC detectors



## Scott Oil Test



The volatile components of citrus juice are what give it its distinctive flavor. Although most of these desirable compounds are found at extremely low levels (parts per million: ppm), they are not commonly quality checked. An exception is d-limonene, the major hydrocarbon in citrus oils. It does not contribute to the citrus juice flavor, however, too much of it can cause an unpleasant bitter sensation in the mouth or tongue known as "oil burn." The Scott Oil Test uses distillation and bromate-bromide titration to monitor the levels of d-limonene. The results are reported as % oil by volume. Most orange juices contain 0.015% to 0.025% oil, which is a level that will not give significant oil burn and is well below USDA grade A and B maximums.

The challenge is that the Scott Oil Test is time-consuming, especially the manual distillation step. The **VAPODEST** automatic distillation equipment has proven to save time for a large citrus juice manufacturer. This manufacturer runs about 50 samples a day at an estimated time of 7-8 minutes per sample.

**The VAPODEST cuts the testing time down to 1.5 minutes per sample, resulting in a time savings of more than 80% from over 400 minutes to 65 minutes.**

There are also other benefits of moving to the automated VAPODEST distillation system including:

1. Safety
  - a. Designed to protect users from contact with hazardous substances throughout the distillation and analysis process
  - b. Illuminated distillation chamber
  - c. A self-diagnosis feature that detects errors early and automatically switches to a safe mode
  - d. Soft start feature to control strong early reactions, allowing for adjustable steam power from 1-100%.
2. System Flexibility
  - a. Range of product models for your desired automation and ISO 17025 requirements
  - b. Tube sizes from 100, 250, 300, 400, 800 and 1200 ml
3. User level Management and Password protection
  - a. Individual user rights
  - b. Automatic logging of all work steps
  - c. Tamper proof data storage
4. 7-inch full color display
  - a. Intuitive control and easy to understand icons
  - b. Smart and visible notifications of error, missing resources, and service



Gerhardt VAPODEST

Xylem is the exclusive North American distributor of C. Gerhardt GmbH & Co. KG

"7-8 minutes to do the distillation we were doing manually versus now it takes us a 1 minute 30. So that was huge time savings and cost savings for us as well. That is why we really wanted to do it on the VAPODEST."

Quality Assurance Supervisor,  
Leading Beverage Manufacturer

## Brix



Degrees Brix (symbol °Bx) is the sugar content of an aqueous solution. One degree Brix represents 1 gram of sucrose in 100 grams of solution and indicates the strength of the solution as a percentage by mass. This measurement correlates to the product's taste, quality, and even nutritional density. Refractometers are used to measure this value. Refractometers measure the index of refraction, which describes how fast a light beam travels through a medium compared to a vacuum.

This relationship is described by the formula:

$$n = c / v$$

Refractometers are straightforward instruments to use in your process, but it is important to choose one that offers durability and reliability so that you do not have wasted downtime, while maintaining confidence in your results. Cleanability is also critical. Whether, you are running 10 or hundreds of samples a shift, you want it to be easy and fast. Bellingham + Stanley has been manufacturing high-quality instrumentation since 1914. The RFM340-T is an ideal and reliable solution for high-throughput laboratories and demanding manufacturing operations. The RFM is a touchscreen digital model with Peltier temperature control and 3 decimal places of Brix precision.

### Additionally, the RFM340-T offers:

1. 7-inch high-definition touchscreen display
2. Peltier Temperature Control critical for precise Brix readings and calculating BAR (Brix/Acid ratio).
3. Flat prism for easy cleaning
4. Reliability
5. Capable of measuring non-homogenous samples such as fruit juice with pulp, perfect for the citrus industry
6. Durability for trouble free continuous use.
7. RFID (Radio Frequency Identification) swipe technology, providing clearance and an audit log of users and instrument configuration making it an excellent choice for FDA-regulated environments operating in accordance with 21 CFR Part 11

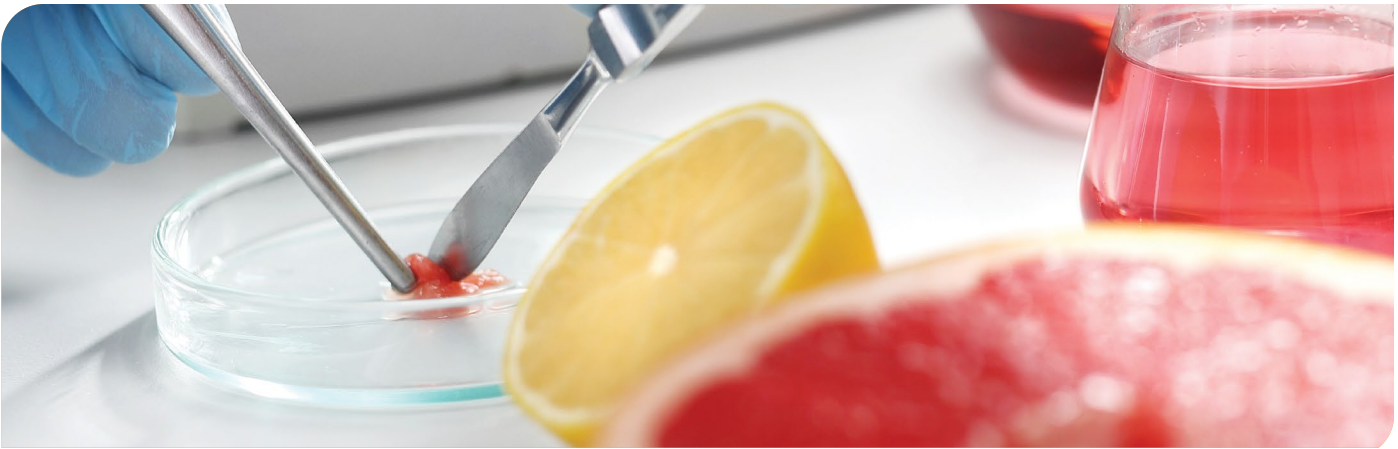


“Bellingham and Stanley refractometers are very reliable. You know, I have been here 10 years. That is the only refractometer we have ever had here at the plant.”

Quality Assurance Supervisor,  
Leading Beverage Manufacturer

All refractometers are made and tested to the highest standards and are supplied with a unique serial number and Certificate of Conformity ensuring every instrument you buy may be traced to NIST and ICUMSA standards.





## Acidity



The acidity, or titratable acidity, is a common measurement of the citric acid content of a juice and is accomplished by titration of a known volume of sample with an aqueous alkali solution to end point. Acidity is a key quality attribute of citrus juice and is responsible for the characteristic tartness or sourness of these products. Measurement of acidity indicates fruit maturity, is used in the correction of the soluble solids measurement and in the BAR calculation. It is normally reported as % citric acid.

The acidity can be done by manual titration but for rapid and precise results the **Titroline®** series of automatic titrators are a perfect solution. The **Titroline 7000**, with over 50 user methods can easily be configured to determine your % citric acid in a fast and reliable way. The **Titroline 7000** calibrates through wireless sensor technology on the ID- Electrodes. These ID- electrodes send their specific data wirelessly to the titrator. Therefore, the **TitroLine® 7000** always uses the correct calibration data and erroneous measurements are excluded.



## BRIX/Acid Ratio (BAR)



The BAR is a derived value and is calculated by dividing the acid and temperature corrected Brix value by the % by weight citric acid value. This ratio is a key quality indicator of fruit maturity and citrus juice quality. The BAR value is used to understand the sweet/tart balance of the citrus juice. Low BAR will be too sour, while high BAR can lack flavor. The BAR is used for precise juice blending to ensure consistency in finished goods. Brix results from the Peltier controlled **RFM340-T** refractometer control and the **Titroline 7000** % Citric Acid allow for the utmost confidence for your juice blending operation.



## Flavor



Flavor is the final quality test, but it is also the most difficult to objectively measure in the quality laboratory. It relies on experience and training. Rubric grading and reliable quality results from the testing helps remove bias. So, pour yourself a glass and take a sip.

The goal of citrus juice processing is to preserve the character of the incoming fruit with careful handling, processing, and quality control checks. Xylem lab solutions can support you along the way and save you time and money while providing reliable and precise results.

**Set your lab up for success. Contact an expert. <https://www.yxi.com/project-consulting-laboratory>**

## Temperature, Pressure, Cold Chain Monitoring



### ebro® measuring devices

ebro® delivers trusted solutions for the agricultural market with a full range of innovative testing technologies. From data loggers and handheld meters to specialty probes and evaluation software, ebro ensures accurate, reliable results that support smart decision-making across the supply chain.



## UV/VIS Spectrophotometers



### pHotolab 7600 UV-VIS

PhotoLab family of spectrophotometers, offers analysis for standard measurement of spectra, kinetics and color. Scanning and fixed wavelength products available depending on your application.



## Organophosphates, halogenated compounds



The **5383 PFPD** and **5370 XSD** offer highly sensitive and selective detection of pesticide residues and other contaminants in a variety of sample matrices. These GC detectors provide critical insights for agricultural and environmental testing, ensuring compliance with regulatory standards.



# Xylem |'zīləm|

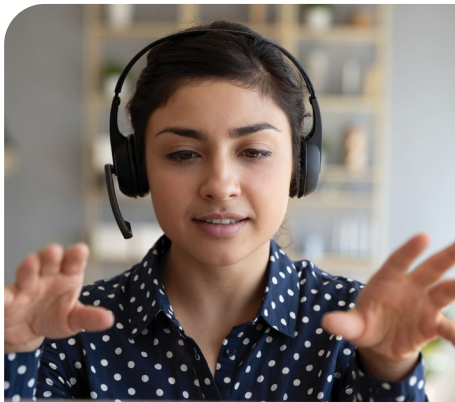
- 1) the tissue in plants that brings water and nutrients upward from the roots.
- 2) a leading provider of unique solutions for your lab.

Xylem Lab Solutions' global brands have been leaders in the laboratory instrumentation market for decades, and are relied upon every day across more than 150 countries. Working in true partnership with our clients, we listen, learn and adapt to individual needs, offering deep application expertise built upon our long history of innovation in instruments and services. Our solutions for analysis, measurement and monitoring help enable many of today's modern laboratories and industrial processes, and provide our customers the trusted and high performing solutions they need to succeed.



## Our support goes beyond instrumentation

We have all the consumables and supplies and we also offer in-house and in-field technical support to keep you up and running. Reach out to your local sales person to see what products are available in your region.



### Technical support

We are here to get your products up and running. It may be a phone call to our tech support team or an on-site visit for installation and familiarization.



### Consumable & spares

We offer a full compliment of operating supplies and spares. A well-maintained instrument will deliver the best results. Our eCommerce is set up to help you get what you need quickly.



### Service contracts

Now that your unit is up and running and generating superior data, we are here to help you keep it that way. We offer in-house bench repair, on-site services, and scheduled preventative maintenance contracts.

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