

# Minimisation of unwanted malolactic fermentation (MLF) in sparkling wine

## Summary

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In the majority of sparkling wines, such as cava, malolactic fermentation (MLF) is undesirable because the presence of L-malic acid is not very high and its fermentation reduces the acidity that is organoleptically desired in this type of wine. Additionally, it should be taken into account that MLF adds stability to bottled wine and therefore there is a risk that MLF will take place in the bottle.

Indeed, samples taken during the disgorging and definitive corking of cava bottles often reveal a reduction in L-malic acid and a slight increase in pH (characteristic of unwanted MLF), which should have taken place just after the tirage, during the ageing or second fermentation, given that the base wine had the correct levels of acidity and L-malic acid.

This must be due to the presence of lactic bacteria (LB) that have enjoyed suitable conditions to grow and deteriorate the L-malic acid. The causes may be a temperature increase, a small concentration of free SO<sub>2</sub>, or a larger than usual quantity of nutrients, which may be the L-malic acid itself, sugars or nitrogenous compounds, or other compounds resulting from the autolysis of the yeasts (vitamins, antioxidants, etc.).

The project will consist of conducting tests and analytical and microbiological monitoring on bottles of cava from different batches where the unwanted MLF problem arises and on control bottles from batches where the problem does not arise.

## Objectives

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The objective of the project is to prevent the appearance of unwanted malolactic fermentation (MLF) in sparkling wine and test possible preventive measures to minimise its appearance.

To meet this goal, this pilot test will be carried out to obtain a completely new procedure to prevent the development of unwanted MLF in sparkling wine.

## Description of initiatives outlined in the project

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The work plan contemplates the following stages or milestones:

1. Analysis of the traceability records (production data, times, temperatures, added SO<sub>2</sub>, other physical and chemical parameters) of the batches of bottles where the problem of malolactic fermentation (MLF) has appeared at the various wineries. It is important to consider the temperature of the environment and of the wine during the tirage and the days elapsed since the start of the use of the yeast starter.

Carry out parallel traceability of bottles from similar batches or from the same batch where the problem has not appeared.

2. Tests and analyses of tirages over three seasons. The wineries will monitor the tirages on a monthly basis in order to detect signs of MLF with the aim of isolating lactic bacteria (LB) and conducting an ecological study of the process.

2.1. In these tirages, tests will be conducted to study the factors that may affect the appearance of MLF:

- Ageing times of the lees, temperature, pressure. The traceability parameters from point 1 will also be used as initial data.
- Components (analyses to be performed): sugars, nitrogen content (ammoniacal, amino acid), alcohol by volume, pH, total and volatile acidity, L-malic acid, L-lactic acid, citric acid, SO<sub>2</sub>, diacetyl.

2.2. Microbiological study with the same bottle samples: The LB populations will be identified and counted.

2.3. Monitoring of the process (analytical and microbiological) at each of the wineries involved. Analyse different critical points to be discussed with the oenologists of each winery. Mainly:

- Base wine and filtered wine
- Sampling of yeasts, in depth, determine the effect of the various additives, and how it develops throughout the multiplications
- Tirage
- Machinery
- Filtration systems for the various products.

3. Statistical comparison of the analytical and microbiological results of the various types of bottles: those with problems, those with no problems from the same batch, and those from other batches.

4. Tests and analyses to determine which products can be used to inhibit MLF and at what point. Pilot test at Mas dels Frares (Rovira i Virgili University) with intentional BL contamination, with analytic and microbiological monitoring similar to that in points 2.1 and 2.2.

5. Based on the results, the definition of a new procedure to be followed by the wineries to eliminate or minimise the problem.

## Expected results and practical recommendations

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The main result expected is a new procedure that eliminates or minimises the risk of unwanted MLF in bottles of sparkling wine. Another indirect result of the project is an increase in the productivity of the companies in the wine and cava sector, both domestically and internationally.

### Task force leader

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Typology of entity:

**Agri-food company**

### Task force coordinator

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### Other task force members (grant beneficiaries)

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Entity: **Rovira i Virgili University (URV) Foundation**

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## Subject area(s) of application

Food quality/processing and nutrition  
Supply chain, marketing and consumpt

## Geographical area(s) of application

### Province(s)

Girona  
Barcelona

### Region(s)

Anoia  
Alt Penedès  
Alt Empordà

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

The project has been presented at an INNOVI project presentation event.

## Project website

[www.innovi.cat/cava-nofml](http://www.innovi.cat/cava-nofml)

## More information on the project

### Project dates

Starting date (month-year): June 2018

Completion date (month-year):

Current status: *Underway*

### Budget approved

**Total budget: €211,997.16**

*DARP funding: €86,638.87*

*EU funding: €65,359.15*

*Own funding: €59,999.15*

## With funding from:



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



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

Project funded through Operation 16.01.01 (Cooperation for Innovation) through the Catalan Rural Development Programme 2014-2020.

*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: 034\_2017