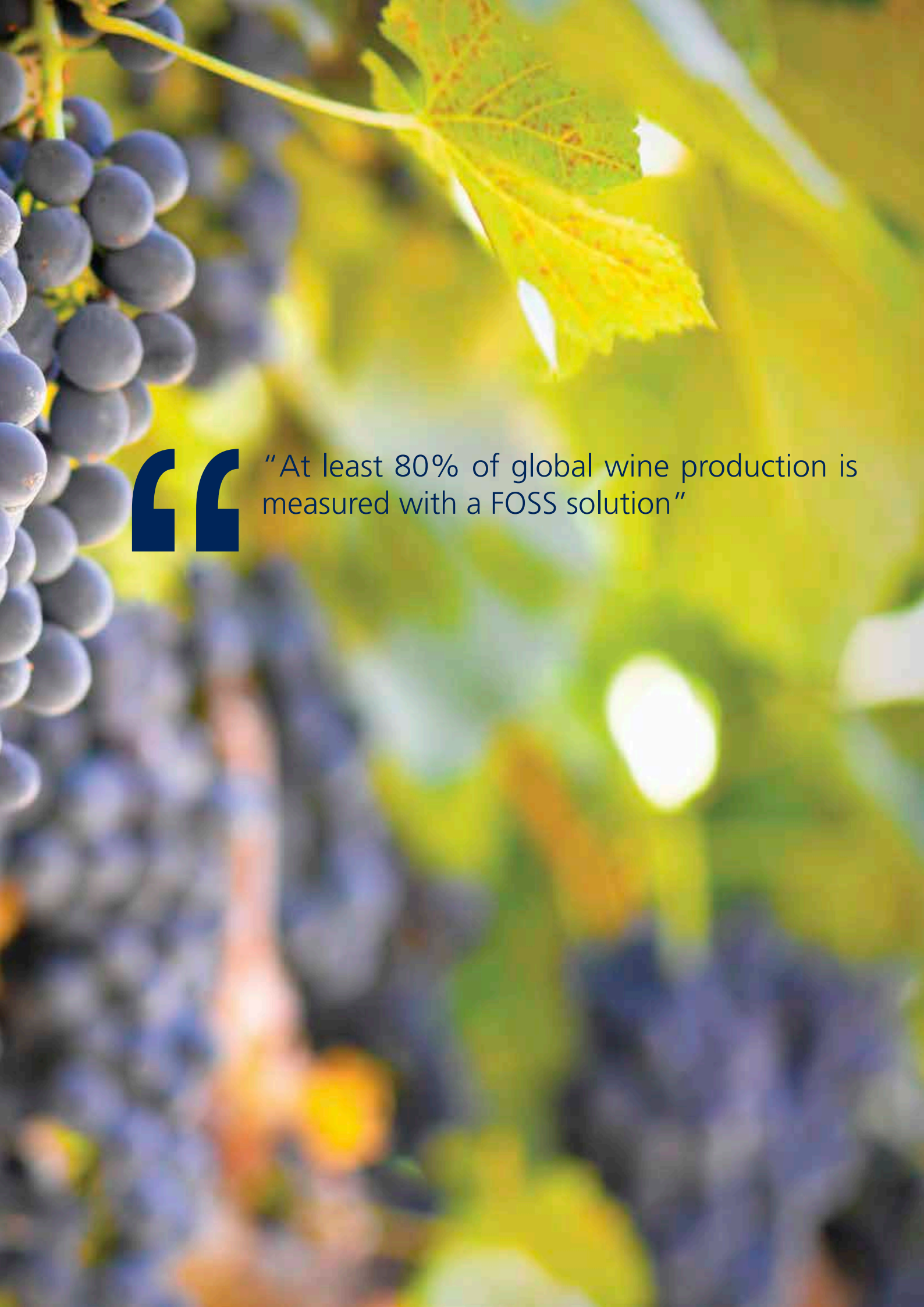
FOSS

Analytical solutions for the wine industry

ANALYTICS BEYOND MEASURE


“At least 80% of global wine production is measured with a FOSS solution”

Quality through knowledge – the unique partnership between routine analysis and winemaking

With a nose to the glass, an ear to the barrel and an experienced palate that no computer can ever match, sensory perception has been at the heart of winemaking for millennia. While these skills will always remain, rapid routine analysis adds a new and exciting dimension in the form of regular objective information that no modern wine producer can afford to ignore.

Just as wine held to the light reveals valuable information to a trained eye, a small sample of wine exposed to the infrared analytical technology inside a FOSS solution pours forth a wealth of information that puts you in full control of the winemaking process. Maybe it just confirms your instinct and knowledge: "I knew I would get fermentation just right this time." Or maybe it doesn't: "The volatile acid levels in my barrels are heading north. I must act now."

From busy wine laboratories serving hundreds of customers to small-volume producers with little time for analysis, FOSS helps you exploit the power of routine analysis as a supplement to your skills, experience and knowledge. Together, we form a unique partnership that lays the ground for even higher levels of quality wine throughout the industry.

Whether you are a small winemaker, large bottling plant or independent wine analysis lab, FOSS can provide the wine analysis methods and solutions to suit your business.

Wine laboratories
Frequent multi-parameter analysis results from FOSS solutions help you to serve your customers efficiently and at low cost per sample. A solution such as the WineScan can measure up to 120 samples in 1 hour and gives you virtually everything you need for routine analysis in one unit. Different models of instrument allowing you to build the perfect analytical solution, for example, with auto sampling functions, free and total sulphite analysis, and optional module for the testing of colour.

Small and mid-sized wineries
Getting all the information you need to make critical decisions takes time and you are more than busy. But with a FOSS solution you can replace various time-consuming analysis solutions with one simple test performed on the spot and taking just two minutes. And with full technical backup, you can still focus on your most important job – making quality wine.

Large-volume producers
Why wait for vital information? Routine multi-parameter measurement gives you accurate information on-the-spot and just when you need it. You'll discover a new wealth of analytical data that allows you to track production more closely, protecting your investment at every stage. Any necessary intervention can be made at just the right moment as you see your creation through from harvest all the way to bottling and shipping.

> We save considerable time and gain better control over the maturity of our grapes.

Alexandra Lebosse, Chateau Pichon Longueville, Bordeaux, France
commenting on the value of rapid routine analysis

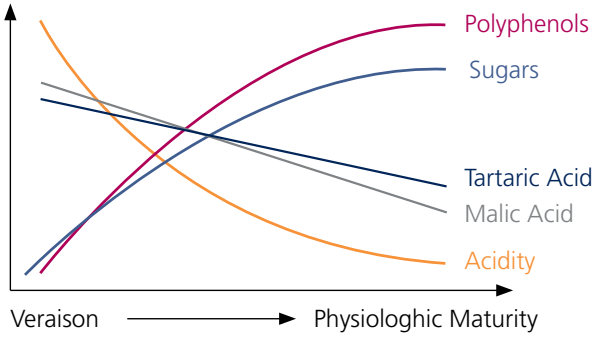
Grape maturity and segregation

Decide when to pick, harvest smarter according to grape maturity, optimise the value of the harvest and pay the right price for grapes - objective measurements of maturity and grape soundness are invaluable during the busy harvest period. Plus, the availability of analytical data for multiple parameters allows a more sophisticated view of grape quality as a whole encompassing both maturity and soundness.

Maturity

With a FOSS solution you can follow the development of grape maturity from the start of the veraison period through to harvest. Individual grape pulp parameters can be followed including fructose, glucose, total sugar, tartaric acid, malic acid and total acidity. With calibration options, it is even possible to analyse grape skin components such as anthocyanins and polyphenols after extracting the components.

On-the-spot objective measurements help you to achieve the balance you are looking for between sugars and acids. You can get a complete picture of ripeness, both in terms of the physiological maturity of the grapes and through insight into the quality potential indicated by the ripeness of tannins and other phenolic compounds in the grapes that contribute to the colour, flavor and aroma of wine.



Rapid and objective measurements of maturity and grape soundness are invaluable during the busy harvest period

Grape soundness – how does it work

The FOSS grape soundness concept is based on the interaction between microorganisms and their media – the grapes. Each microorganism consumes metabolites from the grape (sugars, amino acids, etc) and produces microbial metabolites (ethanol, glycerol, etc). For instance, yeast transforms sugars to ethanol which is the fundamental process in the vinification.

At harvest, no ethanol or other microbial metabolites is expected and indeed, their absence is a prerequisite for grape soundness.

With FTIR, it is possible to measure those metabolites that may be present in high concentrations. In addition, the presence of the individual metabolites at different levels supplements the winemaker's local knowledge of history and climate to give a good indication of which microorganism is causing the disorder.

	Glycerol	Gluconic Acid	Acetic Acid	Ethanol	Citric Acid
Botrytis cinerea	***	**			
Acetic bacteria		*	***		
Indigenous Yeast	*			***	
Aspergillus niger		**			***

Multiple parameters give a comprehensive, multi-dimensional view. The * scale indicates potential to predict a disorder, for example, ethanol is a good indication of indigenous yeast. Glycerol is also an indicator, but not as strong.

Fermentation and maturation

Routine analysis helps you to protect your investment by keeping a close eye on the processes involved in winemaking, for example, with timely information that helps to avoid stuck fermentation. Such information also helps you to develop your approach. Or, if you want to check every barrel, just go ahead. With rapid analysis to support you, you can push the boundaries of quality with powerful combinations of parameters available simultaneously.

Alcoholic fermentation

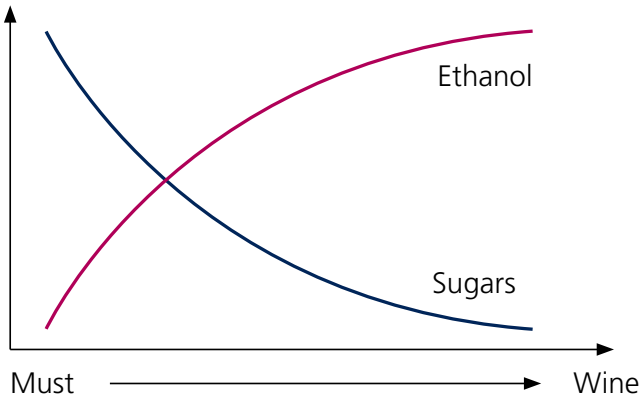
Going into the alchololic fermentation, you can check that the yeast has the right nutrients to grow. An analysis for Yeast Assimilable Nitrogen allows you to supplement nitrogen deficient must with diammoniumphosphate at the start of fermentation to provide adequate nitrogen levels. You can take out the guesswork during fermentation by tracking the conversion of sugars to ethanol. The measurements also provide a valuable reference when tasting for those complex components, only discernable to the experienced palate.

Malolactic fermentation

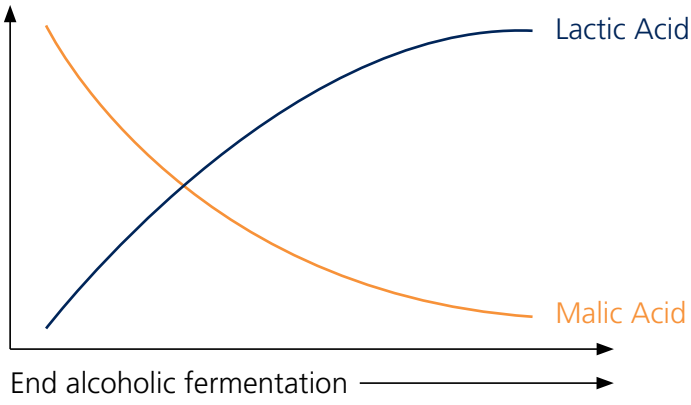
During the malolactic fermentation, rapid analysis allows you to track conversion of malic acid to lactic acid with a simple convenient test. If you are using barrels, you can test each one at no extra cost.

Another aspect of the cost discussion is that so much more data is available because tests can be run as often as required. If a strange result comes up, it is easy to do a re-test on the spot.

The timely, objective measurements give you the backup you need to avoid rash decisions. You can relax and follow through on instinct toward a better result, for example, close monitoring of malolactic fermentation and volatile acid helps you to conclude with confidence.



Take out the guesswork by tracking the conversion of sugars to ethanol.



Rapid analysis allows you to track conversion of malic acid to lactic acid with a simple convenient test

Blending and bottling

You have got your wine where you want it. Now, as you go into the final stages of production, rapid and convenient analysis of sulphur dioxide helps you to keep a close eye on levels pre-bottling and blending. Rapid analysis of parameters such as ethanol, pH and volatile acid then provides an essential, immediate reference for blending, bottling and labelling.

You can ensure that you match profiles exactly both before and after the blending process. A simple pre-bottling check for signs of activity in the wine allows you to bottle with confidence.

Tell your customers
Multiple analysis results from a single sample will help you meet demands from customers for increasingly detailed product information. And you can complete labelling and administrative tasks precisely with accurate analysis using a small sample volume.

Smart sulphur dioxide analysis
The option to measure sulphur dioxide with the WineScan is a new major breakthrough in wine analysis. It is now possible to accurately analyse free and total sulphur dioxide in parallel with other parameters in just over one minute.

Time-to-result compares favourably with around 15 minutes per test with existing routine methods or longer for laboratory reference methods. The system is also considerably more convenient, reducing manual work and associated risks of operator error. Results are delivered alongside the many other quality parameters provided by the WineScan analyser. This gives you a convenient on-screen comparison against parameters such as pH and ethanol of potential interest in combination with sulphur dioxide.

Parameter	Purpose
Glucose / Fructose	Has all sugar been used or is there a danger of fermentation restarting?
pH	How stable is the wine?
Acetic acid	Is vinegar being produced due to acetobacter?
Ethanol	Does it match the figure on the label? Will it affect stability?
Malic acid	Will levels affect stability and cause problems with odours, taste and deposits?
Total acidity	Is acetic acid being formed?
Sulphur dioxide	Is it within legal limits? Is there a risk of spoilage and oxidation?
Polyphenol index	Does it match your targets for colour and tannins?

Some commonly analysed finished wine components.


“The WineScan™ can deliver over 20 critical quality control parameters simultaneously in 30 seconds”

Find the right routine analysis solution and get the most out of it, year after year

Ready to go: FOSS solutions are supplied with robust ready-to-use calibrations. On top, FOSS offers a range of support packages that takes care of everything from hardware updates to calibration adjustments, updates, and maintenance.

Together we will customize a support package that fits with your business.

Support via the internet
Using FOSS network support you can just get on with your measurements without having to worry about instrument performance and calibration updates. Taking advantage of FOSS Mosaic internet networking software, your WineScan or OenoFoss can be connected to a central control centre where experts in FTIR analysis can keep an eye on instrument performance. This can be combined with on-site support visits. New calibrations can also be uploaded remotely.

Wide variety of new applications available
Ready-made calibrations allow for the simultaneous analysis of all major parameters. With unprecedented instrument stability, calibrations are transferable from one instrument to another and powerful calibration development software enables calibration development for new applications.

Traceable results
Facilities in the software platform allow you to improve control through traceable measurements and answer growing demands for documentation of results. Or just look back over the years and track what happened in relation to test results helping you to define your strategy for the next vintage.

WineScan™ and WineScan™ SO_2

WineScan™ is a highly reliable instrument ideal for accurate and efficient analysis, day-in and day-out, in a busy laboratory.

Delivering over 20 important quality control parameters, WineScan helps you to make those key on-the-spot decisions for improved long-term results. Options are available to suit your applications, including auto-sampling functions and the option to test colour or sulphur dioxide in parallel with other key parameters.

An intuitive operator interface is designed for routine operation, for instance, it is easy to switch from must to wine. The industrial design allows WineScan to be used at the weighbridge as well as in the laboratory. You also have the choice of a range of robust ready-made calibrations and the FTIR Calibrator software package is the ideal tool for development of your own calibrations.

WineScan can be considered as a complete wine analysis solution providing rapid routine analysis of all main wine measurement parameters in one solution.

See how it works
fossanalytics.com/so2

For use by: Large wine producers and analytical service laboratories.

Technology: Fourier Transform Infrared (FTIR)

FTIR technique is also used to measure sulphur dioxide levels by simultaneously scanning both the liquid wine sample and SO_2 in the gas evaporated from it. The new unique gas detection technology provides both free and total SO_2 results in just over one minute.

Typical testing volume: > 50 samples per day.

OenoFoss™

OenoFoss™ is a compact, simple-to-use analytical solution that measures multiple parameters of grape must, must under fermentation or wine in just two minutes.

It replaces various time-consuming analysis solutions with a single test performed on the spot. Because it is so quick and simple to perform tests, you'll find that you can do more analysis, more frequently giving you valuable objective information to support your decisions.

With the introduction of OenoFoss, now even small and medium sized wineries can access the powerful FTIR technology used in the larger Winescan. The OenoFoss solution covers multiple analysis demands.

The OenoFoss consists of two modular units: a FTIR wine analysis unit and an optional VIS Colour unit. The total solution consists of the instrument unit(s) together with a PC and software. The PC software displays the results of the analysis and offers data management facilities. OenoFoss can be configured with FTIR Calibrator software for making customized calibrations.

See how it works
fossanalytics.com/Oenofoss

For use by: Small and medium-sized producers

OenoFoss™ is simple for anyone to use and lets you do analysis free of test tubes and chemical reagents - just test and test again as much as you like in pursuit of your quality targets.

Technology: Fourier Transform Infrared (FTIR)

Typical testing volume: 5 - 50 samples per day

Parameters by solution

	WineScan™ SO_2	WineScan™	OenoFoss™
Must	Free SO_2 Total SO_2 Brix Density Malic acid pH Tartaric acid Total acidity Acid rot Ethanol Fermentative activity Gluconic acid Glycerol Grey rot Lactic rot Volatile acidity Alpha amino nitrogen Ammonia Citric acid Colour intensity Extract Folin C (Total polyphenol) Fructose Glucose Lactic acid Potassium Reducing sugar OD280 OD520	Brix Density Malic acid pH Tartaric acid Total acidity Acid rot Ethanol Fermentative activity Gluconic acid Glycerol Grey rot Lactic rot Volatile acidity Alpha amino nitrogen Ammonia Citric acid Colour intensity Extract Folin C (Total polyphenol) Fructose Glucose Lactic acid Potassium Reducing sugar OD280 OD520	Brix Density Malic acid pH Tartaric acid Total acidity Gluconic acid Volatile acidity Alpha amino nitrogen Ammonia
Must under fermentation	CO_2 Density Ethanol Glucose+Fructose Malic acid pH Reducing sugar Total acidity Volatile acidity	CO_2 Density Ethanol Glucose+Fructose Malic acid pH Reducing sugar Total acidity Volatile acidity	Ethanol Glucose+Fructose Malic acid pH Total acidity Volatile acidity
Finished wine	Free SO_2 Total SO_2 A420*** A520*** A620*** Citric acid CO_2 Density Ethanol Fructose Gluconic acid Glucose Glucose+Fructose Glycerol Lactic acid Malic acid pH Reducing sugar Sorbic acid Tartaric acid Total acidity Folin C (Total polyphenol) Volatile acidity	A420*** A520*** A620*** Citric acid CO_2 Density Ethanol Fructose Gluconic acid Glucose Glucose+Fructose Glycerol Lactic acid Malic acid pH Reducing sugar Sorbic acid Tartaric acid Total acidity Folin C (Total polyphenol) Volatile acidity	A420*** A520*** A620*** OD 280 Density Ethanol Fructose Glucose Glucose+Fructose Lactic acid Malic acid pH Total acidity Volatile acidity Total sugar*

*Base wine for sparkling wine **choice between measuring Free SO_2 or Total SO_2 ***requires color module

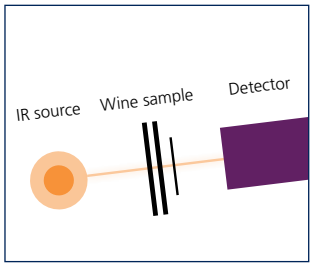
Fourier Transform Infrared – providing new light on traditional methods

Introduced to the wine industry by FOSS in 1999, routine analysis created a revolution in wine analysis and, over the years, has proven its value to wineries and analytical laboratories.

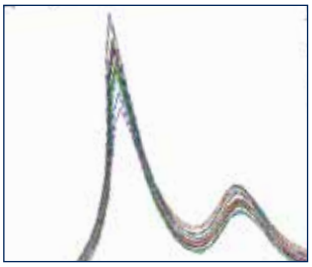
The success of WineScan was founded on an innovative use of Fourier Transform Infrared (FTIR) – an analytical technology that is ideal for rapid multi-parameter analysis of liquid samples.

Today, winemakers around the world use analytical solutions based on FTIR to protect and enhance the quality of their products. And the developments continue with new parameters such as free and total SO_2.

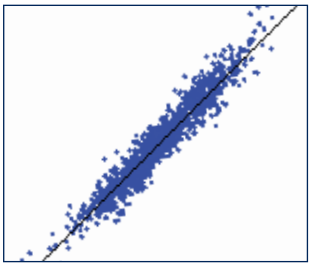
The principle of FTIR analysis



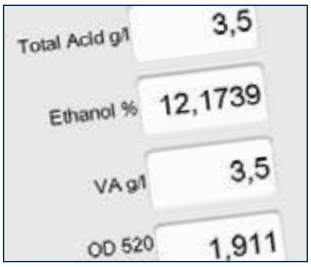
1. Infrared light through sample



2 Spectrum analysis



3. Calculations



4. Result on screen

The principle of FTIR routine analysis involves infrared scanning of must or wine samples. Through mathematical modeling, the concentration of wine constituents is determined within 30 seconds.

Data storage with Foss Integrator software

Facilities in the user software platform for FOSS wine solutions allow you to improve control through traceable measurements and answer growing demands for documentation of results. Or just look back over the years and track what happened in relation to test results helping you to define your strategy for the next vintage.

Automatic recording of measurement activity provides lists of results for improved quality assurance routines and traceability. An intuitive operator interface is designed for routine operation, for instance, it is easy to switch from must to wine measurement.

The information gained from both liquid and gas phase provides the basis for an accurate measurement. During times when you only need the traditional liquid parameter results you can switch off the SO_2 measurement and get your results in only 30 seconds as normal.

Centralised calibration, management and configuration of instruments

For larger laboratories or wineries with multiple sites, the sophisticated Mosaic tools enable internet-based remote instrument monitoring and diagnostics. With this software, internal or external experts can precisely configure and monitor FOSS instruments regardless of their location. Calibration updates and bias corrections are easily and safely handled centrally through the network and the system can be monitored on a daily basis.

"Because the machine has the ability to link directly to FOSS via the internet, and receive and transmit data, I have confidence of ongoing back-up support for the machine"

"… Networking with FOSS first of all provides us with "peace of mind" as we know there is a FOSS specialist managing and doing surveillance on our instrument. We have outsourced all complexity related to running our instrument, calibrations, diagnostics, etc. Networking makes sure that the performance of our entire setup is optimized at all times hereby allowing us to focus on our real business."

"… Adjusting slope/intercept, etc. is surely not my expertise so it is valuable having FOSS do this."

"… Having a large population of instruments the central security and management aspect of networking is extremely important. Operating our instruments is no longer dependent on having on-site specialists as all complexity is handled by our contact at FOSS."

“Everyone has their own style but you can never have too much information. I’d rather have the choice”

Rob Lloyd, consultant winemaker, Napa Valley, California.
commenting on the value of rapid routine analysis

FOSS a reliable partner in the wine industry

FOSS wine analysis solutions were introduced to the wine industry in 1999 and FOSS has quickly become a leading force in quality control of wine at all stages of production.

Thousands of wine producers and laboratories across the wine industry have discovered the ability of FOSS analytical solutions to deliver the rapid and accurate results that winemakers demand. Solutions are based on FTIR analysis technology – a field in which FOSS has vast experience and knowledge.

Our knowledge and experience is complemented by local presence around the world, ensuring that you can always talk to a dedicated sales and support team located near you.

FOSS milestones in wine analysis

1999: FOSS introduces the WineScan. For the first time, winemakers can make use of the power of Fourier Transform Infrared (FTIR) analysis for rapid, multi-component analysis of key quality parameters.

2000: The new GrapeScan introduces the measurement of grape maturity and soundness. Simultaneous availability of multiple parameters across both maturity and soundness gives a new, more sophisticated picture of grape quality.

2008: The handy and easy-to-use OenoFoss analyser extends the benefits of rapid analysis with FTIR to small/medium size wineries.

2011: The WineScan SO_2 fulfils a long-standing wish from the wine industry for rapid and convenient analysis of the most measured parameter in winemaking.

FOSS

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