AROMA PROFILE OF *OENOCOCCUS OENI* STRAINS IN DIFFERENT LIFESTYLES

Giorgia PERPETUINI[1], Noemi BATTISTELLI[1], Luca VALBONETTI[1], Alessio Pio ROSSETTI[1], Giuseppe ARFELLI[1], Carlo PERLA[2], Rosanna TOFALO[1]

[1]Faculty of Bioscience and Technology for Food, Agriculture and Environment, University of Teramo, Via R. Balzarini 1, 64100 Teramo, (TE), Italy

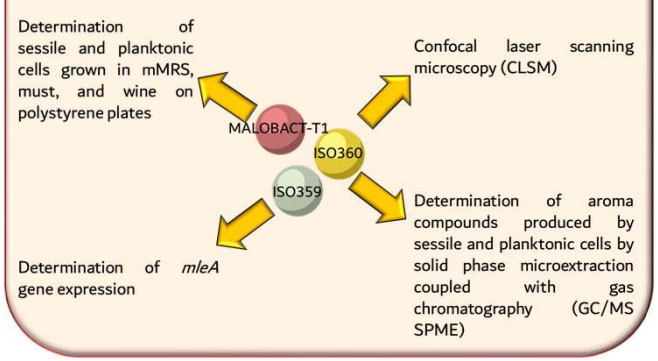
[2]Dalton Biotecnologie S.R.L., Spoltore, (PE), Italy

Introduction

Three *Oenococcus oeni* strains previously isolated from spontaneous malolactic fermentation were tested for their adhesion ability on polystyrene plates. Sessile cells were evaluated for their ability to modify organic red wine aroma profile and improve L-malic acid conversion rate. Adhesion properties were also confirmed by confocal laser scanning microscopy. Moreover, the expression of *mleA* gene involved in malate metabolism was evaluated.

Material and methods

Oenococcus oeni strains were isolated from Montepulciano d'Abruzzo organic wine



Results and Discussion

MALOBACT-T1 and ISO359 preferred the planktonic state in all conditions tested, while ISO360 the sessile one (**Figure 1**). A strain dependent adhesion ability was confirmed by CLSM (**Figure 2**).

A total of 41 aroma compounds belonging to higher alcohols, esters and organic acids were detected. Planktonic and sessile cells showed a different metabolism. Quantitative and qualitative differences were observed. Planktonic cells produced higher concentrations of aroma compounds with few exceptions and a core of specific compounds were associated to a certain lifestyle (**Figure 3**).

The consumption of malic acid was monitored with the quantitative analysis of transcript levels of *mleA* gene. *mleA* gene was upregulated in sessile cells in a strain dependant way (**Figure 4**).

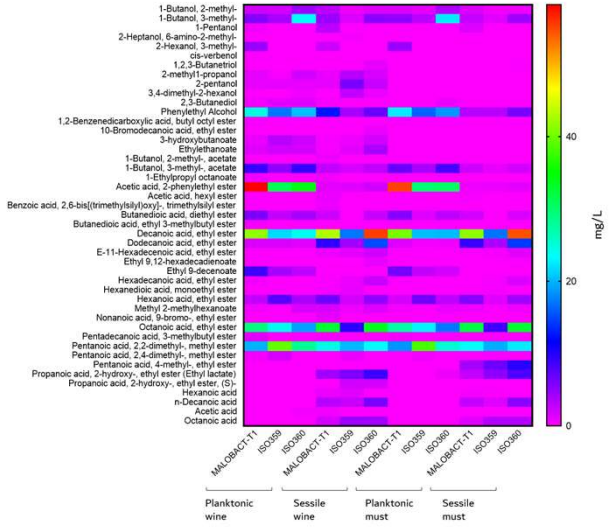


Figure 3. Heatmap related to the production of aroma compounds by tested strains in both lifestyles in must and wine

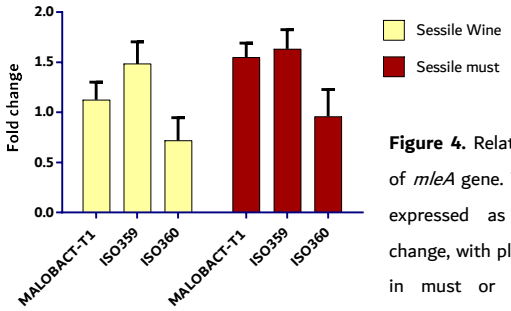


Figure 4. Relative transcript levels of *mleA* gene. Transcript levels are expressed as the relative fold change, with planktonic cells grown in must or wine as reference conditions.

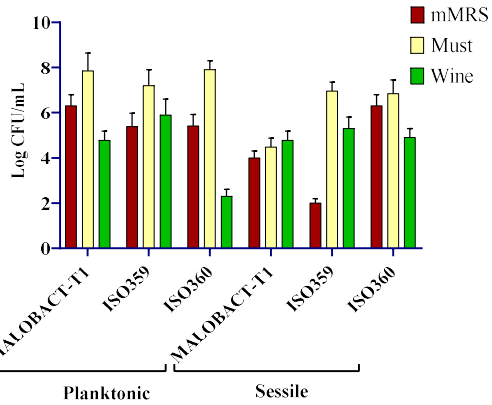


Figure 1. Viable plate count in both lifestyles in mMRS, must, and wine

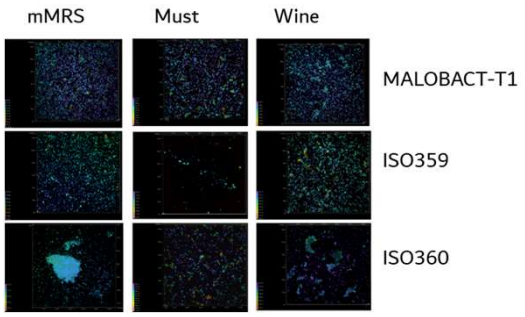


Figure 2. CLSM images of MALOBACT-T1, ISO359 and ISO360 cultured in mMRS, must and wine

Oenococcus oeni sessile cells modulate the malolactic fermentation outcome and the aroma profile of Montepulciano d'Abruzzo organic wine. More in-depth investigations are needed to account for the general use of surface associated microorganisms in winemaking.