IOCFE 2025 Conference
The 1st International Online Conference on Fermentation
12–13 November 2025 | Online
MDPI

Effect of the harvest time on the population and diversity of wine yeasts

Mercè Sunyer-Figueres[1*], Cristina Cuesta-Martí[2], Daniel Fernández-Vázquez[1], Miquel Puxeu[1], Imma Andorrà[1]
[1]Centre Tecnològic del Vi, Carretera de Porrera Km. 1, 43730 Falset, Spain; *merce.sunyer@vitec.wine
[2]Department of Anatomy and Neuroscience, University College Cork, APC Microbiome Cork, Ireland

INTRODUCTION & AIM

The microbial composition of the grape berry influences the performance of alcoholic fermentation, thus impacting on the characteristics of the final wine [1].

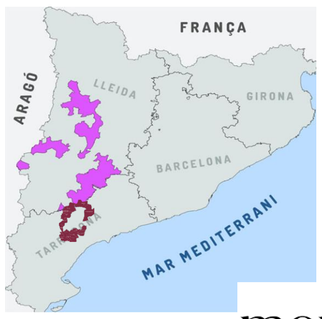
The optimal timing for grape harvest is critical for wine elaboration; it is decided based on climate conditions and physico-chemical characteristics [2].

There is little information on the dynamics of grape microbiota during its maturation.

The **aim** of the present study is to elucidate if the grape surface fungal microbiome evolves during the ripening process, and characterize its evolution.

METHOD

Harvest grapes at two maturation stages



COSTERS DEL SEGRE

montsant DENOMINACIÓ D'ORIGEN

Green grapes — **Mature grapes**

Chardonnay (Cha)

Grenache Noir (Gre) — Carignan (Car)

Monitor the spontaneous fermentation for each must typology

Physico-chemical analysis of musts and final wines
Density measurement
Plate count

Monitor fungal diversity of the stages:
- Must (I)
- Mid-fermentation (density 1040-1060; M)
- End of fermentation (density 1010; F)

From 24 isolated colonies
→ PCR primers ITS1/ITS4 [3] → Yeast species identification
→ PCR primers Delta12/Delta21 [4] → *S. cerevisiae* genotyping

RESULTS & DISCUSSION

Table 1. Chemical characterization of musts. PA stands for Potential Alcohol and TA for Titratable Acidity

	Green grapes			Mature grapes		
	Chardonnay	Grenache Noir	Carignan	Chardonnay	Grenache Noir	Carignan
ºBrix	18.0	23.6	19.6	22.0	27.2	22.7
PA (% v/v)	10.0	13.7	11	12.8	16.1	13.0
Density (g/cm^3)	1075	1100	1082	1093	1118	1096
TA (g/L)	8.1	8.2	5.5	5.2	4.8	5.7
pH	3.30	3.22	3.20	3.59	3.42	3.53

Table 2. Chemical analysis of the obtained wines. AC stands for Alcoholic Content.

	Cha	Gre	Car
Green grapes			
AC (% v/v)	12.32	-	11.68
TA (g/L)	7.97	-	8.20
pH	3.25	-	3.04
L-lactic acid (g/L)	0.67	-	< 0.1
L-malic acid (g/L)	2.86	-	1.30
Glycerol (g/L)	5.90	-	5.50
Mature grapes			
AC (% v/v)	13.25	16.78	14.33
TA (g/L)	5.61	5.10	5.80
pH	3.53	3.36	3.27
L-lactic acid (g/L)	<0.1	< 0.1	< 0.1
L-malic acid (g/L)	1.810	0.20	1.20
Glycerol (g/L)	7.230	9.90	7.10

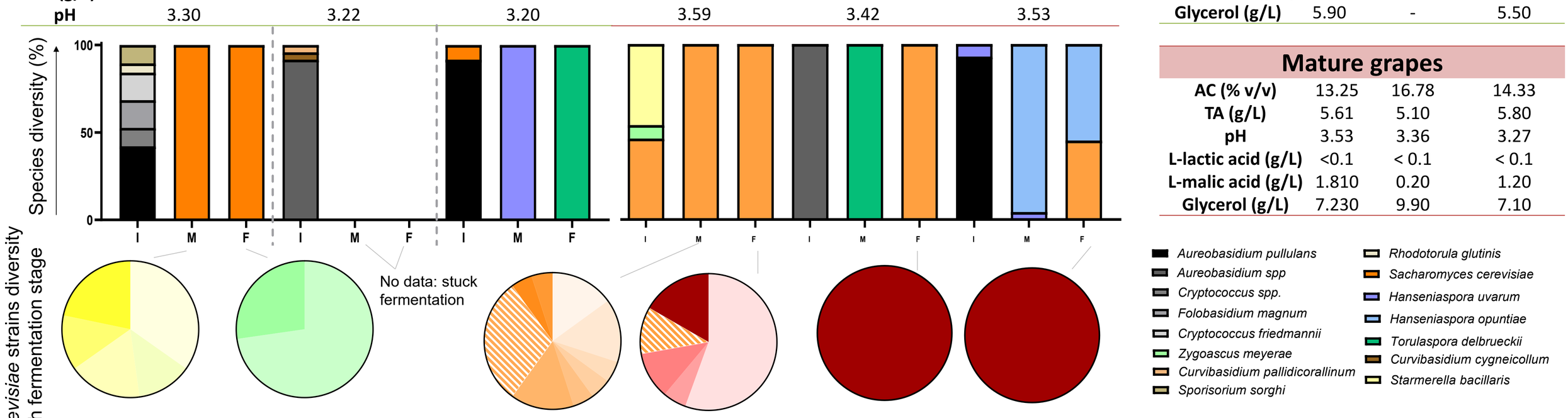


Figure 1. Diversity of species isolated and identified in the spontaneous fermentations. At the points where *S. cerevisiae* is present, the abundance of ***S. cerevisiae* strains** is represented in percentatge. Identical strains are indicated by the same pattern; coincidence of colors does not indicate that are the same strain.

CONCLUSION

The community of the grape surface evolves during the ripening process.

- In the first stages predominate non-yeast fungi.
- In the mature grape generally predominates yeast, and the variability of *S. cerevisiae* increases.

FUTURE WORK / REFERENCES

Collect more data to have a better understanding of the microbiota evolution, as well as to correlate this evolution with varietal, physico-chemical, climate or geological factors.

1. Loureiro, V.; Ferreira, M. M.; Monteiro, S.; Ferreira, R. B. The Microbial Community of Grape Berry. In The Biochemistry of the Grape Berry; Hernâni, G.; Chaves, M.M.; Delrot, S.; Eds. 2012; pp 241–268.
2. Fugelsang, K. C.; Edwards, C. G. Wine Microbiology: Practical Applications and Procedures, 2nd ed.; Springer: New York, 2007.
3. Esteve-Zarzoso, B.; Belloch, C.; Uruburu, F.; Querol, A. Identification of Yeasts by RFLP Analysis of the 5.85 rRNA Gene and the Two Ribosomal Internal Transcribed Spacers. Int. J. Syst. Bacteriol. 1999, 49, 329–337.
4. Legras, J.-L.; Karst, F. Optimisation of Interdelta Analysis for *Saccharomyces cerevisiae* Strain Characterisation. FEMS Microbiol. Lett. 2003, 221, 249–255.