winegrid

Smart Oenology

- PORTFOLIO -

AT THE FOREFRONT OF PRECISION ENOLOGY

OUR MISSION

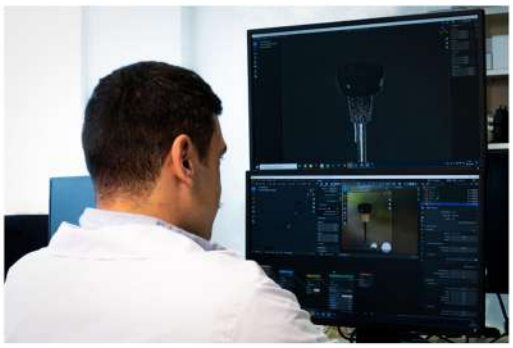
To improve the efficiency of winemaking through real-time vinification monitoring solutions

OUR VISION

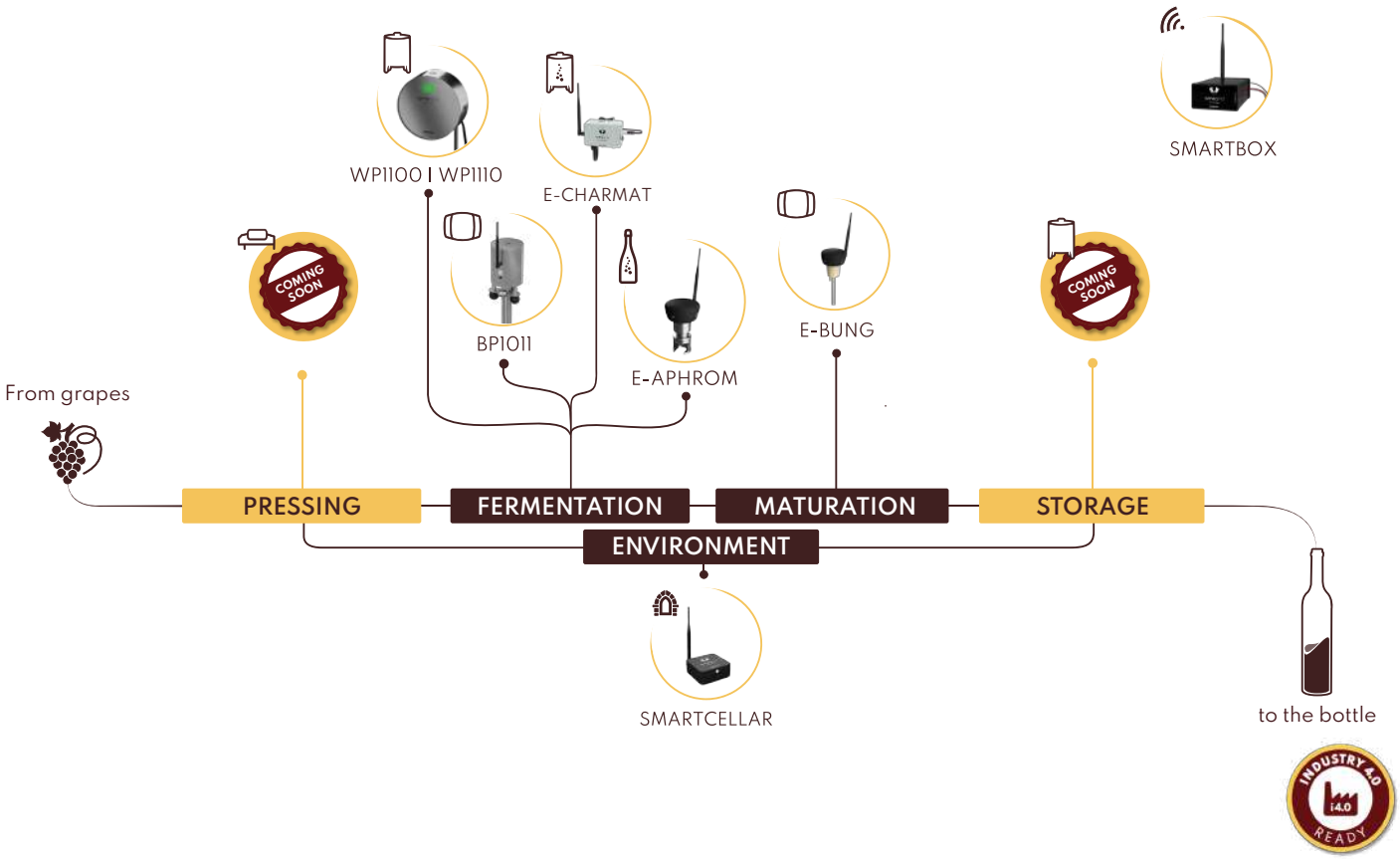
To become the global leader in monitoring solutions for liquids:
IoT for liquids

OUR VALUES

— Passion
— Transparency
— Committment
— Loyalty
— Ethics
— Sustainability
— Excellence
— Honesty
— Team Work
— Creativity


WINEGRID DELIVERS A FULLY INTEGRATED **REMOTE** AND **REAL-TIME** SOLUTION FOR **SMART MONITORING** OF THE **WINEMAKING** PROCESS



winegrid

Smart Oenology

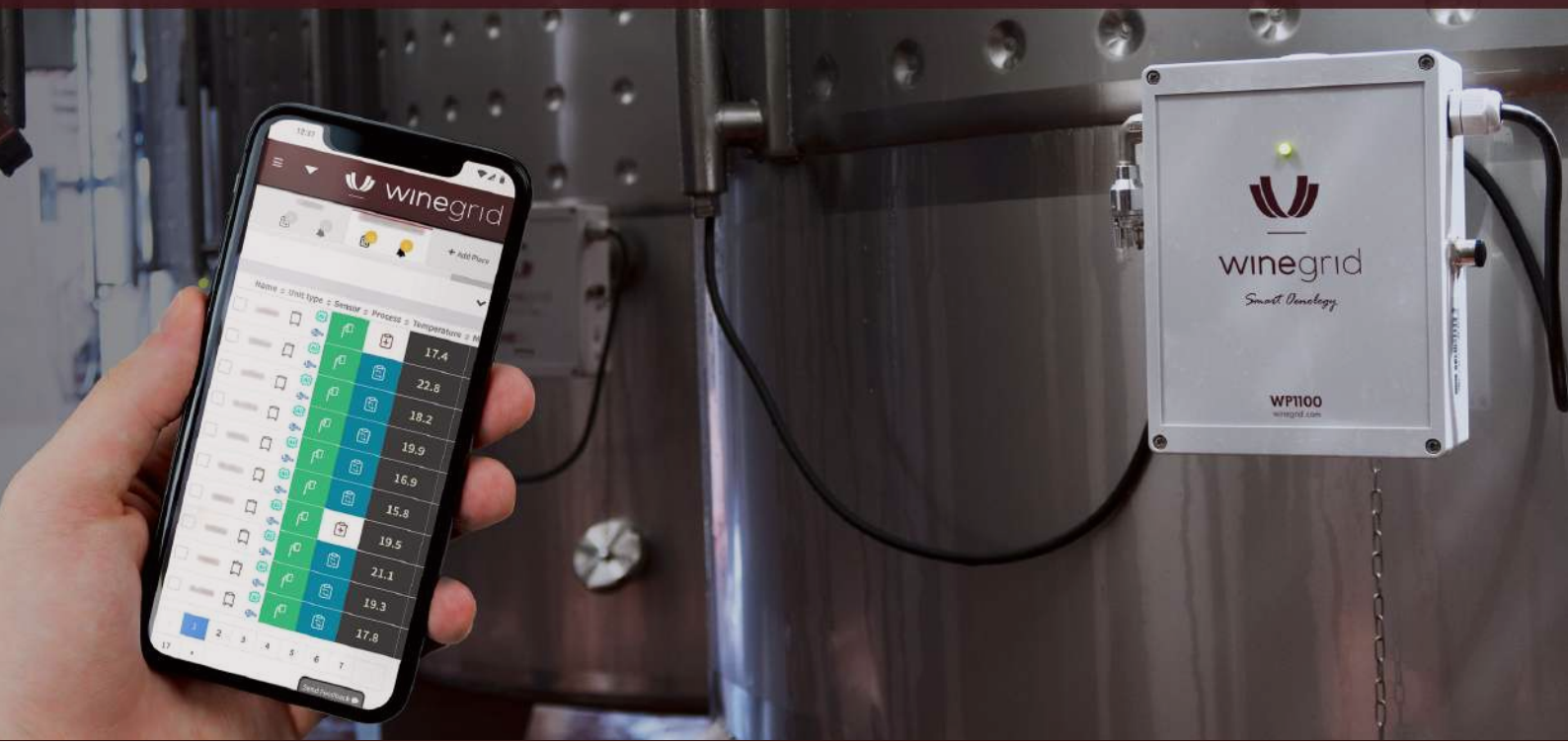
A Winemaker's Unique Tool

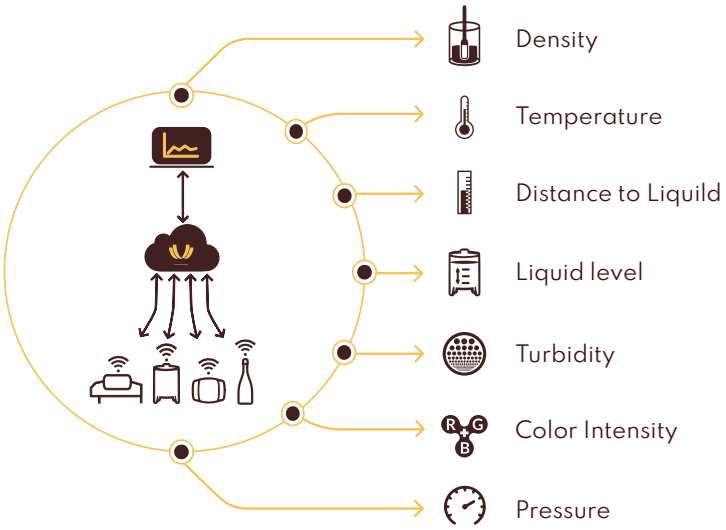
WINEGRID develops and provides a fully integrated, real-time remote solution for smart monitoring of the winemaking process. Through its proprietary technology, composed of hardware (sensors), a computational platform with an Artificial Intelligence engine and a visualization platform, WINEGRID provides precise and accurate solutions for monitoring with relevant impact on operational efficiency, as well as for driving vinification precisely as desired.

The technology has already helped produce hundreds of millions of wine bottles around the world by monitoring and optimizing winemaking.

MULTIPARAMETER MONITORING

Through the WINEGRID Dashboard, the winemaker can access several relevant parameters in real-time.





AWARD-WINNING SOLUTION

DISTINCTION AWARD
Fermentation Monitoring System
2018

INNOVATIVE PRODUCT AWARD
Fermentation Monitoring System
2020

TECHNOLOGY INNOVATION AWARD
Digital Juice System
2022

CROWD WRITING WINNER
WINEGRID Solutions
2022

TECHNICAL NOVELTY AWARD
Second Fermentation Monitoring System
2023

VISUALIZATION PLATFORM
WINEGRID DASHBOARD

With WINEGRID Dashboard you can have an overview of your winery status and still have detailed information of all monitored tanks, barrels, and other units. It is an online based platform where the winemaker has access to profile analysis, alarms, task lists, traceability, smart alerts, and much more.

MULTIPARAMETER MONITORING

Through the WINEGRID Dashboard, the winemaker can access various parameters in real-time.

ARTIFICIAL INTELLIGENCE

The WINEGRID Dashboard uses an Artificial Intelligence engine to automatically detect fermentation events (Start, Stuck and End of Fermentation) and predict the end of an ongoing fermentation, enabling a proactive and predictive approach.

CUSTOMIZABLE ALERTS AND NOTIFICATIONS

Customize your own alerts taking into account your specific needs for the winemaking process. For example: the WINEGRID Dashboard can alert you when a specific temperature, liquid level, or fermentation value is reached.

THE WINERY IN THE PALM OF YOUR HAND.

SIMPLE.
EASY.
ANYTIME.
ANYWHERE.

User-friendly and remote access to all sensor units in your winery on a computer, tablet or smartphone.

WINEGRID'S WINEMAKING MONITORING SYSTEM

WHAT DO YOU GET?

FORGET ABOUT THIS!

✔ Remote and real-time monitoring	✖ Time-consuming manual monitoring
✔ High-accuracy and reliability in data collection	✖ Manual samplings prone to human error
✔ Greater operational efficiency	✖ High labor and cleaning costs
✔ Preservation of wine quality	✖ Wine losses and lower quality
✔ Improved labor management	✖ Repetitive tasks without added value
✔ Proactive and predictive decision-making	✖ Reactive decision-making
✔ Traceability of operations	✖ Difficulty in identifying and preventing problems

BENEFITS

Remote monitoring

Monitor in real-time, anytime, anywhere. User-friendly and remote access to all sensor units in your winery on a computer, tablet, or smartphone.

Greater operational efficiency

With the WINEGRID system, it is no longer necessary to carry out manual monitoring. This frees up time for other tasks, resulting in better management of human resources and organization of the time allocated for winery operations.

Accuracy and reliability

With tens of millions of accumulated measurements, the patented Oenosensing® technology offers unprecedented accuracy and reliability.

Preservation of wine quality

The ability to act proactively, enabled by the WINEGRID system's predictive information, allows for early intervention and, thus, the prevention of defects in wine, avoiding the reduction in quality and consequent devaluation of the brand and the final product.

Reduction of winery waste

Manual sampling, in most cases, not only results in the loss of liters of wine per day, but also the loss of large amounts of water used to clean tools and faucets. Due to the WINEGRID system, these losses are reduced up to 100%.

Process safety

Customizing alerts allow users to be notified when a certain limit is reached.

Traceability

The WINEGRID system allows for the traceability of operations and comparison of the process evolution in different batches.

Highly scalable solution

The WINEGRID system is modular with frequent updates and new features. The sensors connect to the Cloud WINEGRID service, which is fully scalable to thousands of sensors and users.
In addition, the solutions developed by WINEGRID integrate with each other, forming a completely remote, real-time monitoring system for different stages of the winemaking process.

Interoperability

Taking into consideration the growing number of IoT solutions, ERPs and monitoring systems on the market, the WINEGRID system was purposely designed to easily communicate with third-party systems thus becoming an integral part of the Cellar of the Future.

The fermentation process has a decisive impact on the phenolic component of your wine

CHALLENGES OF THE FERMENTATION PROCESS

(IN TANKS AND BARRELS)

- **HIGH OPERATIONAL COSTS**
  due to the intensive use of resources in manual monitoring

- **REACTIVE DECISIONS**
  due to manual sampling, decision making is reactive, not proactive or preventative

- **LOWER WINE QUALITY**
  due to late reaction and potential insufficient monitoring

- **WINE LOSSES**
  can impact the total process cost

- **MANUAL SAMPLING**
  during fermentation which can only occur at the winery during working hours

- **LARGE CARBON AND WATER FOOTPRINT**
  due to ineffective vinification processes

SOLUTION

THE WINEGRID FERMENTATION MONITORING SYSTEM

Monitoring wine fermentation, until recently, was mostly a manual, reactive and time-consuming process.
With **WINEGRID,** it becomes a **remote, real-time, proactive** and **predictive** process.

Fermentation Monitoring System
wineplus

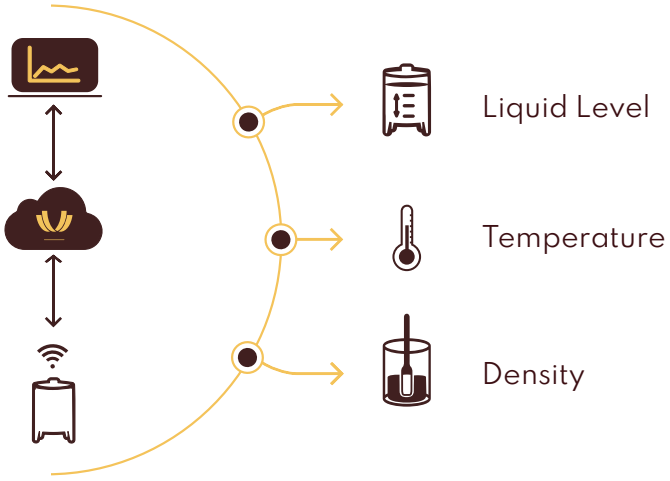
OPTIMIZED FOR TANKS

VISUAL RGB LED ALARM - Allows winemakers to immediately see if everything is okay just by looking at the sensor. With more than 16 million configurable colors, it is possible to set a large number of alarms in the visualization platform WINEGRID Dashboard.The alarm is visualized by a color change of the WINEGRID illuminated logo.

THE WINEGRID FERMENTATION MONITORING SYSTEM

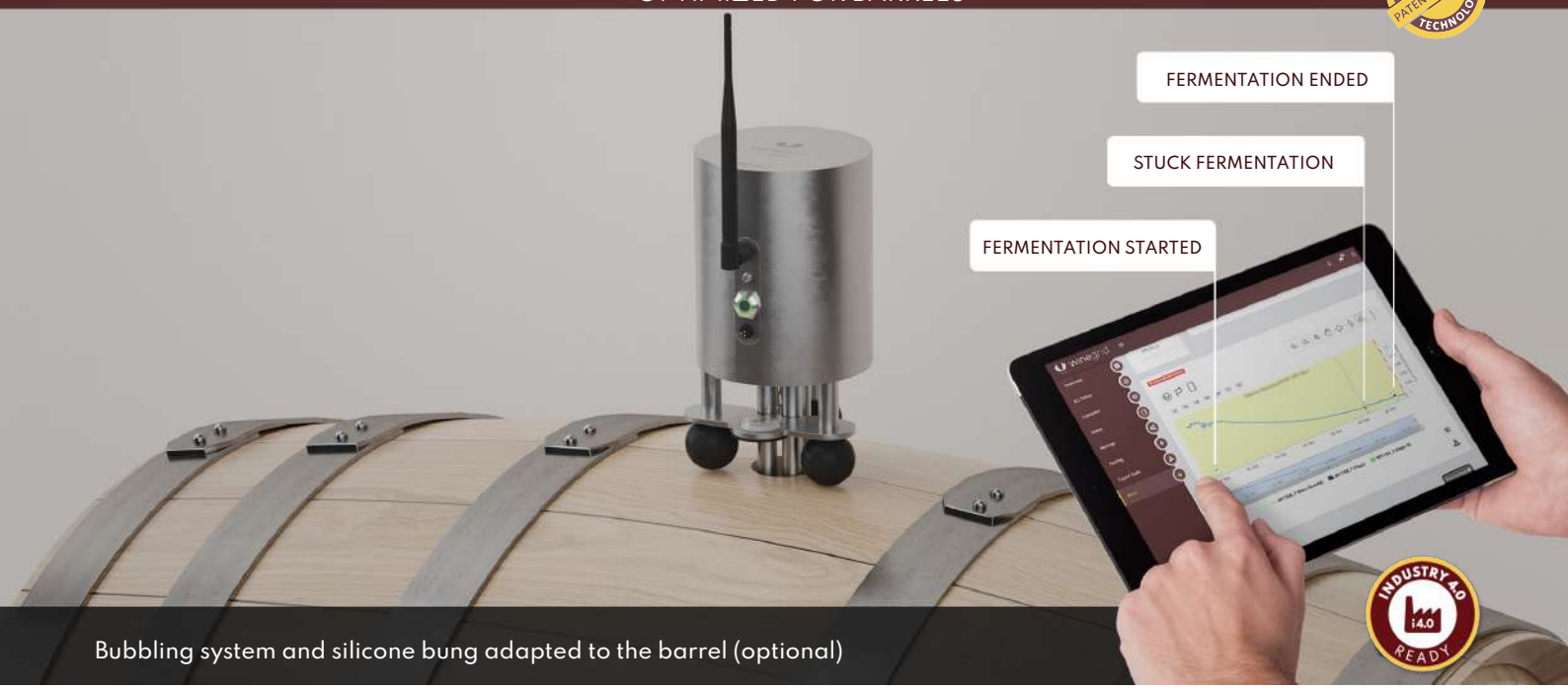
OPTIMIZED FOR TANKS

VISUALIZATION
PLATFORM
(WINEGRID Dashboard)
+
COMPUTATIONAL
PLATFORM
+
HARDWARE
(Sensors)



Fermentation Monitoring System
barrelplus

OPTIMIZED FOR BARRELS

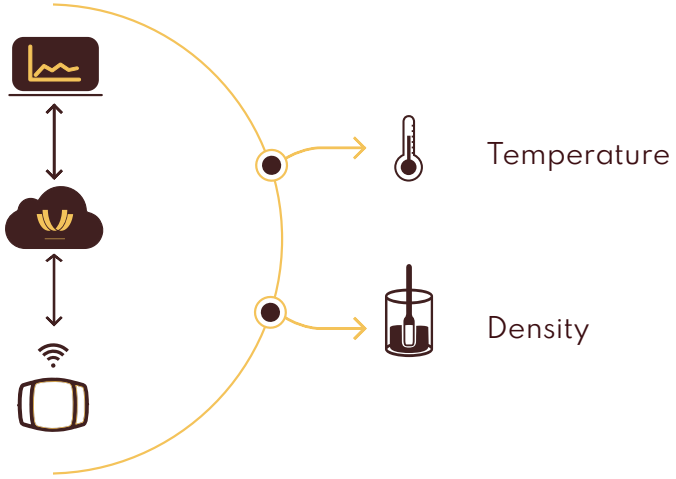


Bubbling system and silicone bung adapted to the barrel (optional)

THE WINEGRID FERMENTATION MONITORING SYSTEM

OPTIMIZED FOR BARRELS

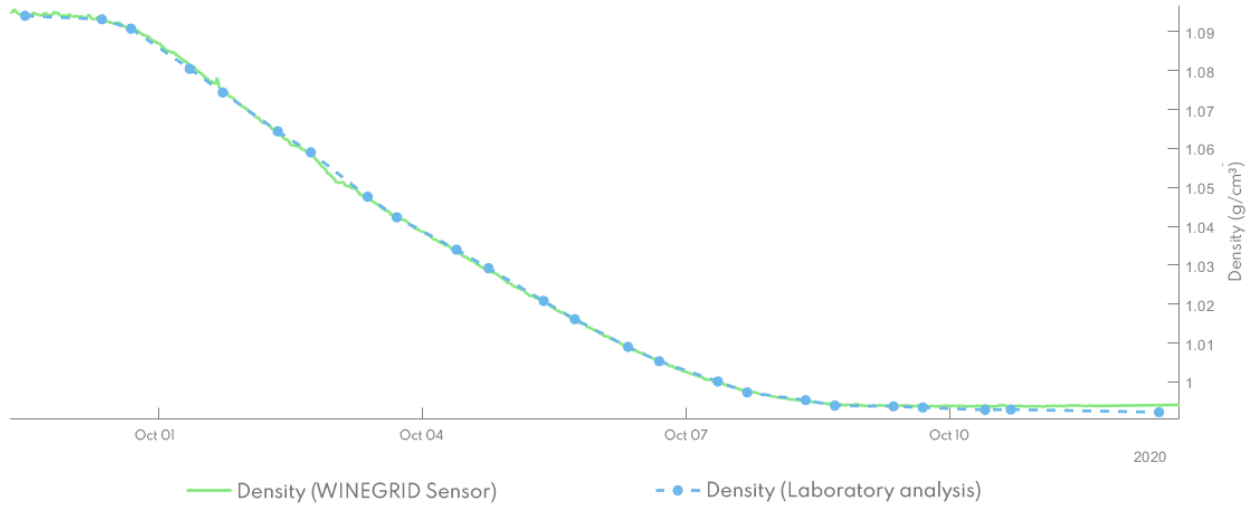
VISUALIZATION
PLATFORM
(WINEGRID Dashboard)
+
COMPUTATIONAL
PLATFORM
+
HARDWARE
(Sensors)



OENOSENSING® TECHNOLOGY

Oenosensing® technology ensures high precision and accuracy

Oenosensing® is a proprietary and awarded technology which measures temperature, density and liquid level in real-time by advanced algorithms together with Artificial Intelligence tools. The combination of these technologies will adjust the measurement iteratively, in order to acquire more and more precise and accurate data, until the final reading is provided. This process occurs in a very short period and, on average, is performed 400 times per final measurement.



This way, the winemaker knows that one simple measurement is the result of the most advanced and precise technology. The use of this innovative technology allows for following the process with greater safety and reliability.

BENEFITS

The multi-award winning Fermentation Monitoring System helps producers and winemakers monitor the fermentation process remotely and in real-time with state-of-the-art technology that ensures a high rate of precision and accuracy.

OIV - PORTUGUESE BRANCH AWARDS 2018

DISTINCTION AWARD

VINITECH SIFEL
LE SALON MONDIAL
vitivinicole.arboricole.maraîcher
LES TROPHÉES DE L'INNOVATION

INNOVATIVE PRODUCT AWARD

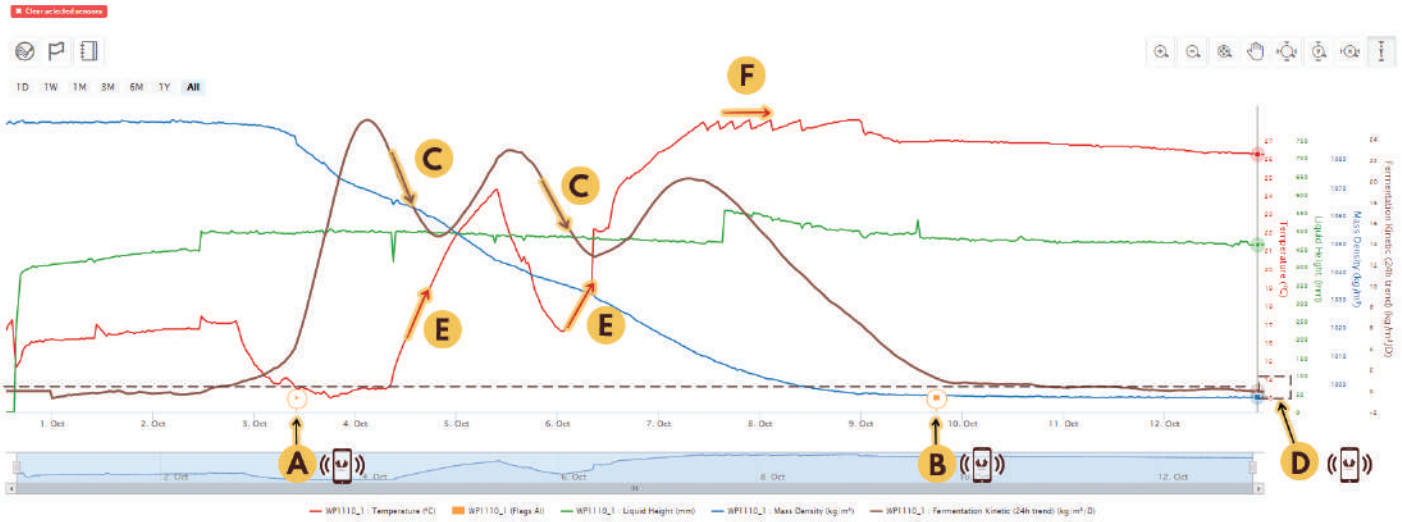
— **EVENT DETECTION THROUGH AN ARTIFICIAL INTELLIGENCE ENGINE**
WINEGRID systems automatically detect fermentation events (start, stuck and end of fermentation)

— **MORE ACCURATE FOLLOW-UP OF YEAST BEHAVIOR**
by monitoring fermentation kinetics allows for better control of the right time for additions (nitrogen, nutrition, etc.) in the appropriate amounts, due to the information provided by the system on the level or volume of the liquid

WINEGRID DASHBOARD

Real-time monitoring of the fermentation process allows for proactive decision-making to prevent possible fermentation problems and protect all sensory qualities of the final product.
Kinetics are based on the density reading performed in the last 24 hours and translates the behavior of yeast.

EXAMPLE OF FERMENTATION IN TANKS



A AUTOMATIC DETECTION OF FERMENTATION BEGINNING

B AUTOMATIC DETECTION OF FERMENTATION ENDING

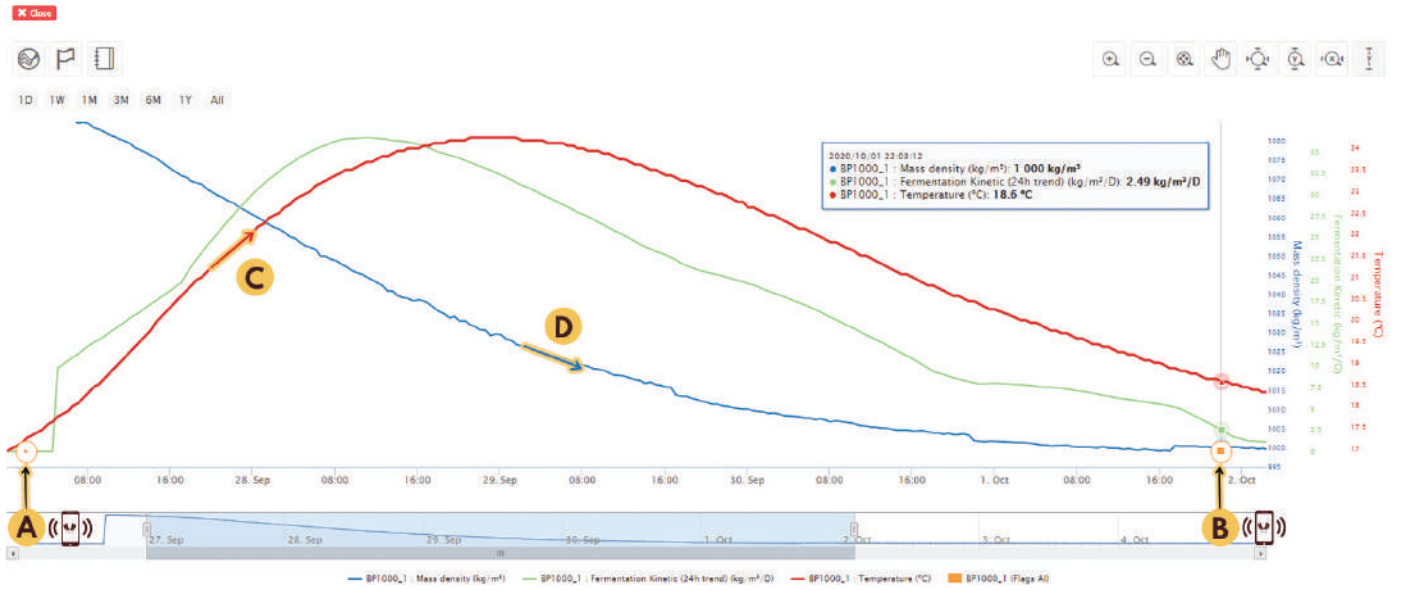
C DECREASE OF FERMENTATION KINETICS

D TEMPERATURE LIMIT DEFINED BY THE USER TO TRIGGER ALARM

E TEMPERATURE RISE TO INCREASE FERMENTATION KINETICS

F CONTROLLED TEMPERATURE FOR DEGRADATION OF RESIDUAL SUGARS

EXAMPLE OF FERMENTATION IN BARRELS



A AUTOMATIC DETECTION OF FERMENTATION BEGINNING

B AUTOMATIC DETECTION OF FERMENTATION ENDING

C TEMPERATURE RISE TO INCREASE FERMENTATION KINETICS

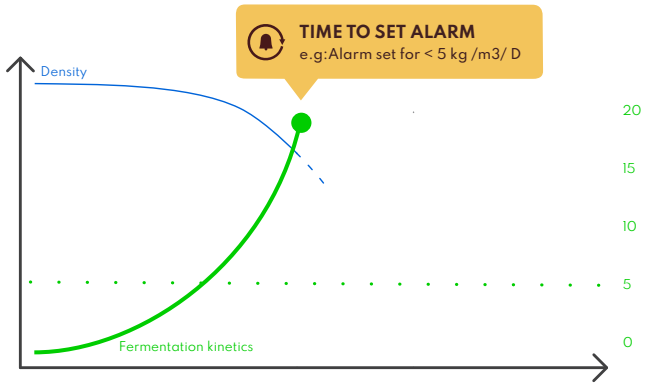
D DECREASE OF DENSITY

WINEGRID DASHBOARD

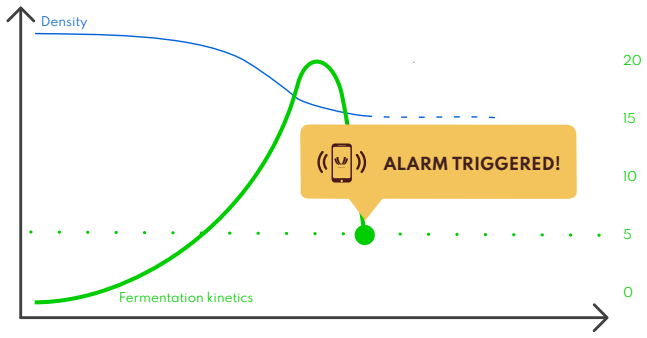
Reduced kinetics indicate delayed fermentation, which can lead to stuck fermentations, which translate into very high production costs. With the Fermentation Monitoring System and by monitoring the evolution of kinetics, it is possible to completely avoid stucks, maximizing fermentative activity.

HOW TO PREVENT STUCK FERMENTATIONS

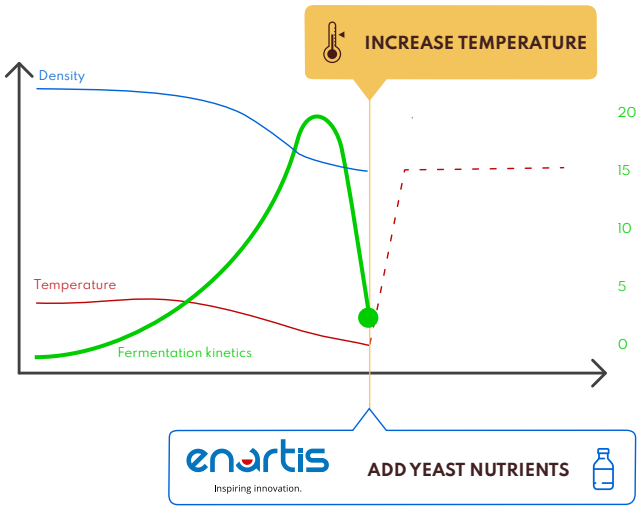
1. SET ALARM



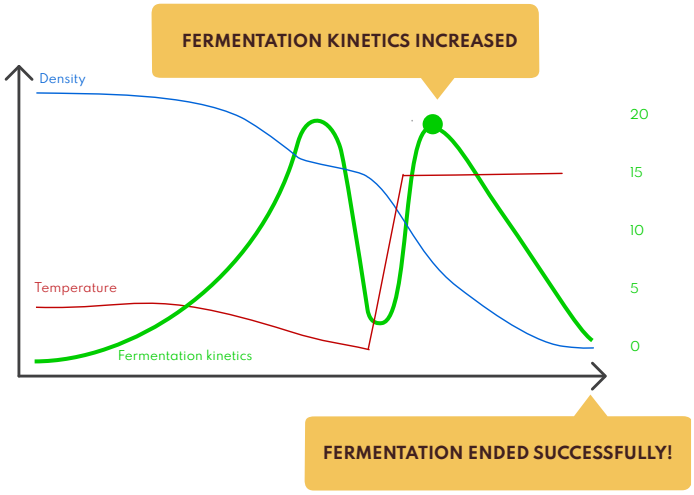
2. GET NOTIFICATION



3. ACT ON TIME



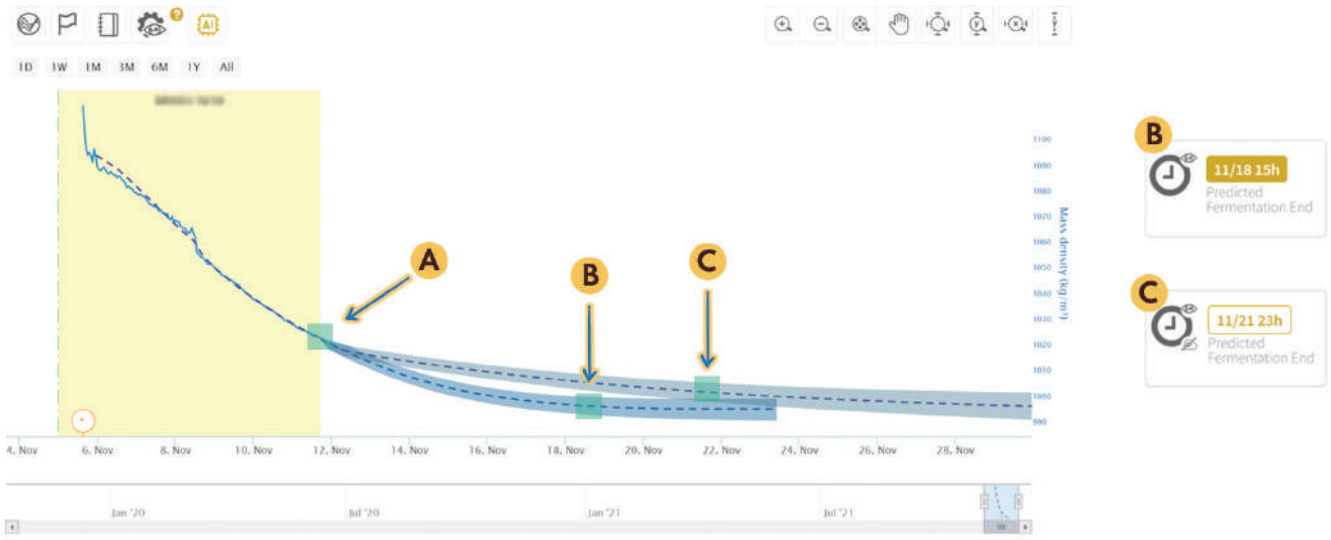
4. RESULT: STUCK AVOIDED



FERMENTATION PREDICTOR

Estimates the next days evolution of an ongoing fermentation

The fermentation forecast may be adjusted and/or compared with the insertion of expected different temperature(s) during the process. It is possible to set a new temperature or multiple temperatures and compare the new forecast with the current one.



A **SIMULATION OF A TEMPERATURE CHANGE**

B **ESTIMATED FERMENTATION END TIME**

C **NEW ESTIMATED FERMENTATION END TIME**

BENEFITS

- **PROVIDES QUICK FORECASTING**
  of the end of fermentation under current temperature conditions
- **ENABLES BETTER PLANNING**
  of next fermentation processes
- **ALLOWS FOR COMPARISON AND ANALYSIS**
  of fermentation evolution with different temperature conditions
- **CONTRIBUTES TO MORE EFFICIENT**
  winery management during the harvest season

CHALLENGES OF THE SECOND FERMENTATION PROCESS

(IN BOTTLES AND TANKS)

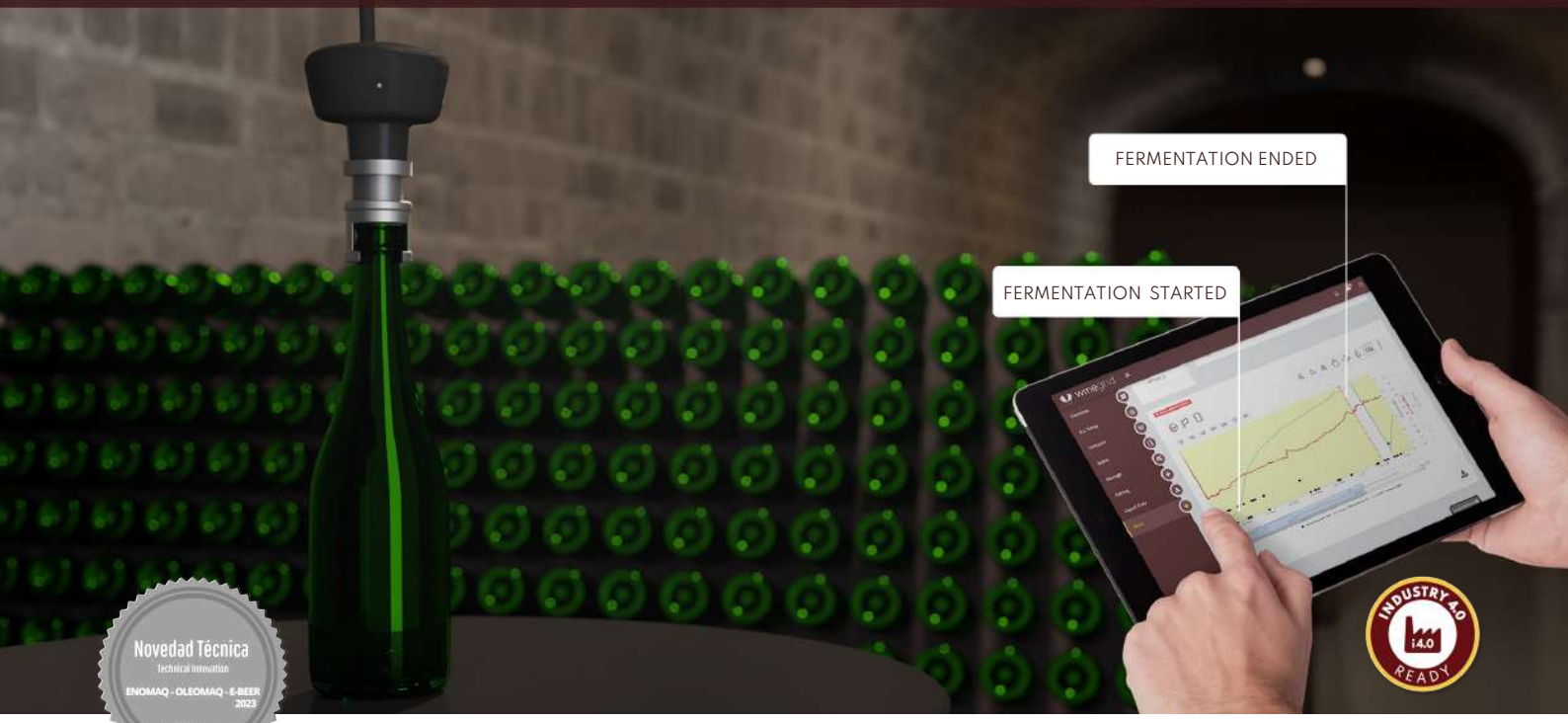
- **HIGH OPERATIONAL COSTS**
  due to the intensive use of resources in manual monitoring
- **REACTIVE DECISIONS**
  due to the manual pressure measurement process, decision-making is reactive, not proactive or preventative
- **LOWER WINE QUALITY**
  due to late reaction and potential insufficient monitoring
- **WINE LOSSES**
  can impact part of the total process cost
- **MANUAL MONITORING**
  during fermentation which can only occur at the winery during working hours
- **LARGE CARBON AND WATER FOOTPRINT**
  due to ineffective vinification
- **PRESSURE FLUCTUATIONS**
  may affect wine quality
- **OPERATOR EXPOSURE**
  to the risk of bottle explosion
- **NUMBER OF BOTTLES**
  used to monitor second fermentation

SOLUTION

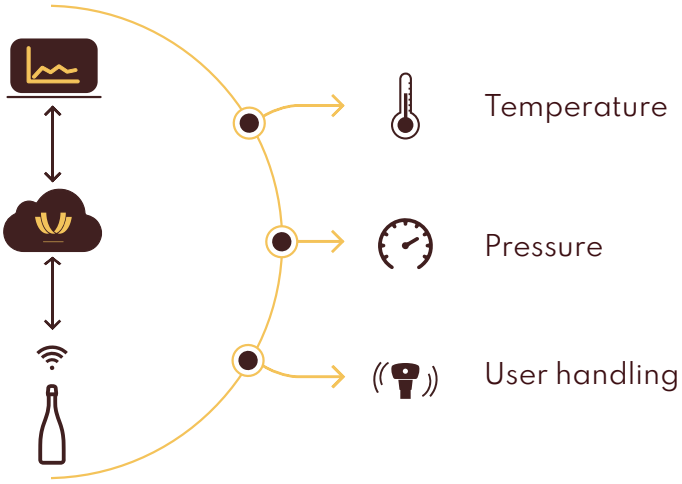
THE WINEGRID SECOND FERMENTATION MONITORING SYSTEM

Second Fermentation Monitoring System
e-aphrom

OPTIMIZED FOR BOTTLES - *Champenoise* Method



VISUALIZATION
PLATFORM
(WINEGRID Dashboard
+
COMPUTATIONAL
PLATFORM
+
HARDWARE
(Sensors)



BENEFITS

— **CONSISTENT PERLAGE**
Allows for monitoring the evolution of pressure throughout the second fermentation process. The ability to act proactively prevents pressure fluctuations, avoiding reduction in quality

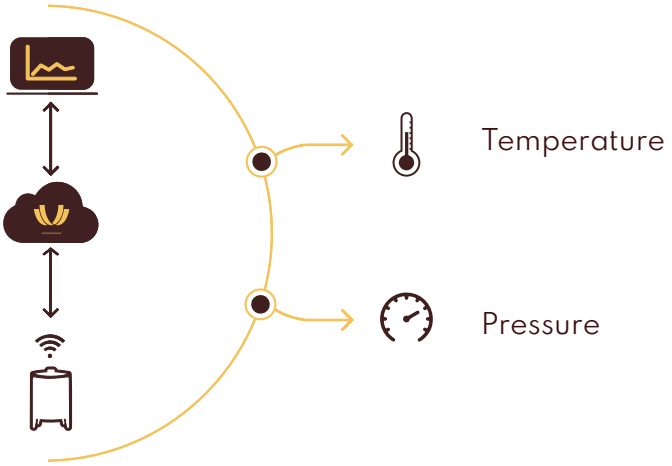
— **POSSIBILITY OF CREATING DIFFERENT PROFILES**
With the control of the second fermentation kinetics, it is possible to associate different fermentation profiles and control the sensory characteristics of the final product

Second Fermentation Monitoring System
e-charmat

OPTIMIZED FOR TANKS - *Charmat* Method

Novedad Técnica
Technical innovation
ENOMAQ - OLEOMAQ - E-BEER 2023

VISUALIZATION
PLATFORM
(WINEGRID Dashboard)
+
COMPUTATIONAL
PLATFORM
+
HARDWARE
(Sensors)



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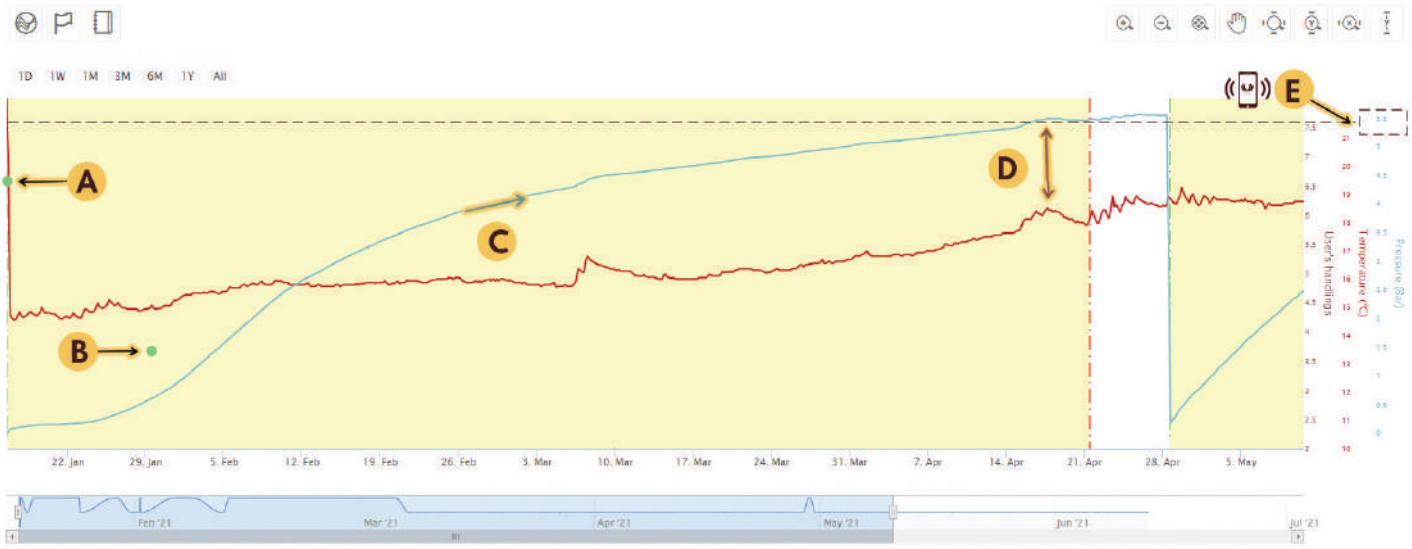
WINEGRID DASHBOARD

EXAMPLE OF SECOND FERMENTATION IN BOTTLES



A USER FORCED MEASUREMENT

B USER HANDLED THE SENSOR

C PRESSURE INCREASE DUE TO CO_2 FORMATION

D SMALL AMBIENT TEMPERATURE VARIATIONS HAVE AN IMPACT ON SECOND FERMENTATION KINETICS

E MAXIMUM PRESSURE LIMIT DEFINED BY THE USER TO TRIGGER THE ALARM

EXAMPLE OF SECOND FERMENTATION IN TANKS

A PRESSURE INCREASE DUE TO CO_2 FORMATION

B MAXIMUM PRESSURE LIMIT DEFINED BY THE USER TO TRIGGER THE ALARM

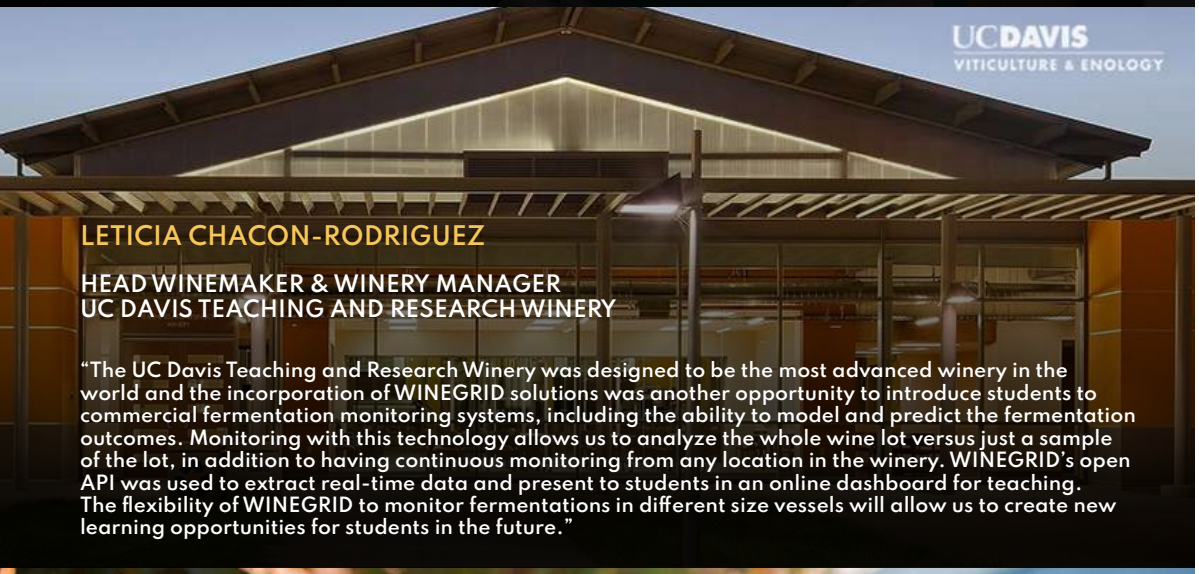
C AGITATION AND REDUCTION OF TEMPERATURE TO BRING YEAST BACK IN CONTACT WITH THE LIQUID

TESTIMONIALS

BLANDINE DE ROUFFIGNAC

RESEARCH & DEVELOPMENT MANAGER AT CHÂTEAU MARGAUX

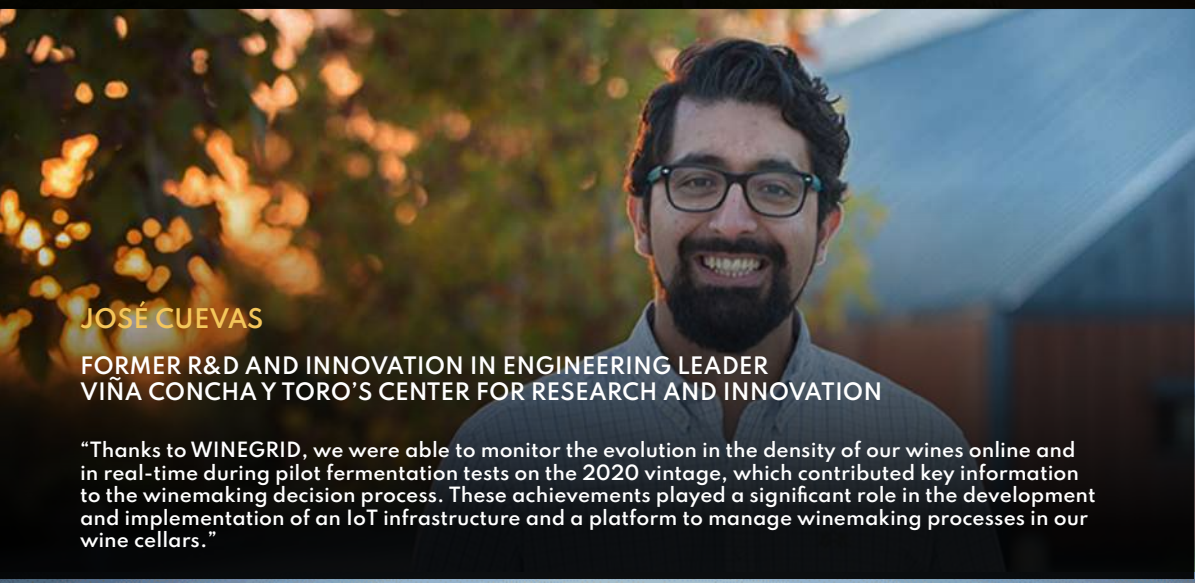
"We've been using WINEGRID technology since 2018.
The accuracy and reliability of the Wineplus density and temperature measurements have been proven compared to traditional manual measurements. The real-time monitoring of the fermentation process allowed us to reduce sampling time as well as decrease wine waste.
But mainly, this technology was decisive in the creation of a new strategy for vinification management by automatically triggering pump overs during fermentation, based on real-time density monitoring."



LETICIA CHACON-RODRIGUEZ

HEAD WINEMAKER & WINERY MANAGER
UC DAVIS TEACHING AND RESEARCH WINERY

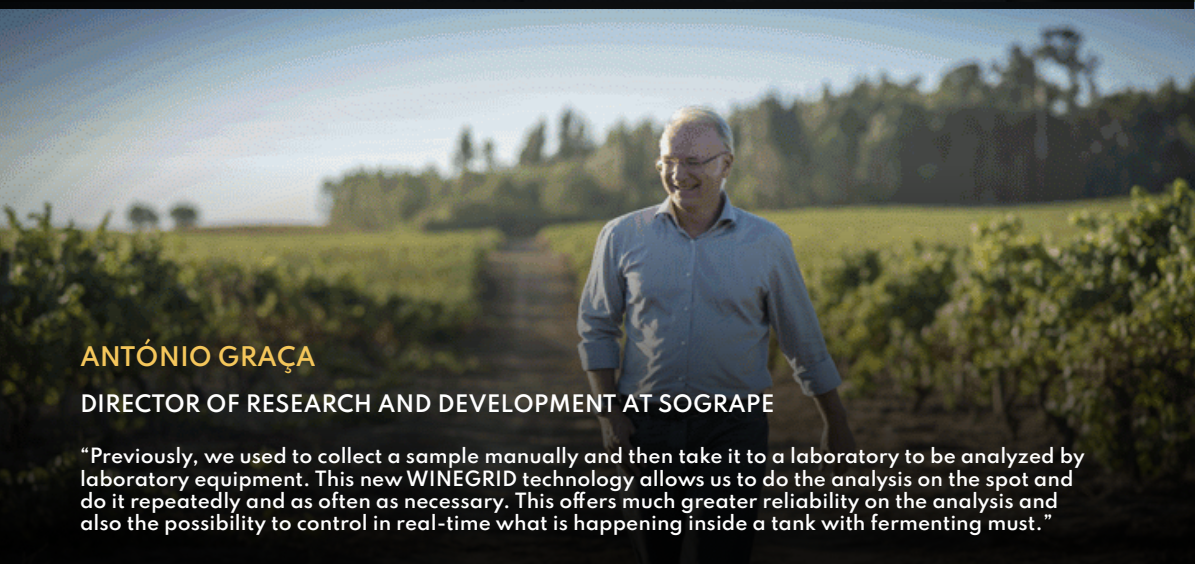
"The UC Davis Teaching and Research Winery was designed to be the most advanced winery in the world and the incorporation of WINEGRID solutions was another opportunity to introduce students to commercial fermentation monitoring systems, including the ability to model and predict the fermentation outcomes. Monitoring with this technology allows us to analyze the whole wine lot versus just a sample of the lot, in addition to having continuous monitoring from any location in the winery. WINEGRID's open API was used to extract real-time data and present to students in an online dashboard for teaching.
The flexibility of WINEGRID to monitor fermentations in different size vessels will allow us to create new learning opportunities for students in the future."



JOSÉ CUEVAS

FORMER R&D AND INNOVATION IN ENGINEERING LEADER
VIÑA CONCHA Y TORO'S CENTER FOR RESEARCH AND INNOVATION

"Thanks to WINEGRID, we were able to monitor the evolution in the density of our wines online and in real-time during pilot fermentation tests on the 2020 vintage, which contributed key information to the winemaking decision process. These achievements played a significant role in the development and implementation of an IoT infrastructure and a platform to manage winemaking processes in our wine cellars."



ANTÓNIO GRAÇA

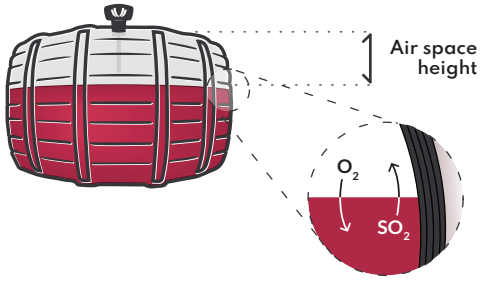
DIRECTOR OF RESEARCH AND DEVELOPMENT AT SOGRAPE

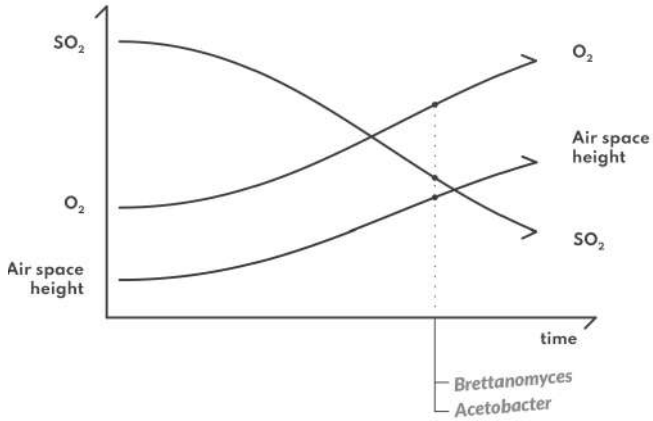
"Previously, we used to collect a sample manually and then take it to a laboratory to be analyzed by laboratory equipment. This new WINEGRID technology allows us to do the analysis on the spot and do it repeatedly and as often as necessary. This offers much greater reliability on the analysis and also the possibility to control in real-time what is happening inside a tank with fermenting must."


winegrid
Smart Oenology
Master wine
maturation like
never before

CHALLENGES OF THE MATURATION PROCESS

- **AIR SPACE IN BARRELS**
- **O_2 IN CONTACT WITH WINE**
- **LOSS OF SO_2 FROM WINE**
  promotes the development of undesired micro-organisms



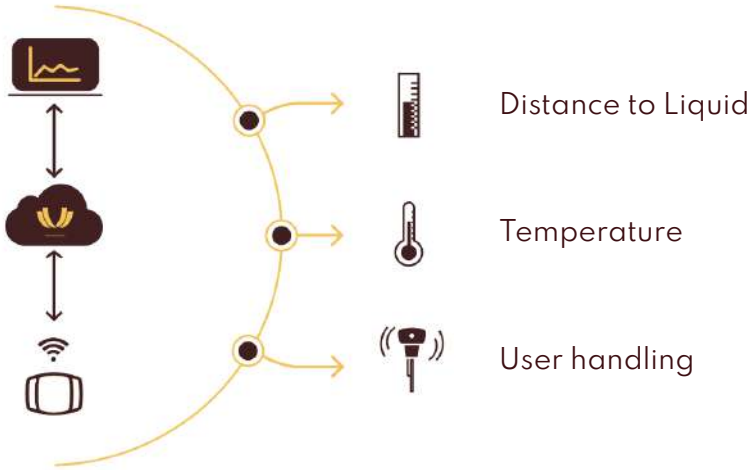


SOLUTION

THE WINEGRID MATURATION MONITORING SYSTEM

OPTIMIZED FOR BARRELS

VISUALIZATION PLATFORM (WINEGRID Dashboard)
+
COMPUTATIONAL PLATFORM
+
HARDWARE (Sensors)



The Maturation Monitoring System allows for the measurement of liquid level and temperature at any desired frequency and to trigger email alerts if the air volume becomes too large, in order to prevent the development of *Brettanomyces* and *Acetobacter*.

Maturation Monitoring System
e-bung

THE CONNECTED BUNG

Industry 4.0 · Optimized for barrels · Easy Cleaning · Easy Maintenance · 316 Stainless Steel · Food Safe · LoRa · WIFI · Connection via Smartbox · 5 YEAR WARRANTY

BENEFITS

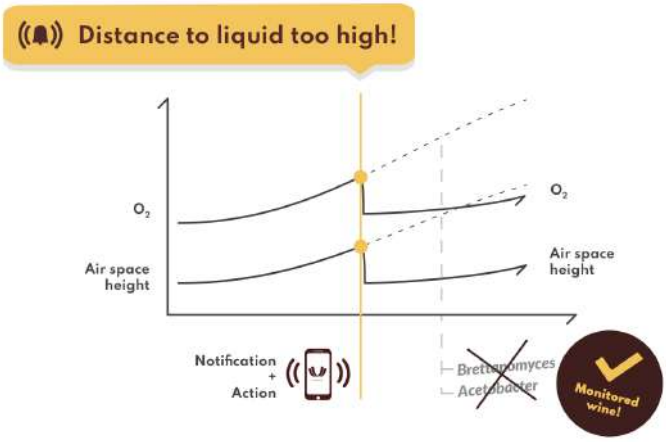
— **ENABLES THE OPTIMIZATION**
of time management devoted to topping off

— **MONITORS DISTANCE TO LIQUID AND TEMPERATURE**
in still wine or spirits in barrels, informing the user when the air volume is becoming too large

— **HELPS PREVENT THE DEVELOPMENT OF MICROORGANISMS**
such as *Brettanomyces* and *Acetobacter*

e-bung

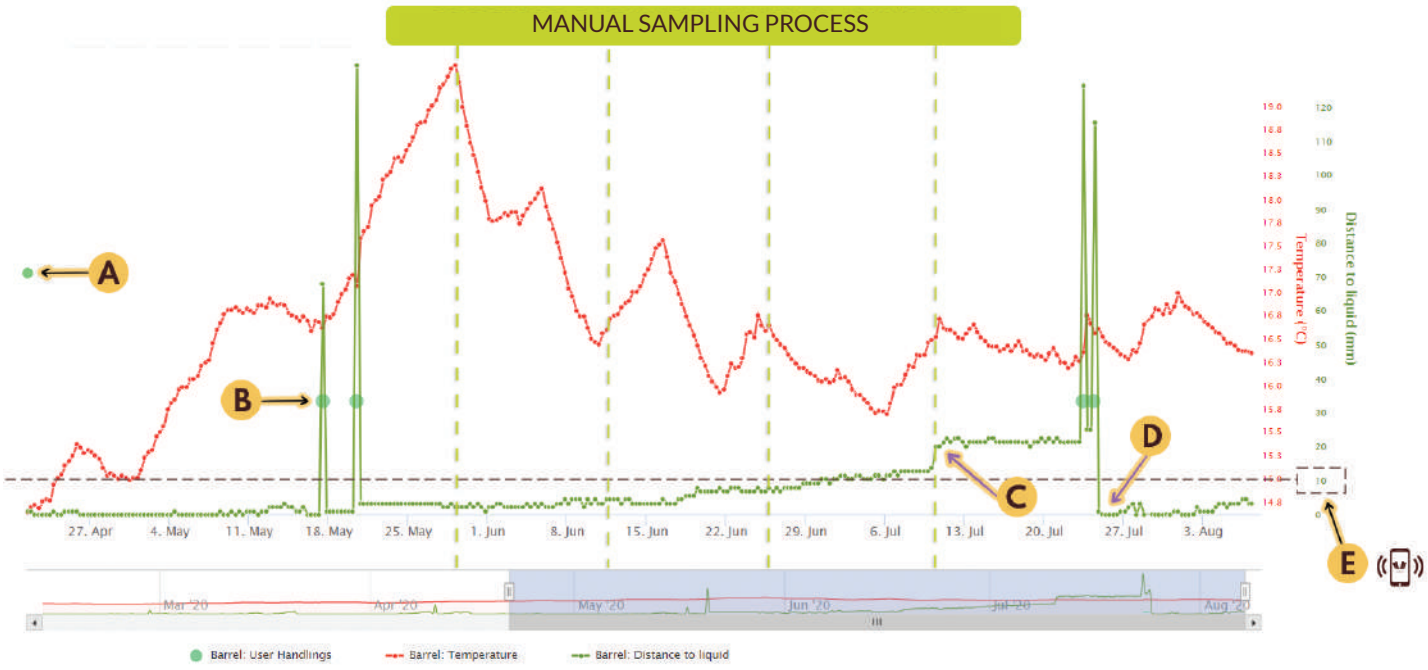
THE CONNECTED BUNG



EXAMPLE OF MATURATION IN BARRELS

WINEGRID DASHBOARD

Real-time monitoring wine maturation allows you to accurately manage the time dedicated to topping off, reducing exposure to oxygen and consequently reducing the amount of SO_2 needed to protect the wine.



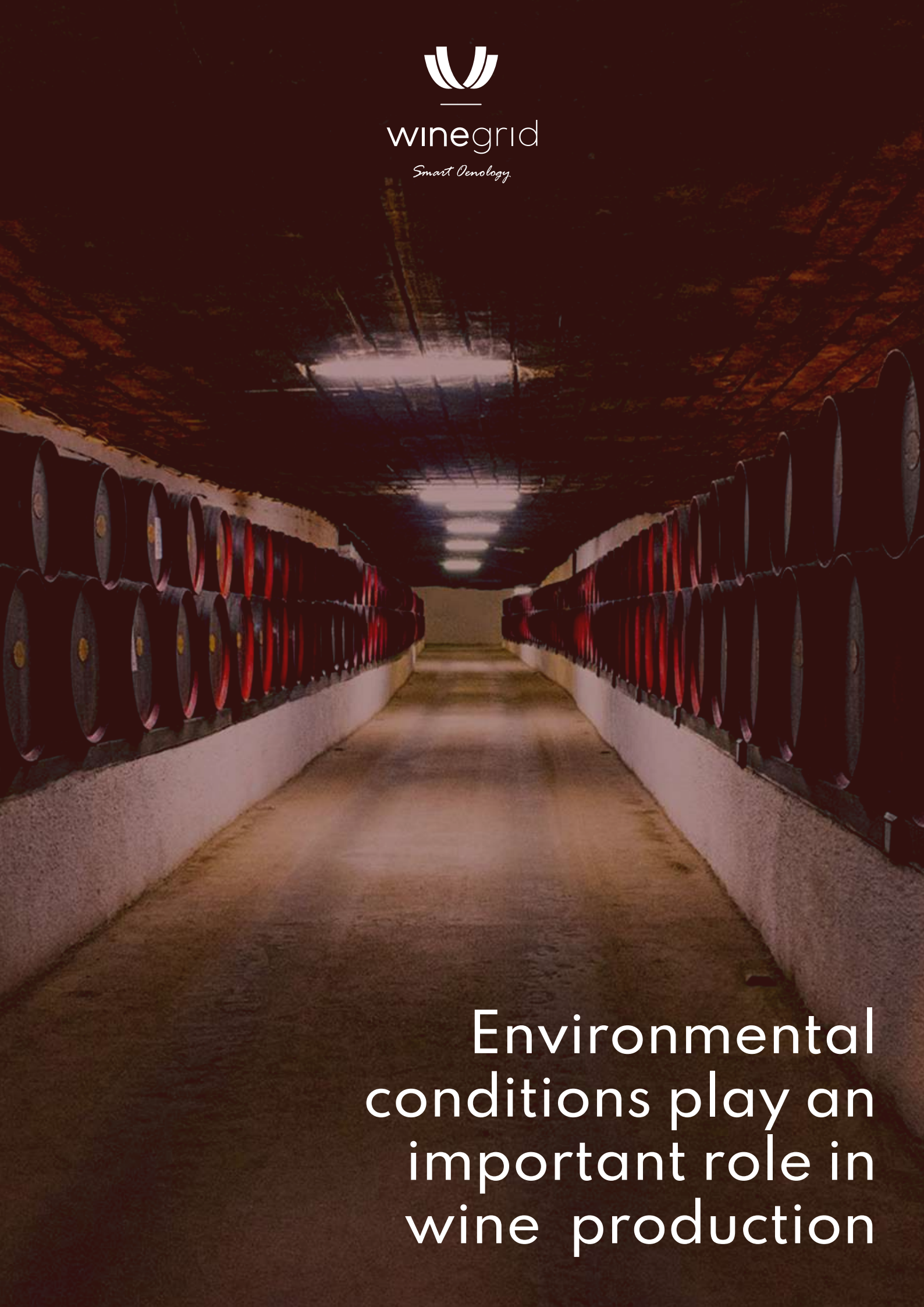
A USER FORCED MEASUREMENT

B USER HANDLED THE SENSOR

C SMALL WINE WITHDRAWAL

D BARREL TOPPING OFF PROCESS

E AIR SPACE MAXIMUM LIMIT DEFINED BY THE USER TO TRIGGER ALARM


winegrid
Smart Oenology
Environmental conditions play an important role in wine production

CHALLENGES OF ENVIRONMENT CONTROL

- **HIGH HEATING AND VENTILATION COSTS**
  to provide a healthy and safe environment

- **SENSORY CHANGES AND WINE OXIDATION**
  due to constant temperature and humidity variations

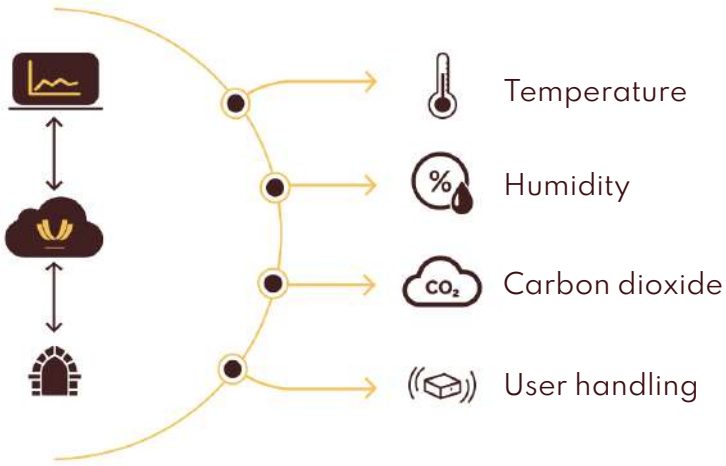
- **RISK OF IMPAIRMENT**
  when the concentration of carbon dioxide released during fermentation reaches levels dangerous to human health

- **LOWER WINE QUALITY**
  due to late reaction and potential insufficient monitoring

SOLUTION

THE WINEGRID ENVIRONMENT MONITORING SYSTEM

VISUALIZATION
PLATFORM
(WINEGRID Dashboard)
+
COMPUTATIONAL
PLATFORM
+
HARDWARE
(Sensors)



Environment Monitoring System

smartcellar

Industry 4.0

Easy Cleaning

Easy Maintenance

LoRa

WIFI

Connection via Smartbox

Warranty

BENEFITS

The Environment Monitoring System provides a healthy environment by monitoring temperature, humidity and CO_2 in the winery.

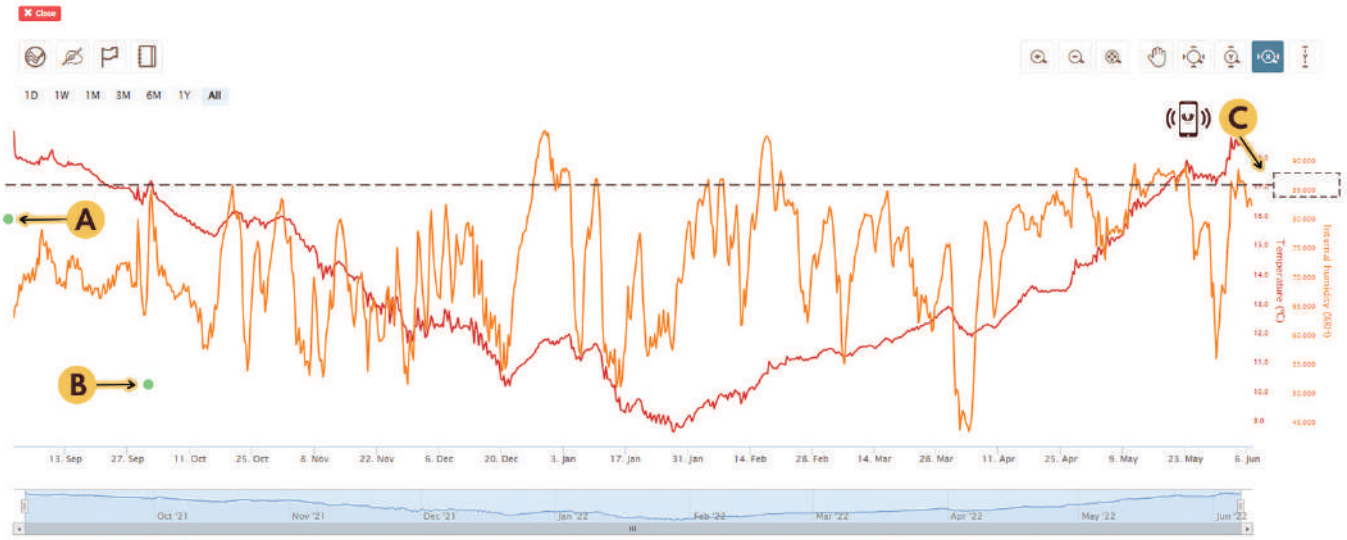
— **HELPS MINIMIZE THE FREQUENCY OF TOPPING OFF DURING MATURATION**
by monitoring temperature and humidity in the winery

— **ENSURES THE OPERATORS SAFETY DURING FERMENTATION**
by monitoring CO_2 levels in the winery

EXAMPLE OF ENVIRONMENT MONITORIZATION

WINEGRID DASHBOARD

TEMPERATURE, HUMIDITY AND USER HANDLING



A USER FORCED MEASUREMENT

B USER HANDLED THE SENSOR

C HUMIDITY MAXIMUM LIMIT DEFINED BY THE USER TO TRIGGER ALARM

— SUDDEN HUMIDITY ALTERATIONS IN THE ENVIRONMENT

— ENVIRONMENT TEMPERATURE VARIATIONS ACCORDING TO THE SEASON

CARBON DIOXIDE

A ACCEPTABLE CO_2 LEVEL IN THE AIR

B CO_2 LEVEL ASSOCIATED WITH COMPLAINTS OF DROWSINESS AND POOR AIR

C CO_2 LEVEL ASSOCIATED WITH HEADACHES, SLEEPINESS AND LOSS OF CONCENTRATION

D CO_2 MAXIMUM LIMIT DEFINED BY THE USER TO TRIGGER ALARM

WINEGRID MONITORING SYSTEM

Available Sensors

wineplus WP1110

wineplus WP1100

barrelplus BP1011

e-aphrom

e-charmat

e-bung

smartcellar

		FERMENTATION			SECOND FERMENTATION		MATURATION	ENVIRONMENT
		Density, Temperature and Liquid level		Density and Temperature	Pressure, Temperature and Handling	Pressure and Temperature	Distance to Liquid, Temperature and Handling	Temperature, Humidity, CO_2 and Handling
	OenoSensing® Precision Technology	✓	✓	✓				
	Patented Technology	✓	✓	✓			✓	
	Patented Design	✓					✓	
	Designed for Bottles				✓			
	Designed for Tanks	✓	✓			✓		
	Designed for Barrels			✓			✓	
	Designed for Wineries							✓
	RGB Alarm	✓						
	Wi-Fi Communication				✓		✓	✓
MATERIAL TYPE	Probes	Stainless Steel 316L	Stainless Steel 316L	Stainless Steel 316L	Aluminum	ABS	Stainless Steel 316L	--
	Enclosure	Stainless Steel 304	Polycarbonate	Stainless Steel 304	Polypropylene	Aluminum	Polypropylene	ABS

COMMON FEATURES

- Food Safe
- IP65
- Easy Cleaning
- Easy Maintenance
- LoRa Communication
- Connection via Smartbox
- Warranty
- Industry 4.0

WINEGRID TECHNOLOGY AROUND THE WORLD

SOME OF OUR CLIENTS & PARTNERS

E&J Gallo Winery · Château Margaux · Seguin Moreau · Pernod Ricard Winemakers — Open Up Our World of Wines · SOGRAPE · KRUG Champagne

Bodega Catena Zapata · UCDAVIS Viticulture & Enology · Undurraga Established in 1885 · Quinta Nova · Château Luchey-Halde Grand Vin de Bordeaux Pessac-Léognan · Finca Flichman Est. 1910

Familia Torres Desde 1870 · Bodegas Lopez 1898 · Rodney Strong · Ventisquero Wine Estates · Globalwines Portugal 19|90 · Concha y Toro Desde 1883

Luis Pato · utad Universidade de Trás-os-Montes e Alto Douro · innovin Cognac + Bordeaux Nouvelle Aquitaine · DIEMME · it instituto de telecomunicações · DIGILAB

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by

enartis

Inspiring innovation.

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