

28th Workshop on the Developments in the Italian Ph.D research
on Food Science, Technology and Biotechnology
Catania, 18-20 September 2024

Resilient wineries

Enological strategies for adaptation to climate change, reduction of inputs, reuse of waste, valorization of native grape varieties

Ilaria Prezioso (ilaria.prezioso@unisalento.it)

Dipartimento di Scienze e Tecnologie Biologiche ed Ambientali, University of Salento, 73100 (LE)

Tutor: Prof. Vito Michele Paradiso

INTRODUCTION The **ozza** is an Apulian amphora traditionally used for ageing **Negroamaro** wines, a typical Apulian variety. Enhancing the territory linkage of the wine and choosing traditional materials and techniques can be a good choice to add value to wines from regional varieties. Each ageing material has in fact a different interaction with the wine (Maioli et al., 2022). This study was aimed at exploring how different ageing materials influence the quality of Negroamaro.

MATERIALS AND METHODS A Negroamaro wine, produced in Cantine Vecchia Torre (Lecce), was aged for six months in two **ozzas** and five different types of **barrels** of different woods (in triplicate), as well as in **glass** bottles as control. Color density (CD), hue, total tannins (TT), total anthocyanins (TA), free anthocyanins (FA) anthocyanin-tannin (A-T) complexes and aroma compounds were analysed. Sensory analysis was conducted by free choice profiling.

RESULTS

Phenolic indices. Compared to control wines in glass bottles, barrel ageing led to an increment of TA, TT, A-T and CD (Tab.1), due to the release of compounds and interaction with wood. Interestingly, the same trend was observed in ozza aged wines, implying a good aptitude of earthenware to protect phenols and stabilize the color (Wang et al., 2022), which was also confirmed by the low hue value.

Volatile compounds. Negroamaro samples showed great concentrations of **furaneol** (Fig.2), reaching the maximum in ozza and glass wines. It is a relevant grape derived compound that can enhance fruity notes of some wines, giving aromas that vary from red fruits (e.g. strawberry) to cooked fruit and intense caramel, depending on its concentration.



Fig.1 Apulian amphorae (ozzas)

Tab.1 Phenolic composition and colour index

	Glass	Ozza	Mix	Fre-Eur oak	American oak	European oak	French oak
TA (U.A.)	16.3±0.00d	18.4±0.07b	17.5±0.06c	18.4±0.17b	16.0±0.15d	18.9±0.10a	17.7±0.15c
TT (g/L)	3.1±0.07c	3.2±0.07b	3.3±0.06bc	3.4±0.06ab	3.6±0.12a	3.5±0.06ab	3.6±0.06a
FA	9.2±0.00ab	9.7±1.20ab	9.1±0.10b	10.1±0.06a	5.4±0.06c	10.2±0.12a	8.7±0.06b
A-T	4.1±0.00c	5.1±0.71b	4.9±0.06b	4.9±0.06b	6.3±0.06a	4.9±0.06b	5.3±0.06b
CD	10.9±0.19b	13.0±1.62a	12.9±0.22a	12.9±0.31ab	13.8±0.42a	12.7±0.37a	12.9±0.41a
hue	0.86±0.01a	0.80±0.04b	0.80±0.00b	0.79±0.01b	0.76±0.03b	0.80±0.00b	0.79±0.01b

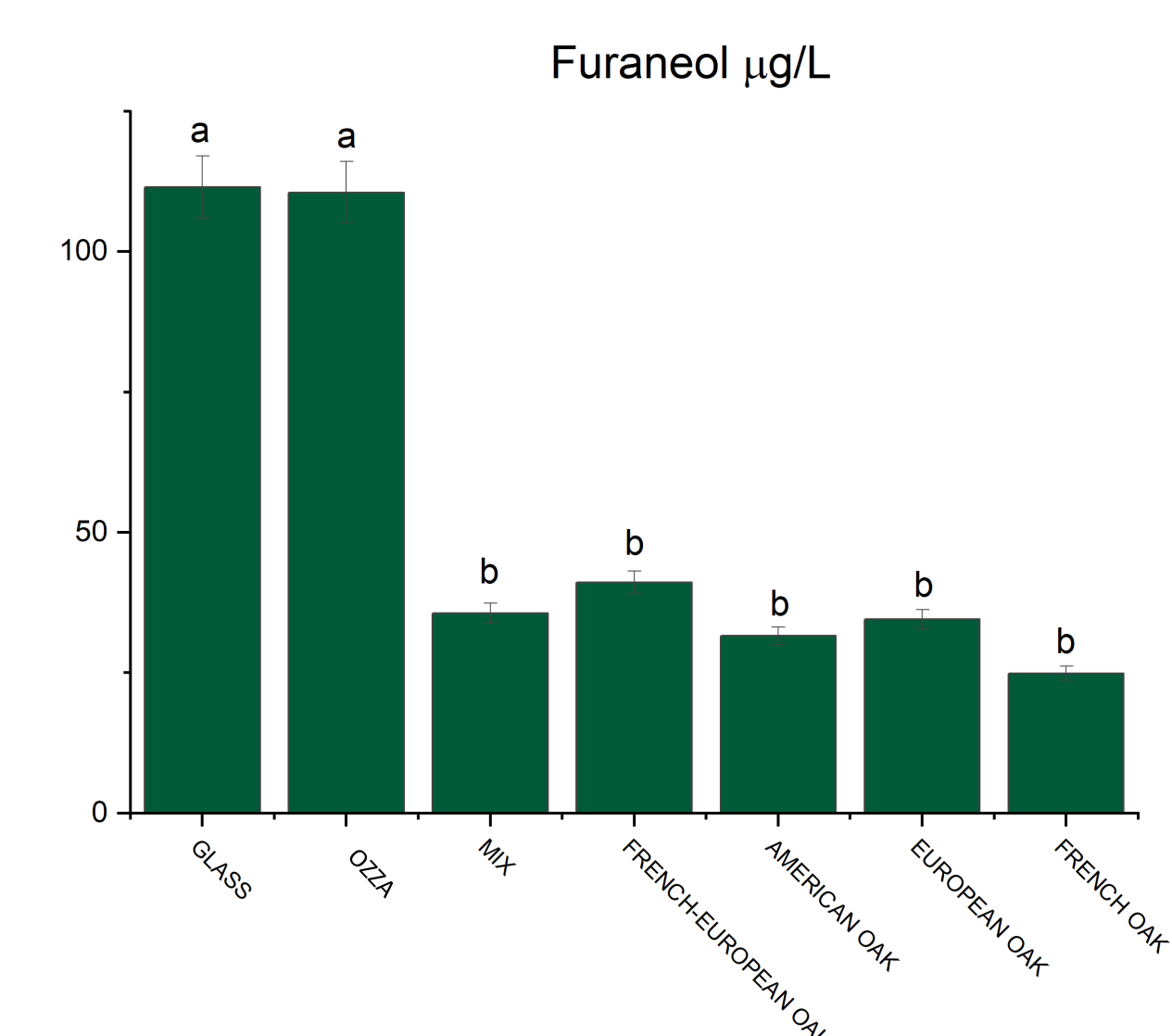


Fig.2 Furaneol concentrations

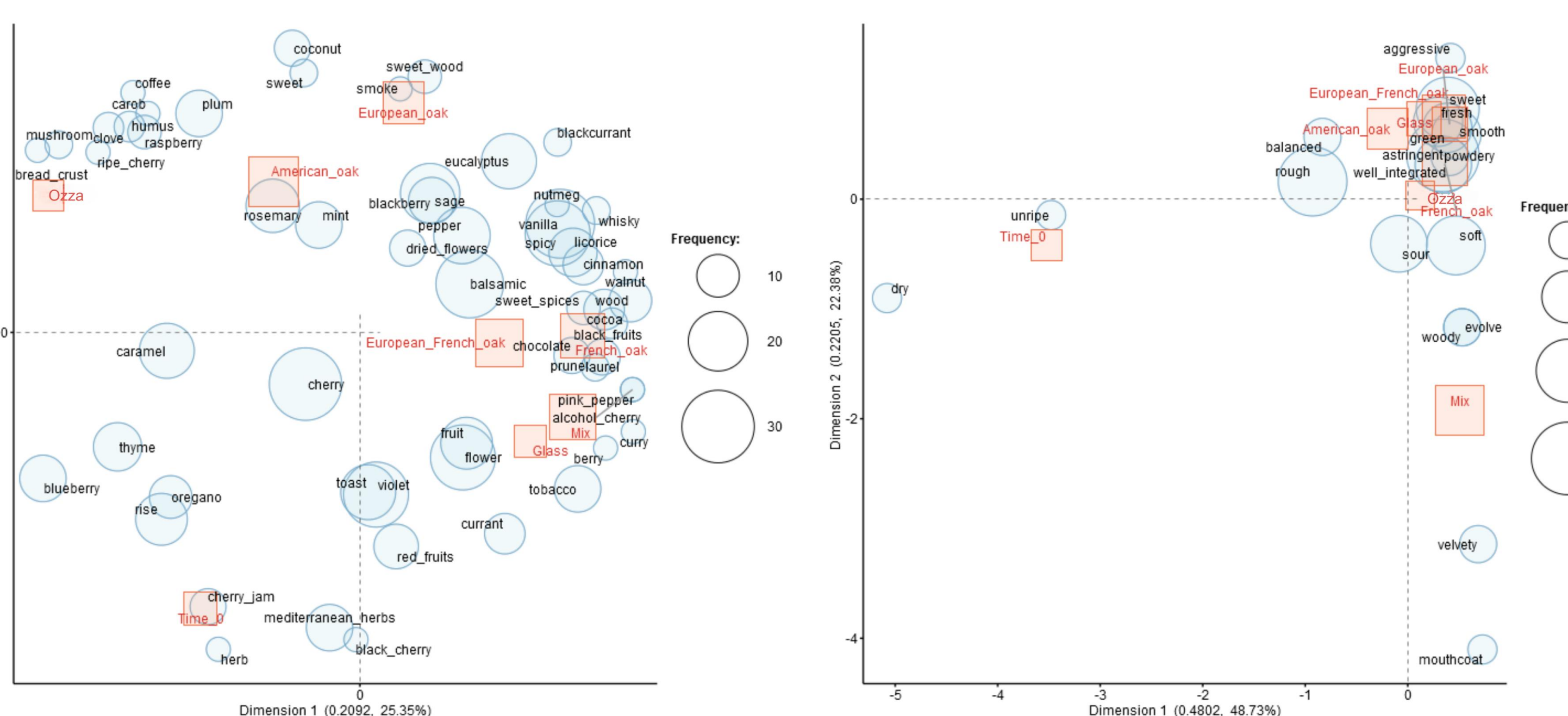


Fig.3 Correspondence analysis of odor and mouthfeel descriptors

Sensory profile. Time 0 was characterized by **Mediterranean herbs** and fruity scents (Fig.3). Wood ageing resulted in smoked, spice and tobacco scents, typical of barrel aged wines. Ozza samples were characterized by earthy odors (**humus**), **red fruits** descriptors and toasted scents, resulting in a sensory evolution without hiding varietal traits (Maioli et al., 2022). The mouthfeel also underwent a transformation during ageing and differences emerged between samples due to a different tannin management by the materials.

CONCLUSIONS: Clear differences were recorded among Negroamaro samples, related to the use of different ageing materials. The ozza, similarly to the barrels, contributed to the stability of the color. During ageing, Negroamaro wines evolved both in terms of aromas and sensory characteristics, and particularly the ozza preserved varietal characteristics of this wine.

REFERENCES

- Maioli, F., et al., (2022). Monitoring of Sangiovese Red Wine Chemical and Sensory Parameters along One-Year Aging in Different Tank Materials and Glass Bottle. ACS Food Science & Technology
- Peterson, et al., (2020). Identification and analysis of new α - and β -hydroxy ketones related to the formation of 3-methyl-2,4-nonanedione in musts and red wines. Food Chemistry
- Wang, C., et al. (2022). Effects of Different Aging Methods on the Phenolic Compounds and Antioxidant Activity of Red Wine. Fermentation, 8(11), Article 11.