

# WINESITY - Automatic sensor to continuously measure density during the wine fermentation process

## Summary

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The Winesity project will develop a density measuring system to continuously control the fermentation processes during winemaking, given that the density of must decreases throughout its transformation into wine.

In the wine industry, fermentation control is essential to ensure the optimal quality of the product: quick fermentations may adversely affect the quality of the wine, while longer fermentation periods delay subsequent processes and increase the risk of affecting the quality of the end product and incurring higher energy costs.

Moreover, monitoring fermentation curves can help detect potential issues during the winemaking process so they can be quickly redressed, preventing irreversible problems and the loss of hundreds or thousands of litres of product.

As the sensor will be installed inside the fermentation tanks, which cannot be punctured, its attachment presents one of the main challenges of the project. The position and protection of the sensor are also major issues to be tested, given that the work conditions inside the tank will have to be withstood: gas bubbling, grape skin movements, recirculations, tartrate deposits, etc.

The sensor will be wired to a display, where the technician can continuously read the results. The best way to run this wire from the tank must be determined.

On the display there will be the option of sending the signal to a computer via radio frequency communication, centralising all the readings and registering their development.

## Objectives

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The general objective is to design and produce a prototype automatic density meter to continuously control the evolution of fermentation during winemaking. The project will build prototypes of the device, which will be installed in several of the cooperative's tanks to verify their operation.

Secondary objectives:

- Reduce the time technical experts spend measuring density during fermentation.
- Detect fermentation delays or stoppages in the winemaking process more quickly.
- Detect the point at which fermentation ends more quickly and accurately in order to optimise the use of the tanks and the reception of grapes at the winery during the harvest.

## Description of initiatives outlined in the project

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- Define the specifications and requirements of the WINESITY system for red wine and white wine/cava.
- Define the design for the construction of the first prototype.
- Perform laboratory tests on wine samples in order to optimise it.

- Install three prototypes in different tanks during the harvest period.
- Monitor the density measurements and curves and compare them with those of the traditional control system in order to verify correct operation.
- Validate the installation and attachment system in the tank.
- Check that the display screen correctly shows the measurement results and that the radio frequency signal reaches the IT terminal correctly.

## Expected results and practical recommendations

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The installation of the pilot units of the Winesity density meter in the winery of the Agrícola Falset Marçà cooperative will enable the verification of the achievement of the objectives sought through the implementation of this automatic sensor.

The results will be easily transferable, as the dimensions of the Agrícola Falset Marçà cooperative are fairly representative of the entire wine cooperative sector and the capacity of the fermentation tanks (33,000 l) is prevalent in medium-sized and large wineries, which means that the pilot programme can easily be extrapolated to other facilities.

The main benefits expected to be obtained with the Winesity sensor are:

- Continuous registration will enable the immediate detection of the point at which density stabilises at the end of the winemaking process.
- It will also facilitate the quick detection of stoppages, problems or irregularities in the fermentation process, allowing the timely application of measures to prevent production losses.
- Free up the fermentation tanks more quickly, due to quicker detection of both the end of the fermentation process and the appearance of any problems that may slow down the process.
- Changing the system from manual to automatic will lessen the workload of the operators during the harvest period, and this device will enable density to be controlled by any operator, in contrast to the traditional aerometry method, which requires qualified personnel.
- Shorter use of the tanks will enable optimisation of the use of the cooling equipment, resulting in energy savings and a consequent reduction in CO<sub>2</sub> emissions.
- The continuous transmission of data via Wi-Fi will enable the centralisation of all the readings of the various tanks in a single computer, in addition to a record of the evolution of this parameter thanks to these ongoing readings.

## Task force leader

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Entity: **Agrícola Falset Marçà i S.C. Afalma SCCL**

Contact e-mail:  
**xavi@etim.cat**

Typology of entity:  
**Agri-food company**

## Task force coordinator

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## Other task force members (grant beneficiaries)

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## Other task force members

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Entity: **ARLALORA S.L./Rafael Domínguez**

Contact e-mail:  
**ecoetica@arrakis.es**

Typology of entity:  
**Other actors in the sector**

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Entity: **Federació Catalana de Cooperatives (FCAC)**

Contact e-mail:  
**marius.simon@fcac.coop**

Typology of entity:  
**Agricultural producers group or association**

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Entity: **Fundació Parc Tecnològic del Vi (VITEC)**

Contact e-mail:  
**sergi.delamo@vitec.cat**

Typology of entity:  
**Agrifood co./ind. assoc. or group**

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Entity: **Innovació i Recerca Industrial i Sostenible, S.L. (IRIS)**

Contact e-mail:  
**albert.torres@iris.cat**

Typology of entity:  
**Research centre**

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### Subject area(s) of application

Farming equipment and machinery

### Geographical area(s) of application

**Province(s)**

**Region(s)**

Tarragona

Priorat

## Dissemination of the project *(publications, conferences, multimedia...)*

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The transferability of the results to the sector is assured thanks to the participation of the FCAC, VITEC and IRIS, which have significant influence on the winemaking industry.

VITEC has an extensive portfolio of private winery customers, which will be duly informed of the progress and results of the project, and its board includes eight of the eleven Designation of Origin Regulatory Boards, which can effectively channel the dissemination of the results of the project and the transferability of the use of the sensor to associated private wineries.

Communication will also be undertaken via social media, the Falset Marçà cooperative website and blog, IRIS or VITEC, in addition to the issuing of press releases. IRIS will disseminate and present WINESITY to its customers in the private wine industry in Spain and to certain wineries in France.

The following demonstrations will be organised in the project:

- Seminar at Priorat organised by the Falset cooperative and VITEC for the practical in situ presentation of the sensor for cooperative members and wineries in the area.
- VITEC will organise a seminar for students of the Espiells (Penedès) and Falset (Priorat) wine industry professional training centres, in addition to oenology degree students at Rovira i Virgili University.
- The FCAC will organise a presentation of the WINESITY project to report the results to the federated wine and cava cooperatives.
- The Ministry of Agriculture, Livestock, Fisheries and Food (DARP) will be informed of the interest of the operating group in participating in the seminars of the Annual Technology Transfer Plan (PATT) of



2019 and 2020 in order to present the Winesity project and its results.

## Project website

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## More information on the project

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### Project dates

Starting date (month-year): June 2018

Completion date (month-year):

Current status: *Underway*

### Budget approved

**Total budget:** **€200,000.00**

*DARP funding:* €79,800.00

*EU funding:* €60,200.00

*Own funding:* €60,000.00

### With funding from:

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Generalitat de Catalunya  
**Departament d'Agricultura,  
Ramaderia, Pesca i Alimentació**



**Fons Europeu Agrícola  
de Desenvolupament Rural:**  
Europa inverteix en les zones rurals

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*Order ARP/133/2017, of 21 June, approving the regulatory bases of grants for cooperation for innovation through the promotion of the creation of European Association for Innovation task forces in terms of agricultural productivity and sustainability and the execution of innovative pilot projects by these groups.*

*Resolution ARP/1868/2017, of 20 July, calling for applications for grants for the year 2017.*

Project ID: 007\_2017